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Adequacy and Sustainability of Instructional Materials in Teaching Food Fish Processing

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Abstract

This study determined the adequacy and sustainability of instructional materials in teaching Food Fish Processing among selected public secondary schools in the Municipalities of Binangonan and Cardona, Division of Rizal, during the School Year 2025–2026. Anchored on Connectivism Theory, the study emphasized the importance of interconnected learning resources, collaboration, and the effective utilization of instructional materials in facilitating teaching and learning. It employed the descriptive method of research, involving 50 selected Technology and Livelihood Education (TLE) teachers specializing in Food Fish Processing. Data were gathered using a researcher-made questionnaire validated by experts, focusing on the adequacy and sustainability of instructional materials in terms of content relevance, availability, appropriateness, accessibility, durability, reusability, and adaptability, as well as the problems encountered in their utilization. The findings revealed that instructional materials were generally perceived as adequate and sustainable, particularly in terms of curriculum alignment, durability, and reusability. However, limitations were identified in the availability of complete tools and equipment, access to updated references, and the adaptability of materials to various instructional requirements. The analysis further revealed that age was the only profile variable that significantly influenced teachers' perceptions of the quantity and accessibility of instructional materials, while other demographic characteristics did not significantly affect their assessments. Moreover, teachers encountered moderate problems in utilizing instructional materials, particularly those associated with limited resources, insufficient training, and the need for improved instructional support. The study concluded that although existing instructional materials generally supported the delivery of Food Fish Processing lessons, improvements in resource provision, professional development, and sustainable utilization practices remained necessary. Accordingly, the study recommended strengthening the procurement and maintenance of instructional materials, providing relevant seminars and training programs for teachers, promoting responsible and innovative resource utilization, and implementing a proposed action plan to address identified instructional challenges. Further research involving additional variables and a wider respondent population was also recommended to enhance the understanding of instructional material adequacy and sustainability.

Keywords: Instructional Materials, Adequacy, Sustainability, Food Fish Processing, Technology And Livelihood Education, Descriptive Research

1. Introduction

Technical and vocational education plays an essential role in developing learners' practical competencies, employability, and entrepreneurial skills. In the Philippine basic education curriculum, Technology and Livelihood Education (TLE) provides opportunities for learners to acquire knowledge and skills applicable to real-life situations and livelihood activities. Among its specialized areas, Food Fish Processing develops competencies in fish handling, preservation, processing, packaging, and product development. Effective

instruction in this field requires not only competent teachers but also adequate, accessible, appropriate, and sustainable instructional materials that support both theoretical discussions and hands-on learning activities.

Instructional materials are essential in facilitating meaningful learning, particularly in skills-based subjects where demonstrations and practical applications are necessary. Textbooks, modules, visual aids, processing tools, laboratory equipment, and updated references enable teachers to demonstrate appropriate procedures and provide learners with opportunities to develop technical competencies. However, insufficient equipment, outdated references, and limited learning resources may constrain the implementation of practical activities and affect the quality of instruction. Thus, evaluating instructional materials should consider their availability, quantity, content relevance, appropriateness, accessibility, durability, reusability, and adaptability.

The importance of instructional resources is consistent with Connectivism Theory by Siemens (2005), which emphasizes learning through networks, connections, and access to diverse sources of knowledge. Applied to Food Fish Processing, the theory highlights the importance of integrating printed materials, digital references, actual equipment, and collaborative learning experiences to strengthen the connection between theoretical knowledge and practical competencies.

Recent studies reinforce the relationship between resource availability, laboratory management, and instructional effectiveness. Mohzana et al. (2023) examined laboratory facility management in secondary schools and found that inadequate planning, limited equipment, and insufficient materials constrained the implementation of laboratory activities. Similarly, Timbasal-Nuevo (2024) reported that deficiencies in laboratory equipment affected teachers' capacity to conduct practical activities, highlighting the importance of adequate resources and professional training. In a related study, Gonzales et al. (2025) identified gaps in laboratory equipment, accessibility, maintenance, and teacher training among public secondary schools in Ilocos Norte. These findings suggest that resource adequacy must be accompanied by effective management and teacher capacity development.

