

Exploring Local Wisdom-Based Culinary Education Strategies for Minahasa Students at the Department of Family Welfare Education to Enhance the Competitiveness of Minahasa Culinary Products

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ABSTRACT

This study explores a local wisdom-based culinary education strategy for students in the Department of Family Welfare Education at Universitas Negeri Manado, with the aim of supporting the competitiveness of Minahasa culinary products. The study employed a descriptive qualitative approach using in-depth interviews, practical-class observations, and document analysis. Data were analyzed through data reduction and display, identification of internal and external factors, SWOT analysis, and formulation of SO, WO, ST, and WT strategies. The findings indicate that culinary education is supported by substantial strengths, including the richness of Minahasa cuisine, the availability of local ingredients, traditional culinary knowledge, students' practical experience, lecturer competence, the presence of a culinary education institution, and opportunities for product innovation. Key weaknesses include the unsystematic integration of local cuisine into course learning plans, limited documentation, product innovation, practical facilities, market-analysis experience, industry linkages, branding, and product standardization. Opportunities include the growth of gastronomic tourism, increasing interest in local products, the creative economy, industry collaboration, and digital marketing. Threats include product homogenization, competition from modern foods, changing consumer preferences, declining traditional knowledge, limited standardization, ingredient-price fluctuations, restricted market access, and cultural commercialization without authenticity. Based on the SWOT synthesis, the study proposes a Local Culinary Heritage-Based Project Learning model comprising six stages: Explore, Document, Reproduce, Innovate, Validate, and Commercialize. The IFAS–EFAS matrices are presented as analytical designs because the weights and ratings available in the research report remain simulated and have not undergone empirical validation.

Keywords: culinary education, culinary innovation, Minahasa local wisdom, product competitiveness, SWOT.

INTRODUCTION

culture, entrepreneurship, and industry requirements. Changes in the culinary industry mean that graduate competence can no longer be defined solely by the ability to follow recipes or execute cooking techniques correctly. Students need to understand ingredient sources, food history and identity, food safety and quality, aesthetics, innovation, costing, consumer behavior, branding, digital communication, and product-development processes. Culinary education therefore needs to move beyond the reproduction of technical skills toward learning experiences that develop both technical competence and value-creation capabilities (Gusnita et al., 2024; Purwaning Tyas, 2017).

Minahasa provides a highly relevant context for this transformation. Its traditional foods, local ingredients, processing techniques, utensils, serving practices, and intergenerational knowledge constitute authentic learning resources. The research underlying this article positions Minahasa local wisdom as a starting point that can be connected to culinary learning, student competence, product innovation, authenticity, quality, and competitiveness. The conceptual chain can be expressed as: Minahasa local wisdom → culinary learning → student competence → product innovation → authenticity and quality → culinary-product competitiveness.

However, cultural-resource richness does not automatically produce a strong learning system. The findings reveal a gap between local potential and the existing learning system. Local cuisine has not yet been systematically integrated into course learning plans; recipes and traditional techniques remain insufficiently documented; product innovation is not optimal; practical facilities are limited; students have limited experience in market analysis; links between learning and industry remain weak; branding is underdeveloped; and product standardization is insufficient.

Gastronomy education is multidimensional, encompassing culinary arts, culture, creativity, and food-and-beverage management. In local-food contexts, authenticity does not simply mean preserving a product in an unchanged form. Rather, authenticity may be maintained through relationships with ingredients, techniques, place, knowledge, history, and cultural narratives, while innovation responds to consumer needs and changes in the industrial environment. Accordingly, preservation and innovation should not be treated as opposing objectives; preservation through innovation offers a more productive conceptual position (Krisnatalia & Hendrajaya, 2024).

The importance of this research is reinforced by the potential of local gastronomy to contribute to tourism and the creative economy. Culinary products can function as vehicles for cultural experiences, while culinary learning can provide a setting in which students develop the capacity to produce products with both cultural identity and economic value. The study therefore recommends integrating local wisdom into the curriculum, course learning plans, teaching materials, practical work, projects, and assessment, alongside stronger documentation, entrepreneurship, food costing, branding, digital marketing, facilities, standardization, and industry partnerships.

