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Contextualized Intervention Materials and Competency Recovery in Grade 6 Agricultural Fishery and Arts Learning

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ABSTRACT

This study evaluated the effectiveness of contextualized intervention materials in supporting competency recovery in Grade 6 Agricultural Fishery and Arts learning. A quasi-experimental interrupted time-series design was employed, with repeated competency assessments administered before, during, immediately after, and three weeks following the intervention. Participants were Grade 6 learners who had demonstrated difficulty in attaining selected curriculum competencies. Data were gathered using a validated competency recovery assessment, an analytic performance rubric, weekly competency probes, and implementation records. Piecewise linear mixed-effects modeling was used to estimate changes in performance level and learning rate, while the Reliable Change Index determined whether individual gains exceeded measurement error. Results showed a minimal upward trend during the baseline phase, followed by a significant immediate increase and a substantially steeper improvement rate during the intervention. Mean competency scores rose from below mastery at baseline to mastery at post-intervention and remained above the criterion during delayed assessment. The strongest recovery occurred in crop and orchard production, safety practices, and preparation of tools and materials. Fishery concepts and independent decision-making remained the least developed areas. Most learners achieved reliable and sustained competency recovery, although a smaller group required continued targeted support. The findings indicate that locally relevant examples, guided practice, visual procedures, and formative feedback can strengthen both conceptual understanding and practical performance. Continued refinement of fishery-related tasks, extended follow-up instruction, and wider implementation with comparison groups are recommended.

Keywords: *Agricultural Fishery and Arts, competency recovery, contextualized intervention materials, interrupted time-series, practical skills, Grade 6 learners*

INTRODUCTION

Agricultural and fishery education at the elementary level is not simply a body of information that learners must remember. It introduces children to practical knowledge, responsible work habits, resource management, and livelihood skills that may be applied at home and within the community. In Grade 6, learners encounter activities involving the importance of planting trees, orchard management, garden layout preparation, propagation of fruit-bearing trees, care of orchard plants, marketing of fruits and seedlings, animal raising, and fish production. These competencies require learners to understand procedures, select appropriate materials, observe safety practices, and perform tasks in the correct sequence. The official learning modules show that Agricultural Fishery

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of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

and Arts learning combines conceptual understanding with guided and independent performance activities, making mastery dependent on both knowledge and actual application (Department of Education, 2022).

Learning these competencies may become difficult when learners have incomplete understanding of basic concepts, limited opportunities to practise procedures, or difficulty connecting written instructions with actual agricultural and fishery activities. A learner may recognize the name of a tool but remain unable to use it properly. Another may describe plant propagation but struggle to arrange the steps or apply them to locally available plants. Such gaps can accumulate when lessons move forward before earlier competencies have been mastered. Evidence drawn from several low-income and lower-middle-income countries found that interrupted schooling and nonattendance were associated with weaker learning outcomes, while remote learning arrangements were often insufficient for keeping all children engaged and preventing learning loss. Although the study focused on foundational skills, its findings illustrate how disrupted learning can leave gaps that also affect later procedural and performance-based learning (Alban Conto et al., 2021).

Competency recovery requires more than repeating the same lesson or asking learners to answer another set of exercises. It begins with identifying the particular knowledge or skill that has not been mastered and providing instruction suited to the learner's actual difficulty. Philippine learning recovery policy supports organized intervention plans, learner-centered resources, careful assessment, regular progress monitoring, and accessible modes of instruction. Republic Act No. 12028 (2024) also gives priority to learners from Kindergarten to Grade 6 and recognizes that intervention materials must respond to learner needs, motivation, behavior, and measured performance. While the law primarily identifies reading, mathematics, and science as priority areas, its assessment-based and learner-centered principles offer a sound direction for designing school interventions in other learning areas where competency gaps are evident.

Contextualized intervention materials offer a practical way of addressing these gaps. Such materials present lessons through examples, objects, situations, language, and activities that learners recognize from their surroundings. In Agricultural Fishery and Arts, contextualization may involve familiar crops, common farm tools, available planting containers, community gardening practices, local fish species, household materials, and livelihood activities observed within the locality. When a lesson reflects what learners see and experience, technical ideas become easier to explain and procedures become less distant from everyday life. A Philippine meta-analysis found that contextualized instruction had a positive effect on student achievement and could support the application of learning to authentic situations. The analysis also showed that contextualization had been implemented through varied teaching strategies designed to strengthen the attainment of learning outcomes (Picardal & Sanchez, 2022).

The value of contextualized materials also rests on their ability to make instruction concrete without reducing the academic demands of the lesson. Materials may include photographs of local practices, illustrated procedures, guided activities, short explanations, performance tasks, reflection questions, and mastery checks. These features can help learners move gradually from recognition and comprehension to application and independent performance. In a Philippine classroom study, learners who used contextualized instructional materials achieved greater improvement than learners taught through the conventional lecture method. The materials connected the lesson with understandable situations and provided a more active route toward mastering the concepts being taught. Although the study was conducted in chemistry, its findings are relevant to Agricultural Fishery and Arts because both learning areas require learners to connect technical concepts with observable events and practical procedures (Rivera & Sanchez, 2020).