More recently, Quiaoit et al. (2025) developed and validated a laboratory manual for Technical-Vocational and Livelihood Education. Their findings established the importance of structured, relevant, and contextualized instructional materials in facilitating hands-on activities and technical skill development. This supports the need to provide teaching resources that are aligned with competencies and responsive to the practical requirements of vocational subjects.

In the Philippine setting, these concerns are supported by Republic Act No. 10533, or the Enhanced Basic Education Act of 2013, which promotes relevant, contextualized, and learner-centered instruction; Republic Act No. 7796, or the Technical Education and Skills Development Act of 1994, which strengthens competency-based technical education; and Republic Act No. 10611, or the Food Safety Act of 2013, which establishes standards for safe food handling and processing. Together, these laws emphasize the need for appropriate learning resources, practical competencies, and safe instructional practices.

Despite these policies and educational initiatives, the actual adequacy and sustainability of instructional materials in teaching Food Fish Processing require further examination. Accordingly, this study assessed teachers' perceptions of resource availability, accessibility, appropriateness, durability, reusability, and adaptability, including the problems encountered in their utilization. It also examined differences in perceptions according to selected profile variables and proposed an action plan to improve instructional resource provision and management among selected public secondary schools in Binangonan and Cardona, Rizal.

2. Material and methods

2.1 Research Design

The study employed the descriptive method of research to determine the adequacy and sustainability of instructional materials in teaching Food Fish Processing, particularly in terms of their availability, appropriateness, accessibility, durability, reusability, adaptability, and the problems encountered by teachers in their utilization.

2.2 Locale of the Study

The study was conducted in selected public secondary schools in the Municipalities of Binangonan and Cardona, Division of Rizal, where Technology and Livelihood Education teachers handling the Food Fish Processing specialization served as the primary sources of data.

2.3 Respondents of the Study
The respondents consisted of 50 selected Technology and Livelihood Education teachers specializing in Food Fish Processing from public secondary schools in Binangonan and Cardona, Rizal, during School Year 2025–2026.

2.4 Sample and Sampling Procedure
The study involved 50 teacher-respondents selected through purposive sampling based on their direct involvement and relevant teaching assignments in Food Fish Processing, ensuring that the participants could provide appropriate assessments of the instructional materials utilized in the subject.

2.5 Research Instrument
Data were collected using a researcher-made questionnaire validated by experts, which covered the respondents' profiles, adequacy and sustainability of instructional materials, and problems encountered in teaching Food Fish Processing.

2.6 Data Gathering Procedure
After securing the necessary permissions from the concerned school authorities, the researcher administered the validated questionnaires to the identified respondents, retrieved the accomplished instruments, and organized the collected data for statistical analysis while ensuring the confidentiality of responses.

2.7 Data Analysis Techniques
The gathered data were analyzed using frequency counts and percentages to describe the respondents' profiles, weighted mean to determine the levels of adequacy, sustainability, and problems encountered, and appropriate inferential statistical tests to establish significant differences in teachers' assessments when grouped according to profile variables

2.8 Ethical Considerations
The study observed research ethics by securing informed consent, ensuring voluntary participation, maintaining respondents' anonymity and confidentiality, protecting collected information, and using the gathered data exclusively for academic and research purposes.

3. Results and Discussion

3.1 Profile of the respondents
The profile of the 50 respondents revealed that the majority were 40–49 years old (34%), female (70%), married (66%), bachelor's degree holders (40%), and occupying the position of Teacher I (60%). In terms of length of service, most had 1–5 years of teaching experience (40%), while 72% had not attended any seminar or training related to Food Fish Processing. These findings indicate that although the respondents possessed varying educational qualifications and professional experiences, most had limited exposure to specialized training in the subject area. The findings are consistent with Jeresano and Dicen (2023), who emphasized the relevance of teachers' educational qualifications, professional experience, and development opportunities in strengthening instructional delivery and competency-based learning in the Technical-Vocational Livelihood track. The substantial proportion of teachers without specialized training further highlights the importance of continuous professional development to enhance their technical competencies and effective utilization of instructional materials in teaching Food Fish Processing.