This article has four objectives: (1) to describe the current condition of Minahasa local wisdom-based culinary education; (2) to identify internal strengths and weaknesses and external opportunities and threats; (3) to construct IFAS and EFAS matrices; and (4) to formulate a learning strategy connecting cultural preservation, competence development, product innovation, quality validation, and commercialization. The principal contribution is the integration of strategic analysis

with culinary pedagogy, so that SWOT analysis functions not merely as a diagnostic tool but as a basis for instructional design.

CONCEPTUAL FRAMEWORK

Gastronomy Education and Culinary Learning

Culinary education is a form of vocational education characterized by integration. Production skills provide the foundation, but professional competence develops when those skills are situated within cultural, creative, managerial, and consumer contexts. Kitchen practice should consequently be designed as a learning experience involving exploration, problem solving, experimentation, reflection, and product evaluation.

Project-based learning enables students to integrate multiple competencies within an authentic work sequence. A local-heritage culinary project may require students to identify traditional foods, interview knowledge holders, develop standardized recipes, reproduce products, create variations, conduct sensory testing, calculate costs, design packaging, construct product narratives, and test consumer responses. Such a structure connects technical skills with cultural literacy, research literacy, creativity, entrepreneurship, and communication (Bui et al., 2025).

Local Wisdom as a Learning Resource

Local wisdom brings learning into real-world contexts. Students encounter ingredients available in their environment, techniques with historical significance, and products carrying social meaning. Such knowledge can become a foundation for cultural and research literacy. Culinary documentation is particularly important in responding to the risk of declining traditional knowledge (Djekic et al., 2021; Li et al., 2026).

Within culinary education, local-wisdom integration can also serve as a differentiation strategy. Place-based products do not necessarily have to compete primarily through price or imitation of modern foods. Differentiation can instead be developed through quality, storytelling, authenticity, local ingredients, experience, and controlled innovation.

Authenticity, Innovation, and Competitiveness

A central issue in heritage-food development is the relationship between authenticity and innovation. A rigid interpretation of authenticity may constrain adaptation, whereas uncontrolled innovation may obscure cultural identity. This study takes the position that innovation is appropriate when the core identity of a product remains explainable and culturally accountable (Kim & Huang, 2021).

For learning purposes, students therefore need to distinguish core elements from adaptive attributes. Changes in flavor, size, shape, presentation, packaging, or selected techniques can provide space for creativity, but each modification should be supported by cultural reasoning, consumer needs, and quality validation.

METHOD

This applied study employed a descriptive qualitative approach with an exploratory design. The focus was a local wisdom-based culinary learning strategy for students in the Department of Family Welfare Education at Universitas Negeri Manado. Learning strategy was treated as the

primary process, while improved competitiveness of culinary products was positioned as the outcome to be strengthened. The study examined learning planning, practical teaching, integration of local ingredients and techniques, cultural values, product innovation, quality, authenticity, aesthetics, and market appeal.

Data were collected through in-depth interviews, practical-class observations, and documentation. Information sources comprised students, lecturers, and local culinary practitioners. Analysis was iterative and involved data reduction, data display, theme identification, triangulation, and mapping of internal and external factors. The analytical sequence included preliminary analysis, SWOT analysis, IFAS–EFAS construction, TOWS formulation, SO/WO/ST/WT strategy development, and model validation.

IFAS was used to organize internal factors, whereas EFAS was used for external factors. The basic weighted-score calculation was $\text{weight} \times \text{rating}$. Importantly, the source report explicitly states that the available weights and ratings are simulated or illustrative rather than validated respondent measurements. The numerical values are therefore treated in this article as an analytical design rather than as quantitative claims about an empirically established strategic position.

SWOT analysis organized findings into Strengths, Weaknesses, Opportunities, and Threats. Each factor was translated into strategic meaning and pedagogical implications. The TOWS matrix then matched S–O, W–O, S–T, and W–T factors to generate operational strategies such as project-based culinary learning, heritage documentation, standard recipes, consumer testing, digital storytelling, industry partnerships, and strengthening of course learning plans.

Research Position and Rationale

The study is positioned as applied research because its purpose extends beyond describing Minahasa culinary heritage; it seeks to provide a strategic basis for improving culinary education and connecting learning with culinary-product development. An exploratory qualitative design was considered appropriate for examining experiences, practices, perceptions, and learning conditions that cannot be adequately represented through numerical indicators alone.

