

## Blending tradition and technology: An instructional video for baking indigenous-ingredient tarts

Belinda I. Paroginog

Kinalangay Viejo Integrated School, Malinao, Aklan, Philippines

Corresponding Author e-mail: [belinda.paroginog@deped.gov.ph](mailto:belinda.paroginog@deped.gov.ph)

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### Abstract

**Aim:** This study developed and evaluated an instructional video on baking tarts infused with indigenous ingredients, specifically marang and malunggay, to enhance the technical-vocational skills of senior high school students in the Bread and Pastry Production course.

**Methodology:** Guided by Kolb's Experiential Learning Theory, the study employed a developmental research design involving 20 Grade 11 students and 4 Technology and Livelihood Education-Technical Vocational Livelihood (TLE-TVL) teachers from Rosario National High School. Pre- and post-assessments using a modified TESDA Competency Self-Assessment Guide were conducted to measure changes in learners' knowledge and skills. Focus group discussions were also utilized to examine students' learning experiences after viewing the instructional video.

**Results:** Findings revealed a significant improvement in students' self-assessed competencies, increasing from "Moderately Competent" ( $M = 3.16$ ) to "Highly Competent" ( $M = 4.67$ ) after viewing the instructional video, with a statistically significant difference ( $p < .001$ ). Panelists also observed improvements in students' competencies; however, the difference was not statistically significant ( $p = .11$ ). Qualitative results indicated that students perceived the instructional video as clear, engaging, culturally relevant, and helpful in understanding baking procedures.

**Conclusion:** The study concludes that well-designed instructional videos can effectively enhance skill acquisition, learner engagement, and appreciation of indigenous resources. These findings highlight the potential of video-based instructional materials as supplemental tools for improving teaching strategies and learning outcomes in Technical-Vocational Livelihood education.

**Keywords:** *instructional video; indigenous ingredients; skill acquisition; video-based instruction*

### INTRODUCTION

The Technical-Vocational Livelihood – Home Economics (TVL-HE) program is strategically designed to equip senior high school students with the specialized competencies and motivation necessary for self-reliance and global employability. However, despite the practical utility of these courses, a significant pedagogical and cultural gap persists in the current instructional landscape. While TVL programs aim to address real-world needs, technical-vocational skills are frequently undervalued by students who perceive greater prestige in alternative academic tracks. This issue is compounded by a growing detachment from local heritage; the integration of indigenous ingredients in baking curricula is steadily declining as imported, standardized components become the default in classroom settings. Furthermore, a methodological stagnation exists at institutions like Rosario National High School, where instruction remains tethered to traditional, synchronous demonstrations. Teachers often bypass the development of innovative video-based instruction (VBI) due to perceived time constraints and a reliance on conventional "live" methods, leaving an urgent need to bridge the gap between traditional teaching and modern instructional technology.

In a global context, the shift toward Technology-Enhanced Learning (TEL) in vocational education has accelerated. Video-based tutorials are highly effective in improving students' baking skills, as the format allows for the visualization of step-by-step processes with the flexibility to pause and rewind, which facilitates the comprehension of complex techniques. This aligns with international culinary trends that prioritize "hyper-localism,"



where indigenous food systems are revitalized to strengthen cultural continuity and food biodiversity (Kuhnlein & Chotiboriboon, 2022). However, despite the increasing adoption of video-based instruction in vocational education, limited studies have examined its effectiveness in integrating indigenous ingredients in bread and pastry production courses.

Nationally, the Philippine Department of Education encourages the contextualization and localization of the curriculum; yet, research highlights that students still face a "continuity gap" in skills transitioning and a lack of localized digital content (Domingo & Mina, 2024). At the local level, students at Rosario National High School remain primarily exposed to traditional classroom paradigms, leaving the abundance of community-based indigenous ingredients as an untapped pedagogical resource. This study addresses these deficiencies by proposing a framework that marries modern digital instructional design with the promotion of local agricultural products. By doing so, the research provides a transformative contribution to technical-vocational education through the validation of indigenous resources, advances instructional design via specialized VBI for kinesthetic learners, and promotes technology-enhanced learning as a viable, flexible solution for resource-constrained educational environments.

## Review of Related Literature

Recent research consistently demonstrates that instructional videos are superior to traditional "one-time" demonstrations in vocational settings. Muhariati (2017) found that video clips significantly improved sweet bread production skills, noting a 32.5% improvement in learner performance from pretest to posttest. The primary advantage lies in the "visualization of step-by-step processes," which allows students to pause and rewind, thereby reducing cognitive overload when learning complex manual techniques (Aboc, 2024). Furthermore, Javier and Java (2025) reports that students exposed to VBI in Cookery outperformed those in traditional groups not only in cognitive knowledge but also in psychomotor outcomes, proving that digital media effectively bridges the gap between theory and actual kitchen performance.

The shift toward "hyper-localism" in culinary education aims to strengthen cultural continuity and food biodiversity (Kuhnlein & Chotiboriboon, 2022). In the Philippines, despite the Department of Education's mandate to localize the curriculum, a "continuity gap" persists due to a lack of localized digital content (Domingo & Mina, 2024). This is particularly evident in Bread and Pastry Production (BPP), where instructional materials often rely on Western-style recipes rather than community-based resources. Rabi and Alo (2025) emphasize that integrating indigenous knowledge systems (IKS) into formal science and vocational training is essential for "culturally responsive education" and sustainable development.

The selection of *marang* and *malunggay* (*Moringa oleifera*) as tart ingredients is supported by their high nutritional profiles. Bahauddin et al. (2025) highlights *malunggay* as a "superfood" rich in Vitamin A, Iron, and Calcium, which can significantly improve the nutritional status of consumers when processed safely. Research in 2024 and 2025 has focused on incorporating *malunggay* into bakery products like biscuits and cakes to enhance their "nutraceutical" value, though studies note that careful formulation is needed to maintain sensory acceptability regarding taste and texture (Hodas et al., 2021).

