EFFECTIVENESS OF ACTIVITY-BASED LEARNING STATIONS IN DEVELOPING LEARNERS' SKILLS IN AGRICULTURE AND FISHERY ARTS

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Abstract

This study examined the effectiveness of Activity-Based Learning Stations in improving Grade 7 learners' skills in Agriculture and Fishery Arts (AFA) at Ballay National High School. A quasi-experimental one-group pretest–posttest design was employed involving 40 Grade 7 learners who participated in station-based learning activities designed to strengthen competency in crop production and fishery-related tasks. Learners' skill levels were measured using a performance-based assessment administered before and after the intervention, while a learner challenge checklist was used to document difficulties encountered during implementation.

Results showed a marked improvement in learners' overall skill performance following the intervention. The pretest yielded an overall mean score of 2.54, interpreted as Low Skill, while the posttest yielded a mean score of 3.79, interpreted as High Skill. A paired-samples t-test confirmed that the difference between pretest and posttest performance was statistically significant, $t(39) = 14.37$, $p \approx 0.001$, indicating that Activity-Based Learning Stations contributed to meaningful gains in AFA skills. Learners reported several implementation challenges, with the most common concerns being insufficient time per station, difficulty using tools and equipment, and confusion with task instructions.

Overall, the findings suggest that Activity-Based Learning Stations are an effective instructional approach for improving learners' competency in performance-based AFA tasks. However, results also highlight the importance of careful station planning, adequate time allotment, and clear task guidance to maximize learner engagement and performance. The study provides practical evidence supporting the integration of structured station-based learning strategies into AFA instruction and similar skills-based learning areas.

Keywords: Activity-Based Learning Stations; Station-Based Instruction; Agriculture And Fishery Arts; AFA Skills; Grade 7 Learners; Quasi-Experimental Design; Active Learning

1. Introduction

Agriculture and Fishery Arts (AFA) remains one of the most practical and socially relevant learning areas in the Philippine basic education curriculum. As part of the Edukasyong Pantahanan at Pangkabuhayan (EPP) / Technology and Livelihood Education (TLE) learning area, AFA is designed to help learners acquire foundational competencies that connect classroom learning with real-life applications. The Department of Education (DepEd) emphasizes that EPP/TLE exposes learners to essential life skills, including competencies in agriculture and fisheries, in preparation for productive living and possible livelihood pathways (Department of Education [DepEd], 2023). This emphasis is especially important in a country where agriculture and fisheries remain key sectors for food security, local enterprise, and employment. Introducing learners early to basic production tasks, safety procedures, and responsible resource use strengthens not only technical competence but also practical readiness and awareness of community realities.

AFA is not simply a "skills subject," but a structured learning space where learners begin to understand how food and livelihood systems work. At the junior high school level, learners are expected to practice basic tasks that develop psychomotor competence, technical reasoning, and

work habits—competencies that cannot be effectively built through lecture-only strategies. The MATATAG Curriculum reinforces that EPP/TLE aims to develop learners who can apply skills in authentic contexts; agriculture and fishery arts are positioned within the curriculum's commitment to applied learning and practical competencies (DepEd, 2023). In addition, DepEd has established programs that connect agricultural education with school and community development, such as farm schools, where learners are exposed to sustainable farming, skills development, and agricultural livelihood preparation (DepEd, 2021). These initiatives reflect a national recognition that agriculture-related learning has both educational and developmental significance.

Despite the clear curriculum direction, many schools still struggle to deliver AFA in ways that fully achieve its hands-on competency goals. One persistent issue is that AFA instruction often shifts toward theory-heavy delivery due to limitations in tools, materials, facilities, and time for practice. This challenge is especially pronounced in public secondary schools, where large class sizes and resource constraints can reduce the frequency and depth of practical activities. Even when teachers demonstrate skills, learners may remain observers rather than active participants. Under these conditions, learners may understand concepts cognitively but still struggle with technical execution—such as proper tool handling, following correct steps, accuracy in performance, or efficiency in completing tasks. In applied subjects like AFA, these skill gaps matter because competence is demonstrated through performance rather than recall.