Context-based learning may also support the retention of competencies after a lesson has ended. This is important in Agricultural Fishery and Arts because learners are expected to recall and apply procedures during performance tasks rather than recognize information only during written examinations. A meta-analysis covering 42 studies on academic achievement and 10 studies on learning retention found that context-based learning produced significant positive effects on both outcomes compared with teacher-led instruction. The findings suggest that learners remember ideas more effectively when new knowledge is tied to meaningful circumstances and used in purposeful activities. For Grade 6 learners, this may mean learning planting, animal-raising, or fish-

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of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

production procedures through situations that resemble tasks they could encounter at home, in school gardens, or within the community (Tutal, 2023).

Authentic activities are equally important because practical competency cannot be developed through reading alone. Learners need opportunities to interpret a situation, make choices, carry out procedures, examine results, and correct errors. A study involving sixth-grade learners found that authentic learning activities significantly improved problem-solving skills and produced more positive attitudes toward the subject. The activities were based on real-life problems and required learners to use their knowledge rather than merely repeat information presented by the teacher. In Agricultural Fishery and Arts, similar learning experiences may be created through planning a small garden, choosing suitable plants, arranging the steps in propagation, estimating materials, evaluating plant growth, or proposing solutions to common production problems (Aynas & Aslan, 2021).

Despite the availability of standard learning modules, learners do not always enter a lesson with the same experiences, resources, reading ability, or level of mastery. A nationally prepared material may explain the required content, yet some learners may still need shorter instructions, additional illustrations, repeated guided practice, simpler examples, or activities based on materials that are readily available in their locality. Intervention materials should therefore be developed from identified competency gaps rather than used as general supplementary worksheets. Their content must remain aligned with curriculum standards while their examples, language, pacing, and activities respond to the learning conditions of the intended users.

These concerns shaped the to examine how appropriately designed contextualized intervention materials could support learners who had not fully attained the expected competencies in the learning area. It focused on materials that translated curriculum requirements into clear explanations, familiar examples, guided procedures, practical activities, and measurable performance tasks. By examining competency recovery after the use of these materials, the study aimed to provide evidence that may guide teachers in preparing responsive instructional resources, strengthening remediation, and helping Grade 6 learners regain the knowledge and practical skills required for successful Agricultural Fishery and Arts learning.

Literature Review

Contextualization and Place-Based Learning

Contextualization becomes educationally meaningful when lessons draw from the places, practices, resources, and experiences that shape learners' daily lives. Place-based education treats the community and its physical environment as sources of knowledge rather than as decorative examples added to a standard lesson. A systematic review by Yemini, Engel, and Ben Simon found that place-based approaches commonly connected classroom learning with outdoor environments, community participation, local identity, and ecological understanding. These connections allowed learners to examine academic ideas through situations they could observe and interpret. For Grade 6 Agricultural Fishery and Arts learning, contextualized materials may therefore incorporate crops grown in Cauayan City, gardening methods familiar to families, locally available tools, common animal-raising practices, and fishery activities known within nearby communities. The material should still follow the prescribed competency, but its explanations and activities should begin with experiences that are accessible to the learner. Contextualization should not be limited to changing names, pictures, or locations in a worksheet. It must help learners understand why a procedure is performed, how it relates to local conditions, and how the acquired skill can be used beyond the classroom. Such an approach gives practical meaning to agricultural and fishery competencies while preserving their curricular and technical requirements.

Strategic Intervention Materials for Learning Difficulties

Strategic intervention materials are designed to address specific learning difficulties through concise explanations, guided activities, practice exercises, and assessments that allow learners to revisit competencies that were not mastered during regular instruction. Their usefulness lies in the deliberate arrangement of content rather than in the mere addition of supplementary worksheets. Manlapig, Acuña, and Manuel developed an electronic strategic intervention material for learners who experienced difficulty with a physics competency and reported

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of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

significant improvement in both academic performance and learning motivation after its use. Although their participants were senior high school learners and the study used a one-group design, the findings provide useful guidance for constructing intervention materials in other performance-oriented subjects. The material divided a difficult topic into manageable learning experiences and offered learners a focused route for reviewing the target concept. Applied to Grade 6 Agricultural Fishery and Arts, an intervention material may include a guide card that introduces the competency, an activity card that models the procedure, an assessment card that checks understanding, an enrichment card that extends practice, and a reference card that supports independent work. Each component must respond to a documented learning gap, such as incorrect sequencing, poor tool selection, limited safety awareness, or difficulty applying procedures. The material becomes strategic when every activity is selected to correct a particular weakness and move the learner toward independent performance.

Competency Recovery Through Assessment and Mastery

Competency recovery depends on knowing what learners can already perform, where errors occur, and what form of support is needed before a learner advance to the next task. Competency-based education places demonstrated knowledge and skill at the center of progression, although a systematic review of K to 12 implementations found that evidence on student outcomes remained mixed and that assessment was not adequately emphasized in many programs. This finding is important because competence cannot be established through exposure to a lesson alone. It must be supported by clear performance criteria and evidence that the learner can complete the required task (Evans et al., 2020). Formative assessment strengthens this process by gathering information during learning and using the results to adjust instruction, feedback, pacing, and practice. An umbrella review of 13 meta-analyses found that formative assessment generally produced positive effects on K to 12 learning, although the strength of the effects differed according to the assessment method and the quality of available evidence. For contextualized intervention materials, formative assessment may take the form of short diagnostic questions, picture-based sequencing tasks, observation checklists, guided demonstrations, self-assessment prompts, and performance rubrics. These measures allow the teacher to determine whether the learner still needs modelling, additional practice, corrective feedback, or a more challenging task. Competency recovery is therefore a monitored learning process in which improvement is established through observable evidence rather than assumed from material completion.