The gathered literature underscores a clear consensus: while video-based instruction (VBI) is an empirically proven tool for enhancing technical skills in bread and pastry production, there is a significant lack of specialized content that features indigenous ingredients like *marang* and *malunggay*. Current trends in "hyper-localism" and the Philippine government's push for "contextualized learning" provide a strong theoretical foundation for this study. By developing a VBI framework that focuses on local tarts, this research directly addresses the "continuity gap" identified in 2024, merging modern instructional design with the preservation and promotion of local agricultural biodiversity.

## Theoretical Framework

This study is theoretically anchored in David A. Kolb's Experiential Learning Theory (ELT), which conceptualizes learning as a continuous process where knowledge is created through the transformation of experience (Kolb, 1984). As synthesized by Kurt (2020), ELT posits that mastery is achieved when learners move beyond rote memorization to apply abstract concepts within authentic, real-world contexts. In the Technical-Vocational Livelihood (TVL) domain, Video-Based Instruction (VBI) serves as a potent pedagogical vehicle for this transformation, facilitating Kolb's four-stage cycle by providing a structured yet flexible medium for skill acquisition.

Initially, VBI facilitates Concrete Experience (CE) by providing high-fidelity visual and auditory surrogates for physical demonstrations; by observing the integration of indigenous ingredients in a professional baking sequence, students engage in a vicarious experience that is consistently replicable. This leads to Reflective Observation (RO),

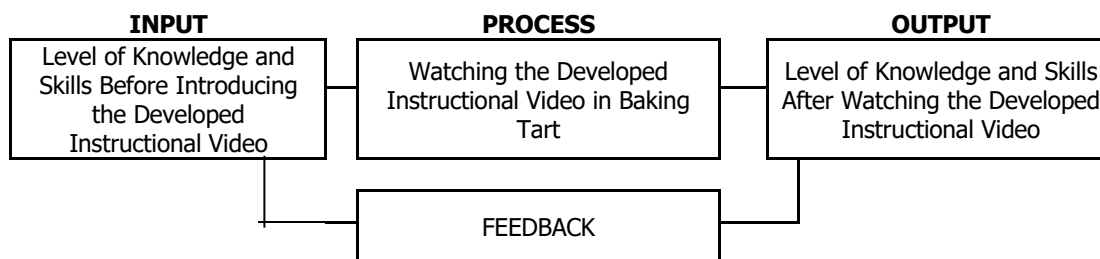


where the digital affordances of video, specifically the ability to pause and rewind, encourage learners to scrutinize technical nuances, such as dough consistency and crumb texture, which are often missed in traditional live demonstrations. Furthermore, the instructional scaffolding within the video, such as expert narration and on-screen cues, aids in Abstract Conceptualization (AC), allowing students to synthesize observations into logical culinary theories regarding the chemical properties of native substitutes. Finally, the cycle culminates in Active Experimentation (AE) as students transition to the baking laboratory, using the VBI as a persistent reference guide to physically manipulate local materials and validate their conceptual understanding through practice. By utilizing VBI as a pedagogical bridge, this research argues that experiential learning is significantly enhanced by technology that fosters deeper cognitive engagement and the seamless integration of localized heritage into vocational excellence.

### Conceptual Framework

Anchored in David A. Kolb's Experiential Learning Theory, the study was systematically organized according to the four sequential phases of experiential learning: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The concrete experience entailed the development of, and engagement with, an instructional video demonstrating the preparation of tart products incorporating indigenous ingredients. Reflective observation was manifested as students viewed the video and underwent assessment to evaluate the knowledge and skills they acquired. Abstract conceptualization corresponded to the formulation of learning outcomes derived from students' experiences and assessment performance. Active experimentation was evident in the planning, implementation, and pilot testing of the developed instructional video.

Within the study's conceptual framework, the tart infused with indigenous ingredients functioned as the input, while the instructional video on baking Marang tart constituted the process. The output was defined as the students' level of knowledge and skills, particularly in the preparation of tart products incorporating Marang and Malunggay. Upon completion of the viewing activity, students offered feedback and recommendations for enhancing the instructional material, thereby completing the experiential learning cycle.



### Statement of the Problem

Technical-Vocational Livelihood (TVL) education aims to equip students with practical competencies that can prepare them for employment and entrepreneurial opportunities. In the Bread and Pastry Production course, students are expected to develop technical knowledge and practical baking skills that can be applied in real-life situations. However, despite the importance of these competencies, instructional practices in many technical-vocational classes still rely heavily on traditional demonstrations and face-to-face instruction, with limited integration of multimedia learning tools such as instructional videos.

The use of instructional videos in technical-vocational education has the potential to enhance students' understanding of procedures, reinforce demonstrations, and support independent learning. In addition, integrating indigenous ingredients in baking activities may promote cultural relevance, resource utilization, and community-based livelihood opportunities. However, in many learning environments, including Rosario National High School, video-based instructional materials for baking using indigenous ingredients remain limited.

Moreover, students' knowledge and skills in baking tarts infused with indigenous ingredients have not been systematically examined before and after the use of instructional video materials. There is therefore a need to develop and evaluate an instructional video that can support the teaching of baking techniques while promoting the use of locally available ingredients such as marang and malunggay. Assessing the effectiveness of such instructional tools may provide insights into improving teaching strategies and enhancing students' learning experiences in Bread and Pastry Production courses.

This study was conducted to develop and evaluate an instructional video for baking tarts infused with indigenous ingredients and to determine its effectiveness in improving the knowledge and skills of senior high school students.

### General Objective

To develop and evaluate an instructional video on baking tarts infused with indigenous ingredients to enhance the knowledge and skills of senior high school students in Bread and Pastry Production.