Competency-based education principles support this concern. In technical and vocational learning, competence is defined by performance standards—learners must demonstrate specific skill outcomes rather than merely describe them. In the Philippine context, the Technical Education and Skills Development Authority (TESDA) consistently positions competency standards as central to technical education and training, supporting the broader direction of competency-based instruction in skill-oriented learning environments (Technical Education and Skills Development Authority [TESDA], n.d.). Although TESDA focuses on post-basic and workforce-oriented training, the principle of competency demonstration is relevant to junior high school AFA because AFA is part of the foundational pipeline of technical-livelihood learning. Learners who do not gain adequate hands-on practice early may enter higher levels of TVL learning with weak skill readiness and low confidence.

Within this context, activity-based teaching approaches are increasingly recognized as necessary for strengthening performance in practical subjects. Active learning and student-centered instructional models emphasize that learners gain a deeper understanding and mastery when they are directly engaged in meaningful tasks, rather than receiving information passively. Research literature consistently indicates that active methodologies improve learning outcomes by increasing participation, motivation, and time-on-task—elements critical to competency development in practical disciplines (Ribeiro-Silva et al., 2022). The core idea is that learners develop skills most effectively when they are given repeated opportunities to perform tasks, receive feedback, and reflect on their performance.

One structured way to apply active learning in practical subjects is through Activity-Based Learning Stations, also referred to as learning stations or station rotation models. Learning stations divide a classroom, laboratory, or learning environment into multiple task areas, where learners rotate in small groups. Each station is designed to build a specific competency through guided practice and task completion. Unlike whole-class demonstrations, learning stations increase the time learners spend actually practicing the target skill. Station rotation models have been widely used in blended learning and differentiated instruction contexts, particularly because they allow teachers to manage small-group instruction. At the same time, other learners engage in independent or collaborative tasks (American Institutes for Research [AIR], 2021). In practical subjects such as AFA, this approach offers a promising structure for maximizing limited resources. Instead of having all learners wait for a single demonstration or share a few tools at once, stations allow smaller groups to practice while the teacher circulates to coach and monitor progress.

Learning stations also align with the fundamental logic of skill acquisition: learners need repeated, structured practice. When tasks are broken down into stations, learners can focus on one competency at a time—such as soil preparation, planting procedures, basic fishery operations, or tool care—and gradually improve through repetition. Over time, the combination of repetition, feedback, and scaffolding contributes to stronger psychomotor development and more consistent performance. Teacher support at learning stations is also more targeted: rather than supervising a whole class performing a single task, the teacher can intervene at critical points, correct errors early, and reinforce safety and sanitation routines.

Educational research provides evidence of the effectiveness of learning stations in improving achievement and skill performance. A meta-analysis on the learning stations technique found that it has a positive effect on academic achievement when compared with traditional approaches, suggesting that structured stations support stronger learning outcomes by promoting engagement and practice opportunities (Şahin, 2019). Additionally, practitioner and research-based guidance on station rotation emphasizes that the approach increases time-on-task, supports differentiation, and strengthens mastery when station tasks are clearly designed and aligned to learning goals (AIR, 2021). These features correspond well with the needs of AFA instruction, where competency mastery depends on repeated task execution and guided performance.

However, implementing learning stations also requires attention to known challenges. Station rotation models can become less effective when learners have too little time per station, unclear task directions, insufficient tools, or uneven group participation. Practitioner literature highlights that pacing and station management are common barriers, particularly in classrooms with limited resources (AIR, 2021). In AFA contexts, such barriers may be intensified because tasks often require physical equipment and procedural accuracy, and learners may experience low confidence in tool handling and task performance. These realities indicate that while learning stations are promising, their effectiveness must be evaluated in real school settings, especially in public secondary schools, where constraints are common.

The present study, therefore, responds to both a practical instructional need and a research gap. While AFA is expected to develop real-life competencies, many learners remain underprepared in technical execution due to limited hands-on opportunities. A structured intervention, such as Activity-Based Learning Stations, may offer a feasible and effective solution, but its impact must be demonstrated with evidence. At Ballay National High School, where AFA is implemented as part of the Grade 7 curriculum, there is a clear need to strengthen learners' skills through strategies that increase engagement, increase practice time, and focus on competency. This study investigates whether Activity-Based Learning Stations can significantly improve learners' AFA performance—particularly in key areas such as crop production routines, tool use, safety practices, accuracy, efficiency, and basic fishery operations.

