



Teacher-designed Interactive Activities towards Learning Outcomes of Students in Technology and Livelihood Education: Basis for Instructional Plan

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Abstract

This study examined the utilization of teacher-designed interactive activities (TIAs) and their influence on the learning outcomes of Grade 9 students in Technology and Livelihood Education (TLE), particularly in Food Processing, in one secondary school in the Division of Cavite during the school year 2025–2026. The research employed a descriptive–correlational design involving 110 respondents, composed of 30 TLE teachers and 80 Grade 9 students. A researcher-made questionnaire was used to assess the level of utilization of teacher-designed interactive activities in terms of quality and appropriateness, student engagement, alignment with learning objectives, and teacher implementation fidelity. Data were analyzed using weighted mean, paired t-test, and Pearson correlation through SPSS. Findings revealed that the utilization of teacher-designed interactive activities was highly evident across all measured dimensions as perceived by both teachers and students. Results also showed a significant difference in the assessment of teachers and students regarding the utilization of these activities. Moreover, students' academic performance significantly improved, with mean scores increasing from 14.03 in the pretest to 36.53 in the posttest after the implementation of interactive activities. A significant relationship was found between the utilization of TIAs and students' learning outcomes. Based on these findings, an instructional plan was proposed to further enhance interactive teaching strategies in Technology and Livelihood Education.

Keywords: Teacher-Designed Interactive Activities, Students Learning Outcomes, Technology and Livelihood Education, Student Engagement, Alignment of Interactive Activities with Learning Objectives, and Teacher's Implementation Fidelity

Introduction

Tajikistan In contemporary education, instructional strategies that promote active learning and student engagement have become essential in improving learning outcomes. Traditional lecture-based teaching methods are increasingly being supplemented with interactive instructional approaches that encourage participation, collaboration, and practical skill development. In technical and vocational subjects such as Technology and Livelihood Education (TLE), particularly in Food Processing, the use of interactive learning activities is considered an effective way to enhance students' understanding and practical competencies. Teacher-designed interactive activities (TIAs) provide opportunities for learners to engage in hands-on experiences, problem-solving tasks, and collaborative learning, which are crucial in developing both conceptual knowledge and technical skills (Lopez, 2023; Santos, 2022)^[5, 9]. The growing emphasis on learner-centered education highlights the importance of instructional strategies that actively involve students in the learning process. Interactive activities designed by teachers can foster deeper learning by allowing students to apply theoretical knowledge in practical contexts. In vocational and technical education, these activities support experiential learning and help students acquire skills relevant to real-world applications. Studies have shown that active learning approaches significantly improve student motivation, participation, and academic performance, particularly in technical and vocational subjects (De Guzman *et al.*, 2023; Villanueva, 2022)^[3, 10].

Educational institutions also serve as important environments for implementing programs that strengthen student development, preparedness, and resilience. A study conducted in selected academic institutions in General Mariano Alvarez (GMA), Cavite examined the compliance and difficulties encountered in the implementation of the Disaster Risk Reduction and Preparedness Program (DRRPP). The findings revealed that while schools generally comply with disaster preparedness policies, several challenges such as limited resources, insufficient training, and administrative constraints affect effective implementation. The study highlighted the crucial role of educational institutions in developing programs that enhance students' awareness, preparedness, and practical competencies necessary for real-life situations (Abril & Francia, 2026) [2].

Similarly, intervention-based strategies have been implemented in vocational education to enhance students' academic performance and technical competencies. The study "Intervention Brigade: A Strategic Process to Improve the Academic Performance of Cookery 9 Students in Bulihan Integrated National High School, Silang, Cavite, Philippines" demonstrated that structured intervention programs and guided instructional strategies can significantly improve the academic performance of students in cookery subjects. The findings indicated that targeted learning support, collaborative activities, and strategic instructional processes help learners strengthen their practical skills and conceptual understanding in technical-vocational education (Abril, Payumo, & Abril, 2025) [1].

Despite the recognized benefits of interactive learning strategies, many classrooms still rely heavily on traditional teaching methods due to limited instructional resources, insufficient teacher training, and time constraints. These challenges may hinder the effective implementation of innovative instructional practices that promote meaningful learning experiences. Furthermore, while several studies have explored the advantages of active learning strategies,

limited research has specifically examined the utilization of teacher-designed interactive activities and their direct relationship with students' learning outcomes in Technology and Livelihood Education, particularly in Food Processing at the secondary level (Reyes, 2023; Mendoza, 2021) [8, 6].

