

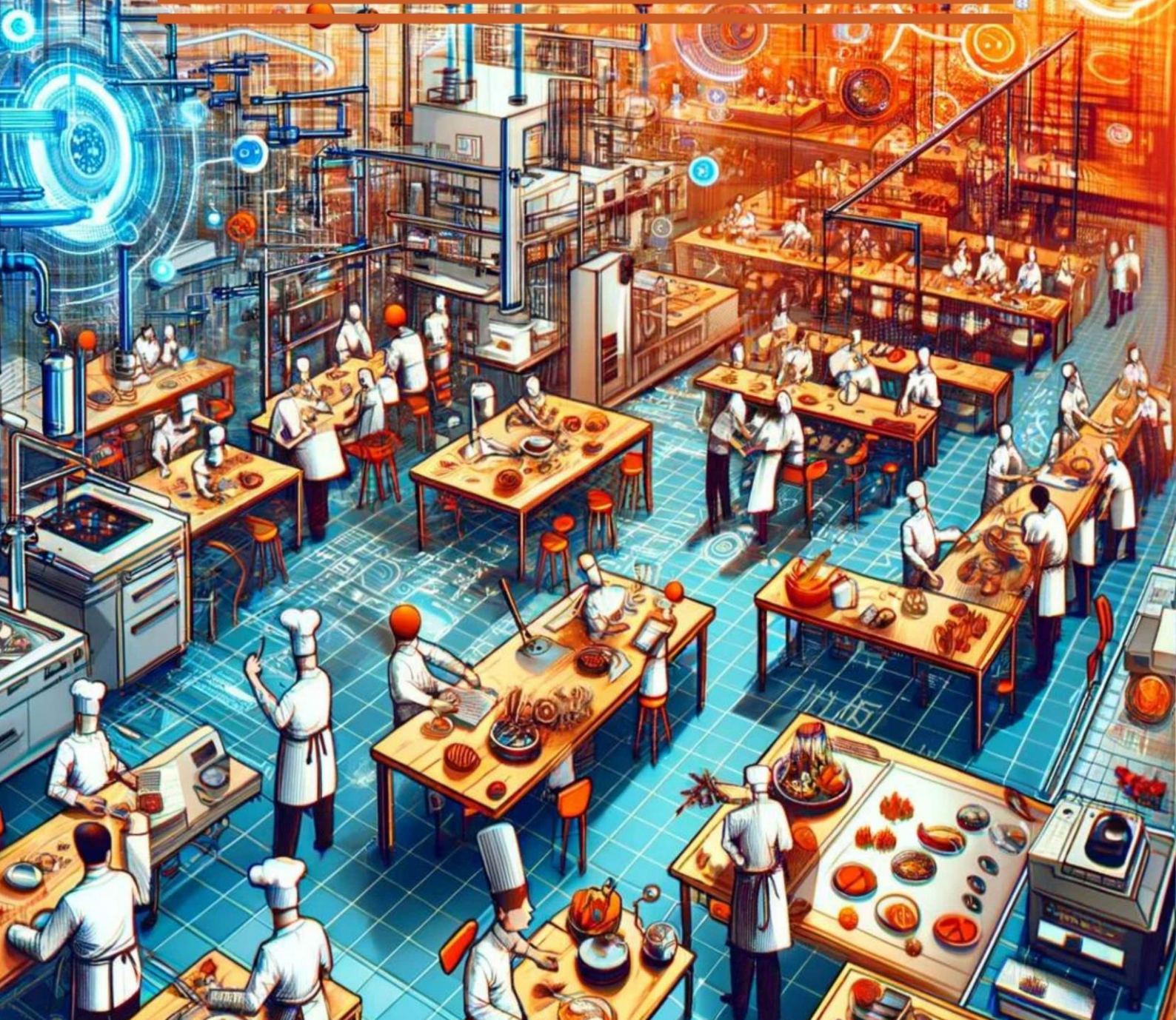
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Correspondence: Faculty of Engineering of Universitas Negeri Yogyakarta
Kampus Karangmalang, Yogyakarta, 55281

Telp. (0274) 586168 psw. 1216,1276,1289,1292 (0274) 586734 Fax. (0274) 586734

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Table of Content

<i>Consumer Decision-Making in Halal Product Purchases at Bakpia Pathok 25 Based on the Theory of Planned Behavior.....</i>	102-118
Luthfiyyah Ariana, Nani Ratnaningsih	
<i>Exploring Students' Knowledge and Interest in Food Styling and Photography within Culinary Arts Programs at Vocational Colleges.....</i>	119-130
Aina Afifah binti Azali, Zahidah Ab-Latif, Elia Md Zain	
<i>Creation of E-Magazine Learning Resource for Pastry and Bakery Products Courses Focused on Low-Calorie Diets.....</i>	131-143
Intan Diah Kusuma, Mutiara Nugraheni	
<i>Innovative Foods with Red Bean Flour: A Sensory and Economic Analysis.....</i>	144-155
Nur Aulia Wijayanti	
<i>TikTok-Integrated Video Educational Resources on Basic Food Processing Techniques for Grade X Culinary Vocational High School Students.....</i>	156-165
Ristya Candyka Alfiolita, Sutriyati Purwanti	
<i>The Correlation Among Knowledge, Attitude, and Instant Food and Beverage Consumption Patterns on the Nutritional Status of Culinary Students.....</i>	166-176
Nafiah Adhuha Ramadhani, Titin Hera Widi Handayani	
<i>The Connection Between Knowledge and Skills in the Cookie Domain within Pastry and Bakery Programs.....</i>	177-185
Latifah Nurul Qomarotul Nikmah, Rizqie Auliana	
<i>SWOT Analysis of the Marketing Strategy for Empon-Empon Products by the Mekar Women's Farming Group.....</i>	186-196
Mawar Berliana Sari, Minta Harsana	
<i>Realization of the Merdeka Curriculum in Culinary Fundamentals Education for Grade X at Vocational High School.....</i>	197-208
Namira Nursaffana Maharrifqa, Fitri Rahmawati	
<i>Gastronomic Exploration of Kalasan Fried Chicken in the Local Culinary Culture of Yogyakarta.....</i>	209-217
Angela Auralia Krisna, Marwanti	

Consumer Decision-Making in Halal Product Purchases at Bakpia Pathok 25 Based on the Theory of Planned Behavior

Luthfiyyah Ariana *, Nani Ratnaningsih 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

*Corresponding Author. E-mail: luthfiyyahariana.2020@student.uny.ac.id

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ABSTRACT

Bakpia Pathok 25 has secured halal certification; nonetheless, the promotion and marketing efforts have inadequately highlighted its halal status, resulting in consumer unawareness of the product's halal designation. This study seeks to investigate the impact of attitude, subjective norms, and perceived behavioral control on customer decision-making on the acquisition of halal items at Bakpia Pathok 25, grounded in the Theory of Planned Behavior (TPB). This is a quantitative study utilizing a survey methodology. The study population included 4,227 users of Bakpia Pathok 25 at the Pabrik Jaya shop, with a sample of 110 respondents chosen by purposive sampling. The study tool employed is a questionnaire including 45 items. The instrument's validity and reliability were assessed by Pearson's product-moment correlation and Cronbach's Alpha. Data analysis methodologies encompass multiple regression analysis and Structural Equation Modeling-Partial Least Squares (SEM-PLS). The data processing software comprises IBM SPSS Statistics 23, SmartPLS 4.1.0.6, and Microsoft Excel Office 2021. The findings reveal that the categories of attitude, subjective norms, perceived behavioral control, and consumer decision-making regarding the purchase of halal items at Bakpia Pathok 25 were moderate, with frequencies of 62%, 67%, 47%, and 65%, respectively. The attitude did not exert a favorable and significant influence on consumer purchasing decisions for halal products at Bakpia Pathok 25. Subjective norms and perceived behavioral control exerted a positive and significant influence on consumer purchasing decisions. Collectively, attitude, subjective norms, and perceived behavioral control exerted a large and favorable impact on consumer purchasing decisions. Attitude did not directly influence purchasing decisions, although subjective norms and perceived behavioral control exerted a direct impact. Both attitude and perceived behavioral control exerted an indirect influence on purchasing decisions, but attitude additionally impacted subjective norms indirectly.

Keywords: Bakpia Pathok 25, consumer purchase decision, halal products, Theory of Planned Behavior (TPB)

INTRODUCTION

Indonesia, home to the largest Muslim population in the world, with 240.62 million people (86.7%) identifying as Muslim in 2023, according to the Royal Islamic Strategic Studies Centre in 2023, has seen a significant increase in demand for halal products, particularly food. Indonesia is the second-largest consumer of halal products globally, after Malaysia, and aspires to become the world's leading halal product producer by 2024. The Indonesian government has enacted Law No. 33 of 2014 on Halal Product Guarantee (JPH), providing a legal framework to protect consumers. In Islam, halal refers to that which brings goodness, benefits, and health in various aspects of life, as outlined in the Quran (Quran 2:168), whereas haram refers

to things prohibited or unlawful according to Islamic teachings (Aslan, 2023). The mandatory halal certification for food and beverages, as well as for slaughtered products, will take effect starting October 18, 2024. According to Rongiyati (2024), there are 64.4 million Ministry of Micro, Small and Medium Enterprises (MSMEs) in Indonesia, but only 3.8 million have obtained halal certification between October 2019 and February 2024. On May 15, 2024, the government decided to delay the mandatory halal certification for micro and small enterprises' food and beverage products until October 2026, while medium and large enterprises will still be required to comply starting October 18, 2024 (bpjph.halal.go.id). Challenges in halal certification for MSMEs include a lack of knowledge, financial issues, lack of facilities and documentation, and the mindset that halal certification is only necessary for large businesses (Ningrum, 2022).