### Specific Objectives

1. To determine the level of students' knowledge and skills in baking tarts infused with indigenous ingredients before introducing the developed instructional video, as assessed by the students and Technology and Livelihood Education–Technical Vocational Livelihood (TLE–TVL) teachers.
2. To develop an instructional video that can enhance students' learning in baking tarts infused with indigenous ingredients.
3. To determine the level of students' knowledge and skills after watching the developed instructional video, as assessed by the students and TLE–TVL teachers.
4. To determine whether there is a significant difference in the students' level of knowledge and skills before and after watching the developed instructional video.
5. To explore the effects of the instructional video on students' learning experiences in baking tarts infused with indigenous ingredients.

### Research Questions

This study sought to answer the following questions:

1. What is the level of students' knowledge and skills in baking tarts infused with indigenous ingredients before the introduction of the developed instructional video, as assessed by the students and TLE–TVL teachers?
2. What instructional video can be developed to enhance students' learning in baking tarts infused with indigenous ingredients?
3. What is the level of students' knowledge and skills after watching the developed instructional video, as assessed by the students and TLE–TVL teachers?
4. Is there a significant difference in the students' level of knowledge and skills before and after watching the developed instructional video?
5. How do students describe their learning experiences after viewing the instructional video on baking tarts infused with indigenous ingredients?

### Hypothesis

1. There is no significant difference in the level of students' knowledge and skills in baking tarts infused with indigenous ingredients before and after watching the developed instructional video.

## METHODS

### Research Design

The study adopted a developmental research design, which is particularly suited for generating systematic knowledge to refine instructional design, development, and evaluation processes, as emphasized by Ibrahim. Consistent with the perspective of Richey and Nelson (2020), developmental research entails the concurrent implementation and examination of instructional design, development, and evaluation activities. In the present study, this approach encompassed the creation of an instructional video, the administration of pre- and post-assessments to measure students' knowledge and skills in baking, the application of hypothesis testing, and the analysis of the effects of video-based instruction on learning outcomes.

To strengthen the rigor and comprehensiveness of the inquiry, the study further employed a mixed-methods approach, integrating both quantitative and qualitative strands of data. This design was particularly appropriate because the study sought not only to measure changes in students' knowledge and skills through objective assessments, but also to capture the depth of their learning experiences, perceptions, and responses to the instructional material. The quantitative component enabled the researcher to determine the effectiveness of the instructional video through statistical analysis of pre- and post-test results, thereby providing empirical evidence of learning gains. In contrast, the qualitative component allowed for an in-depth exploration of participants' behaviors, perspectives, and experiences, offering contextual insights that could explain and enrich the numerical findings. As

noted by Ayton (2023), a qualitative descriptive design is highly effective for mapping out unfamiliar research territories where the primary objective is to gain a comprehensive overview of a specific area of study.

### Population and Sampling

The study was conducted at Rosario National High School and involved two distinct groups of participants, each with clearly defined roles. The primary respondents consisted of twenty (20) Grade 11 students enrolled in the Technical-Vocational-Livelihood (TVL) – Home Economics strand, specifically those taking Bread and Pastry Production. These student participants served as the main source of quantitative and experiential data, as they engaged directly with the instructional video, completed the pre- and post-assessments, and participated in focus group discussions to share their learning experiences and insights.

Purposive sampling was employed to ensure that the selected student respondents possessed the relevant background, competencies, and exposure aligned with the objectives of the study. Their inclusion was based on their enrollment in the specified specialization and their capacity to actively participate in all required research activities.

In addition, four (4) teachers specializing in Technology and Livelihood Education (TLE) and Technical-Vocational-Livelihood (TVL) – Home Economics were designated as teacher-evaluators. Their role was to provide expert evaluation and professional judgment regarding the quality, relevance, and instructional soundness of the developed video material. They also contributed to the validation of the study's instruments and outputs, thereby strengthening the credibility of the findings.

To ensure consistency and feasibility in data collection, all participants both student respondents and teacher-evaluators were required to be affiliated with Rosario National High School and available to attend the scheduled focus group sessions. This criterion ensured active participation and the completeness of data necessary for the study.

### Instruments

The study utilized a modified version of the Technical Education and Skills Development Authority (TESDA) Competency Self-Assessment Guide to measure students' levels of knowledge and skills. While the instrument was grounded in established TESDA competency standards, selected domains and statements were carefully revised to ensure closer alignment with the specific objectives and context of the study, particularly in relation to baking tarts infused with indigenous ingredients. The instrument was administered as both a pre-assessment and post-assessment tool, enabling the systematic evaluation of changes in students' competencies following exposure to the researcher-developed instructional video.

To establish content validity, the modified instrument underwent expert review by Food Service Management instructors, who evaluated its relevance, clarity, and alignment with intended learning outcomes. Their recommendations were subsequently incorporated, resulting in a more refined and contextually appropriate assessment tool.

Furthermore, the reliability of the instrument was ensured through pilot testing, conducted via a dry run with ten (10) Grade 12 students who were not included in the actual study. Using the Cronbach alpha, the result was .7996 considered reliable. This procedure allowed the researcher to assess the consistency, clarity, and internal coherence of the instrument, as well as to identify and address any ambiguities or issues prior to its formal administration. Collectively, these validation and reliability procedures enhanced the rigor and trustworthiness of the data collection instrument used in the study.

### Data Collection

Prior to data collection, formal authorization to conduct the study was obtained from relevant educational authorities, including the Department of Education – Schools Division of Aklan, the Public Schools District Supervisor, the Senior Education Program Specialist, as well as the school head, validators, participants, and teacher-evaluators.

The study was implemented over a five-month period, from November 2022 to March 2023, following a structured and sequential procedure. The process commenced with the planning phase, which involved the preparation and validation of research instruments and instructional materials. This was followed by the administration of the pre-assessment to establish baseline data on students' knowledge and skills. Subsequently, the intervention phase was carried out, consisting of the demonstration and presentation of the researcher-developed instructional video.

After the intervention, a post-assessment was conducted to measure changes in students' competencies. The data collection process concluded with focus group discussions, which provided qualitative insights into



participants' experiences and perceptions. This systematic sequence ensured the organized implementation of the study and the comprehensive collection of both quantitative and qualitative data.