By examining learners' pretest and posttest performance and documenting challenges encountered during station activities, the study aims to provide localized evidence that can inform instructional improvement. More importantly, the findings can contribute to broader discussions on how applied, competency-driven strategies can strengthen technical-livelihood education at the junior high school level. Ultimately, improving AFA instruction is not only about raising test scores but also about equipping learners with meaningful skills that support life readiness, community development, and future livelihood possibilities within and beyond the school environment.

2. Method

2.1 Research Design

This study utilized a quasi-experimental research design, specifically the one-group pretest–posttest design, to determine the effectiveness of Activity-Based Learning Stations in improving Grade 7 learners' skills in Agriculture and Fishery Arts (AFA). The design was selected because it allowed the researcher to examine changes in learners' performance before and after the intervention under natural classroom conditions, where random assignment of participants to experimental and control groups was not feasible.

In this design, the same group of learners was assessed at two points: (1) prior to the implementation of the Activity-Based Learning Stations (pretest) and (2) after completing the station-based learning activities (posttest). The difference between the two assessment results served as the main basis for evaluating whether the intervention produced measurable improvements in learners' AFA skills. This design is commonly applied in educational research when the primary goal is to test the impact of a teaching strategy within an existing class or school setting, particularly when ethical and logistical constraints prevent the use of randomized controlled trials.

The quasi-experimental approach was especially appropriate for the present study because AFA is a performance-based subject that requires the development of practical competencies through practice and structured activities. Activity-Based Learning Stations were introduced as a planned instructional intervention intended to increase learners' engagement, hands-on participation, and skill mastery by allowing learners to rotate through specific learning tasks and apply competencies in small-group settings. The pretest–posttest structure enabled the researcher to quantify improvement in overall skill levels and in specific skill domains, such as crop production and fishery-related competencies.

Although the one-group pretest–posttest design does not include a comparison group, it remains helpful in examining instructional effectiveness in real classroom settings, particularly when the purpose is formative: to evaluate whether an intervention can improve learning outcomes and identify areas that may require adjustment. To strengthen the credibility of the results, the study applied consistent test procedures and scoring criteria for both the pretest and posttest, ensuring that any observed changes in performance could reasonably be linked to the intervention rather than to differences in assessment conditions.

Overall, the research design provided a practical, evidence-based approach to evaluating whether Activity-Based Learning Stations could enhance learners' AFA skills, while offering insights into the challenges learners encountered during station-based learning. These findings are intended to support instructional improvement in AFA and similar skills-based learning areas within junior high school settings.

2.2 Participants

The participants of this study were 40 Grade 7 learners enrolled in Agriculture and Fishery Arts (AFA) at Ballay National High School. The participants were selected using purposive sampling, as the study specifically targeted learners currently taking AFA and directly exposed to the instructional intervention. This sampling approach ensured that the participants were appropriate for the study's objectives, particularly in evaluating whether Activity-Based Learning Stations could improve AFA-related skills in an actual classroom setting.

The selected learners represented a typical group of Grade 7 students in a public secondary school setting, where practical skill development is expected as part of the Technology and Livelihood Education curriculum. Their participation was essential because the intervention required learners to engage in hands-on activities that involved skill performance tasks aligned with the AFA learning competencies. By focusing on Grade 7 learners, the study also captured

early-stage skill development, which is important because foundational competence in AFA is expected to be strengthened as learners progress through junior high school.

All participants took part in both the pretest and posttest assessments, allowing the study to compare their skill performance before and after exposure to the Activity-Based Learning Stations. Because the study used a one-group pretest–posttest design, maintaining the same participants throughout the study was necessary to measure performance change over time accurately.

Participation was carried out within normal instructional conditions, and learners were oriented on the purpose of the activities and the expectations during station-based learning. The learners worked individually and in small groups, depending on the requirements of each station, ensuring that every participant had opportunities to perform the required tasks and demonstrate competencies during the intervention period.