Special Region of Yogyakarta (DIY) is a popular tourist destination, with a 17% increase in foreign tourist visits in December 2023. This has spurred the growth of souvenir industries, including Bakpia, a traditional Yogyakarta delicacy. Bakpia Pathok 25, established by Ibu Tan Aris Nio in 1979, is a famous souvenir center that has obtained halal certification. However, the halal status of Bakpia Pathok 25 has not been effectively highlighted in its promotions and marketing efforts, leading to consumer unawareness of the product's halal status. Understanding consumer behavior is crucial in addressing consumer desires and needs. According to Kotler dan Armstrong (2012), purchase decision is the final stage in the consumer's buying behavior, whether as an individual or a household buying goods and services for personal consumption.

This study uses the Theory of Planned Behavior (TPB) to predict consumer behavior in purchasing halal products. TPB has been widely used in studies on the intention to purchase halal food (Agistya & Khajar, 2022; Mariana et al., 2020; Ningtyas et al., 2021; Vizano et al., 2021). According to Ajzen (1991), an individual's behavior, in this case, their purchase decision, stems from their intention to purchase. TPB provides a comprehensive framework for understanding the factors that determine this behavior and has been used extensively to measure purchase intention among consumers. Attitude, subjective norms, and perceived behavioral control influence purchase intention, which in turn affects the purchase decision (Ajzen, 2015). Halal knowledge refers to the facts, feelings, or experiences an individual or group has regarding the halal status of consumed products (Fachrurrozie et al., 2023). Halal awareness refers to knowledge about the concept of halal, halal processes, and the importance of consuming halal products (Millatina & Sayyaf, 2023). Halal certification is the formal recognition of a product's halal status, issued by BPJPH based on a fatwa from MUI (Kusuma & Kurniawati, 2021).

This study aims to examine the impact of consumer attitude variables (halal knowledge, halal awareness, and halal certification), subjective norms (normative beliefs and motivation to comply), and perceived behavioral control (control beliefs and the power of control beliefs) on consumer decision-making in purchasing halal products at Bakpia Pathok 25, based on TPB. The findings of this study are expected to provide insights into the influence of attitude, subjective norms, and perceived behavioral control on consumer decisions in purchasing halal products at Bakpia Pathok 25.

PURPOSE OF THE STUDY

The objectives of this study are to examine consumer attitudes, subjective norms, perceived behavioral control, and their influence on purchasing decisions regarding the halal product, Bakpia Pathok 25. This study aims to investigate the effect of consumer attitudes on their purchasing decisions for Bakpia Pathok 25, a halal product. Additionally, the study will analyze the impact of subjective norms on consumer decision-making when purchasing the halal product Bakpia Pathok 25. The study will also evaluate how perceived behavioral control influences consumer purchasing decisions for Bakpia Pathok 25. Finally, this

research will explore the combined effect of attitudes, subjective norms, and perceived behavioral control on consumer purchasing decisions for Bakpia Pathok 25.

METHOD

This study is a quantitative research with a survey method approach. According to Sugiyono (2024), quantitative research is based on the philosophy of positivism, used to investigate a specific population or sample, data is collected using research instruments, and data analysis is quantitative or statistical, with the aim of describing and testing the hypotheses that have been set. This study uses independent variables (attitude, subjective norms, and perceived behavioral control) and a dependent variable (purchase decision). The research was conducted from January to July at the official Bakpia Pathok 25 store, namely the Toko Pabrik Jaya in Sanggrahan Pathuk NG I/504, Ngampilan, Yogyakarta City, Special Region of Yogyakarta.

Population and Sample

The population in this study consists of 4,227 Bakpia Pathok 25 consumers. The sample was determined using Slovin's formula at a 10% significance level, resulting in 110 consumers. The sampling technique used in this study is purposive sampling.

Data Collection and Analysis

This study used a questionnaire distributed directly to consumers at the official Bakpia Pathok 25 store, Toko Pabrik Jaya. The questionnaire was filled out in two ways: online via Google Forms and offline using paper questionnaires distributed directly. The data analysis techniques used are multiple regression analysis and Structural Equation Modeling - Partial Least Squares (SEM-PLS).

Research Instruments

The questionnaire was developed based on the instrument blueprint, consisting of 45 items, divided into the following variables: attitude (10 items), subjective norms (10 items), perceived behavioral control (10 items), and purchase decision (15 items). The research instrument blueprint is shown in Table 1.

Validity and Reliability

The validity test was conducted on 30 respondents. The research results show that the table value of r for 30 respondents (N) is 0.361. Items 1 to 45 have calculated r values greater than the table r value of 0.361 ($n = 30$; $\alpha = 5\%$). Thus, it can be concluded that these items are valid and can be used for data collection.

Table 1. Instrument Reliability Test Results

Variable	Cronbach's Alpha	Description
Attitude	0.876	Reliable
Subjective Norms	0.858	Reliable
Perceived Behavioral Control	0.909	Reliable
Purchase Decision	0.919	Reliable

Based on Table 2, it can be seen that all variables have a Cronbach's Alpha greater than 0.7, so it can be concluded as reliable, and therefore, each item is suitable for use as a measurement tool. This study uses descriptive analysis and categorization for respondent characteristics. The prerequisite tests for analysis include normality test, multicollinearity test, and heteroscedasticity test. Hypothesis testing is carried out

using multiple regression analysis (coefficient of determination, simultaneous significance test (F-test), and individual parameter significance test (t-statistic)), and Structural Equation Modeling – Partial Least Squares (SEM-PLS).

Table 2. Research Instrument Blueprint

Variabel	Indikator	Sub Indikator	No Item	Referensi
Attitude (10 items)	Halal Knowledge	Understanding halal and haram laws	1	Briliana & Mursito (2017)
		Differentiating between halal and haram	2	Briliana & Mursito (2017)
	Halal Awareness	Information on halal status	3	Briliana & Mursito (2017)
		Importance of halal knowledge	4	Briliana & Mursito (2017)
		Production process according to halal standards	5	Basri & Kurniawati (2019)
		Use of halal ingredients	6	Bachmid & Noval (2023)
	Halal Certification	Halal products are clean and healthy	7	Aslan (2023)
		Importance of halal certification	8	Aslan (2023)
		Halal logo	9	Basri & Kurniawati (2019)
		Belief in halal certification	10	Hasib et al. (2023)
Subjective Norms (10 items)	Normative Beliefs	Belief in religious norms	1	Ningtyas et al. (2021)
		Belief in family norms	2	Hasib et al. (2023)
		Belief in friends	3	Ardiyanto et al. (2024)
		Belief in community leaders	4	Hasib et al. (2023)
		Belief in social norms	5	Vanany et al, 2019
	Motivation to Comply	Motivation to comply with religious norms	6	Hasib et al. (2023)
		Motivation to comply with family norms	7	Hasib et al. (2023)
		Motivation to comply with friends	8	Hasib et al. (2023)
		Motivation to comply with community leaders	9	Aslan (2023)
		Motivation to comply with social norms	10	Vanany et al. (2019)
Perceived Behavioral Control (10 items)	control beliefs	Availability of products	1	Vanany et al. (2019)
		Belief in knowledge	2	Lim & An (2021)
		Time	3	Vanany et al. (2019)
		Ease of access	4	Vanany et al. (2019)
		Product price	5	Ardiyanto et al. (2024)
	Power of Control Beliefs	Availability of information	6	Ardiyanto et al. (2024)
		Ease of obtaining products	7	Ardiyanto et al. (2024)
		Repeat purchase	8	Lim & An (2021)
		Self-confidence	9	Lim & An (2021)
		Blessings	10	Vanany et al. (2019)
Purchase Decision (15 items)	Internal Factors	Motivation	1	Tambunan (2021)
			2	Aslan (2023)
		Perception	3,4	Florencia & Subiga (2016)
			5	Aslan (2023)
		Attitude formation	6	Tambunan (2021)
	External Factors	Integrity	7	Tambunan (2021)
		Personality	8	Florencia & Subiga (2016)
		Family	9	Tambunan (2021)
		Culture	10	Florencia & Subiga (2016)
		Social class	11, 12	Florencia & Subiga (2016)
		Reference group	13,14	Tambunan (2021)
		Technology	15	Tambunan (2021)

FINDINGS

Respondent Characteristics

The respondents in this survey come from a variety of backgrounds, representing diverse age groups ranging from 15 to over 35 years old. They have different educational levels, from high school graduates to those with master's degrees, and a wide range of occupations, including students, civil servants, entrepreneurs, and others. The respondents' religious beliefs and regional origins also vary, with participants

coming from various areas across Indonesia, and they have different income levels, reflecting a broad spectrum of socio-economic statuses. The respondent characteristics of this study are shown in Table 3.