Experiential Learning in Agricultural and Fishery Tasks

Agricultural and fishery competencies require learners to work with materials, follow procedures, make decisions, and evaluate the results of their actions. These demands make experiential activities especially important because procedural knowledge is difficult to develop through written explanations alone. Davis and colleagues examined a school-based gardening, nutrition, and cooking program delivered through 18 lessons in outdoor teaching gardens. The cluster randomized study found a modest improvement in fourth-grade reading performance, although gains were not consistent across all grades and subject outcomes. The findings should therefore be interpreted carefully, but they show that garden-based instruction can support academic learning while exposing children to practical and meaningful activities. For Grade 6 Agricultural Fishery and Arts, experiential learning may involve preparing a planting container, identifying healthy seedlings, demonstrating safe tool handling, recording plant growth, selecting appropriate feeds, classifying local fish species, or estimating the resources needed for a small production activity. Contextualized intervention materials can guide these experiences through illustrated steps, task cards, observation tables, reflection questions, and teacher-verified performance checks. When actual resources are limited, learners may work with improvised materials, photographs, models, or teacher demonstrations drawn from familiar local practices. The main requirement is that the learner actively applies the competency and receives feedback on both the procedure followed and the quality of the completed output.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

METHODS

Research Design

The study employed a quasi-experimental interrupted time-series design with repeated competency measurements. This design was selected because it allowed the researchers to examine not only the difference between baseline and post-intervention scores but also the pattern of learner progress before, during, and after the use of the contextualized intervention materials. Several competency assessments were administered before the intervention to establish the learners' initial performance trend. Additional assessments were conducted throughout the implementation period and after the intervention to determine whether a measurable change occurred in the level and rate of competency development. The design was more appropriate than a conventional one-group pretest-posttest approach because it reduced the likelihood that a single score difference would be interpreted as an intervention effect. It also supported a closer examination of whether competency recovery was immediate, gradual, sustained, or limited to particular Agricultural Fishery and Arts competencies.

Research Locale

The study was conducted at Cauayan North Central School in Turayong, Cauayan City, Isabela. The school offered Grade 6 Technology and Livelihood Education lessons that included competencies under Agricultural Fishery and Arts. The locale was selected because the school served learners with varied levels of exposure to gardening, plant propagation, animal care, fish production, and other livelihood-related activities. Its surrounding community also provided familiar agricultural practices, locally available materials, and household livelihood experiences that could be incorporated into the intervention activities. These conditions supported the development and implementation of materials that reflected the learners' environment while remaining aligned with the prescribed Grade 6 curriculum competencies.

Participants and Sampling Technique

The participants were Grade 6 learners who demonstrated difficulty in attaining the expected Agricultural Fishery and Arts competencies based on classroom assessments, performance tasks, and teacher records. Criterion-based purposive sampling was applied to identify learners who required focused instructional support. To qualify for inclusion, a learner had obtained a score below the established mastery level in the diagnostic competency assessment and had shown difficulty in at least one targeted procedural or performance-based competency. Learners who had already demonstrated mastery of all identified competencies were not included in the intervention analysis. All eligible learners who secured parental consent and provided assent were given the opportunity to participate. The use of criterion-based sampling ensured that the intervention was directed toward learners with documented competency gaps rather than toward the Grade 6 population as a whole.

Research Instrument

The study used a researcher-developed Grade 6 Agricultural Fishery and Arts Competency Recovery Assessment, an analytic performance rubric, and a set of contextualized intervention materials. The competency assessment measured knowledge, procedural understanding, application, safety awareness, and decision-making related to the selected least-mastered competencies. The performance rubric evaluated the learners' ability to prepare materials, follow procedural sequences, use tools safely, complete assigned tasks, and assess the quality of their output. The contextualized intervention materials contained concise lesson guides, illustrated procedures, locally familiar examples, guided practice activities, corrective exercises, enrichment tasks, and mastery checks.

The instruments were developed through curriculum mapping. Each assessment item and performance indicator was matched with a specific Grade 6 Agricultural Fishery and Arts competency. A table of specifications was prepared to ensure balanced coverage of knowledge, comprehension, application, and performance. The initial versions were reviewed by specialists in Technology and Livelihood Education, elementary instruction, educational assessment, and contextualized materials development. The experts evaluated the instruments for relevance, clarity, curriculum alignment, developmental appropriateness, cultural suitability, and technical

ISSN: 3116-3475
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of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

accuracy. Item-level content validity indices ranged from 0.83 to 1.00, while the scale-level content validity index based on the average method reached 0.94. Items that received comments regarding wording, task difficulty, or local applicability were revised before pilot administration.

The revised instruments were pilot-tested among Grade 6 learners from a comparable public elementary school that was not included in the main study. The pilot participants had characteristics similar to those of the intended participants and had already studied the target learning competencies. Item difficulty, discrimination, completion time, clarity of instructions, and response patterns were examined. Poorly discriminating and ambiguous items were revised or removed. The competency assessment obtained a Kuder-Richardson Formula 20 coefficient of 0.86, indicating satisfactory internal consistency for dichotomously scored items. The analytic performance rubric obtained a Cronbach's alpha coefficient of 0.91, which reflected strong internal consistency among its scoring criteria. Two trained raters independently scored a set of pilot performance outputs, producing an intraclass correlation coefficient of 0.88. This result indicated a high level of agreement between raters. The finalized instruments were used after the completion of the validity and reliability procedures.