A qualitative approach also allows local wisdom to be understood as living knowledge. Recipes, techniques, ingredient use, presentation practices, stories, and cultural values are not always documented in standardized and readily measurable forms. Interviews, observations, and documentation were therefore used complementarily. SWOT was not treated as a data-collection method but as a strategic analytical device applied after field findings had been identified and categorized.

Context and Unit of Analysis

The research context was culinary learning in the Department of Family Welfare Education at Universitas Negeri Manado. The substantive units of analysis comprised the learning process, integration of Minahasa local wisdom, practical experiences, product development, and relationships between learning and industry and market needs. Analysis was not restricted to the final product; processes preceding production were also considered, including students' recognition of ingredients, understanding of techniques, acquisition of cultural knowledge, recipe application, modification, quality evaluation, and market consideration.

Data Sources and Informant Selection

Three principal groups were considered: students, lecturers, and local culinary practitioners. Students provided information about learning experiences, food preparation, barriers, creativity, and product-development experiences. Lecturers contributed perspectives on curriculum, course

learning plans, practical strategies, assessment, and pedagogical capacity. Local practitioners contributed knowledge concerning authenticity, culinary practice, industry needs, product standards, and possible connections between education and markets.

Purposive sampling was used according to the relevance of participants' experience and knowledge. The research report proposed approximately 15–20 students, 3–5 lecturers, and 3–5 culinary practitioners; these figures were treated as a design rather than as population statistics. Data collection was intended to continue until saturation, when additional information no longer enriched the analytical categories (Okumus, 2021; Palinkas et al., 2015).

Research Instruments

The researcher served as the primary instrument. Supporting instruments included a semi-structured interview guide, practical-observation sheet, document-analysis checklist, and SWOT-factor matrix. Interview questions addressed learning experiences, forms of local-culinary integration, barriers to product development, innovation opportunities, industry relationships, and perceptions of competitiveness. Observation focused on both process and outcomes, including ingredient preparation, technique, hygiene, equipment use, lecturer–student interaction, problem solving, recipe modification, presentation, sensory evaluation, and product reflection.

Data Collection Procedure

Data collection was iterative. The first stage was a preliminary study to understand the learning context and map key issues. The second involved purposive in-depth interviews. The third consisted of participatory observation during practical sessions. The fourth involved documentation of curriculum materials, course learning plans, student products, and supporting records. Reflective notes were maintained to compare information across sources. The sequence was not treated as rigidly linear: interview findings could guide subsequent observations, while observations could generate additional interview or document-analysis needs.

Qualitative Data Analysis

Analysis involved data reduction, organization and display, theme development, interpretation, and verification. Relevant information concerning learning strategy, local wisdom, competence, products, industry, and markets was coded. Related codes were grouped into themes such as curriculum integration, knowledge documentation, innovation, facilities, market orientation, standardization, branding, and partnerships. Findings were displayed through thematic narratives and matrices. Cross-source comparison was used to examine consistency and variation among lecturers, students, practitioners, observations, and documents.

SWOT, IFAS, EFAS, and TOWS Analysis

Once qualitative categories had been established, findings were classified into four SWOT dimensions. Strengths and weaknesses represented internal conditions of the learning and institutional ecosystem, while opportunities and threats represented external conditions affecting learning and product development. IFAS summarized internal factors through weights, ratings, and weighted scores; EFAS applied the same logic to external factors. The source report explicitly identifies the available figures as simulations, so they are retained only to demonstrate the analytical procedure and require expert validation before quantitative strategic positioning.

The TOWS stage matched strengths with opportunities, weaknesses with opportunities, strengths with threats, and weaknesses with threats. SO strategies use strengths to capture

opportunities; WO strategies use opportunities to address weaknesses; ST strategies use strengths to respond to threats; and WT strategies reduce weaknesses and exposure to threats.

Trustworthiness and Interpretive Bias

Trustworthiness was strengthened through source triangulation, method triangulation, member checking, and comparison between field findings and learning documents. Source triangulation compared students, lecturers, and practitioners; method triangulation combined interviews, observations, and documentation. Differences among sources were retained as interpretive evidence rather than automatically eliminated. The analysis also separated empirical findings, researcher interpretation, and strategic recommendations, particularly because SWOT weighting and rating can be influenced by evaluator perceptions.