### Treatment of Data

The gathered data were recorded, tallied, coded, and encoded using the SPSS software version 22.0. The descriptive statistics of the weighted mean was used to analyze the data. To describe the level of knowledge and skills learned by the participants and the experience of panelists before introducing and after watching the developed instructional video on baking tart infused with indigenous ingredients (Marang and Malunggay), the following scales and interpretations were used:

Table 1: Competency Level Interpretation Scale

Numerical Value	Range	Competency Level	Interpretation
5	4.50-5.00	Highly Competent	Demonstrates an excellent level of knowledge and skills in baking
4	3.50-4.49	Competent	Demonstrates a very good level of knowledge and skills in baking
3	2.50-3.49	Moderately Competent	Demonstrates a good level of knowledge and skills in baking
2	1.50-2.49	Slightly Competent	Demonstrates a fair level of knowledge and skills in baking
1	1.00-1.49	Not Competent	Demonstrates a poor level of knowledge and skills in baking

Inferential statistical analysis, specifically the t-test, was employed to determine whether a statistically significant difference existed in students' levels of knowledge and skills in baking tarts infused with indigenous ingredients before and after exposure to the developed instructional video. The level of significance was set at  $\alpha = 0.05$ , which served as the criterion for the acceptance or rejection of the null hypothesis.

To complement the quantitative findings and provide a more comprehensive evaluation of the instructional intervention, focus group discussions were conducted to elicit participants' opinions, observations, and suggestions regarding their learning experiences. The qualitative data obtained were systematically analyzed, synthesized, and organized into coherent themes, and subsequently presented in textual form to support and enrich the interpretation of the statistical results.

### Ethical Considerations

The conduct of the study was guided by established ethical principles to ensure fairness, respect, and the protection of all participants throughout the research process. Prior to participation, respondents were fully informed of the purpose, procedures, and intended benefits of the study, thereby upholding the principle of informed consent. As the participants were Grade 11 students, parental consent was formally secured through the distribution of permission letters, ensuring that participation was both authorized and ethically compliant.

Participation in the study was strictly voluntary, and respondents were made aware of their right to decline or withdraw at any stage without consequence. Furthermore, the researcher implemented measures to safeguard participants' privacy and confidentiality by ensuring that all personal information and responses were anonymized and used solely for academic and research purposes. These protocols collectively ensured that the rights, welfare, and dignity of the participants were adequately protected.

## RESULTS and DISCUSSION

This chapter presents the gathered data, the results of the statistics, analysis and the interpretation of the findings were conducted. The presentation of collected data was based on the sequence on the statement of the problem.

### Level of Knowledge and Skills Learned by the Students Before Presenting the Developed Instructional Video as Assessed by Themselves and Panelists

Table 2. Students' pre-self-assessment on the knowledge and skills before introducing the developed instructional video in baking tart as a whole

Knowledge and Skills	Mean	Description
<b>Preparation and selection of baking equipment, tools, utensils, and materials</b>	<b>3.48</b>	<b>Moderately Competent</b>
Select and use appropriate equipment, tools, and utensils.	3.35	Moderately Competent
Assemble and disassemble cleaning equipment safely.	3.60	Competent
Store or stack clean equipment, supplies, and utensils safely in the designated place in accordance with instructions.	3.70	Competent
Select and use suitable packaging materials to preserve taste, appearance, and tasting characteristics.	3.25	Moderately Competent
<b>Preparation of dessert</b>	<b>2.98</b>	<b>Moderately Competent</b>
Select, measure and weigh ingredients according to recipe requirements.	3.20	Moderately Competent
Prepare variety of flavors according to standard mixing procedures/formula/recipes and desire aromatic characteristics.	3.05	Moderately Competent
Select oven temperature to bake products in accordance with desired characteristics, recipes specifications, and practices.	2.90	Moderately Competent
Bake products according to techniques and appropriate conditions, and requirement and standards.	2.70	Moderately Competent
Prepare variety of desserts according to recipe specification, desired characteristics, and standard operating procedures.	2.95	Moderately Competent
Select and prepares fillings.	3.05	Moderately Competent
Assemble tarts and fillings ingredients according to quantity, type, and quality required.	2.90	Moderately Competent
Prepare ingredients based on the required form and time frame.	3.05	Moderately Competent
Taste prepares desserts in accordance with the required taste.	3.00	Moderately Competent
<b>Presentation of dessert</b>	<b>3.03</b>	<b>Moderately Competent</b>
Decorate and present products.	3.30	Moderately Competent
Plate and decorate a variety of dessert products.	2.90	Moderately Competent
Observe environmental requirements for food packaging.	3.05	Moderately Competent
Demonstrate knowledge on varieties and characteristics of desserts.	2.95	Moderately Competent
Observe factors in plating and presenting dessert.	3.10	Moderately Competent
Present dessert hygienically, logically, sequentially within the required time frame and decorated creatively.	2.95	Moderately Competent
Plate and portion desserts according to standards.	2.90	Moderately Competent
Store dessert at the appropriate temperature and correct conditions to maintain quality, freshness and appeal to the observers.	3.05	Moderately Competent
<b>Overall Mean</b>	<b>3.16</b>	<b>Moderately Competent</b>

The pre-assessment results reveal that students exhibited an overall level of "Moderately Competent" (M = 3.16) in baking tarts infused with indigenous ingredients, indicating that while foundational knowledge and basic skills are present, a higher level of proficiency has yet to be achieved. Students performed relatively better in routine



and procedural tasks, such as the proper handling and storage of equipment; however, they demonstrated only moderate competence in more complex domains, particularly in dessert preparation ( $M = 2.98$ ) and presentation ( $M = 3.03$ ). These areas require greater precision, procedural understanding, and creative execution, suggesting a gap between conceptual knowledge and practical application.

This finding aligns with the observations of Easterbrook-Smith (2020), who emphasized that many learners entering baking-related fields often lack sufficient preparation for tasks that demand advanced technical knowledge and hands-on competence. The moderate performance across key skill areas in this study reflects this broader issue, where limited exposure and practice constrain students' ability to fully develop their competencies.