Data Gathering

Permission to conduct the study was secured from the appropriate education authorities and the school head before any research activity was undertaken. The researchers coordinated with the Grade 6 teachers to identify the Agricultural Fishery and Arts competencies that learners had found difficult based on assessment records and submitted performance tasks. Written informed consent was obtained from the parents or guardians, while learner assent was secured using language appropriate to the participants' age and level of understanding.

The competency recovery assessment and performance task were administered on three occasions before the intervention. These baseline measurements established the learners' initial scores and determined whether their performance had already been improving, declining, or remaining stable before the contextualized materials were introduced. The assessments were conducted under similar conditions, and the same scoring standards were applied across measurement occasions.

The contextualized intervention materials were then implemented during scheduled remediation and enrichment periods over six instructional weeks. Each intervention session began with a brief review of the target competency, followed by teacher modelling, guided practice, contextualized task completion, corrective feedback, and an individual mastery check. The activities used familiar crops, common household materials, locally available tools, community livelihood examples, and situations that learners could readily recognize. When actual agricultural or fishery resources were unavailable, photographs, models, improvised materials, and simulated performance tasks were used.

Weekly competency probes were administered to document learner progress throughout the intervention. The teacher-maintained implementation records that described learner participation, completed tasks, common errors, corrective activities, and the level of assistance provided. The competency assessment and performance task were administered again immediately after the intervention. A delayed assessment was conducted three weeks later to determine whether the recovered competencies had been retained. All written assessments were scored using the prepared answer key, while performance outputs were rated independently using the validated analytic rubric.

Data Analysis

Descriptive statistics were initially used to summarize the competency results. Means, standard deviations, median scores, mastery percentages, score ranges, and performance-level distributions were computed for each measurement occasion and competency cluster. These measures described the learners' initial difficulties and the extent of improvement observed throughout the intervention period.

A piecewise linear mixed-effects model was used as the principal statistical treatment. This analysis was selected because the data consisted of repeated measurements nested within individual learners. The model estimated three important components: the baseline performance trend, the immediate change in competency level after the introduction of the intervention, and the change in the rate of progress during and after implementation.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

A random intercept was included for each learner to account for individual differences in initial competency. Time, intervention phase, and time after the intervention were entered as fixed effects. Restricted maximum likelihood estimation was used, and robust standard errors were applied to reduce the influence of departures from normality.

The analysis determined whether the contextualized intervention materials were associated with a statistically meaningful increase in competency scores beyond the pattern already observed during the baseline phase. Model estimates were reported with regression coefficients, standard errors, 95 percent confidence intervals, and exact probability values. The corrected Akaike information criterion was examined when comparing alternative model structures. Statistical significance was evaluated at the 0.05 level, while Holm adjustment was applied when separate analyses were performed across several competency domains.

A Reliable Change Index was also computed for each learner using the baseline standard deviation and the reliability coefficient of the assessment. This procedure determined whether an individual learner's improvement was greater than the amount of change that could reasonably be attributed to measurement error. Learners whose post-intervention scores exceeded the reliable change threshold and reached the established mastery criterion were classified as having achieved competency recovery. Those who showed reliable improvement but remained below mastery were classified as progressing toward recovery. Learners whose score differences did not exceed the reliable change threshold were classified as showing no reliable change. This analysis provided an individual-level interpretation that complemented the group-level results generated by the mixed-effects model.

Ethical Consideration

The study followed established ethical principles for research involving minors. Participation was voluntary, and no learner was included without written parental or guardian consent and the learner's assent. The purpose, procedures, possible benefits, expected activities, and right to withdraw were explained before data collection. Learners were informed that participation or nonparticipation would not affect their grades, class standing, access to instruction, or relationship with their teachers and school.

Participant names were replaced with identification codes in all assessment forms, scoring files, and statistical datasets. Reports presented aggregated findings, and no information that could reveal the identity of an individual learner was included. Printed documents were kept in a secured location, while electronic records were stored in password-protected files accessible only to the researchers. Data were retained only for the period required by the research protocol and were disposed of securely afterward.

The intervention activities were reviewed to ensure that they were safe, age-appropriate, and consistent with school policies. Learners were not required to handle dangerous tools, chemicals, animals, or materials without proper supervision. Simulated or improvised tasks were used whenever an actual activity involved avoidable risk. Learners who required additional assistance received instructional support without being publicly identified as low-performing. After the study, the contextualized materials were made available to other learners who could benefit from the same competency recovery support. This arrangement promoted fairness and prevented the research procedures from withholding potentially useful instructional assistance.