Table 3. Respondent Characteristics

Respondent Characteristics	Respondent Characteristics	Respondent Characteristics
Age		
15 - 20 years	26	24%
20 - 25 years	49	45%
25 - 30 years	16	15%
30 - 35 years	7	6%
> 35 years	12	11%
Gender		
Male	55	50%
Female	55	50%
Education		
High School/Equivalent	22	20%
Bachelor/Diploma	78	73%
Master	8	7%
Religion		
Islam	95	86%
Catholic	9	8%
Christian	5	5%
Hindu	0	0%
Buddhist	1	1%
Confucianism	0	0%
Origin		
DIY (Special Region of Yogyakarta)	23	21%
Central Java	17	15%
East Java	20	18%
West Java	14	13%
Greater Jakarta Area (Jabodetabek)	8	7%
Sumatera	14	13%
Kalimantan	7	6%
Sulawesi	4	4%
Bali	1	1%
Nusa Tenggara	2	2%
Occupation		
Student	69	63%
Civil Servant/Military/Police	7	6%
State-Owned Enterprise Employee	8	7%
Entrepreneur	19	17%
Others	7	6%
Income		
< Rp. 1,000,000	50	45%
Rp. 1,000,000 - Rp. 2,500,000	30	27%
Rp. 2,500,000 - Rp. 3,500,000	8	7%
> Rp. 3,500,000	20	20%
Reasons for Buying Bakpia		
Souvenir from Yogyakarta for family	84	76%
Personal consumption	50	45%
Requested by family/friends	27	25%
Delicious taste	28	25%
Nostalgic moment	13	12%

Attitude, Subjective Norms, Perceived Behavioral Control, and Consumer Purchase Decision When Buying the Halal Bakpia Pathok 25 Product

The categorization of the variables attitude, subjective norms, perceived behavioral control, and consumer purchase decision when buying the halal Bakpia Pathok 25 product is shown in Figure 1.

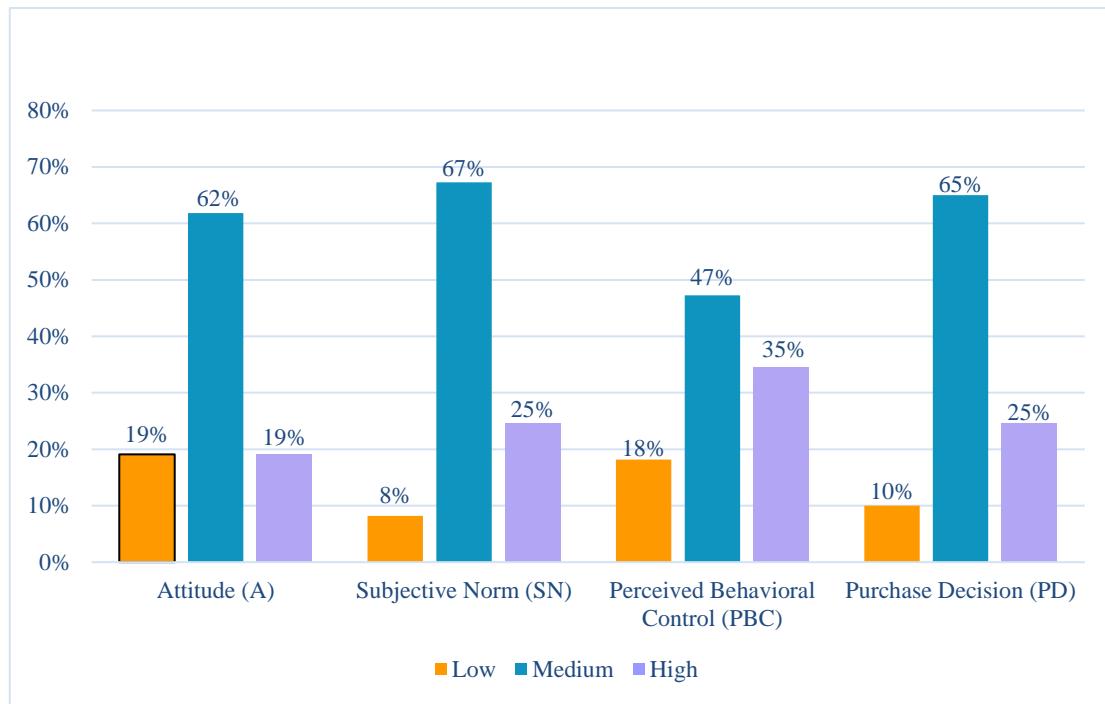


Figure 1. Categorization of Research Variables

Prerequisite Tests for Analysis

Normality Test

The Asymp. Sig. (2-tailed) value obtained is 0.200, which is greater than 0.05, indicating that the data is normally distributed. See Table 4.

Table 4. Kolmogorov-Smirnov (K-S) Normality Test

Variable	N	Asymp. Sig. (2-tailed)	Description
Unstandardized Residual	110	0.2	Normal

Multicollinearity Test

The tolerance value in Table 5 is greater than 0.10, and the Variance Inflation Factor (VIF) is less than 10, indicating that no multicollinearity occurs.

Table 5. Multicollinearity Test

Variable	Tolerance	VIF
Attitude	0.528	1.894
Subjective Norms	0.507	1.972
Perceived Behavioral Control	0.495	2.021

Heteroscedasticity Test

No clear pattern is observed, and the points are randomly scattered above and below zero on the Y-axis, indicating that heteroscedasticity does not occur.

Hypothesis Testing

Individual Parameter Significance Test (t-Statistic Test)

The significance value in Table 6 is less than 0.05 or the calculated t value is greater than or equal to the table t value of 1.662, indicating a significant influence of the independent variable on the dependent variable partially/individually, and the hypothesis is accepted.

Table 6. Individual Parameter Significance Test (t-Test)

Model	t	Significance
Attitude (X1)	1.351	0.18
Subjective Norms (X2)	4.739	0
Perceived Behavioral Control (X3)	3.98	0

The attitude variable has a significance value of 0.180 and a calculated t value of 1.351, so there is no significant effect on the purchase decision variable, and the hypothesis is rejected. The subjective norm variable has a significance value of 0.000 and a calculated t value of 4.739, indicating a significant effect on the purchase decision variable, and the hypothesis is accepted. The perceived behavioral control variable has a significance value of 0.000 and a calculated t value of 3.980, indicating a significant effect on the purchase decision variable, and the hypothesis is accepted.

Simultaneous Significance Test (F-Statistic Test)

The significance value is less than 0.05 or the calculated F value is greater than the table F value of 3.09, indicating that the independent variables simultaneously influence the dependent variable, and the hypothesis is accepted.

Table 7. Simultaneous Significance Test (F-Test)

Model	F	Significance
Regression	52.345	0.000

The significance value is 0.000, and the calculated F value is 52.345, meaning that the attitude, subjective norms, and perceived behavioral control variables significantly affect the purchase decision variable simultaneously, and the hypothesis is accepted.

Coefficient of Determination (R²)

The Adjusted R² value is considered good if it is greater than 0.5 because if the Adjusted R² value approaches 1, it means that most of the independent variables explain the dependent variable.

Table 8. Coefficient of Determination

R	R-Square	Adjusted Square	Std. Error of the Estimate
0.773	0.597	0.586	4.342

The Adjusted R² value obtained in this study is 0.586. This indicates that the variables of attitude, subjective norms, and perceived behavioral control collectively contribute 58.6% to the purchase decision variable. In other words, this model is able to explain more than half of the variation in purchase decisions based on these three variables. The remaining 41.4% of the variation in purchase decisions is influenced by other variables not included in this study. This suggests that there are additional factors that may play a significant role in influencing purchase decisions and should be further explored in future research.

Structural Equation Model – Partial Least Square (SEM - PLS)

Outer Model Evaluation

Convergent Validity

If the loading factor/outer loading value exceeds 0.5 and the square root of the Average Variance Extracted (AVE) is greater than 0.50, the indicator is considered part of the model. Conversely, if the loading factor/outer loading value is less than 0.5 and the AVE square root is less than 0.50, the indicator needs to be eliminated from the model.

Figure 2 shows that the attitude, subjective norms, perceived behavioral control, and purchase decision variables for the halal Bakpia Pathok 25 product have loading factor/outer loading values ranging from 0.523 to 0.799, with AVE square root values less than 0.50, indicating the need for elimination. After elimination, Figure 3 shows that all items have loading factor/outer loading values between 0.537 and 0.828, with AVE values greater than 0.50.

The process of eliminating items with low loading factors and improving AVE values enhances the measurement model's overall quality. By ensuring that each construct is measured more accurately and reliably, the study's findings become more robust and credible. The final model, as shown in Figure 3, is better suited for further analysis and interpretation of the relationships between the constructs related to the halal Bakpia Pathok 25 product.

Construct Reliability

The reliability test results, as presented in Table 9, demonstrate that the composite reliability and Cronbach's Alpha values for the constructs exceed the threshold of 0.70. Additionally, the Average Variance Extracted (AVE) values are greater than 0.50, which further confirms the reliability of the constructs. These findings indicate that all four constructs in the study are reliable, as they meet the required thresholds for Cronbach's Alpha, rho_a, rho_c, and AVE. This suggests that the constructs are consistently measured, providing confidence in their stability and dependability. The high reliability scores imply that the measurement instruments used are robust and can accurately capture the intended constructs. Consequently, these constructs can be considered dependable for further analysis or interpretation in the study, ensuring that the results derived from them are trustworthy and valid.