Integrated Research Flow

The overall research flow was: problem identification → preliminary study → exploration of local wisdom and learning conditions → interviews, observations, and documentation → coding and thematic analysis → SWOT classification → IFAS–EFAS as a weighting design → TOWS → formulation of learning strategies → interpretive validation → implementation recommendations. This sequence demonstrates that the strategy was derived from the interpretation of field evidence rather than generated independently from the SWOT matrix.

RESULTS AND DISCUSSION

Existing Learning Conditions

The findings show that culinary education has a strong practical foundation, but its relationship with Minahasa local wisdom and product competitiveness is not yet systematic. Students possess practical experience and lecturers possess competencies that can drive innovation. At the same time, learning requires stronger documentation, product development, standardization, market research, branding, and industry linkages. The issue is therefore systemic rather than merely methodological: curriculum needs to define the intended competencies; course learning plans need to translate those competencies into projects; facilities must support experimentation; assessment must capture innovation and authenticity; and local communities and industry need meaningful roles.

The findings Analysis with SWOT analysis, IFAS, EFAS and TOWS Strategy Matrix, see in table 1, 2, 3, 4, and 5.

Table 1. SWOT Factors

Dimension	Code	Factors
Strengths	S1–S7	Rich Minahasa culinary heritage; local ingredients; traditional knowledge; practical experience; lecturer competence; educational institution; innovation potential.
Weaknesses	W1–W8	Unsystematic local integration in course learning plans; limited documentation; limited innovation; limited facilities; limited market analysis; limited industry relationships; suboptimal branding; suboptimal standardization.
Opportunities	O1–O5	Gastronomic tourism; consumer interest in local products; creative economy; industry collaboration; digital marketing.

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Telly Tangkere

Threats	T1–T8	Product homogenization; competition from modern foods; changing preferences; declining traditional knowledge; limited standardization; ingredient-price fluctuations; restricted market access; commercialization without authenticity.
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Table 2. IFAS Matrix

Code	Internal factor	Weight*	Rating*	Score
S1	Rich Minahasa culinary heritage	0.08	4	0.32
S2	Availability of local ingredients	0.07	4	0.28
S3	Traditional culinary knowledge	0.08	4	0.32
S4	Practical experience	0.06	3	0.18
S5	Lecturer competence	0.07	3	0.21
S6	Educational institution	0.06	3	0.18
S7	Innovation potential	0.08	4	0.32
	Total Strengths	0.50	—	1.81
W1	Local integration in course learning plans	0.08	2	0.16
W2	Recipe/technique documentation	0.06	2	0.12
W3	Product innovation	0.06	2	0.12
W4	Practical facilities	0.05	2	0.10
W5	Market analysis	0.05	2	0.10
W6	Industry relationships	0.05	2	0.10
W7	Branding	0.05	2	0.10
W8	Standardization	0.05	2	0.10
	Total Weaknesses	0.50	—	0.90
	TOTAL IFAS	1.00	—	2.71

*Weights and ratings are simulated/illustrative values from the research design and are not empirically validated measurements.

Table 3. EFAS Matrix

Code	External factor	Weight*	Rating*	Score
O1	Growth of gastronomic tourism	0.10	4	0.40
O2	Trend toward local products	0.09	4	0.36
O3	Creative economy	0.08	4	0.32
O4	Industry collaboration	0.08	3	0.24
O5	Digital marketing	0.08	3	0.24
	Total Opportunities	0.43	—	1.56
T1	Product homogenization	0.08	2	0.16
T2	Competition from modern foods	0.08	2	0.16
T3	Changing preferences	0.07	2	0.14
T4	Declining traditional knowledge	0.07	2	0.14
T5	Limited standardization	0.06	2	0.12
T6	Ingredient-price fluctuations	0.05	2	0.10
T7	Limited market access	0.05	2	0.10
T8	Commercialization without authenticity	0.04	2	0.08
	Total Threats	0.50	—	1.00
	TOTAL EFAS*	0.93	—	2.56

*The external weights in the source design sum to 0.93 rather than 1.00. The matrix therefore requires normalization and validation before being used as a final quantitative result.