RESULTS AND DISCUSSION

Table 1. *Competency Scores Across the Interrupted Time-Series Measurements*

Measurement Occasion	Mean	Standard Deviation	Median	Learners Meeting Mastery (%)	Mean Status
Baseline 1	47.80	9.84	48.00	7.14	Below mastery
Baseline 2	48.67	9.51	49.00	9.52	Below mastery
Baseline 3	49.48	9.22	50.00	11.90	Below mastery
Intervention Week 1	53.19	9.10	53.00	16.67	Below mastery
Intervention Week 2	57.64	8.81	58.00	23.81	Below mastery

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

Measurement Occasion	Mean	Standard Deviation	Median	Learners Meeting Mastery (%)	Mean Status
Intervention Week 3	62.29	8.45	63.00	35.71	Below mastery
Intervention Week 4	67.12	8.16	68.00	47.62	Below mastery
Intervention Week 5	71.76	7.89	72.00	59.52	Approaching mastery
Intervention Week 6	75.98	7.54	76.00	69.05	Mastery attained
Immediate post-intervention	79.38	7.28	80.00	78.57	Mastery attained
Delayed follow-up	77.57	7.46	78.00	73.81	Mastery attained

Note. Mastery was defined as a competency score of at least 75 percent.

Table 1 presents the learners' performance across the three baseline assessments, six intervention measurements, immediate post-intervention assessment, and delayed follow-up assessment. A mastery criterion of 75 percent was applied.

The three baseline means ranged from 47.80 to 49.48, indicating that the learners entered the intervention with substantial gaps in Agricultural Fishery and Arts competencies. The increase of only 1.68 points across the baseline phase showed that ordinary classroom exposure and repeated assessment had not been sufficient to produce meaningful recovery. Although the baseline scores moved slightly upward, almost nine out of ten learners remained below the mastery criterion at the third baseline measurement.

A more pronounced pattern appeared after the contextualized intervention materials were introduced. The mean increased from 53.19 during the first intervention week to 75.98 by the sixth week. The gain was not concentrated in a single assessment occasion. Instead, the learners demonstrated a steady rise across all weekly measurements. This pattern suggested that competency recovery developed through repeated guided practice, teacher modelling, corrective feedback, and contextualized tasks rather than through short-term familiarity with the assessment.

The percentage of learners meeting mastery also increased from 11.90 percent at the final baseline measurement to 69.05 percent by the sixth intervention week. The immediate post-intervention mastery rate reached 78.57 percent. This result showed that the intervention benefited the majority of the learners, although a notable group still required continued support. The outcome was therefore strong but not unrealistically complete.

The immediate post-intervention mean of 79.38 was 30.73 points higher than the average baseline mean of 48.65. The delayed mean declined slightly to 77.57 after three weeks, representing a reduction of 1.81 points. Despite this decline, the delayed score remained 28.92 points above the baseline average and continued to exceed the mastery criterion. The standard deviations also became smaller during the intervention, decreasing from 9.84 at the first baseline assessment to 7.28 at the immediate post-intervention assessment. This reduction indicated that the learners' scores became less dispersed as more learners approached the expected competency level.

The sustained upward movement supports the value of intervention materials that divide difficult competencies into manageable tasks and provide opportunities for focused remediation. Manlapig, Acuña, and Manuel (2024) likewise reported improved academic performance after learners used an electronic strategic intervention material, although their work involved physics and a conventional pretest-posttest design. The present time-series pattern provided stronger evidence of gradual development because improvement was documented across several measurement occasions rather than through only two test administrations.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

Table 2
Competency Recovery According to Agricultural Fishery and Arts Cluster

Competency Cluster	Baseline Mean	Baseline SD	Immediate Post Mean	Post SD	Delayed Mean	Delayed SD	Mean Gain	Post Mastery (%)	Delayed Mastery (%)
Crop and orchard production	52.10	9.35	83.57	6.41	81.82	6.73	31.47	83.33	78.57
Animal production and care	49.36	9.52	79.79	7.05	77.90	7.29	30.43	76.19	71.43
Fishery concepts and production	43.90	10.11	73.74	8.37	71.52	8.61	29.84	61.90	57.14
Safety, resource use, and marketing	49.24	9.74	80.42	7.29	79.04	7.21	31.18	78.57	76.19
Overall	48.65	9.68	79.38	7.28	77.57	7.46	30.73	78.57	73.81

Note. Baseline means were obtained from the average of the three pre-intervention assessments. Mean gain was calculated by subtracting the baseline mean from the immediate post-intervention mean.

Table 2 shows the baseline, immediate post-intervention, and delayed follow-up performance in the four competency clusters addressed by the contextualized materials.

Crop and orchard production obtained the highest immediate post-intervention mean of 83.57 and the highest delayed mean of 81.82. Its immediate mastery rate of 83.33 percent indicated that most learners were able to understand and perform competencies involving planting materials, orchard establishment, propagation, plant care, and related production procedures. These competencies were supported by locally familiar examples, illustrated sequences, and activities involving plants and materials that learners could recognize from their homes and community.

Safety, resource use, and marketing also showed a strong gain of 31.18 points. The delayed mean of 79.04 remained close to the immediate post-intervention result, indicating that knowledge involving safe practices, material selection, responsible resource use, and basic product marketing was retained. The strong result may be attributed to repeated safety reminders, visual cues, scenario-based exercises, and performance checklists embedded in the materials.

Animal production and care improved from 49.36 to 79.79. The delayed mean of 77.90 remained above the mastery criterion, although its delayed mastery rate decreased to 71.43 percent. This result indicated that some learners understood general animal-care principles but continued to experience difficulty when they were required to make decisions involving feeding, housing, health monitoring, and appropriate care procedures. Further remediation may need to provide additional case situations and repeated opportunities to distinguish correct from unsafe or unsuitable practices.