From an educational perspective, these results underscore the importance of structured and experiential instructional strategies to support skill acquisition. The findings reinforce the need for interventions such as the use of instructional video demonstrations that provide clear modeling of procedures and opportunities for guided learning. By addressing the identified gaps in preparation and presentation skills, such interventions can facilitate the transition from basic understanding to applied competence, ultimately enhancing students' readiness for performance-based tasks in technical-vocational contexts.

Table 3. Students' Knowledge and Skills in Baking Tart Infused with Indigenous Ingredients as Assessed by the Teacher-Evaluators Before Introducing the Developed Instructional Video

Knowledge and Skills	Mean	Description
<b>Preparation and selection of baking equipment, tools, utensils, and materials</b>	<b>3.25</b>	<b>Moderately Competent</b>
Select and use appropriate equipment, tools, and utensils.	3.25	Moderately Competent
Assemble and disassemble cleaning equipment safely.	3.50	Competent
Store or stack clean equipment, supplies and utensils safely in the designated place in accordance with instructions.	3.00	Moderately Competent
<b>Preparation of dessert</b>	<b>2.92</b>	<b>Moderately Competent</b>
Select, measure and weigh ingredients according to recipe requirements.	3.00	Moderately Competent
Select oven temperature to bake products in accordance with desired characteristics, recipes specifications, and practices.	3.00	Moderately Competent
Bake products according to techniques and appropriate conditions, and requirement and standards.	3.00	Moderately Competent
Select and prepare fillings.	3.00	Moderately Competent
Assemble tarts and fillings ingredients according to quantity, type, and quality required.	3.00	Moderately Competent
Prepare ingredients based on the required form and time frame.	2.50	Moderately Competent
<b>Presentation of dessert</b>	<b>2.69</b>	<b>Moderately Competent</b>
Decorate and present products.	2.50	Moderately Competent
Observe environmental requirements for food packaging.	2.75	Moderately Competent
Present dessert hygienically, logically, sequentially within the required time frame and decorated creatively.	2.50	Moderately Competent
Plate and portion desserts according to standards.	2.50	Moderately Competent
Store dessert at the appropriate temperature and correct conditions to maintain quality, freshness and appeal to the observers.	3.00	Moderately Competent
<b>Overall Mean</b>	<b>2.95</b>	<b>Moderately Competent</b>

The teacher-evaluators' pre-assessment indicates that students demonstrated an overall level of "Moderately Competent" ( $M = 2.95$ ) in baking tarts infused with indigenous ingredients, reinforcing the findings from the students' self-assessment. While learners exhibited relative strength in routine tasks particularly in the safe assembly, disassembly, and cleaning of equipment, these competencies were largely attributed to repeated exposure and habitual practice in maintaining sanitation standards. In contrast, more complex domains such as dessert preparation ( $M = 2.92$ ) and presentation ( $M = 2.69$ ) remained less developed, reflecting limitations in students' procedural understanding, precision, and creative application.

Teacher-evaluators particularly noted inconsistencies in executing critical baking processes, including ingredient preparation within appropriate time frames, proper plating and portioning, and the logical and aesthetic

presentation of finished products. These gaps suggest that students' competencies are still confined to basic operational skills rather than higher-order performance abilities required in authentic baking contexts.

Educationally, these findings are significant as they highlight the need for instructional approaches that go beyond routine practice and actively support deeper knowledge construction and skill integration. This observation is consistent with the assertions of Ou et al. (2018), who emphasized that effective instruction must provide meaningful learning experiences that enable learners to construct and apply knowledge in practical contexts. The panelists' evaluation underscores the importance of incorporating structured, experience-based interventions such as guided demonstrations and instructional videos to enhance students' competence in complex tasks. Such approaches can strengthen both conceptual understanding and practical execution, thereby improving learners' overall performance and increasing educators' confidence in students' readiness for more advanced baking activities.

Table 4. Distribution of Students' Knowledge and Skills in Baking Tart Before Introducing the Developed Instructional Video as Assessed by Themselves and Teacher-Evaluators Taken as a Whole

Pre-self Assessment in the Level of Skills and Knowledge	Students n=20	Respondents of the Study		
		%	Panelist n=4	%
Competent (3.50-4.49)	4	20.00	0	0.00
Moderately Competent (2.50-3.49)	16	80.00	4	100.00
<b>Mean</b>	<b>3.16</b>		<b>2.95</b>	
<b>Description</b>	<b>Moderately Competent</b>		<b>Moderately Competent</b>	

Table 4 presents a consolidated view of students' pre-assessment levels in baking tarts infused with indigenous ingredients, integrating both self-assessment and teacher-evaluators' evaluations. The results show that the majority of students (80%, n = 16) rated themselves as "Moderately Competent," while a smaller portion (20%, n = 4) perceived themselves as "Competent." In comparison, all panelists (100%, n = 4) consistently rated students as "Moderately Competent." The overall mean scores were 3.16 for students and 2.95 for panelists, confirming that, prior to the intervention, students possessed a foundational yet limited level of baking knowledge and skills.

These findings have important educational implications. The predominance of moderate competency highlights the need for structured, hands-on instructional strategies that can reinforce skill acquisition and bridge gaps between theoretical understanding and practical performance. This is consistent with the observations of Lavelle et al. (2019), who emphasize that effective skill development in culinary contexts requires not only knowledge but also confidence, sustained practice, positive attitudes, and passion for cooking. Accordingly, the results underscore the necessity of interventions such as the researcher-developed instructional video that can provide guided, experiential learning opportunities to enhance students' baking competence and readiness for advanced culinary tasks.

### Instructional Video Developed to Enhance the Learning of Student in Baking Tart Infused with Indigenous Ingredients

Data from both students' and teachers' self-assessments were collected and encoded into computer software for analysis of the pre-assessment results.