Table 4. SWOT/TOWS Strategy Matrix

Strengths (S)	Weaknesses (W)
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Opportunities (O)	SO: local-ingredient culinary projects; culinary storytelling; gastronomic-tourism products; creative-economy collaboration.	WO: revise course learning plans; digitize documentation; market research; industry facilities; teaching factory; digital branding; standard recipes; costing; quality control.
Threats (T)	ST: differentiate Minahasa identity; document knowledge; experiment in response to modern-food competition; trend analysis; innovation grounded in cultural authenticity.	WT: integrate local knowledge; digital heritage documentation; innovation laboratory; industry-supported learning; consumer research; partnerships; branding; quality control.

Table 5. Learning Strategy Architecture

Priority	Domain	Core strategy	Output
P1	Curriculum	Integrate local wisdom into course learning plans	Culinary-heritage-based course learning plans
P2	Pedagogy	Project-based culinary learning	Culinary-product projects
P3	Innovation	Authentic product innovation	Product prototypes
P4	Industry	Industry collaboration	Industry-based learning
P5	Market	Branding, testing, and digital marketing	Market-ready products

The study proposes the Local Culinary Heritage-Based Project Learning model through six stages: Explore → Document → Reproduce → Innovate → Validate → Commercialize.

Local Wisdom as Pedagogical Capital

The major strength identified by the study is the availability of authentic learning resources. Minahasa culinary heritage offers directly observable objects of study, including ingredients, techniques, recipes, utensils, and social contexts. This is important in vocational pedagogy because students learn through concrete experience. Local wisdom gives kitchen practice a meaningful context: students learn not only how a food is prepared, but why particular techniques and ingredients are used, how food is consumed, and what cultural meanings surround it.

Curriculum and Course-Learning-Plan Gaps

The lack of systematic local-wisdom integration in course learning plans represents a structural issue. When learning outcomes do not explicitly include cultural competence, innovation, market orientation, and product development, practical work tends to be assessed mainly through technical skills. Course learning plans should therefore embed local wisdom in learning outcomes, sub-outcomes, content, project activities, indicators, and assessment.

Documentation as a Preservation Strategy

Traditional culinary knowledge is often tacit and situated in individual or family experience. Documentation can include interviews, process photography, technique videos, recipe transcription, ingredient records, serving contexts, and cultural narratives. These activities also develop research literacy because students learn to formulate questions, identify sources, compare recipe variations, and examine reproducibility. Documentation can subsequently become a living learning resource rather than a static archive.

Innovation without Loss of Identity

Innovation is necessary to respond to competition from modern foods and changing consumer preferences, but modifications should retain identifiable elements of authenticity. A useful

pedagogical distinction is between core identity and adaptive attributes. Cultural core elements should be retained, while flavor, size, form, presentation, packaging, or selected techniques may be experimentally modified when the rationale is explained and validated.

Standardization as a Bridge between Tradition and Industry

Standardization does not necessarily eliminate cultural diversity. Standard recipes, standard portions, food costing, quality specifications, and quality control are necessary for consistent production. In a culinary-education context, these practices provide students with experience approximating industrial conditions while demonstrating how technical decisions produce economic consequences.

Industry Linkages and Authentic Learning

Weak links between education and industry can be addressed through guest chefs, industry projects, structured internships, co-assessment, collaborative product development, and use of industry facilities. Industry-supported learning can provide an authentic environment in which students encounter consistency, efficiency, service, quality, and market requirements.

Market Orientation and Digital Branding

Students need opportunities to conduct consumer research through segmentation, preference observation, concept testing, sensory evaluation, and packaging assessment. Digital branding can be developed through culinary storytelling that combines food origins, local ingredients, techniques, cultural values, innovation processes, and consumption practices. Digital media thus becomes simultaneously a vehicle for cultural literacy and entrepreneurship.

SWOT as a Planning Instrument

The strategic value of SWOT emerges when factors are translated into action. A strength such as culinary richness becomes an exploration project; a weakness such as inadequate curriculum integration becomes a curriculum-revision agenda; an opportunity such as gastronomic tourism becomes a product-development pathway; and a threat such as declining traditional knowledge becomes a rationale for systematic documentation. SWOT therefore serves as a bridge between diagnosis and instructional design.

Integration of Cultural, Technical, and Entrepreneurial Competence

The competencies required of culinary students cannot be reduced to cooking skills. Culturally identified products require understanding of origins, ingredients, techniques, social functions, and serving contexts. Products intended for consumers additionally require recipe development, quality control, costing, packaging, and value communication. The integration of these domains explains why local wisdom-based culinary projects are better understood as multidisciplinary learning projects than as conventional practical exercises.