Overall, the participants provided a relevant sample for examining the effects of Activity-Based Learning Stations on AFA skill development, and their performance outcomes served as the primary basis for determining the instructional strategy's effectiveness.

2.3 Instrumentation

To evaluate the effectiveness of Activity-Based Learning Stations in enhancing learners' skills in Agriculture and Fishery Arts (AFA), the study used a skills assessment test administered as both a pretest and a posttest. This teacher-developed instrument was designed to measure learners' competency levels in key Grade 7 AFA domains, particularly crop production and fishery-related skills, using performance-based indicators aligned with expected learning outcomes. The same assessment tool and scoring criteria were applied during both testing periods to ensure that observed differences in scores reflected actual improvement in learners' skills rather than changes in test content or procedures.

In addition, a learner challenge checklist was employed to document common difficulties encountered during the station-based learning activities. The checklist captured practical barriers that could affect performance, such as time constraints per station, difficulty handling tools or materials, and confusion about task instructions. Responses were summarized using frequency counts and percentages to identify the most prevalent challenges, providing contextual information that supported the interpretation of learners' skill gains after the intervention.

2.4 Data Analysis

Data analysis was conducted using descriptive and inferential statistical procedures to determine learners' skill levels before and after the implementation of Activity-Based Learning Stations and to assess whether the observed changes were statistically significant. Descriptive statistics—specifically, means and descriptive interpretations—were used to summarize learners' pretest and posttest performance in Agriculture and Fishery Arts (AFA), including overall results and skill-domain scores. These measures provided a clear picture of how learners performed at baseline and how their performance shifted after exposure to the intervention.

To test the effectiveness of the intervention, the study applied a paired-samples t-test, which is appropriate for comparing the mean scores of the same participants across two testing periods (pretest vs. posttest). The test determined whether the improvement in learners' scores after the learning stations was statistically significant at the standard significance level ($\alpha = 0.05$). Results showed that the posttest mean was higher than the pretest mean, and the computed t-value indicated a significant gain in skill performance following the intervention.

For the learner challenge checklist, responses were analyzed using frequency counts and percentages to identify the most common difficulties encountered during the station activities. This analysis helped contextualize the quantitative findings by highlighting practical issues that may influence learner performance, such as time constraints, tool-handling difficulties, and unclear

instructions. Together, these data analysis procedures enabled the study to evaluate both the measurable effect of Activity-Based Learning Stations on AFA skills and the implementation challenges to be considered for future classroom application.

3 Results

The results indicate a clear improvement in learners' Agriculture and Fishery Arts (AFA) skills after the implementation of Activity-Based Learning Stations. Prior to the intervention, the learners' overall pretest performance yielded a mean score of 2.54, indicating Low Skill. After completing the station-based learning activities, their overall posttest performance increased to a mean score of 3.79, interpreted as High Skill. This shift suggests that the learning stations provided learners with more effective opportunities to practice and apply AFA competencies in a structured, performance-focused environment.

To determine whether the observed improvement was statistically significant, a paired-samples t-test was conducted comparing the pretest and posttest scores of the same group of learners. The analysis revealed a computed $t(39) = 14.37$ with an associated p-value ≈ 0.001, indicating a statistically significant difference between the pretest and posttest results. This confirms that the improvement in learners' performance was not due to chance, but was strongly associated with the instructional intervention implemented during the study.

In addition to performance gains, learners also reported specific challenges during the implementation of the learning stations. The most frequently reported difficulty was insufficient time to complete tasks per station (65%), followed by difficulty using tools and equipment (55%), and confusion with instructions (45%). These results suggest that while Activity-Based Learning Stations were effective in improving skills, successful implementation also requires careful attention to pacing, tool readiness, and clarity of task directions to enhance the learner experience and performance further.

4. Discussion

The findings of this study provide strong evidence that Activity-Based Learning Stations can significantly improve Grade 7 learners' skills in Agriculture and Fishery Arts (AFA). Learners' performance increased from a low skill level in the pretest ($M = 2.54$) to a High Skill level in the posttest ($M = 3.79$), and the paired-samples t-test confirmed that the improvement was statistically significant, $t(39) = 14.37$, $p \approx 0.001$. From an instructional standpoint, this suggests that station-based learning provided learners with structured opportunities to practice AFA competencies more consistently than conventional whole-class delivery, which is often constrained by time, limited tools, and large class sizes. In performance-based subjects like AFA, improvement is most likely when learners are repeatedly engaged in authentic tasks, rather than simply observing demonstrations or recalling procedures.