3.2 Extent of Adequacy of Instructional Material in Teaching Food Fish Processing as Perceived by Themselves with Respect to the Different Aspects
The findings revealed that the extent of adequacy of instructional materials in teaching Food Fish Processing was generally perceived as Much Adequate, obtaining a composite weighted mean of 4.10. Consumption and equity in distribution ranked highest, both with a weighted mean of 4.16, followed by accessibility (4.13), while quantity ranked last (3.95), although all aspects received the same verbal interpretation. These results indicate that instructional materials are generally well-utilized, fairly distributed, and accessible to teachers; however, the comparatively lower rating for quantity suggests the need to provide additional resources to accommodate instructional and laboratory requirements. The findings imply that school administrators should sustain effective resource allocation and management while prioritizing the procurement and replenishment of tools, equipment, and other materials needed for practical activities. This is consistent with Majed and Lebuda (2022), who emphasized the importance of adequate availability, proper utilization, and equitable distribution of instructional resources in improving teaching effectiveness and facilitating meaningful learning experiences. Overall, the findings highlight that although existing instructional materials adequately support Food Fish Processing instruction, continuous resource enhancement remains necessary to ensure the effective delivery of practical competencies.

3.3 Significant Difference on the Extent of Adequacy of Instructional Material in Teaching Food Fish Processing as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

The findings revealed that age was the only profile variable that showed significant differences in teachers' perceptions of the adequacy of instructional materials, particularly in terms of quantity ($p = 0.015$) and accessibility ($p = 0.043$), both below the 0.05 level of significance. Thus, the null hypothesis was rejected for these two aspects. However, no significant differences were observed in consumption ($p = 0.089$) and equity in distribution ($p = 0.192$). Similarly, sex, civil status, educational attainment, length of service, position title, and seminars and trainings attended showed no significant differences across all four aspects, resulting in the acceptance of the null hypothesis. These findings suggest that teachers generally share similar assessments of instructional material adequacy regardless of their demographic and professional characteristics, although age-related differences may influence their perceptions of resource sufficiency and accessibility. The results imply that school administrators should consider the varying resource needs and expectations of teachers across age groups while maintaining equitable distribution and accessibility. The findings are consistent with Mahama et al. (2023) and Vi and Calanza (2023), which highlighted the possible influence of demographic characteristics, particularly age, on teachers' perceptions and utilization of instructional resources..

3.4 Extent of Sustainability of Instructional Material in Teaching Food Fish Processing as Perceived by Themselves with Respect to the Different Aspects

The findings revealed that the extent of sustainability of instructional materials in teaching Food Fish Processing was generally perceived as Much Adequate, obtaining a composite weighted mean of 4.22. Environmental impact ranked first with a weighted mean of 4.29, followed by recyclability (4.28), durability (4.20), and reusability and cost-effectiveness, both obtaining 4.17. These results indicate that instructional materials are generally considered environmentally responsible, recyclable, durable, and economically practical for instructional purposes. The high ratings for environmental impact and recyclability suggest that teachers recognize the importance of responsible resource utilization and environmentally sustainable practices, while the comparatively lower ratings for reusability and cost-effectiveness indicate opportunities to maximize the repeated use of materials and improve resource management. The findings imply that schools should strengthen practices involving material conservation, equipment maintenance, recycling, and cost-efficient procurement to sustain the quality of practical instruction. These results are consistent with the sustainability principles discussed by Filimonau and Naus (2023), particularly the importance of environmental responsibility, waste reduction, and efficient resource utilization in promoting sustainable institutional practices. Overall, the findings emphasize that sustainable instructional material management requires balancing environmental considerations, economic efficiency, and long-term usability.