Understanding how teacher-designed interactive activities influence students' academic performance is essential for improving instructional practices and curriculum implementation. Investigating the level of utilization of these activities, as well as their relationship with student learning outcomes, can provide valuable insights for educators, school administrators, and curriculum developers. Such evidence can guide the development of effective instructional strategies that enhance both theoretical understanding and practical skill acquisition among learners (Garcia, 2024; Ramirez, 2021) [4, 7].

Therefore, this study aimed to examine the utilization of teacher-designed interactive activities and their influence on the learning outcomes of Grade 9 students in Technology and Livelihood Education. Specifically, the study assessed the level of utilization of these activities in terms of quality and appropriateness, student engagement, alignment with learning objectives, and teacher implementation fidelity. It also examined the level of student performance before and after the use of these activities and determined whether a significant relationship exists between the utilization of teacher-designed interactive activities and students' learning outcomes

Result and Discussion

Level of Utilization of Teacher-Designed Interactive Activities

The level of utilization of teacher-designed interactive activities (TIAs) in Technology and Livelihood Education was assessed in terms of quality and appropriateness, student engagement, alignment with learning objectives, and teacher implementation fidelity. The results are presented in Table 1.

Table 1: Level of Utilization of Teacher-Designed Interactive Activities

Indicators	Teachers (Mean)	Students (Mean)	Verbal Interpretation
Quality and Appropriateness	3.91	3.64	Highly Evident
Student Engagement	3.87	3.56	Highly Evident
Alignment with Learning Objectives	3.88	3.51	Highly Evident
Teacher Implementation Fidelity	3.89	3.62	Highly Evident
Overall Mean	3.89	3.58	Highly Evident

Note: Scale interpretation: 3.26–4.00 = Highly Evident; 2.51–3.25 = Evident; 1.76–2.50 = Slightly Evident; 1.00–1.75 = Not Evident.

The results show that teacher-designed interactive activities were highly evident across all indicators as perceived by both teachers and students. Teachers reported slightly higher ratings than students, indicating strong implementation of interactive learning strategies in TLE classes.

Difference in the Assessment of Teachers and Students

A paired t-test was conducted to determine whether there was a significant difference between teachers' and students' assessments regarding the utilization of teacher-designed interactive activities. The results are presented in Table 2.

Table 2: Difference in the Assessment of Teachers and Students

Indicators	Mean Difference	T-Value	Decision	Interpretation
Quality and Appropriateness	0.32667	3.116	0.004	Reject Ho
Student Engagement	0.20667	2.334	0.027	Reject Ho
Alignment with Learning Objectives	0.31833	5.335	0.000	Reject Ho
Teacher Implementation Fidelity	0.23333	3.943	0.000	Reject Ho
Overall	0.27167	4.809	0.000	Reject Ho

Note: Level of significance = 0.05.

The results reveal that there is a significant difference between the perceptions of teachers and students regarding the utilization of teacher-designed interactive activities. This suggests that teachers and students may have different perspectives regarding the implementation and effectiveness of these instructional activities.

Table 3: Level of Performance of Grade 9 Students Before and After the Utilization of Interactive Activities

Test	N	Minimum	Maximum	Mean	Standard Deviation
Pretest	80	7.00	20.00	14.03	2.63
Posttest	80	33.00	40.00	36.53	1.74

The results show a substantial improvement in students' performance after the utilization of teacher-designed interactive activities. The mean score increased from 14.03 in the pretest to 36.53 in the posttest, indicating that interactive instructional strategies significantly enhanced students' understanding of Food Processing concepts and skills.

Table 4: Difference in Students' Performance Before and After Interactive Activities

Test Comparison	Mean Difference	t-value	p-value	Decision	Interpretation
Pretest vs. Posttest	22.50	Significant	0.000	Reject Ho	Significant

Note: Level of significance = 0.05.

The results confirm that there is a significant difference between the pretest and posttest scores, indicating that teacher-designed interactive activities significantly improved students' academic performance.

Table 5: Relationship Between Utilization of Interactive Activities and Student Performance

Variables	Correlation (r)	p-value	Interpretation
Utilization of TIAs and Student Performance	0.72	0.000	Significant Positive Relationship

Note: Level of significance = 0.05.

The results indicate a significant positive relationship between the utilization of teacher-designed interactive activities and students' learning outcomes. This suggests that increased use of interactive instructional strategies leads to improved academic performance among students in Technology and Livelihood Education.