Table 9. Construct Reliability

Variables	Cronbach's Alpha (≥ 0.70)	rho_a (≥ 0.70)	rho_c (≥ 0.70)	AVE (≥ 0.50)	Description
Attitude	0.810	0.823	0.864	0.517	Reliable
Subjective Norms	0.849	0.854	0.885	0.526	Reliable
Perceived Behavioral Control	0.892	0.899	0.911	0.506	Reliable
Purchase Decision	0.904	0.914	0.920	0.513	Reliable

Discriminant Validity

The Heterotrait-Monotrait Ratio (HTMT) for each variable pair ranges from 0.638 to 0.809, which is less than 0.90, confirming that the discriminant validity evaluation using HTMT is satisfied. The data presented in Table 10 evaluates discriminant validity using the Heterotrait-Monotrait Ratio (HTMT) for pairs of variables. Discriminant validity assesses whether constructs that are supposed to be different are indeed distinct from each other. The HTMT criterion provides a more stringent test for discriminant validity, with a commonly accepted threshold of 0.90. If the HTMT value for a pair of constructs is below 0.90, it suggests that the constructs are sufficiently distinct, which is essential for the validity of the measurement model in the study.

Table 10. Discriminant Validity

HTMT	PD	SN	PBC	A
Purchase Decision (PD)				
Subjective Norms (SN)	0.791			
Perceived Behavioral Control (PBC)	0.809	0.801		
Attitude (A)	0.638	0.748	0.679	

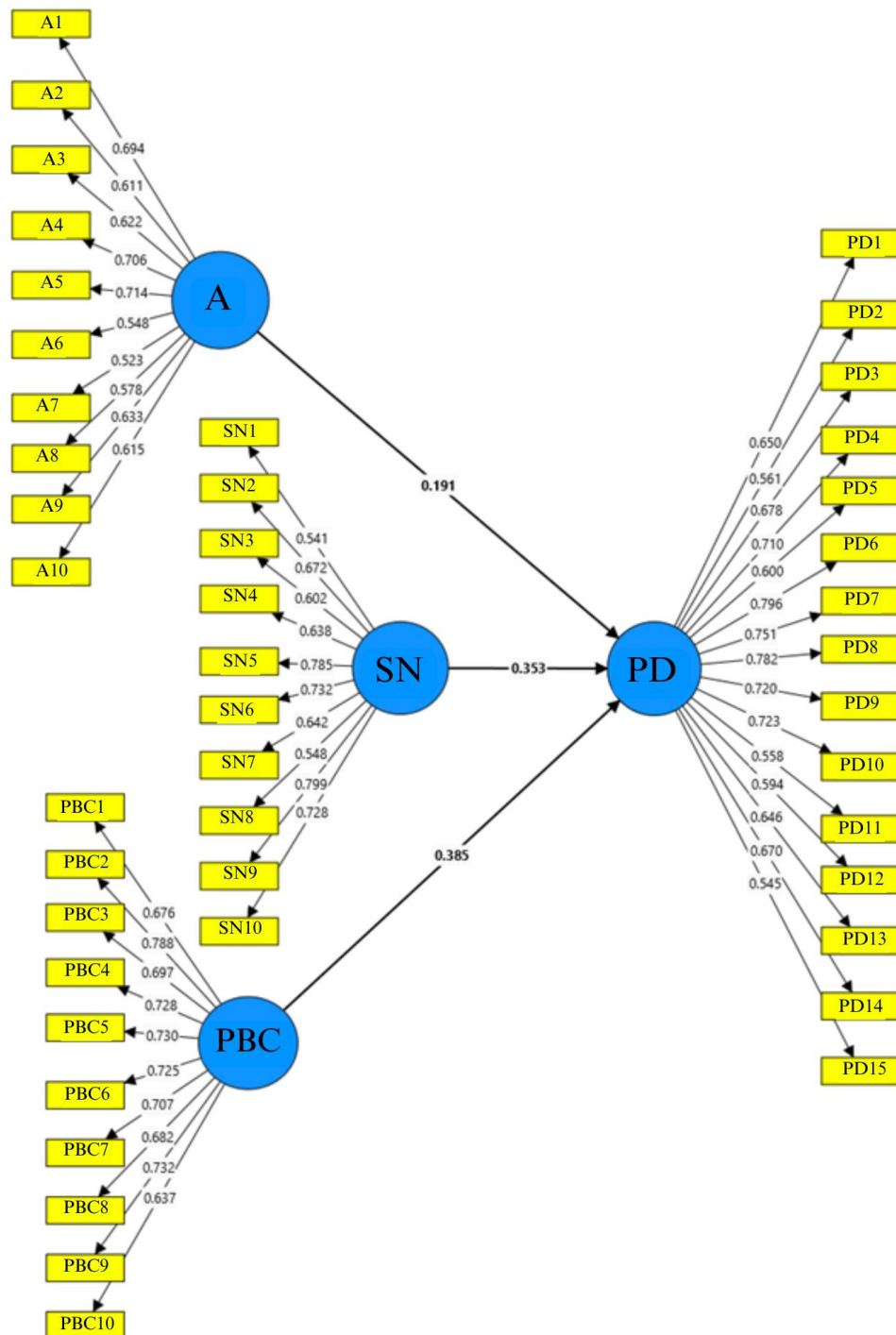


Figure 2. Loading Factor 45 Items

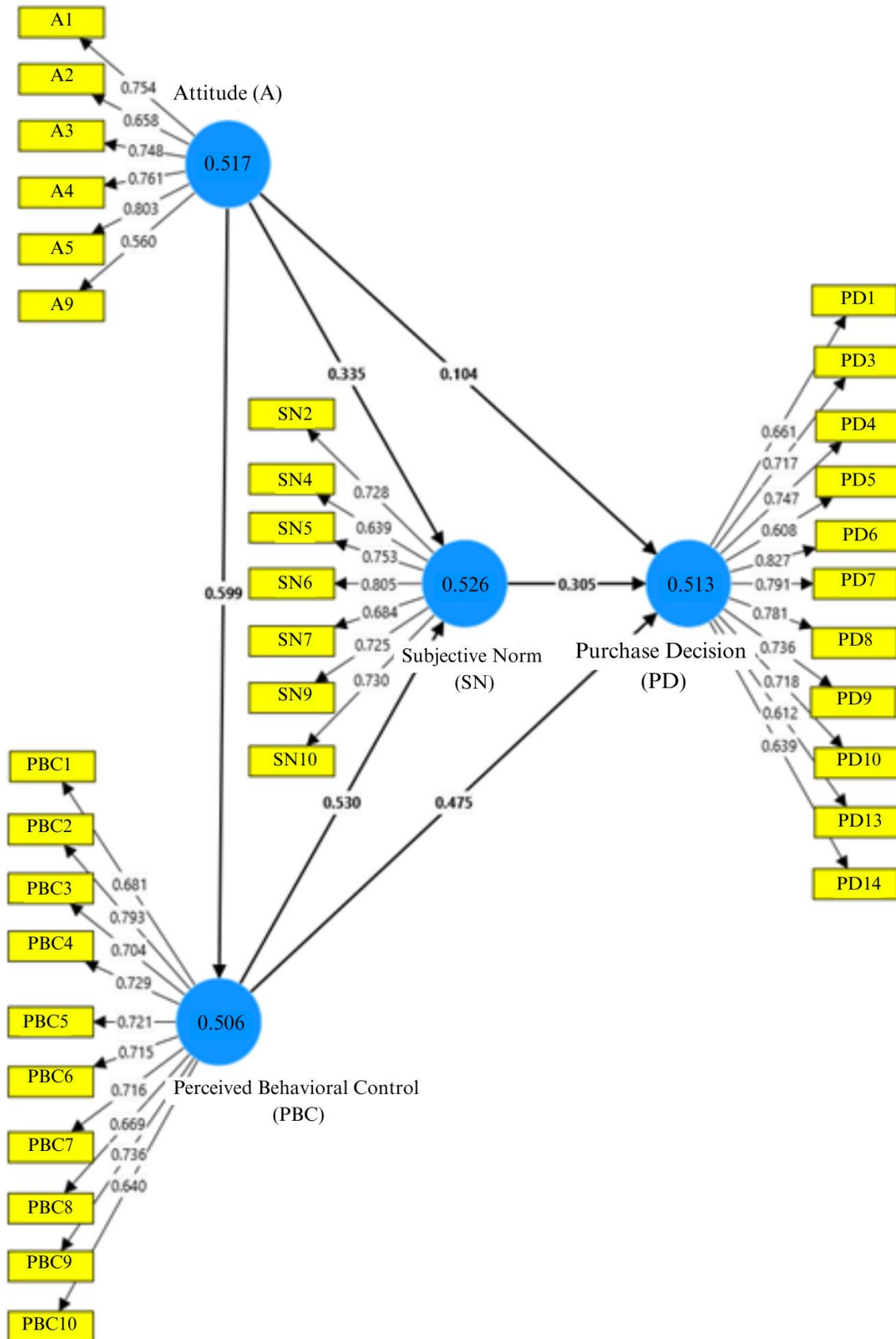


Figure 3. Loading Factor 34 Items (After Elimination)

Inner Model Evaluation

Goodness-of-Fit Test Using R-Square

Based on Table 11, model explains 64.1% of the variance in purchase decisions, while the remaining 35.9% is explained by factors outside the model.

