



Visual and Audio-Visual Materials in food Processing and its Effect on the Performance of Grade 9 Students in Technology and Livelihood Education: Basis for Strategic Plan

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Abstract

The present investigation delved into the effectiveness of using visual and audio, visual aids for both teaching food processing and improving the academic performance of Grade 9 Technology and Livelihood Education (TLE) students who would be part of the 20252026 strategic planning of a secondary school in Cavite. Teachers and students became respondents through total enumeration. A researcher, constructed tool was used to gather information on how often, how diverse, how good, how engaging, how available, and how accessible visual and audio, visual materials are. Data were analyzed and interpreted with statistical tools.

The results showed that the teachers extensively used visual and audio, visual materials in all the dimensions measured. However, a discrepancy was found between the teachers' and students' views, particularly in terms of frequency, diversity, quality, engagement, and accessibility. The learning outcomes of the students were further improved significantly as indicated by the results. A considerable escalation was noted in the pretest and posttest scores when multimedia materials were integrated into food processing instructions. In addition, posttest scores revealed a very strong positive correlation between the use of visual and audio, visual resources and students' achievement in food preparation tasks. Hence, it is advised that teachers and school administrators work hand in hand in making sure that there are always diverse multimedia resources that students can easily use so that their engagement will be high and their academic performance will be consistently improved.

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1. Introduction

Delivery of Technology and Livelihood Education (TLE) courses, especially in Food Processing strand, highly relied on a strategic combination of print and audio, visual materials (AVMs) nowadays to not only enhance the effectiveness of the teaching but also to aid students in the development of their conceptual understanding and hands, on skills. According to Smith (2021) ^[17], the use of multimedia during the vocational instruction significantly increases skill acquisition as well as the grasp of the concepts. Besides, educational videos, multimedia demonstrations, virtual experiments, and annotated diagrams provide the necessary information on food preservation, cleanliness, hazard prevention, and processing. At the same time, these instructional materials help the teacher in making the lessons of Grade 9 concrete, exciting, and easily understood (Alonzo, 2019; Lopez & Reyes, 2020) ^[2, 10].

The evidence goes further to show that learning through multimedia increases cognitive involvement, comprehension, and memory of the material more than the traditional lecture method (Gomez & Santos, 2022; Hernandez, 2021) ^[5, 6].

Multimedia resources enhance communication of safety, compliance, and risk management concepts to students of vocational education besides facilitating instruction. Food processors should comply with the protocols of sanitation, hazard prevention, and emergency preparedness. A local study entitled Compliance and Predicaments Encountered in the Risk Reduction and Disaster Preparedness Program (RRDPP) of Selected Academic Institutions in Gen. Mariano Alvarez (GMA), Cavite, Philippines disclosed that the availability of resources, the adequacy of training, and the presence of instructional reinforcement mechanisms influence both institutional compliance and program implementation (Abril *et al.*, 2024). The study revealed that well, structured instructional materials and awareness programs enhance compliance, even if there are operational limitations.

This serves as a strong message that systematic instructional support, including multimedia integration, is a key factor in raising the academic as well as the safety, related competencies of students in schools. Audio, visual media (AVMs) has many advantages, however, very little is known about its usage in secondary food, processing classes. A wealth of research has been conducted on the effectiveness of multimedia in technical or STEM contexts (Gomez & Santos, 2022; Martinez, 2020) ^[5, 12], whereas only a handful has looked at the impact of AVM use on the food, processing academic achievement, practical competence, and learner motivation.

Moreover, the integration of multimedia is hindered by the presence of issues related to technology access, teacher readiness, and curriculum implementation (Alonzo, 2019; Hernandez, 2021) ^[2, 6]. The shortage of locally based, data, driven research on both AVM integration and student performance in food processing necessitates a methodical investigation. So as to bring about the needed changes in instruction, further professional development, compliance with institutional standards, and allocation of resources, it is necessary to know in detail how the frequency, variety, quality, and availability of AVMs affect academic achievement and skill acquisition. The present study focuses on the AVM utilization in food processing teaching and the resultant effects on Grade 9 students' attendance, performance and motivation.