Fishery concepts and production remained the weakest competency cluster. Although its mean increased by 29.84 points, the immediate post-intervention mean of 73.74 did not reach the established mastery criterion. Its delayed mean decreased further to 71.52, and only 57.14 percent of learners maintained mastery during the follow-up assessment. The lower result may have been associated with limited direct exposure to fish-production facilities, fewer opportunities to handle actual fishery materials, and the technical nature of competencies involving species identification, pond or container preparation, feeding, water quality, and production management.

The findings demonstrated that the intervention was beneficial across all clusters, but its effectiveness differed according to the nature of the competency. Topics that could be demonstrated using common plants, household materials, pictures, or school-based activities produced stronger outcomes than competencies that depended on specialized equipment or less familiar production settings. This distinction is important because competency-based learning requires learners to demonstrate knowledge and skill rather than merely complete learning activities. Evans, Landl, and Thompson (2020) emphasized that competency-based education depends

ISSN: 3116-3475
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of Education, Research, and Innovation Perspectives
Volume 2 Issue 7 (July 2026)

on clear expectations, meaningful assessment, and evidence of learner mastery. The remaining fishery gaps therefore indicate the need for additional instruction rather than a conclusion that all competencies had been fully recovered.

Table 3. *Piecewise Linear Mixed-Effects Model for Competency Recovery*

Model Effect	Estimate	Standard Error	95% Confidence Interval	t Value	p Value
Initial baseline level	47.79	1.43	44.98 to 50.60	33.42	< .001
Baseline slope	0.84	0.27	0.31 to 1.37	3.11	.003
Immediate intervention level change	2.86	0.96	0.98 to 4.74	2.98	.004
Change in slope during intervention	3.71	0.32	3.08 to 4.34	11.59	< .001
Total intervention slope	4.55	0.29	3.98 to 5.12	15.69	< .001
Post-intervention level change	-1.14	0.91	-2.92 to 0.64	-1.25	.214
Follow-up slope	-1.81	1.02	-3.81 to 0.19	-1.77	.081

Model-fit information: Null-model AICc = 3840.12; linear-time model AICc = 3475.66; piecewise model AICc = 2897.34; marginal R^2 = .74; conditional R^2 = .86.

The baseline slope was positive and statistically significant, $\beta = 0.84$, $p = .003$. This indicated that the learners' scores had already been increasing by approximately 0.84 points per assessment occasion before the intervention. However, the baseline rate was too small to explain the much steeper progress observed after the contextualized materials were introduced.

The immediate intervention level change was 2.86 points, $p = .004$. After controlling for the existing baseline trend, the learners demonstrated an immediate improvement when the intervention phase began. This result suggested that the first exposure to the contextualized materials provided benefits beyond the small improvement associated with repeated baseline assessment.

The change in slope during the intervention was 3.71 points, $p < .001$. When this value was added to the original baseline slope, the total intervention slope reached 4.55 points per measurement occasion. Thus, competency scores increased approximately five times faster during the intervention than during the baseline period. The confidence interval for the total intervention slope ranged from 3.98 to 5.12, indicating that the observed acceleration was precise and consistently positive.

The post-intervention level change was negative but not statistically significant, $\beta = -1.14$, $p = .214$. The follow-up slope was also negative but did not reach statistical significance, $\beta = -1.81$, $p = .081$. These results showed a small decline after the structured sessions ended, but the reduction was not large enough to establish a general loss of recovered competency. The findings therefore supported retention at the group level, although the cluster-level results showed that retention was weaker in fishery competencies.

The piecewise model produced the lowest corrected Akaike information criterion, with an AICc of 2897.34, compared with 3475.66 for a single linear-time model. This substantial difference indicated that the learners' performance was better explained by separate baseline, intervention, and follow-up phases than by a single continuous trend. The marginal R^2 of .74 showed that the intervention phases and time variables explained 74 percent of the variation in scores. The conditional R^2 of .86 indicated that the explanatory value increased when individual differences among learners were included.

These model results strengthened the interpretation that the improvement was associated with the contextualized intervention rather than merely with repeated testing. The small baseline increase was statistically separated from the more rapid intervention-phase improvement. Nevertheless, the absence of a separate comparison group meant that external events, concurrent instruction, and maturation could not be eliminated completely. The result should therefore be interpreted as strong time-linked evidence of intervention effectiveness rather than absolute proof of causality.

The repeated competency checks and corrective activities may have contributed to the steady upward slope because the teacher was able to respond to errors while instruction was still underway. Sortwell et al. (2024)

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Volume 2 Issue 7 (July 2026)

found that formative assessment generally supported K to 12 learning, although effects differed according to the assessment approach and implementation quality. In the present study, weekly probes were not treated merely as tests. They guided reteaching, modelling, task adjustment, and feedback, which likely strengthened the intervention's cumulative effect.

Table 4. *Performance Ratings Before and After the Contextualized Intervention*

Performance Domain	Baseline Mean	Baseline SD	Immediate Post Mean	Post SD	Delayed Mean	Delayed SD	Mean Gain	Delayed Interpretation
Preparation of tools and materials	1.95	0.51	3.44	0.39	3.36	0.42	1.49	Highly competent
Procedural accuracy	1.82	0.56	3.35	0.41	3.23	0.45	1.53	Competent
Safe tool and material handling	2.10	0.48	3.56	0.34	3.51	0.36	1.46	Highly competent
Quality of completed output	1.76	0.58	3.22	0.45	3.12	0.47	1.46	Competent
Independent decision-making	1.61	0.60	3.03	0.49	2.91	0.53	1.42	Competent
Overall performance	1.85	0.55	3.32	0.42	3.23	0.45	1.47	Competent

Note. Interpretation: 3.25 to 4.00 = highly competent; 2.50 to 3.24 = competent; 1.75 to 2.49 = developing competence; 1.00 to 1.74 = beginning competence.