3.5 Significant Difference on the Extent of Sustainability of Instructional Material in Teaching Food Fish Processing as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

The findings revealed that there were no significant differences in teachers' perceptions of the sustainability of instructional materials in teaching Food Fish Processing when grouped according to age, sex, civil status, educational attainment, length of service, position title, and seminars and trainings attended. All computed p-values for reusability, cost-effectiveness, environmental impact, durability, and recyclability were greater than the 0.05 level of significance; hence, the null hypothesis was accepted across all profile variables. These results indicate that teachers generally share similar perceptions regarding the sustainability of instructional materials, regardless of their demographic and professional backgrounds. The findings further suggest that sustainable resource utilization, maintenance, recycling, and cost management are commonly recognized practices among the respondents. This implies that school administrators should continue implementing consistent resource management policies and sustainability initiatives that benefit all teachers. The results are supported by Almalki et al. (2023), who emphasized the importance of institutional policies and organizational practices in promoting sustainability within educational settings. Overall, the findings suggest that teachers' perceptions of instructional material sustainability are relatively consistent and are not significantly influenced by their individual profile characteristics.

3.6 Extent of the Problems Encountered by the Respondents in Teaching Food Fish Production

The findings revealed that respondents sometimes encountered problems in teaching Food Fish Processing, obtaining an overall weighted mean of 3.44. The most frequently encountered problem was the lack of teacher training related to the utilization of instructional materials (WM = 3.72), verbally interpreted as Often, followed by limited budget for purchasing materials (WM = 3.56), also interpreted as Often. Poor maintenance of tools and equipment ranked third (WM = 3.48), while limited administrative support for material procurement ranked last (WM = 3.28), interpreted as Sometimes. These results indicate that although instructional materials are generally perceived as adequate and sustainable, challenges remain in strengthening teachers' technical competencies, ensuring sufficient financial resources, and maintaining available equipment. The findings imply the need for regular capability-building programs, strategic budget allocation, and systematic equipment maintenance to improve the delivery of practical instruction. Moreover, the limited participation in specialized training reported

in the respondents' profile reinforces the need to prioritize professional development in Food Fish Processing. Overall, the findings suggest that addressing teachers' training needs and resource constraints is essential to sustaining the effectiveness of instructional material utilization and improving competency-based teaching.

4. Conclusion & Recommendations

The study concluded that instructional materials in teaching Food Fish Processing were generally perceived as much adequate and sustainable in terms of availability, utilization, equitable distribution, accessibility, reusability, cost-effectiveness, environmental impact, durability, and recyclability. Age was the only profile variable that significantly influenced teachers' perceptions of the quantity and accessibility of instructional materials, while other demographic and professional characteristics showed no significant differences. Despite the favorable assessments, teachers still encountered challenges, particularly insufficient training, limited budgets, and inadequate maintenance of tools and equipment. These findings indicate that although existing instructional resources generally support practical instruction, continuous improvements in resource provision, management, and teacher development remain necessary.

Based on these conclusions, school administrators should strengthen the procurement, distribution, accessibility, and maintenance of instructional materials, tools, and equipment for Food Fish Processing. Teachers should be provided with relevant seminars, workshops, and capability-building programs to enhance their technical competencies and skills in developing and utilizing instructional resources. Sustainable practices, including proper equipment maintenance, material reuse, recycling, and environmentally responsible resource management, should also be promoted in classroom and laboratory activities. Furthermore, the proposed action plan should be implemented to address identified instructional challenges, particularly limited training opportunities and resource constraints. Future researchers may explore additional variables, employ broader respondent populations, and examine other technical-vocational specializations to further establish the adequacy and sustainability of instructional materials in competency-based education.

5. Compliance with ethical standards

The authors affirm that no conflicts of interest exist in relation to this study. The research was conducted in accordance with accepted ethical principles for human-participant research, including obtaining informed consent, ensuring voluntary participation, allowing participants to withdraw at any stage without consequence, and protecting participant confidentiality through anonymous, secure, and aggregated data management. Because the study examined psychological well-being, all research procedures were non-invasive and implemented with appropriate measures to reduce the risk of discomfort. Participants were informed of available support services should the need arise. Furthermore, the necessary institutional approvals were obtained for the administration of the research instruments and access to relevant academic records.

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