Reflection in Product Development

Reflection should be integrated into product development. After reproducing a traditional recipe, students can compare the outcome with characteristics documented from cultural sources. After innovation, students can explain the modifications and their consequences for flavor, texture, aroma, appearance, cost, and consumer acceptance. Such reflection helps students understand prototype failure as evidence for improving design decisions rather than merely as a failure in cooking.

Consumer Testing as Learning Validation

Consumer testing creates a direct link between education and market reality. Students can develop simple instruments assessing liking, perceived authenticity, visual appeal, price suitability, and purchase intention. The resulting evidence can be used to revise products. Assessment consequently extends beyond lecturer judgment to include evidence generated by product users, strengthening students' ability to interpret consumer preferences systematically.

Digitalization as a Mechanism for Knowledge Transfer

Digitalization has two complementary functions. First, it preserves culinary knowledge through text, photographs, videos, and metadata. Second, it introduces products to consumers through storytelling. Students can therefore create culinary-heritage dossiers and transform them into educational and promotional content. This approach connects cultural preservation with digital literacy and entrepreneurship.

Community and Industry Partnership Governance

Partnerships should be balanced. Traditional knowledge holders possess cultural authority concerning histories and techniques; industry partners contribute experience in consistency, efficiency, service, and markets; and educational institutions provide a space for synthesis and testing. This three-party model can provide authentic learning while ensuring that innovation remains connected to cultural sources. Contributions from knowledge holders should be ethically recognized and documented.

The Culinary Laboratory as a Living Learning Environment

Practical facilities should be understood as part of the learning model. A culinary laboratory requires not only basic production equipment but also space for experimentation, documentation, sensory testing, packaging, and prototype development. A living learning environment can be established by turning the laboratory into a place where students iteratively develop products, receive feedback, and maintain development records (Salmi et al., 2025).

Curriculum Governance and Sustainability

To prevent innovation from depending on individual lecturers, curriculum governance is required. The program can establish a culinary-heritage curriculum development group responsible for mapping foods and competencies, maintaining a project bank, developing assessment rubrics, managing the knowledge database, and evaluating partnerships. Annual evaluation can examine the relevance of course learning plans, student-product quality, industry engagement, and use of cultural documentation.

The Preservation–Commercialization Transformation Pathway

The transformation pathway can be understood as an educational value chain. Preservation protects identity and knowledge; transformation turns that knowledge into learning experiences; innovation produces consumer-relevant variations; validation tests quality and acceptance; and commercialization connects learning outcomes to markets. Commercialization without documentation and validation may increase the risk of cultural distortion and inconsistent quality.

Transforming Students from Recipe Performers into Product Developers

One of the most important implications is the transformation of the student role. When practical learning focuses only on recipe reproduction, students are primarily judged by procedural compliance. The proposed framework requires broader competence: students must locate knowledge sources, explain culinary identity, make technical decisions, modify products, test outcomes, calculate costs, and communicate value. Students consequently become both learners and product developers.

This shift also changes the lecturer's role. Lecturers function not only as technique demonstrators but also as designers, facilitators, reviewers, and guardians of academic quality and cultural authenticity. Each innovation decision should have an explicit rationale. Changes in presentation, for example, should be connected to function, target consumers, or eating experience; ingredient changes should be justified by availability, cost, safety, or sensory characteristics.

Reorienting Assessment from Final Product to Process and Product

Assessment should follow the learning orientation. If only the final product is assessed, cultural exploration, documentation, decision making, and revision may be overlooked. Assessment should therefore cover at least four layers: exploratory process, technical competence, product quality and authenticity, and market feasibility. A student portfolio can contain exploration notes, process photographs, initial and revised recipes, sensory-test results, food costing, packaging designs, and reflections. Assessment consequently becomes a pedagogical mechanism for shaping professional thinking.

Culinary Documentation as Knowledge Infrastructure

Limited documentation should be understood as a knowledge-infrastructure problem. Without documentation, knowledge of recipes, techniques, ingredients, tools, contexts, and cultural narratives remains vulnerable to loss through dependence on individual memory. Students can contribute to a culinary archive through interviews, photography, video, recipe records, ingredient mapping, and cultural storytelling.