Table 11. R-Square Value

Variable	R-square	R-square adjusted
Purchase Decision (PD)	0.641	0.631
Subjective Norms (SN)	0.606	0.598
Perceived Behavioral Control (PBC)	0.359	0.353

Significance Test of Path Coefficients

Path coefficients are considered significant if the t-statistic value is greater than the t-table value (1.96 at a 5% significance level) and the p-value is less than 0.05, indicating that the effect represented by the path coefficient is statistically significant. Table 12 and Table 13 show direct and indirect effects.

Table 12. Direct Effects

Direct Effect	O	M	SD	t statistict	P-value	Description
A -> PD	0.104	0.095	0.110	0.945	0.345	Not Significant
SN -> PD	0.305	0.324	0.099	3.078	0.002	Significant
PBC -> PD	0.475	0.466	0.093	5.082	0.000	Significant
A -> SN	0.335	0.331	0.111	3.013	0.003	Significant
PBC -> SN	0.530	0.545	0.092	5.757	0.000	Significant
A -> PBC	0.599	0.614	0.061	9.893	0.000	Significant

The analysis reveals that while attitude does not have a significant direct effect on purchase decision, it does have significant indirect effects through perceived behavioral control and subjective norms. Both subjective norms and perceived behavioral control have significant direct effects on purchase decision, indicating their importance in influencing consumer behavior. Perceived behavioral control also significantly influences subjective norms, highlighting interconnected relationships among these constructs.

Table 13. Indirect Effect

Specific Indirect Effects	O	M	SD	t statistics	P values
PBC -> SN -> PD	0.161	0.178	0.068	2.363	0.018
A -> PBC -> PD	0.284	0.287	0.067	4.242	0.000
A -> PBC -> SN -> PD	0.097	0.110	0.044	2.199	0.028
A -> SN -> PD	0.102	0.105	0.047	2.178	0.029
A -> PBC -> SN	0.317	0.335	0.068	4.675	0.000

DISCUSSION

Attitude, Subjective Norms, Perceived Behavioral Control, and Consumer Purchase Decision When Buying the Halal Bakpia Pathok 25 Product

Overall, consumer attitudes fall into the moderate category, with 68 respondents (62%) indicating this. The sources of attitude formation are explained by halal knowledge, halal awareness, and halal certification on Bakpia Pathok 25 halal products. The more consumers possess halal knowledge, the more halal products are consumed as awareness among Muslims increases. However, in Istanbul, Turkey, a weak

relationship was found between attitudes toward halal food and the preference for certified halal products (Ozdemir, 2020). Cultivating halal awareness is crucial in influencing Muslim consumers' purchase decisions to select certified halal products and recognize the characteristics of certified products (Septiani & Ridlwan, 2020).

Subjective norms among consumers were generally moderate, with 74 respondents (67%) reporting this. Subjective norms, which relate to normative beliefs and motivation to comply, can shape purchase intentions (Nora & Sriminarti, 2023). Subjective norms stem from external influences (normative beliefs) such as parents, partners, close friends, colleagues, or others. The social or organizational perspective plays a significant role in shaping Muslim consumers' perceptions. When influential people recommend buying halal products, the likelihood of a consumer following this recommendation increases.

Perceived behavioral control among consumers was also generally moderate, with 52 respondents (47%) indicating this. Perceived behavioral control is determined by an individual's beliefs about the situational and internal factors that facilitate the behavior (Ajzen, 2015). Perceived behavioral control can directly influence behavior by increasing efforts toward goal achievement. Indonesia, as a predominantly Muslim country, shows that Muslims tend to rely on their community (Rachbini, 2018).

Consumer purchase decisions were generally moderate, with 71 respondents (65%) reporting this. A purchase decision involves two or more parties. Purchase decisions are not only made by marketing researchers but also have a psychological dimension. Psychological research shows that creating an emotional bond with buyers can enhance a company's product value (Millatina et al., 2022). Bakpia Pathok 25 also forms an emotional connection with consumers through memorable moments in Yogyakarta and the legendary taste of Bakpia.

The Partial Effect of Attitude, Subjective Norms, and Perceived Behavioral Control on Purchase Decision

Consumer attitudes are formed based on their views on the product and learning through experience or other means (Subianto, 2007). In this study, the attitude variable did not have a significant effect on the purchase decision. This might be due to the fact that consumers could not fully evaluate halal knowledge and halal awareness. However, consumers can assess halal certification because such regulations are officially written and recognized by the government. This finding aligns with a study by Aslan (2023) in Turkey, which found that attitudes did not directly affect the intention to buy halal food but had an indirect effect through religiosity as a mediator. Similarly, Marchall et al. (2015) found that attitude did not affect consumer purchase decisions, meaning that changes in consumer attitudes would not influence purchase decisions. Verbeke & Vackier (2005) found that attitude did not directly affect purchase decisions but was mediated by behavioral intentions.

Subjective norms refer to perceived social pressure from others regarding whether or not to perform a certain behavior (Ajzen, 1991). Subjective norms, related to normative beliefs and motivation to comply, can form purchase intentions (Nora & Sriminarti, 2023). Subjective norms reflect an individual's perception of the expectations of significant others in their life to engage in a certain behavior or not. Subjective norms are influenced by an individual's beliefs, based on the views of others toward the attitude object, or normative beliefs. Subjective norms are social influences on an individual's behavior, such as those from friends or family expectations. This study aligns with research by Hasyim & Purnasari (2021), which found that subjective norms directly and indirectly affected halal product purchase decisions. Research by Agistya & Khajar (2022), Ahsen & Hendayani (2022), as well as Nora & Sriminarti (2023) and Fachrurrozie et al. (2023), also found that subjective norms significantly influenced the purchase decision for halal products.

Perceived behavioral control refers to an individual's perception of the desired behavior. In the case of halal product purchases, individuals consider several relevant factors (such as food safety, cleanliness, certification, and price) and assess the producer's ability before purchasing halal food (Hasyim & Purnasari, 2021). This study is consistent with Hasyim & Purnasari (2021), which found that perceived behavioral control significantly influenced halal food purchase decisions in Indonesia. Mariana et al. (2020) also found that perceived behavioral control had a positive and significant effect on the intention to buy halal fast food.

The Effect of Attitude, Subjective Norms, and Perceived Behavioral Control on Purchase Decision

The Theory of Planned Behavior (TPB) significantly influences the decision to purchase halal food. TPB is an extension of the Theory of Reasoned Action (TRA). In TRA, an individual's intention to perform a behavior is shaped by two key factors: attitude toward the behavior and subjective norms (Ajzen, 1991). TPB adds a third factor: perceived behavioral control. Thus, TPB consists of three constructs: attitude, subjective norms, and perceived behavioral control. The individual's intention to perform a behavior is the central factor in TPB (Hasyim & Purnasari, 2021). In this study, behavior is modified to represent the purchase decision. This study confirms that attitude, subjective norms, and perceived behavioral control can lead to a purchase decision for the halal Bakpia Pathok 25 product. Similar research conducted by Ahsen & Hendayani (2022) in Tasikmalaya showed that attitude, subjective norms, and perceived behavioral control simultaneously had a positive and significant effect on the behavior of Muslim student consumers. Imtihanah (2022) also found that these three factors had a positive and significant effect on the intention to buy halal food products among non-Muslim communities. Hasyim & Purnasari (2021) found that all TPB constructs—attitude, subjective norms, and perceived behavioral control—had a significant effect on halal food purchase decisions among customers in Indonesia. The attitude, subjective norms, and perceived behavioral control variables together explain 58.6% of the consumer decision variable in purchasing halal products from Bakpia Pathok 25, with the remaining 41.4% influenced by other factors outside of this study, such as trust (Aslan, 2023; Najmudin & Ahyakudin, 2024), habit (Vanany et al., 2019), product quality (Murni et al., 2022; Nurhayati et al., 2022; Wulansari et al., 2023), brand loyalty (Sari et al., 2022), price (Lucky, 2024; Murni et al., 2022; Nurhayati et al., 2022; Wahyudi et al., 2020; Wulansari et al., 2023), and service quality (Wahyudi et al., 2020).

Purchase Decision Based on Structural Equation Model – Partial Least Squares (SEM-PLS)

In line with Aslan's (2023) study in Turkey, which found that attitude did not directly influence the intention to buy halal food, but had an indirect effect through religiosity as a mediator, research by Marchall et al. (2015) shows that attitude did not affect consumer purchase decisions, indicating that changes in consumer attitudes would not influence their purchase decisions. Verbeke & Vackier (2005) found that attitude did not directly affect purchase decisions but was mediated by behavioral intentions. Rachbini's (2018) study on halal food purchasing behavior in Jakarta found that subjective norms directly influenced the intention to buy halal food. Subjective norms reflect an individual's perception of the expectations of significant others regarding a particular behavior. Consumers are influenced by those around them. In Indonesia, where the majority of the population is Muslim, the intention to buy halal food products tends to align with Muslim cultural values, which aim for the collective good. Perceived behavioral control directly affects the intention to buy among Muslim consumers in Indonesia, who are guided by mutual dependence in accordance with Islamic teachings (Puspita, 2023).

CONCLUSION

The categorization of attitude, subjective norms, perceived behavioral control, and consumer decisions in purchasing halal products from Bakpia Pathok 25 were, respectively, classified as moderate, with frequencies of 62%, 67%, 47%, and 65%. Attitude did not have a positive and significant effect on consumer decisions in purchasing the halal Bakpia Pathok 25 product. Subjective norms and perceived behavioral control had a positive and significant partial effect on consumer decisions regarding the purchase of halal Bakpia Pathok 25. Attitude, subjective norms, and perceived behavioral control had a positive and significant simultaneous effect on consumer decisions in purchasing halal Bakpia Pathok 25. Attitude did not directly influence purchase decisions, whereas subjective norms and perceived behavioral control had a direct effect. Attitude and perceived behavioral control had an indirect effect on purchase decisions. Attitude had an indirect effect on subjective norms.