Table 4 presents the learners' performance in the analytic rubric domains. Scores ranged from 1 to 4, with higher scores indicating stronger and more independent performance.

The overall performance rating increased from 1.85, interpreted as developing competence, to 3.32, interpreted as highly competent. At the delayed assessment, the mean was 3.23, which remained within the competent range. The findings confirmed that the increase in written competency scores was accompanied by improvement in actual task performance.

Safe tool and material handling obtained the highest immediate and delayed ratings. The delayed mean of 3.51 showed that learners consistently followed safety instructions even after the intervention sessions had ended. Safety symbols, step reminders, teacher demonstrations, and repeated use of performance checklists may have supported this outcome. The result was important because competency recovery in Agricultural Fishery and Arts should not be measured only through correct answers. Learners must also perform activities without placing themselves, their classmates, animals, crops, or equipment at unnecessary risk.

Preparation of tools and materials also reached the highly competent level at the delayed assessment. Learners became more capable of identifying the resources required for a task, arranging them before beginning, and selecting locally available alternatives when standard materials were unavailable. This outcome suggested that contextualized examples helped learners connect lesson requirements with objects and resources they could actually access.

Procedural accuracy obtained the largest mean gain of 1.53 points. However, its delayed mean of 3.23 remained slightly below the highly competent range. Learners had improved in following sequential procedures but continued to commit errors when tasks involved several stages or required adjustments based on changing conditions. This issue was especially visible in fishery and animal-production activities, where correct decisions depended on interpreting a situation rather than following a fixed sequence.

Independent decision-making received the lowest post-intervention and delayed ratings. Although its mean increased substantially from 1.61 to 3.03, the delayed result of 2.91 indicated that many learners still relied on teacher cues, illustrations, or step cards. They were generally able to complete familiar tasks but showed less confidence when materials differed from those used during practice or when they encountered an unexpected

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condition. This finding revealed that competency recovery had been stronger for guided performance than for independent transfer.

The results indicated that contextualized materials should gradually reduce instructional support rather than maintain the same level of guidance throughout the intervention. Later activities may need to include open-ended problems, incomplete procedures, resource limitations, and alternative task conditions that require learners to justify their choices. Such activities could strengthen decision-making and transfer without removing the clarity and structure needed by learners who are still recovering essential competencies.

The improvement in practical performance also reflected the value of learning activities linked to observable and meaningful tasks. Davis et al. (2023) found that a school-based garden program produced modest academic benefits, although effects were not consistent across all grades and outcomes. The stronger improvement in the present results may be partly explained by the close alignment between the intervention tasks and the competencies measured. The assessments evaluated the same Agricultural Fishery and Arts skills that learners practised, while the garden study examined broader academic outcomes.

Table 5. *Reliable Change Classification by Competency Cluster*

Competency Cluster	Competency Recovered (%)	Progressing Toward Recovery (%)	No Reliable Change (%)	Reliable Deterioration (%)
Crop and orchard production	78.57	14.29	7.14	0.00
Animal production and care	71.43	19.05	9.52	0.00
Fishery concepts and production	57.14	30.95	11.91	0.00
Safety, resource use, and marketing	76.19	16.67	7.14	0.00
Overall classification	69.05	21.43	9.52	0.00

Note. Competency recovered indicated a score increase greater than 9.04 points and a delayed score of at least 75.

Progressing toward recovery indicated reliable improvement without reaching delayed mastery. No reliable change indicated that the score difference did not exceed the reliable-change threshold.

The Reliable Change Index showed that 69.05 percent of learners achieved overall competency recovery. These learners obtained an improvement greater than the 9.04-point threshold and maintained a delayed score of at least 75 percent. Their gains were therefore unlikely to be explained by measurement error alone.

A further 21.43 percent demonstrated reliable improvement but remained below the mastery criterion. These learners benefited from the intervention, yet their progress had not reached the level required for full recovery. They should not be classified as unsuccessful because their gains exceeded expected measurement variation. However, they still required targeted follow-up activities, especially in fishery production, procedural application, and independent decision-making.

The remaining 9.52 percent did not achieve reliable change. Their scores may have increased slightly, but the amount of improvement did not exceed the established threshold. Possible explanations included irregular participation, difficulty understanding written directions, limited prior knowledge, slow acquisition of procedural skills, or a need for more intensive individual guidance. Additional diagnostic assessment would be necessary before selecting another intervention for these learners.

No reliable deterioration was recorded. This finding indicated that the materials did not produce a meaningful decline in any learner's overall performance. The absence of deterioration was encouraging, but it did not remove the need to examine why a small group failed to achieve reliable progress.

Crop and orchard production produced the highest recovery rate at 78.57 percent, followed by safety, resource use, and marketing at 76.19 percent. Fishery concepts and production recorded the lowest recovery rate at 57.14 percent and the highest proportion progressing without mastery at 30.95 percent. This pattern confirmed

that the principal unresolved problem was not a general failure of the intervention. It was a more specific difficulty involving fishery concepts and the transfer of knowledge to less familiar practical conditions.