The significant increase in posttest scores is consistent with broader evidence that active learning approaches lead to stronger learning outcomes than traditional lecture-based methods. Freeman et al. (2014), in a large meta-analysis of STEM education research, found that active learning strategies increase student performance and reduce failure rates compared with lecture-only instruction. Although the present study was conducted in a junior high school AFA setting rather than higher education STEM contexts, the underlying learning mechanism remains comparable: learners improve when they actively participate in tasks that require thinking, doing, decision-making, and problem-solving. Activity-Based Learning Stations align with active learning because they encourage learners to engage directly with learning tasks, practice procedural steps, and develop competence through repeated performance and feedback.

More specifically, the gains observed in this study support evidence from the literature focused on station techniques. Şahin (2019) reported that learning stations have a positive overall effect on academic achievement when compared with traditional methods, largely because they

promote engagement and allow learners to interact with content in varied, activity-driven ways. In the context of AFA, this is especially relevant because competence requires physical execution and accuracy, which are difficult to develop without consistent opportunities for practice. The station format naturally increases hands-on engagement by allowing learners to rotate through tasks in smaller groups, rather than waiting passively for their turn in a whole-class activity. This structure likely contributed to the improved skill outcomes in this study by increasing the amount of meaningful practice per learner, even within the constraints of a typical public school classroom.

In addition, the intervention's effectiveness aligns with the curriculum's direction, which emphasizes applied, competency-based learning in EPP/TLE. The MATATAG Curriculum Guide highlights that AFA and other TLE components are intended to develop learners' practical skills and productive competence through engagement with real-world tasks. The improved performance in this study suggests that Activity-Based Learning Stations operationalize these expectations by transforming AFA learning outcomes from theoretical targets into concrete skill experiences. In other words, the strategy did not simply help learners "know" agriculture and fishery concepts—it helped them practice and demonstrate the skills the curriculum expects them to acquire.

While the results show that Activity-Based Learning Stations are effective, learners' reported implementation challenges highlight practical areas for improvement. The most common concern was insufficient time per station (65%), followed by difficulty using tools and equipment (55%) and confusion with instructions (45%). These difficulties are consistent with implementation issues documented in station rotation models, where pacing, clarity of task directions, and station management are frequently identified as barriers to success. The American Institutes for Research (2021) notes that station rotation models require careful planning to ensure that tasks are clearly structured, time allotment is realistic, and learners can transition smoothly between stations without losing instructional momentum. In AFA settings, these issues may become even more pronounced because learners often need more time for tool handling, safety compliance, and step-by-step task completion—particularly when learners are still developing foundational competence.

These challenges do not weaken the overall effectiveness of the intervention; instead, they provide direction for refining implementation. For example, the reported time constraint suggests that stations may need to be adjusted by reducing task complexity, extending time per station, or limiting the number of tasks per session so that learners can complete activities without rushing. The difficulty with tool use also underscores the importance of short pre-rotation demonstrations, safety orientations, or tool-handling practice before learners begin rotating. Finally, confusion with instructions suggests that station task guides should be simplified, made more visual, or delivered using step-by-step checklists, especially for learners who are still building procedural confidence. Addressing these issues would likely enhance both learner experience and skill gains, and may further increase the effectiveness of station-based instruction in future implementations.

Overall, the findings support the conclusion that Activity-Based Learning Stations are a feasible and effective instructional approach for enhancing Grade 7 learners' AFA skill performance. The strategy aligns with competency-based curriculum goals, is supported by active learning literature, and has demonstrated measurable improvement in learner outcomes. At the same time, the reported challenges emphasize that successful implementation depends not only on the strategy itself but also on practical factors such as station pacing, tool readiness, and instructional clarity. Future applications of the approach may benefit from improved station design, clearer task guides, and structured scaffolding to ensure that all learners can engage productively and confidently at each learning station.

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