**Planning.** The instructional video was developed through observation of baking videos on YouTube and Facebook, consultation of books, and gathering information from Home Economics teachers. The study used Marang fruit, a seasonal and abundant local fruit in Malinao, available from October to December and found around Rosario National High School, as the indigenous ingredient for the tarts.

**Execution.** The instructional video consisted of two parts. The first part, lasting 5 minutes and 41 seconds, presented the learning objectives, baking terminologies, tools and equipment for making Marang tart, and common baking techniques. The second part, lasting 8 minutes and 1 second, covered the description of Marang, preparation of tart shell dough, making tart filling, use of Marang seeds, tart baking process, and the benefits and significance of each component. According to Poquet et al., (2018), that it is very important to select a video production that is appropriate for learning objectives, and content presentation.

**Enhancement of instructional video.** Although the video was recorded only once, it underwent multiple rounds of editing using KineMaster ProX+ and other video editing software. After finalization, the instructional video was shown to the respondents and used as a tool to assess their knowledge and skills in baking tarts infused with indigenous ingredients. The significance of instructional video according to Poquet et al., (2018) provide a preliminary overview of the effects on diverse learning outcomes, including the effect of manipulating video presentation, learning tasks, and the way content is structured, and communicated.

### Post Student Self-Assessment on the Level of Knowledge and Skills After Watching the Developed Instructional Video in Baking Tart Infused with Indigenous Ingredients Assessed by Themselves and the Panelists

Table 5. Students' Post Self-Assessment on the Knowledge and Skills After Watching the Developed Instructional Video in Baking Tart Infused with Indigenous Ingredients as Assessed by Themselves

Knowledge and Skills	Mean	Description
<b>Preparation and selection of baking equipment, tools, utensils, and materials</b>	<b>4.65</b>	<b>Highly Competent</b>
Select and use appropriate equipment, tools, and utensils.	4.75	Highly Competent
Assemble and disassemble cleaning equipment safely.	4.50	Highly Competent
Store or stack clean equipment, supplies and utensils safely in the designated place in accordance with instructions.	4.65	Highly Competent
Select and use suitable packaging materials to preserve taste, appearance, and tasting characteristics.	4.70	Highly Competent
<b>Preparation of dessert</b>	<b>4.66</b>	<b>Highly Competent</b>
Select, measure and weigh ingredients according to recipe requirements.	4.85	Highly Competent
Prepare variety of flavors according to standard mixing procedures/formula/recipes and desire aromatic characteristics.	4.75	Highly Competent
Select oven temperature to bake products in accordance with desired characteristics, recipes specifications, and practices.	4.70	Highly Competent
Bake products according to techniques and appropriate conditions, and requirement and standards.	4.50	Highly Competent
Prepare variety of desserts according to recipe specification, desired characteristics, and standard operating procedures.	4.40	Competent
Select and prepares fillings.	4.65	Highly Competent
Assemble tarts and fillings ingredients according to quantity, type, and quality required.	4.70	Highly Competent
Prepare ingredients based on the required form and time frame.	4.65	Highly Competent
Taste prepare desserts in accordance with the required taste.	4.75	Highly Competent
<b>Presentation of dessert</b>	<b>4.70</b>	<b>Highly Competent</b>
Decorate and present products.	4.85	Highly Competent
Plate and decorate a variety of dessert products.	4.45	Competent
Observe environmental requirements for food packaging.	4.70	Highly Competent
Demonstrate knowledge on varieties and characteristics of desserts.	4.65	Highly Competent
Observe factors in plating and presenting dessert.	4.60	Highly Competent
Present dessert hygienically, logically, sequentially within the required time frame and decorated creatively.	4.80	Highly Competent
Plate and portion desserts according to standards.	4.70	Highly Competent
Store dessert at the appropriate temperature and correct conditions to maintain quality, freshness and appeal to the observers.	4.80	Highly Competent
<b>Overall Mean</b>	<b>4.67</b>	<b>Highly Competent</b>

The post-intervention self-assessment results, as presented in Table 5, indicate a substantial improvement in students' knowledge and skills in baking tarts infused with indigenous ingredients, with an overall mean of 4.67, classified as "Highly Competent." Students reported high proficiency across all assessed domains, including the preparation and selection of equipment, precise measurement of ingredients, baking techniques, assembling and



filling tarts, and the hygienic and creative presentation of desserts. Even complex and integrative skills, such as plating, decorating, and maintaining quality standards, were rated highly, reflecting a marked enhancement from the pre-assessment levels.

These findings underscore the educational significance of the researcher-developed instructional video. The observed gains suggest that video-based, demonstration-driven learning effectively supports both procedural mastery and conceptual understanding, particularly in technical-vocational contexts where hands-on practice is essential. The results are consistent with Surgenor et al. (2017), who found that instructional videos in culinary education significantly improve students' skills, providing visual guidance, step-by-step modeling, and the opportunity for repeated observation and practice. Overall, the post-assessment demonstrates that integrating multimedia instructional tools can meaningfully enhance students' competence, confidence, and readiness for performance-based baking tasks.

Table 6. Students' Knowledge and Skills After Watching the Developed Instructional Video in Baking Tart Infused with Indigenous Ingredients as Assessed by the Teacher-Evaluators

Knowledge and Skills	Mean	Description
<b>Preparation and selection of baking equipment, tools, utensils, and materials</b>	<b>4.25</b>	<b>Competent</b>
Select and use appropriate equipment, tools, and utensils.	4.25	Competent
Assemble and disassemble cleaning equipment safely.	4.50	Highly Competent
Store or stack clean equipment, supplies and utensils safely in the designated place in accordance with instructions.	4.00	Competent
<b>Preparation of dessert</b>	<b>4.38</b>	<b>Competent</b>
Select, measure and weigh ingredients according to recipe requirements.	4.50	Highly Competent
Select oven temperature to bake products in accordance with desired characteristics, recipes specifications, and practices.	4.50	Highly Competent
Bake products according to techniques and appropriate conditions, and requirement and standards.	4.00	Competent
Select and prepares fillings.	4.25	Competent
Assemble tarts and fillings ingredients according to quantity, type, and quality required.	4.50	Highly Competent
Prepare ingredients based on the required form and time frame.	4.50	Highly Competent
<b>Presentation of dessert</b>	<b>3.85</b>	<b>Competent</b>
Decorate and present products.	3.50	Competent
Observe environmental requirements for food packaging.	4.00	Competent
Present dessert hygienically, logically, sequentially within the required time frame and decorated creatively.	4.00	Competent
Plate and portion desserts according to standards.	3.75	Competent
Store dessert at the appropriate temperature and correct conditions to maintain quality, freshness and appeal to the observers.	4.00	Competent
<b>Overall Mean</b>	<b>4.16</b>	<b>Competent</b>