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Exploring Students' Knowledge and Interest in Food Styling and Photography within Culinary Arts Programs at Vocational Colleges

Aina Afifah binti Azali ^{1*}, Zahidah Ab-Latif ² , Elia Md Zain ² 

¹ Master of Sciences TVET, Universiti Pendidikan Sultan Idris, Malaysia

² Lecturer of Faculty Technical and Vocational, Universiti Pendidikan Sultan Idris, Malaysia

* Corresponding Author. E-mail: M20232003070@siswa.upsi.edu.my

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ABSTRACT

This study examines the knowledge and interest of Diploma Vocational Malaysia semester 4 Culinary Arts students in food styling and photography to support educators in refining teaching strategies and curriculum design. Conducted among 434 students across Peninsular Malaysia, a sample size of 205 was determined using the Krejcie and Morgan table. Data were gathered through a structured questionnaire assessing students' opinions, knowledge, skills, and attitudes. Using the ASSURE model, which integrates media and technology into learning, the study focused on effective instructional design through learner analysis, objective setting, and evaluation. Analysis via SPSS version 27 revealed a high level of subject implementation, with a mean score of 3.9155 and a standard deviation of 0.34094, indicating students' recognition of the subject's importance for future careers. The findings highlight that mastering food styling and photography can enhance students' employability, providing an advantage in the food and beverage as well as creative industries. These skills address job market challenges, boosting the marketability of vocational graduates. The study also suggests its applicability to public universities and private institutions, offering a basis for broader evaluations of student interest and knowledge. Expanding this research could further improve curriculum design and graduate employability across educational sectors.

Keywords: Culinary arts, food styling and photography, vocational education

INTRODUCTION

Over the past two centuries, workplace skills have had to evolve significantly in response to changing industries and societal demands (Abdullah & Abd Majid, 2022). While technical skills remain important, there is a growing emphasis on other competencies that allow employees to work more efficiently and collaboratively (Zulkifeli, Ishar, & Hamid, 2022). These competencies, often referred to as core or soft skills, such as communication, teamwork, and problem-solving, are critical for navigating today's dynamic work environments. Habidin et al. (2019) argue that these skills are foundational for personal growth, effective teamwork, and adaptability in diverse settings. In the context of food styling and photography, the importance of these competencies is even more pronounced. Food styling and photography are both an art and a science, aimed at making food visually appealing for marketing, advertising, and social media purposes. As Cookist and MasterClass highlight, well-styled food images not only influence consumer behavior and enhance the perceived value of food but also evoke sensory responses like taste and aroma, underlining the emotional connection between presentation and consumer engagement.

According to Heinich et al. (1999), the ASSURE model offers a systematic approach to instructional design by focusing on six steps: Analyze Learners, State Objectives, Select Methods, Media, and Materials, Utilize Media and Materials, Require Learner Participation, and Evaluate and Revise wherein learners are assessed for motivation, discipline, and readiness to accept a new subject (*Food Styling and Photography*), objectives are defined to center on student engagement and skill-building in culinary arts, teaching aids and methods are carefully selected to ensure relevance and effectiveness, media and materials are mastered and tailored for both students and educators, active learner participation is fostered through performance-based activities and feedback mechanisms, and evaluation processes are implemented to determine the subject's impact on student performance and whether revisions are required to better address educational goals, ensuring the systematic integration of the subject into the vocational curriculum and its alignment with both teaching and industry needs.

Moreover, food stylists and photographers often face ethical dilemmas related to the extent of modifications made to food images. Techniques such as using non-food items or enhancing food with substitutes (e.g., glue for milk or oil for syrup) can help manage challenges like wilting or melting, but these methods also spark debates over authenticity in food marketing. The rise of food photography on platforms like Instagram has democratized the field, allowing amateurs to create professional-level food images. This shift offers creative and economic opportunities, turning food styling and photography into viable career paths for many. These insights lay a strong foundation for incorporating food styling and photography into educational and vocational programs, where bridging technical and creative skills can improve employability in both the culinary and creative industries. As Varzakas and Antoniadou (2024) suggest, integrating a design-thinking approach into food well-being allows for innovative solutions that consider the interconnected physical, emotional, and social aspects of food. By leveraging food styling and photography as tools, students and professionals can create more holistic food experiences, fostering deeper connections with food culture while enhancing career opportunities.

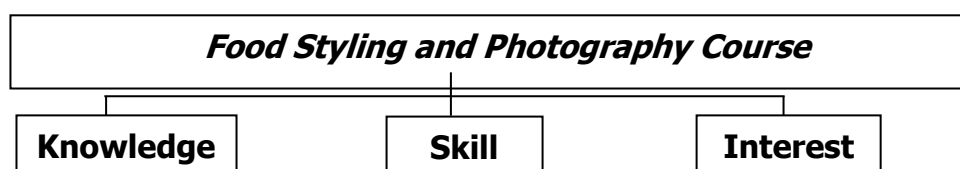


Figure 1. Conceptual Framework

PURPOSE OF THE STUDY

This study was carried out to meet several key objectives: first, to determine the level of knowledge in food styling and photography within the topic of culinary artistry at vocational colleges. Second, to assess the level of interest in food styling and photography among students studying culinary artistry at these institutions. Finally, the study aims to evaluate students' skill levels in the food styling and photography course at vocational colleges. The ASSURE model (Analyze learners - State objectives - Select methods, media, and materials - Utilize media and materials - Require learner participation - Evaluate and revise), proposed by Heinich et al., is a systematic and comprehensive approach to instruction. This model focuses on the effective use of media and technology to create engaging, efficient, and effective learning experiences.

The use of the ASSURE model in instructional design helps in planning, identifying, and setting objectives, selecting appropriate methods and materials, and conducting proper evaluations. The model's acronym represents the key components or steps involved in the instructional process. By applying the

ASSURE model, educators can design learning activities in a structured way that integrates technology and media, making learning more effective and meaningful. Meaningful learning, in this context, refers to learning that is effective, efficient, and engaging (Kim, D., & Downey, S., 2016). This study aligns with the focus of evaluating students' knowledge and interest in the topic of food styling and photography within the culinary artistry subject. The goal is to determine whether the learning approach applied is efficient and systematic.

METHOD

This study employed a quantitative research design using a questionnaire. A quantitative research design collects numerical data from a large sample of respondents through an instrument that includes questions and feedback. A questionnaire, as a quantitative method, involves distributing a structured set of questions to a sample to gather insights into the opinions, knowledge, skills, and interest of a given population.

Participants

The participants were selected through simple random sampling, a method widely regarded as effective for obtaining a representative sample of the population (Rahman et al., 2022). The study involved 434 Culinary Arts students from the Vocational College, with 281 female students and 154 male students enrolled in food styling and photography courses. Based on the Krejcie and Morgan (1970) table, the required sample size for the study was calculated to be 205 students. It is important to note that all participants had already completed courses in food styling and photography as part of their academic program, indicating that they had acquired foundational knowledge and skills in the subject. However, the students were not given additional instruction or specific background information related to the objectives of the study. The focus of this research was on evaluating their existing knowledge and understanding of food styling and photography, based on what they had learned in the curriculum, rather than any specialized preparation for the study.

Data Collection and Analysis

In this study, a survey was conducted using a questionnaire adapted from previous research by Emilda Balkis Ismail and Anuar Ahmad (2022) at Petaling Utama Secondary School. Specifically, it assessed the areas of subject implementation, student knowledge, interest, and skills in food styling and photography. The questionnaire is divided into five sections: Sections A, B, C, and D consist of the survey items, while Section E collects respondents' demographic information. The instrument contains 43 items, grouped into four constructs: 13 items focused on subject implementation, 10 on knowledge, 10 on interest, and 10 on skills related to food styling and photography. A 5-point Likert scale was used to measure students' responses, gauging their attitudes and perceptions toward these areas.

To ensure the validity of the questionnaire, a face validity process was conducted, where the content and language of the questionnaire were reviewed by experts for clarity and relevance. According to Md Zahir et al. (2019), face validity ensures the questionnaire's content is clear and understandable, while content validity ensures it aligns with the research topic. Two faculty members from the Department of Family and Consumer Sciences evaluated the questionnaire for accuracy and relevance. Clarifying how the items are categorized and their relation to classroom practices will further enhance the understanding of how food styling and photography are taught, helping to improve the curriculum and teaching methods.

The Scale

The validity form is designed to assess both the face validity and content validity as evaluated by experts for food styling and photography students. According to (Mason, J., Classen, S., Wersal, J., & Sisiopiku, V. P., 2020). face validity is assessed to ensure language accuracy and clarity of the material, while content validity examines whether the material aligns with the study objectives. This form is reviewed by two lecturers from the department of family and consumer sciences and is divided into five sections: part a, part b, part c, part d, and part e. See Table 1 and Table 2.