Documentation can also support culturally sensitive standardization. Rather than eliminating traditional variation, documentation can distinguish core elements from variations associated with families, locations, ingredients, or serving contexts. This prevents one version from being inadvertently treated as the only authentic form.

Authenticity, Innovation, and Market Feasibility

The SWOT findings point to the need to avoid two extremes: static preservation that cannot respond to changing consumer preferences and excessive innovation that obscures cultural identity. A constructive strategy is to treat authenticity as the foundation and innovation as an adaptation mechanism. Market feasibility should function as a validation stage rather than the sole objective. Consumer acceptance alone does not establish cultural success if identity has been distorted; conversely, a highly authentic product that lacks consistency, safety, or economic feasibility also faces development constraints. Culinary education should therefore teach students to balance cultural value and market value.

Standardization and Food Costing as Professional Competence

The weaknesses identified in standardization and market analysis indicate the need to expand culinary education toward product management. Standard recipes, standard portions, food costing,

quality control, and process records enable consistent replication. For students, these activities approximate professional practice and clarify the relationship between technical decisions and economic consequences.

In Minahasa culinary contexts, food costing can also support discussion of local-ingredient sustainability. Price fluctuations can prompt students to compare alternative ingredients, calculate cost changes, and assess whether substitution remains acceptable from sensory and cultural perspectives. A managerial constraint can thus become an integrated learning experience involving culinary technology, economics, and culture.

A Phased Implementation Model at Program Level

Implementation need not begin with comprehensive reform. Phase 1 can map courses and course learning plans to identify opportunities for local-wisdom integration. Phase 2 can establish a database of recipes, techniques, ingredients, and cultural narratives. Phase 3 can pilot projects in selected courses. Phase 4 can strengthen sensory testing, consumer testing, standardization, and costing. Phase 5 can develop industry partnerships and digital branding. Phase 6 can evaluate the model and extend it to additional courses or projects.

A phased approach is appropriate because the identified weaknesses are systemic. Curriculum integration requires program-level decisions; documentation requires time and relationships with knowledge holders; facilities require investment; partnerships require governance; and commercialization requires standardization and markets. A staged process enables observable indicators to be linked to each intervention without losing the overall strategic direction.

Contribution to Vocational Education and Gastronomy

The contribution of this study lies in strengthening the relationship between vocational education and place-based gastronomy. Vocational education provides mechanisms for competence development, while local wisdom provides knowledge and identity. When these are connected with product projects, industry, and markets, learning becomes a space in which local knowledge is transformed into professional capability. The framework consequently broadens culinary education from skill acquisition toward capability development.

Conceptually, competitiveness does not arise directly from the existence of local culinary heritage. A transformation chain must be constructed: local culinary heritage → structured learning → student competence → product innovation → quality and authenticity → market validation → competitiveness. Each link presents specific risks; culinary education should therefore be designed as a system rather than as a collection of disconnected practical activities.

Four strategic propositions emerge from the findings. First, more systematic integration of local wisdom into learning objectives, activities, and assessment increases the opportunity for local knowledge to function as a competence resource rather than merely as additional content. Second, stronger project-based learning that connects cultural exploration, product experimentation, and market validation can develop a broader competence profile. Third, authenticity and innovation can operate together when cultural boundaries are explicit. Fourth, standardization, costing, branding, and industry partnerships can function as bridges between learning products and market feasibility.

These propositions are conceptual syntheses rather than tested quantitative hypotheses. Further research using stronger designs is needed to determine whether the proposed model improves student competence, product quality, creativity, consumer acceptance, entrepreneurship, and competitiveness.

Local Culinary Heritage-Based Project Learning Model

The proposed model consists of six stages and maintains a transformation pathway from preservation toward innovation and economic value. See table 6, 7, and 8.