Table 6 illustrates the teacher-evaluators' post-assessment of students' knowledge and skills in baking tarts infused with indigenous ingredients, showing an overall mean of 4.16, classified as "Competent." The evaluation indicates that students demonstrated notable proficiency in key operational tasks, including the safe assembly and disassembly of equipment, measurement and preparation of ingredients, and assembling tarts, with certain skills rated as "Highly Competent." While performance in dessert presentation and plating remained comparatively lower, students still exhibited competence, reflecting both understanding and practical application of baking procedures.

These results highlight the educational impact of guided, experiential learning, demonstrating that structured instruction particularly using demonstration and multimedia resources can enhance students' technical skills and confidence in performing baking tasks. The findings align with the observations of Francisco et al. (2018), who reported that engaging in baking activities not only develops students' practical skills but also fosters a sense of pride, accomplishment, and motivation for further learning. Collectively, the teacher-evaluators' assessment



corroborates the effectiveness of the instructional video in reinforcing procedural mastery and supporting student engagement in technical-vocational education.

Table 7. Distribution of Students' Knowledge and Skills After Watching the Developed Instructional Video in Baking Tart Infused with Indigenous Ingredients as Assessed by Themselves and the Teacher-Evaluators

Post-Assessment in the Level of Skills and Knowledge	Respondents of the Study			
	Students n=20	%	Panelists n=4	%
Highly Competent(4.50-5.00)	18	90.00	2	50.00
Competent (3.50-4.49)	2	10.00	2	50.00
<b>Mean</b>	<b>4.67</b>		<b>4.16</b>	
<b>Description</b>	<b>Highly Competent</b>		<b>Competent</b>	

Table 7 presents the post-assessment distribution of students' knowledge and skills in baking tarts infused with indigenous ingredients, integrating both student self-assessment and teacher-evaluator ratings. The results indicate that 90% of students (n = 18) rated themselves as "Highly Competent" (M = 4.67), while the remaining 10% (n = 2) were rated as "Competent." In contrast, teacher-evaluators assessed half of the students (50%, n = 2) as "Highly Competent" and the other half as "Competent," yielding an overall mean of 4.16.

These findings demonstrate that the researcher-developed instructional video effectively enhanced students' baking knowledge and skills, particularly in procedural execution, ingredient handling, and creative presentation, while also encouraging the exploration of other indigenous ingredients beyond Marang. The results align with the study of Rathman (2021) et al., which found that demonstration videos significantly improve students' comprehension, engagement, and preparedness in practical learning environments. Educationally, this underscores the value of video-based instruction as a tool for reinforcing technical competencies, promoting experiential learning, and fostering student confidence and independence in performance-based tasks.

### Difference in Students' Knowledge and Skills Learned Before and After the Developed Instructional Video in Baking Tart Infused with Indigenous Ingredients as Assessed by Themselves and Panelists

Table 8. Pre and Post Assessment of Students' Knowledge and Skills Learned in Baking Tart Before and After the Developed Instructional Video as Assessed by Themselves

Assessment	Mean	Mean Differences	Df	t-value	p-value	Interpretation
Pre-	3.16	1.51	19	13.04	.001*	Reject H <sub>0</sub>
Post-	4.67					

\* significant at 5% level

Table 8 presents the comparison of students' pre- and post-assessment scores on knowledge and skills in baking tarts, as evaluated through self-assessment. The results reveal a substantial improvement, with the mean increasing from 3.16 ("Moderately Competent") in the pre-assessment to 4.67 ("Highly Competent") in the post-assessment, yielding a mean difference of 1.51. The paired t-test analysis produced a t-value of 13.04 and a p < .001, indicating a statistically significant difference at the 5% significance level and leading to the rejection of the null hypothesis.

These findings provide strong evidence of the effectiveness of the researcher-developed instructional video in enhancing students' technical knowledge, procedural skills, and confidence in baking tarts infused with indigenous ingredients. Observations during practical activities suggested that students demonstrated heightened enthusiasm and engagement, which may have contributed to slightly elevated self-assessment scores. This is consistent with Sibag (2018), who reported that hands-on, structured instructional interventions significantly improve students' technical baking competencies and self-efficacy in culinary tasks. Educationally, the results underscore the value of integrating multimedia instructional tools to reinforce experiential learning, promote mastery of procedural skills, and foster learner confidence in performance-based contexts.

Table 9. Pre and Post Assessment on Students' Knowledge and Skills Learned in Baking Tart Before and After the Developed Instructional Video as Assessed by Panelists

Assessment	Mean	Mean Differences	Df	t-value	p-value	Interpretation
Pre-	2.95					
Post-	4.16	1.21	3	2.29	.11*	Accept H <sub>0</sub>

\* not significant at 5% level

Table 9 presents the comparison of students' pre- and post-assessment scores on knowledge and skills in baking tarts infused with indigenous ingredients, as evaluated by the panelists. The mean score increased from 2.95 in the pre-assessment to 4.16 in the post-assessment, reflecting a mean difference of 1.21. However, the paired t-test yielded a t-value of 2.29 with a  $p=.11$ , which is not statistically significant at the 5% level, resulting in the acceptance of the null hypothesis.