Table 1. Likert Scale

Level of Agreement	Scale
Strongly Disagree (STS)	1
Disagree (TS)	2
Somewhat Agree (KS)	3
Agree (S)	4
Strongly Agree (SS)	5

Table 2. Number of Items in a Questionnaire Instrument

Section	Description	Item	Source
A	Implementation	13	Adapted from Ismail and Ahmad (2022), Shaharin & Hamdan (2008)
B	Knowledge	10	Adapted from Isa & Mahamod (2021), Hashamiza Hamdan (2004), Lasan Noh & Hamzah (2017)
C	Interest	10	Adapted from Isa & Mahamod (2021), Amiruddin, Ngadiran, Zainudin, & Ngadiman (2016), Abdullah & Razak (2021)
D	Skills	10	Adapted from Subeli & Rosli (2021), Zulkarnain, Saim & Abd Talib (2012), Hashamiza Hamdan (2004)
E	Demographic Information	4	Reviewers

Validity experts use a 4-point scale—ranging from "good" to "needs improvement" and "rejected"—to rate each item in the instrument. According to Rosli et al, (2023), items that score a 3 or 4 indicate a consensus among experts. The number of experts assigning a score of 3 or 4 is then divided by the total number of experts to determine the I-CVI value. If there are fewer than six experts, the I-CVI should ideally reach 1.00 (Polit & Beck, 2006). The S-CVI is calculated as the average of I-CVI values across items in a construct, with a minimum threshold of 0.8, indicating that the instrument has achieved content validity.

In this study, the researcher provided a set of questionnaires to validity experts, considering their comments and suggestions to modify and refine the items. The number of experts was determined based on various recommendations, including having between one and ten experts or between three and ten (Elangovan, N., & Sundaravel, E., 2021). For this purpose, two experts were selected: one content lecturer and one language lecturer, both from the Faculty of Technical and Vocational Education.

Reliability

Instrument reliability refers to its consistency in measuring the intended construct (Sürücü, L., & Maslakci, A., 2020). The internal reliability index of an instrument can be assessed during the pilot study

using Cronbach's Alpha coefficient. Internal consistency is evident when responses remain consistent across items in the measurement. In this study, the instrument will be administered in a pilot phase, with data collected based on respondents' feedback to determine reliability values. Cronbach's Alpha will be calculated using SPSS software. Table 3 presents the categories of Cronbach's Alpha values and their reliability interpretations, as defined by Izah, S. C., Sylva, L., & Hait, M. (2023).

Table 3. Reliability Interpretation

Reliability Coefficient	Reliability Level
0.90 or above	Excellent
0.80 – 0.89	Good
0.60 – 0.79	Moderate
0.40 – 0.59	Questionable
0.00 – 0.39	Unacceptable

FINDINGS

Findings should respond to the purpose of the study and be presented systematically. They should be supported with sufficient and relevant quotations, examples, tables, and diagrams. Findings should be discussed with a reference to relevant and recent literature. Analysis and interpretation of these findings are necessary before they are discussed. For experimental research, the order of presenting the findings is adjusted to the research hypothesis, while for qualitative research, it is adjusted to the research questions.

Table 4. Demographics of Respondents

Gender			
		Frequency	Percent
Valid	Female	129	54.9
	Male	106	45.1
	Total	235	100

Table 4 shows that the number of women exceeds that of men, with 129 females, representing 54.9% of the total gender distribution.

Table 5. Implementation of Food Styling and Photography Subjects

Descriptive Statistics				
	N	Mean	Standard Deviation	Variances
Implementation	235	3.9155	0.34094	0.116
Valid	235			

Table 5 presents the descriptive statistics, including the standard deviation values and overall mean for the implementation construct of the food styling and photography subjects. The table indicates a high total mean of 3.9155.

Table 6 provides a detailed analysis of respondents' perceptions and experiences regarding a questionnaire focused on food styling and photography. The table presents the mean, standard deviation, and response level for each item, offering insights into the overall sentiment and variability of responses.

Most items in the questionnaire received a "High" response level, indicating strong positive feelings or significant agreement among respondents. For instance, items such as confidence in learning food styling and photography (mean = 3.89, SD = 0.314), viewing the subject as a potential career path (mean = 3.96, SD = 0.331), and the perception of the subject as skill-enhancing (mean = 3.96, SD = 0.429) all reflect a

high level of agreement. The standard deviation values suggest that responses were relatively consistent, with lower variability for most items, except for "I feel that food styling and photography is the best subject for culinary arts students to take," which had a moderate response level (mean = 3.74, SD = 0.688). This indicates a more varied opinion on this specific aspect. Overall, the data suggests that students generally perceive food styling and photography positively, although there are areas, such as the sufficiency of learning time and the use of guides, where opinions might be more diverse.

Table 6. Statistics for Each Questionnaire Item Answered by The Respondents

No.	Item	Mean	Standard Deviation	Level
1	I feel confident in learning food styling and confident to become a photographer.	3.89	0.314	High
2	I think the subject of food styling and photography can be a career path.	3.96	0.331	High
3	I feel nervous during food styling and photography practical classes.	3.95	0.483	High
4	I prefer to ask my classmates rather than the teacher.	3.99	0.51	High
5	I feel that the subject of food styling and photography can improve my skills.	3.96	0.429	High
6	I feel that food styling and photography is the best subject for culinary arts students to take.	3.74	0.688	Moderate
7	I feel that the learning time for food styling and photography is insufficient.	3.93	0.514	High
8	I find it easy to take photos following the latest trends.	3.92	0.509	High
9	I prefer using a guide when doing food styling and photography.	4.06	0.657	High
10	I think having a technology-based guide would make it easier for me to learn this subject.	3.87	0.609	High
11	I feel that the teacher's instruction is very encouraging and stimulates my thinking in learning food styling and photography.	3.93	0.26	High
12	I feel that using guides or modules in teaching makes me want to learn and succeed in food styling and photography.	3.93	0.351	High
13	I feel that the teacher always gives a clear explanation of the concepts in the subject of food styling and photography.	3.86	0.432	High

Table 7 show indicates the overall value for the variable of student knowledge in the subject of food styling and photography.

Table 7. Student Knowledge in the Subject of Food Styling and Photography

Descriptive Statistics				
	N	Mean	Standard Deviation	Variances
Implementation	235	3.938	0.361	0.131
Valid	235			

Table 8 provides an insightful analysis of student knowledge in the subject of food styling and photography. The table presents the mean, standard deviation, and response level for each questionnaire item, offering a comprehensive overview of students' self-assessed understanding and skills in this area. The majority of items demonstrate a "High" response level, indicating that students generally feel confident and knowledgeable about the subject matter. For instance, the item "I don't know everything about food styling and photography" has a mean score of 4.06 with a standard deviation of 0.358, reflecting a high level of agreement and suggesting that students recognize the complexity of the subject and their own learning needs. Similarly, items related to practical skills, such as identifying correct angles for photography (mean =

3.99, SD = 0.527) and knowing appropriate food styles (mean = 3.99, SD = 0.523), also received high scores, indicating that students feel competent in these areas.

Table 8. Student Knowledge in the Subject of Food Styling and Photography

No.	Item	Mean	Standard Deviation	Level
14	I don't know everything about food styling and photography.	4.06	0.358	High
15	I can identify the correct angles to capture photos.	3.99	0.527	High
16	I know the appropriate food style for different types of food.	3.99	0.523	High
17	I know which foods can be used for food styling and photography.	3.86	0.564	High
18	I need to have a deeper knowledge of this subject.	3.81	0.598	High
19	I can apply the knowledge from the food styling and photography subject to my daily life.	3.96	0.545	High
20	I can ask questions to gain further clarification.	3.96	0.553	High
21	I can express ideas critically.	4.03	0.484	High
22	I can discuss a topic well by using a variety of questions.	3.86	0.348	High
23	I can evaluate situations presented in the food styling and photography subject.	3.86	0.432	High

Students express a desire for deeper knowledge, as evidenced by the item "I need to have a deeper knowledge of this subject" (mean = 3.81, SD = 0.598), which also holds a high response level. This suggests an awareness of the need for ongoing learning and improvement. The ability to apply knowledge to daily life (mean = 3.96, SD = 0.545) and to express ideas critically (mean = 4.03, SD = 0.484) further underscores students' confidence in their skills and their ability to engage with the subject matter critically.

Table 9. Student Interest in the Subject of Food Styling and Photography

Descriptive Statistics				
	N	Mean	Standard Deviation	Variances
Implementation	235	3.30	0.31729	0.101
Valid	235			

Table 10. Student Interest in the Subject of Food Styling and Photography

No.	Item	Mean	Standard Deviation	Level
24	I often feel sleepy during the food styling and photography lessons.	4.06	0.406	High
25	I am interested in the subject of food styling and photography.	3.99	0.587	High
26	I find it hard to focus during the food styling and photography class.	3.99	0.457	High
27	I feel excited during food styling and photography lessons.	3.86	0.411	High
28	I enjoy this subject more when I am with friends.	3.81	0.458	High
29	I am more interested in this subject if it includes a guide.	3.96	0.511	High
30	This subject boosts my motivation to learn.	3.96	0.52	High
31	I actively participate in activities conducted during this class.	4.03	0.413	High
32	I actively engage in question-and-answer sessions during this subject.	3.86	0.484	High
33	I consistently participate in group interactions during this class.	3.86	0.475	High

Understanding student engagement and interest in the Food Styling and Photography subject, we turn to the data presented in Tables 9 and 10. Table 9 provides an overview of the descriptive statistics related to the implementation of the subject, highlighting key metrics such as the mean, standard deviation, and variance of student interest across a sample of 235 respondents. This table sets the stage by offering a

general sense of how students perceive the subject overall. Table 10 delves deeper into specific aspects of student interest by presenting individual questionnaire items that capture various dimensions of their experience. This detailed analysis allows for a comprehensive understanding of what drives student engagement in this subject, providing valuable information for educators aiming to enhance the learning experience.