Visual and audio, visual materials (AVMs) such as instructional videos, multimedia presentations, digital simulations, annotated diagrams, etc. can be very effective for teachers and students of Grade 9 Food Processing to establish a better understanding of the concepts and enhance their practical skills. Apart from explaining the complicated procedures of food preservation, sanitation practices, and processing techniques, among others, these multimedia tools make the TLE lessons more interactive and students can easily get access to the lessons. This research study intends to find out the degree/level to which visual and audio, visual materials are employed in Food Processing instruction and whether they have any impact on student's academic performance and practical competencies in Grade 9. To be more specific, the research tries to find out the frequency,

variety, quality, level of engagement, availability, and accessibility of AVMs, as well as study their statistical correlation with students pretest and posttest results. The outcomes of this inquiry may serve as a valuable basis for further instructional improvements, better management of resources, as well as teacher training in TLE.

2. Method

This descriptive–correlational study examined the use of visual and audio-visual materials (AVMs) in food processing instruction and their impact on Grade 9 students' academic performance. The descriptive component assessed AVM frequency, diversity, quality, engagement level, availability, and accessibility, while the correlational component examined AVM utilization and students' pretest and posttest scores:

- **Respondents of the Study**

The participants were Grade 9 students taking Technology and Livelihood Education (TLE) Food Processing and the teachers of these students in a secondary school in the Division of Cavite during the School Year 2025-2026. In order to collect data from all the participants, total enumeration sampling was used.

- **Research Instrument**

A researcher developed survey questionnaire served as the main data collection tool. The tool was composed of two sections: (1) the extent of utilization of the visual and audiovisual materials in terms of the frequency of use, diversity of materials used, quality and engagement level, and availability and accessibility; and (2) students' academic performance as evidenced by their pretest and posttest scores.

The instrument was content validated by experts in the subject matter and experts in research before being administered.

- **Data Gathering Procedure**

The researcher gave out survey questionnaires to teachers and students after getting permission from the school authorities.

The pretest was done before the introduction of Audio, Visual Materials in Food Processing lessons, then a multimedia, supported instruction was implemented. After the teaching phase, a posttest was given to assess the students performance changes. All questionnaires were returned, inspected for completeness, and prepared for statistical analysis.

- **Statistical Treatment of Data**

Descriptive statistics like frequency, percentage, weighted mean, and standard deviation were employed to establish the level of AVM usage. Differences between pretest and posttest scores were detected through the use of a paired sample t-test.

Pearson Product-Moment Correlation Coefficient (r) was applied to find out how the extent of AVM utilization is related to the students' academic performance. The level of significance was kept at 0.05.

3. Results and Discussion

This part reports on the research findings about the extent of the use of visual and audio, visual materials (AVMs) in Food Processing and their effect on the academic performance of Grade 9 students.

3.1. Results

An assessment was made to measure to what extent the visual and audio, visual materials were used in terms of how often

they were used, the diversity of the materials employed, the degree of quality and engagement, the availability, and the accessibility of the materials.

Table 1: Extent of Utilization of Visual and Audio-Visual Materials in Food Processing

Indicators	Mean	Interpretation
Frequency of use	3.62	Highly Utilized
Diversity of Materials	3.48	Highly Utilized
Quality and Engagement Level	3.71	Highly Utilized
Availability and Accessibility	3.35	Moderately Utilized
Overall Mean	3.54	Highly Utilized

The overall average of 3.54 signifies that AVMs are on the whole frequently used in the instruction of Food Processing. The quality and engagement level recorded the highest average (3.71), which implies that the use of multimedia materials helps to attract the students' attention and they participate more actively in the learning tasks. On the other hand, the availability and accessibility got the lowest average (3.35), which means that there are still some difficulties in resource provision.

These results are in line with a study by Nguyen (2023) ^[15] who asserted that students who had been presented with

audio, visual materials scored better on theoretical assessment tests and showed higher motivation. Also, Martinez and Santos (2023) ^[13] discovered that the use of interactive AVMs greatly enhanced student engagement and their performance of practical skills. Kim and Villanueva (2023) ^[8] additionally pointed out that the students' problem-solving abilities were improved when AV materials were used frequently and in varied ways. Taken together, these articles support the current finding that a deliberate and high-quality multimedia integration increases the impact of instruction.

3.2. Level of Performance of Grade 9 Students

The students' academic performance was measured using pretest and posttest scores.

Table 2: Pretest and Posttest Scores of Grade 9 Students

Test	Mean Score	Interpretation
Pretest	74.26	Satisfactory
Posttest	86.83	Very Satisfactory
Mean Gain	12.57	Improved

After the introduction of AVMs, a review of the results shows that the students' academic performance has been tremendously improved. The average score during the evaluation went up from 74.26 (Satisfactory) to 86.83 (Very Satisfactory), which reflects a mean increase of 12.57 points. Johnson (2023) ^[7] mentioned that students who were exposed to multimedia instructional aids had remarkable improvements in their conceptual understanding as well as their practical skills in comparison to students who had

lecture, based instruction only. This agrees with the results obtained from the experiment in the same way that Alvarez and Reyes (2023) ^[3] found that students who were provided with digital AVMs showed a higher level of performance in the practical tests which confirmed that they had a better understanding and skill mastery. From the perspective that multimedia, supported instruction brings about better academic results, these similar studies serve as additional evidence of the point made.