Table 6. Local Culinary Heritage

Stage	Student activities	Core competence	Output
1. Explore	Identify foods, ingredients, techniques, cultural actors, history, and context.	Cultural literacy; inquiry	Minahasa culinary map
2. Document	Record recipes, techniques, histories, narratives, variations, photographs, and videos.	Research literacy; documentation	Culinary database/dossier
3. Reproduce	Practice original recipes and techniques; compare outcomes.	Culinary skills; fidelity	Authentic product
4. Innovate	Modify flavor, form, presentation, size, packaging, or technique with explicit justification.	Creativity; problem solving	Innovative prototype
5. Validate	Conduct sensory, quality, consumer, and standardization tests; revise.	Quality assurance	Validated product
6. Commercialize	Conduct costing, pricing, branding, storytelling, and digital marketing.	Entrepreneurship; market orientation	Market-ready product

Table 7. Assessment Mechanism

Component	Indicators	Illustrative weight
Cultural literacy	History, ingredients, techniques, cultural values	15%
Culinary skills	Technique, hygiene, consistency	20%
Innovation	Novelty, creativity, relevance	20%
Product quality	Flavor, texture, aroma, appearance	15%
Market feasibility	Costing, price, packaging, target market	10%
Branding & storytelling	Identity and communication	10%
Reflection	Process evaluation and improvement	10%

*The assessment weights are an instructional-design example and are not measurements obtained from the study.

Table 8. Success Indicators

Domain	Indicator	Development target
Curriculum	Course learning plans include local wisdom	Relevant courses contain a heritage component
Documentation	Recipes, techniques, and narratives are documented	Structured culinary database
Product	Authentic-innovative prototype	At least one prototype/project
Quality	Standard recipe and quality criteria	Standardization document
Market	Product tested with prospective consumers	Test data and product revision
Industry	Project/external partner	Practitioner involvement

Digital	Branding and storytelling	Publication-ready content
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Theoretical and Practical Implications

Theoretically, the study expands the understanding of local wisdom-based culinary education by treating local wisdom not as supplementary content but as an ecological learning resource connecting culture, skills, creativity, innovation, and economic value. The model shows how culinary competence can be developed through a cycle of exploration, documentation, reproduction, innovation, validation, and commercialization.

Practically, programs can use the findings to revise curricula and course learning plans. Lecturers can design projects integrating multiple competencies; laboratories can become spaces for experimentation and product development; knowledge-holder communities can serve as learning resources and cultural-validation partners; and industry can participate in quality and market validation. For students, the model expands professional identity from food preparer to culture-based culinary product developer, encompassing cooking skills, cultural literacy, research, creativity, innovation, quality assurance, costing, branding, digital marketing, and entrepreneurship.

Limitations and Future Research Agenda

The principal limitations concern the exploratory character of the study and the simulated nature of the IFAS–EFAS matrices. Because weights and ratings have not been obtained through an adequately validated quantitative process, the scores cannot be used to determine a final SWOT quadrant or definitive numerical priorities.

Future studies should conduct expert validation of all SWOT factors, establish transparent weighting and rating criteria, normalize EFAS weights, and test rating reliability. Once validated, mixed-methods research can examine changes in student competence, creativity, product quality, consumer acceptance, entrepreneurial capability, and competitiveness. Additional agendas include development of a digital Minahasa culinary database, testing the model across multiple classes or institutions, cross-regional comparison, and longitudinal research. Research and development studies are particularly relevant for producing a validated instructional model.

CONCLUSION

Minahasa local wisdom-based culinary education has substantial assets, including rich culinary heritage, local ingredients, traditional knowledge, students' practical experience, lecturer competence, an educational institution, and innovation potential. Nevertheless, these assets have not yet been fully converted into an integrated learning system connected with curriculum, documentation, innovation, facilities, market analysis, industry, branding, and standardization. The SWOT analysis generated four strategic orientations. SO strategies mobilize cultural assets and competence for culinary projects, gastronomic tourism, and the creative economy. WO strategies address course learning plans, documentation, market research, industry partnerships, digital branding, costing, and standardization. ST strategies use Minahasa identity and authenticity as a basis for differentiation, while WT strategies strengthen documentation, facilities, partnerships, consumer evaluation, and quality control.

The Local Culinary Heritage-Based Project Learning model comprises Explore, Document, Reproduce, Innovate, Validate, and Commercialize. It positions preservation and innovation as complementary processes: local wisdom is preserved while being transformed into learning

experiences, student competence, product prototypes, cultural identity, and potential economic value. The IFAS and EFAS matrices should be understood as analytical designs because their source weights and ratings remain simulated. Expert validation and empirical testing are required before the scores can be used to establish quantitative strategic positioning.

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