Although the observed increase suggests some improvement in students' performance, the lack of statistical significance indicates that the panelists did not perceive a measurable change in knowledge and skills within the assessment period. This discrepancy may be attributed to the fact that the students themselves were the primary beneficiaries of the instructional video, which could have influenced their self-perception and confidence more strongly than observable performance during evaluation. Educationally, these findings highlight the importance of combining self-assessment with objective, externally validated measures, as improvements in learner confidence and engagement may precede or exceed immediately measurable skill gains.

### Effect of Instructional Video on Students Towards their Learning Experience

The effect on students' learning after watching the instructional video was presented in the final part of the research. During the focus group discussions, a few questions were asked to the respondents about the overall quality of the instructional video.

Student 1 replied that,

*As a student, the video is very helpful because it includes all the needed information we want to learn. And, the host is very pleasing to look at and listen to, that is why it is easy to follow the instructions.*

The same observation from Student 2 who stated:

*Enjoyable and informative, you won't be bored because there are lots of information to absorb. It is informative and the topic is easy to understand.*

This means that the clear, informative, and understandable quality of the instructional video was noted favorably to the viewers. According to Fiorella and Mayer (2018), instructional methods are ways to support, and facilitate human learning, or development, and instructional sequence such as the presentation of instruction.

When the respondents were asked if the instructional video contains extraneous information, they replied the following statements:

Student 1, asked the presenter,

*Is it possible that Marang can be used with other pastries? Yes – the host replied.*

Student 2, said that,

*Nope. The presentation was good, I understood.*

The students showed interest in using Marang fruit in other desserts besides tarts. Similar experiments have explored using different indigenous ingredients in tarts. For example, Quipe et al. (2020) infused pineapple and cucumber into tarts and found that the resulting product had no sour aftertaste and possessed an appetizing aroma.

The host questioned the instructional video's accuracy and applicability in real-life situations. Their comments are as follows:

Student 1, mentioned,



*Yes, because in the video it promotes that Marang is abundant and rich in Rosario, so it will help in discovering possible livelihood opportunities.*

With the same ideas, Student 2 replied,

*Yes, because Marang is promoted in other places that can be made into a tart.*

This indicates that by promoting Marang can be a source of livelihood that is beneficial to the local community.

The observation was consistent with the purpose of Technical Vocational Livelihood program aims, to focus not only on the academic field of the learners, but also on the technical and livelihood skills they have. Hands-on experiences are created to develop simultaneously the technical skills and academic skills to the students.

When asked whether the knowledge in the instructional video improved the living conditions in the community, one replied (Student 3) that,

*Yes, it can because you've never heard of Marang tart before and are really intrigued to try it.*

Student 2, said that,

*Yes, if the viewer follows the instructions given in the video, it is possible and really helpful.*

Student 1 only replied "Yes".

The feedback appears to suggest that the Marang tart instructional video provides a concept that will enhance the quality of life of the communities because it gives them ideas to produce new products that have a unique taste and aroma. According to Pitstick (2021) study that the familiar aromas, and tastes allowed students to draw upon positive memories affiliated with these foods and find comfort.

The audience has provided positive feedback regarding the backgrounds and music used in the instructional video, and this is what they said:

According to Student 1, *Clear sound and speech.*

Student 2 response that,

*The background is calm, and the speaker's delivery is perfectly clear.*

The instructional video was presented without any issues, indicating that it was well-delivered by the speaker because the researcher made sure the developed instructional video supports the learning needs of students. This was confirmed by Fiorella, and Mayer (2018) that for moving beyond the existing design principles involve "moving toward better aligning instructional methods, learning materials, process measures, and learning outcome measures."

## Conclusions

The study concludes that the developed instructional video substantially enhanced students' knowledge and skills in baking tarts infused with indigenous ingredients, as evidenced by significant gains in pre- and post-assessment results. The findings demonstrate that the video effectively clarified procedural steps, reinforced conceptual understanding, and increased student confidence in performing baking tasks. While teacher-evaluators' evaluations reflected observable improvements, the lack of statistical significance suggests that students' practical performance still benefits from continued hands-on practice and skill refinement.

Educationally, the study underscores the potential of instructional videos to advance teaching and learning by providing clear, engaging, and easily accessible demonstrations that support active skill acquisition. The integration of Marang as an indigenous ingredient illustrates the value of curriculum innovation, linking technical content with cultural relevance and local resource utilization, thereby expanding opportunities for community-based applications and livelihood initiatives. Moreover, the study highlights the importance of integrating instructional technology into technical-vocational education as a means to enhance learner engagement, promote experiential learning, and support differentiated instructional strategies.

Finally, the research points to implications for teacher professional development, emphasizing the need to equip educators with the skills to design, implement, and evaluate multimedia instructional materials effectively. Overall, the study affirms that thoughtfully designed instructional videos are a powerful tool for improving curriculum



delivery, enhancing learning outcomes, fostering cultural and practical relevance, and supporting continuous professional growth among teachers in technical-vocational education.

## Recommendations

Institutionalize concise, well-structured instructional videos as a core supplement to the Bread and Pastry Production curriculum, paired with scaffolded, performance-based practice to turn perceived learning gains into measurable skills, particularly in weaker areas like dessert preparation and presentation identified in pretests. Teachers may introduce key concepts (tools, techniques, standards) through short videos, followed by step-by-step lab work using clear rubrics, timed plating tasks, and immediate feedback to address possible post-video overconfidence.

To strengthen assessment validity, student self-assessments may be aligned with teacher-evaluators rubrics, the number of evaluators may be expanded, and objective product-quality measures (e.g., doneness, symmetry, portioning, hygiene) may be incorporated. Videos may be improved through iterative refinement adding close-ups of critical steps, pacing controls, on-screen checklists, and bilingual captions, and content may be expanded to feature more indigenous ingredients beyond Marang to enhance cultural relevance and community livelihood connections.

Finally, brief teacher training on video-led instruction may be provided, and reflective journals or skill logs may be integrated to help students monitor their progress from "moderately competent" to higher proficiency levels, ensuring lasting transfer of skills from viewing to hands-on performance.

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