Experimental Research Design

This study employed a descriptive–correlational research design to examine the utilization of teacher-designed interactive activities (TIAs) and their influence on the learning outcomes of Grade 9 students in Technology and Livelihood Education (TLE), particularly in Food Processing. The design was selected because it allows the researcher to determine the relationship between variables without manipulating them. Specifically, the study investigated the level of utilization of teacher-designed interactive activities in terms of quality and appropriateness, student engagement, alignment with learning objectives, and teacher implementation fidelity, as well as the level of student performance before and after the implementation of these activities.

Participants

The participants of the study consisted of 110 respondents from one secondary school in the Division of Cavite during

Students' Performance Before and After the Utilization of Interactive Activities

To determine the effectiveness of teacher-designed interactive activities, the performance of Grade 9 students was measured using pretest and posttest scores. The results are shown in Table 3.

Significant Difference in Students' Performance (Pretest vs. Posttest)

To determine whether the improvement in students' performance was statistically significant, a paired t-test was conducted. The results are shown in Table 4.

Relationship Between Interactive Activities and Student Learning Outcomes

Pearson correlation analysis was used to determine the relationship between the utilization of teacher-designed interactive activities and students' learning outcomes. The results are shown in Table 5.

the school year 2025–2026. The respondents included 30 teachers teaching Technology and Livelihood Education and 80 Grade 9 students enrolled in Food Processing classes. The study utilized the total enumeration sampling technique, allowing all available respondents who met the criteria to participate in the research.

Research Instrument

Data were collected using a researcher-developed questionnaire checklist designed to measure the level of utilization of teacher-designed interactive activities. The instrument consisted of three parts: demographic information of respondents, assessment of the utilization of teacher-designed interactive activities, and student performance based on pretest and posttest scores. The questionnaire used a four-point Likert scale, with response categories ranging from *Not Evident* to *Highly Evident*.

The instrument underwent content validation by subject experts and educators with experience in Technology and Livelihood Education and research methodology. Reliability testing was conducted through a pilot study, and Cronbach's alpha was used to determine the internal consistency of the instrument.

Data Collection Procedure

Prior to data collection, permission was obtained from the school administration. The researcher explained the

objectives and procedures of the study to the respondents and ensured that participation was voluntary. Survey questionnaires were distributed to teachers and students to assess the utilization of teacher-designed interactive activities. In addition, pretest and posttest assessments were administered to measure the level of student performance before and after the implementation of interactive instructional activities. Completed questionnaires were collected and organized for statistical analysis.

Statistical Analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Several statistical techniques were employed to interpret the data. The weighted mean was used to determine the level of utilization of teacher-designed interactive activities. The paired t-test was applied to examine the significant differences between teachers' and students' assessments and to compare students' pretest and posttest scores. Furthermore, Pearson's correlation coefficient (r) was utilized to determine the relationship between the utilization of teacher-designed interactive activities and the learning outcomes of Grade 9 students.

Ethical Considerations

Ethical standards were observed throughout the research process. Participation in the study was voluntary, and respondents were informed about the purpose of the research prior to completing the questionnaire. Confidentiality and anonymity of the respondents were strictly maintained, and the collected data were used solely for academic and research purposes. Participants were also informed that their responses would not affect their academic standing or professional evaluation.

Conclusion

This study examined the utilization of teacher-designed interactive activities (TIAs) and their influence on the learning outcomes of Grade 9 students in Technology and Livelihood Education (TLE), particularly in Food Processing. The findings revealed that teacher-designed interactive activities were highly evident across all measured dimensions, including quality and appropriateness, student engagement, alignment with learning objectives, and teacher implementation fidelity. Both teachers and students recognized the importance of these interactive activities in promoting effective learning experiences in the classroom. The results also showed a significant difference between the perceptions of teachers and students regarding the utilization of interactive instructional strategies. This suggests that although teachers consistently implement these activities, students may perceive their effectiveness differently based on their learning experiences and engagement during the lessons.

Furthermore, the study demonstrated a significant improvement in students' academic performance, as reflected by the notable increase in posttest scores compared to pretest scores. This indicates that teacher-designed interactive activities effectively enhance students' understanding and mastery of Food Processing concepts and skills. The correlation analysis also revealed a significant positive relationship between the utilization of interactive activities and students' learning outcomes, confirming that greater

integration of interactive teaching strategies contributes to improved academic performance.

Overall, the findings highlight the importance of integrating well-designed interactive instructional strategies in Technology and Livelihood Education to promote active learning, strengthen student engagement, and improve academic achievement. The results also served as the basis for the development of an instructional plan aimed at further enhancing the implementation of interactive teaching practices in TLE classrooms.

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