The individual-level findings provided a more balanced interpretation than the mean scores alone. The intervention generated substantial overall gains, but approximately three out of ten learners had not yet reached reliable and sustained mastery. Continued remediation should therefore be differentiated. Learners progressing toward recovery may need additional guided practice and feedback, while those showing no reliable change may require simplified tasks, smaller learning steps, peer-supported practice, oral explanations, or more intensive teacher assistance.

CONCLUSION

The contextualized intervention materials substantially supported competency recovery in Grade 6 Agricultural Fishery and Arts learning, as shown by the steady increase in assessment scores, stronger performance ratings, significant improvement in the intervention slope, and the sustained mastery demonstrated during the delayed assessment. The materials were particularly effective in crop and orchard production, safety practices, preparation of tools and materials, and guided procedural tasks, while fishery concepts, independent decision-making, and the transfer of skills to unfamiliar situations remained areas that required further attention. It was therefore recommended that the school continue using contextualized intervention materials as part of remediation and enrichment programs, with regular diagnostic assessment to identify specific competency gaps before assigning activities. Teachers should strengthen the fishery component through demonstrations, models, videos, community-based examples, and supervised practical tasks, while gradually reducing instructional support to develop learner independence. Additional intervention cycles should be provided to learners who showed progress but had not yet reached mastery, and more intensive individualized assistance should be given to those who did not demonstrate reliable change. The materials should also be reviewed periodically by Technology and Livelihood Education specialists to ensure curriculum alignment, technical accuracy, safety, and suitability for Grade 6 learners. School administrators may support implementation by providing instructional resources, time for remediation, teacher training, and opportunities to share effective practices. Further studies should examine the intervention using a comparison group, a larger participant base, a longer follow-up period, and additional measures of skill transfer to determine whether the recovered competencies are maintained and applied beyond the intervention setting.

References

Alban Conto, C., Akseer, S., Dreesen, T., Kamei, A., Mizunoya, S., & Rigole, A. (2021). Potential effects of COVID-19 school closures on foundational skills and country responses for mitigating learning loss. *International Journal of Educational Development, 87*, Article 102434. doi:10.1016/j.ijedudev.2021.102434

Aynas, N., & Aslan, M. (2021). The effects of authentic learning practices on problem-solving skills and attitude towards science courses. *Journal of Learning for Development, 8*(1), 146–161. doi:10.56059/jl4d.v8i1.482

Davis, J. N., Nikah, K., Landry, M. J., Vandyousefi, S., Ghaddar, R., Jeans, M., Cooper, M. H., Martin, B., Waugh, L., Sharma, S. V., & van den Berg, A. E. (2023). Effects of a school-based garden program on academic performance: A cluster randomized controlled trial. *Journal of the Academy of Nutrition and Dietetics, 123*(4), 637–642. doi:10.1016/j.jand.2022.08.125

Department of Education. (2022, July 11). *Self learning module: Quarter 0, TLE Agri Fisheries Arts, Grade 6, modules 1–15* [Self-learning module set]. DepEd Learning Portal.

Evans, C. M., Landl, E., & Thompson, J. (2020). Making sense of K–12 competency-based education: A systematic literature review of implementation and outcomes research from 2000 to 2019. *Journal of Competency-Based Education, 5*(4), Article e01228. doi:10.1002/cbe2.1228

Manlapig, E., Jr., Acuña, E. B., & Manuel, A. M. (2024). Exploring student academic performance and motivation in physics through electronic-strategic intervention material (e-SIM). *Anatolian Journal of Education, 9*(1), 145–156. doi:10.29333/aje.2024.9110a

Picardal, M. T., & Sanchez, J. M. P. (2022). Effectiveness of contextualization in science instruction to enhance science literacy in the Philippines: A meta-analysis. *International Journal of Learning, Teaching and Educational Research, 21*(1), 140–156. doi:10.26803/ijlter.21.1.9

Republic Act No. 12028. (2024). *An act establishing an Academic Recovery and Accessible Learning (ARAL) Program and appropriating funds therefor*. Republic of the Philippines.

Rivera, G. M., & Sanchez, J. M. P. (2020). Use of contextualized instructional materials: The case of teaching gas laws in a public uptown high school. *Orbital: The Electronic Journal of Chemistry, 12*(4), 276–281. doi:10.17807/orbital.v12i4.1526

Sortwell, A., Trimble, K., Ferraz, R., Geelan, D. R., Hine, G., Ramirez-Campillo, R., Carter-Thuiller, B., Gkintoni, E., & Xuan, Q. (2024). A systematic review of meta-analyses on the impact of formative assessment on K–12 students' learning: Toward sustainable quality education. *Sustainability, 16*(17), Article 7826. doi:10.3390/su16177826

Tutal, Ö. (2023). Does context-based learning increase academic achievement and learning retention? A review based on meta-analysis. *Journal of Practical Studies in Education, 4*(5), 1–16. doi:10.46809/jpse.v4i5.71

Yemini, M., Engel, L., & Ben Simon, A. (2025). Place-based education: A systematic review of literature. *Educational Review, 77*(2), 640–660. doi:10.1080/00131911.2023.2177260