3.3. Test of Significant Difference Between Pretest and Posttest Scores

Table 3: Test of Significant Difference Between Pretest and Posttest Scores

Variables Compared	t-value	p-value	p-value
Pretest vs Posttest	6.85	0.000	Significant

Since the computed p, value (0.000) is less than the level of significance of 0.05, we reject the null hypothesis and state that a statistically significant difference exists between the Pre, test and Post, test scores.

Hence, the features of visual and audio, visual materials contributed significantly to the increased Academic Performance of the Students in the Food Processing Course. This is supported by the results of Fernandez and Morales

(2023) ^[4] who found that repeated exposure to various types of audiovisual materials led to very significantly higher scores in practical tests. Besides this, Tan and Lim (2023) ^[9] revealed that those students who worked with safety, oriented AVMs scored better in safety assessments. These studies' findings further support the idea that multimedia instruction is a viable option in vocational education settings.

3.4. Relationship Between Utilization of AVMs and Student Performance

The results of the analysis showed that there is a significant connection between the amount of time students spend using AVMs and their performance on the posttest. This is indicative of the fact that the use of multimedia is largely responsible for academic results, although of course other factors may also influence the level of performance.

Lim and Torres (2023)^[9] in their study, revealed that there was a significant positive correlation between the quality of audiovisual materials as perceived by the students and their level of engagement. However, Lopez and Rivera (2023) found that the regular and diverse use of multimedia resources significantly increased students' motivation and confidence. These results support the present study's conclusion that the enhancement of student learning outcomes in Food Processing is directly attributed to the productive use of quality AVMs.

4. Discussion

To maintain quality and student engagement, food processing teachers mostly rely on visual and audio, visual materials (AVMs). It means teachers employ multimedia to capture students' interest and facilitate instruction. Resource allocation and institutional support must be enhanced to get the most out of multimedia integration as the particular mean availability and accessibility are quite low. The absence of multimedia learning aids deeply disrupts the instruction of vocational classes and student participation, as noted by Ocampo and Sison (2023)^[16].

There was a marked improvement in student posttest results, thereby proving the instructional effectiveness of AVMs. Multimedia facilitates Food Processing understanding, memory, and real, life application which, in turn, raises average scores. Richard E. Mayer's Cognitive Theory of Multimedia Learning (2001)^[14] emphasizes that the use of visual and auditory channels helps overcome cognitive overload and facilitates dual coding, thereby enhancing learning. According to Nguyen (2023)^[15], theoretical test scores were raised due to audio, visual presentations. Martinez and Santos (2023)^[13] documented that the use of interactive AVMs greatly enhanced food processing students' engagement and the acquisition of skills.

The highly significant difference in pretest and posttest scores statistically indicates that academic performance has improved due to the use of AVMs. Concepts and practical skills were most likely enhanced through demonstrations, instructional videos, and guided presentations explaining the processes. Johnson (2023)^[7] revealed that the use of multimedia, assisted instruction led to a better conceptual grasp and the ability to carry out techniques by food technology students. According to Fernandez and Morales (2023)^[4], the use of multimedia frequently in a variety of ways has led to higher achievement in technical subjects and skill mastery.

Technology and Livelihood Education (TLE) Food Processing students have improved their learning with the help of visually and audibly pleasing materials that are well designed. These research findings are in line with studies showing that orderly multimedia integration increases motivation, comprehension, and performance in vocational education.

5. Conclusion

The data essentially revealed that among Grade 9 students Food Processing teachers rely heavily on visual and audio, visual materials to exemplify their explanations. The use of the latter has visually and theoretically led to a notable enhancement of pupils level of understanding if the drastic improvement in their posttest scores is taken as evidence.

There was a significant change in the test scores of students before and after the use of AVMs, thus, confirming their efficiency as teaching aids in Technology and Livelihood Education. Additionally, the use of AVM correlates significantly with student achievement thereby pointing to the increasingly vital role of multimedia incorporation in vocational teaching.

As such, the educational institutions should be urged to continue sustaining the provision and ease of access to top, rate multimedia materials as well as enable their teaching staff through training to take full advantage of AVMs in Food Processing instruction.

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