Table 11 provides a broad overview of student skills, showcasing key descriptive statistics such as the mean, standard deviation, and variance from a sample of 235 respondents. This table offers a general assessment of student skill levels, with a mean score of 3.852, indicating a relatively high level of perceived competence in the subject.

Table 11. Student Skills in the Subject of Food Styling and Photography

Descriptive Statistics				
	N	Mean	Standard Deviation	Variances
Implementation	235	3.852	0.382	0.146
Valid	235			

Table 12 delves into specific skill areas, presenting individual questionnaire items that reflect various dimensions of student abilities. Each item is accompanied by its mean score, standard deviation, and response level, offering a detailed view of students' self-assessed skills. For instance, items such as the improvement in photography skills (mean = 3.9, SD = 0.475) and the ability to use a digital camera (mean = 3.93, SD = 0.51) both received a "High" response level, suggesting that students feel confident in these areas. However, the item regarding taking photos and styling food without guidance (mean = 3.67, SD = 0.704) was rated as "Moderate," indicating that students may still rely on some form of instruction or support.

Table 12. Student Skills in the Subject of Food Styling and Photography

No	Item	Mean	Standard Deviation	Level
34	I feel that my photography skills have improved after studying the subject of food styling and photography.	3.9	0.475	High
35	I feel that my food styling skills have increased after studying the subject of food styling and photography.	3.9	0.534	High
36	I can use a digital camera well.	3.93	0.51	High
37	I know how to take photos and style food without being taught by a teacher.	3.67	0.704	Moderate
38	I know how to take photos and style food without using a guide.	3.78	0.554	High
39	I have sufficient skills and knowledge in the subject of food styling and photography.	3.93	0.432	High
40	I strive to create creative and appealing food photographs.	3.87	0.555	High
41	I am unable to perform practical tasks in food styling and photography.	3.9	0.595	High
42	I can set the settings on a digital camera.	3.81	0.394	High
43	I knew how to use a digital camera before studying the subject.	3.83	0.452	High

DISCUSSIONS

Overall, this study allowed the researcher to assess students' knowledge, interest, and skills in the subject of food styling and photography. Previously, the researcher was unsure of students' knowledge, interest, and skill levels in this subject. However, with the data obtained from the analysis, the researcher was able to understand these aspects based on the study's constructs.

Discussion of Findings on the Implementation of the Food Styling and Photography Subject

The findings regarding the implementation of the food styling and photography subject suggest a high level of engagement, with a mean score of 3.9155 and a standard deviation of 0.34094. This indicates that students view the subject, particularly the culinary artistry topic, as highly relevant in vocational education and essential for equipping them with valuable skills for future employment. The ASSURE model, which guides instructional design, was applied in the assessment of this subject, ensuring that student needs were considered through careful planning, media selection, and active participation (Heinich et al., 1999). According to the data, the item with the highest mean score, item 9, states: "I prefer using a guide when doing food styling and photography," with a mean of 3.97 and a standard deviation of 0.657. This reflects students' reliance on structured guidance for performing practical tasks in this subject. The use of guides is emphasized in previous studies by Lee, K. S. (2022), who notes that guides support both instructors and students in the teaching and learning process, and by Çanakçı, S. D., & Turan, B. (2021), who highlight the effectiveness of guides as reference materials for students in hands-on activities. These findings align with the ASSURE model's emphasis on utilizing appropriate materials and methods to enhance student learning outcomes.

Discussion of Findings on Students' Knowledge in Food Styling and Photography

Regarding the construct of students' knowledge in food styling and photography, the descriptive analysis results indicate a high level of implementation, with a mean score of 3.9383 and a standard deviation of 0.36195. A notable finding is item 14, which states, "I do not know everything about food styling and photography," with a mean score of 4.06 and a standard deviation of 0.358. This suggests that while students possess a good foundational understanding, many feel that their knowledge is incomplete, indicating room for further development in this area. This aligns with the ASSURE model's step of analyzing learners, which stresses understanding student needs and identifying areas for further learning and growth (Heinich et al., 1999). The results highlight a potential avenue for follow-up research, as students' awareness of their knowledge gaps can inform further educational strategies. Fowler, D. S. (2023) recommends ongoing studies to build on existing research, particularly in areas such as culinary arts, to deepen understanding and refine teaching approaches.

Discussion of Findings on Students' Interest in Food Styling and Photography

In the construct of students' interest in food styling and photography, descriptive analysis results show a high implementation level, with a mean score of 3.30 and a standard deviation of 0.31729. However, a key finding is item 14: "I often feel sleepy during lessons for food styling and photography," with a mean score of 4.06 and a standard deviation of 0.406, suggesting that a significant portion of students experience disengagement during these lessons. This points to the need for further research to explore and enhance student interest in this subject.

This observation underscores the relevance of the ASSURE model, particularly the "Analyze Learners" step, which emphasizes the importance of understanding students' attention levels and engagement needs. To address this challenge, integrating active learning strategies, such as interactive and hands-on activities, could be an effective approach to increase student interest and participation (Pachava et al., 2024; Inayat & Ali, 2020). Recent studies also highlight the benefits of incorporating technology and flexible teaching methods to foster greater engagement, as students are more likely to remain attentive when

lessons include dynamic, technology-driven, and experiential components (Godoy Pena et al., 2023). By aligning these strategies with the ASSURE model's "Utilize Media and Materials" step, educators can tailor lessons to maintain student interest and improve overall learning outcomes.

Discussion of Findings on Students' Skills in Food Styling and Photography

In the construct of students' skills in food styling and photography, the descriptive analysis reveals a high skill level, with a mean score of 3.85 and a standard deviation of 0.382. Notably, items such as "I can use a digital camera effectively" (mean = 3.93, SD = 0.510) and "I have adequate skills and knowledge in food styling and photography" (mean = 3.93, SD = 0.432) reflect the students' proficiency in these areas. These findings suggest that most students possess competent technical skills in food photography and styling, which are increasingly relevant in modern job markets where digital literacy and creative abilities are highly valued.

These results align with the "State Objectives" and "Utilize Media and Materials" steps of the ASSURE model. In the context of modern job markets, where creative industries and visual media are growing rapidly, it is essential to ensure that students develop skills that are aligned with these evolving industry demands (Bennett et al., 2020). As employers place greater emphasis on digital proficiency and creative problem-solving, particularly in fields like food marketing, blogging, and content creation, the ability to effectively use digital tools, such as cameras and editing software, becomes a significant asset (Kim & Lee, 2021). This study highlights the need for continued research to further explore how students' knowledge and interest in food styling and photography can be expanded to meet the increasing demands of the creative job market.

By leveraging the ASSURE model, educators can further refine the curriculum to ensure students are equipped with the skills that will not only enhance their academic experience but also improve their employability in competitive and technology-driven industries.

CONCLUSION

This study on food styling and photography for Vocational College students demonstrates its significant potential in enhancing students' skill sets, particularly in terms of their employability. The findings suggest that the specialized skills learned in food styling and photography offer students a competitive advantage in the job market, as these skills are highly valued not only in the food and beverage industry but also in the creative arts sector. As the job market continues to evolve, possessing expertise in areas such as food photography and presentation can set vocational graduates apart from their peers (Simons & Goh, 2020; Kim & Lee, 2021).

To further improve the relevance of this subject, evidence-based recommendations for curriculum adjustments include integrating technology-based practical sessions. This would allow students to gain hands-on experience with digital tools and media commonly used in the industry (Pachava et al., 2024). Additionally, incorporating collaborative projects with real-world applications can strengthen students' ability to adapt and work in dynamic environments, enhancing both their technical and creative problem-solving abilities (Bennett et al., 2020). Furthermore, research by Johnson and Barrow (2021) emphasizes the need for industry partnerships to ensure that the curriculum remains aligned with contemporary market demands, providing students with practical, job-ready skills.

Moreover, while vocational students are currently the primary focus of this subject, expanding research to include students from public universities and private institutions could provide a broader

understanding of interest and knowledge in food styling and photography. These insights could inform curriculum development and pedagogical strategies across educational sectors, ensuring that students in diverse learning environments are equipped with skills that meet modern industry demands (Harper & Oliver, 2020). This broader approach would not only enrich educational experiences but also ensure that graduates are better prepared for the demands of a highly competitive job market.

Therefore, the study provides a foundation for refining food styling and photography education, making it more interdisciplinary and adaptable to various educational and professional contexts (Varzakas & Antoniadou, 2024; Fowler, 2023).

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Creation of E-Magazine Learning Resource for Pastry and Bakery Products Courses Focused on Low-Calorie Diets

Intan Diah Kusuma *, Mutiara Nugraheni 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

* Corresponding Author. E-mail: intandiah.2019@student.uny.ac.id

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ABSTRACT

The objectives of this study are to: (1) Develop an E-magazine learning medium on pastry and bakery products for a low-calorie diet for students, and (2) Determine the feasibility of the E-magazine learning medium on pastry and bakery products for a low-calorie diet. This study is a type of Research and Development (R&D) research using the 4D model, which consists of four stages: 1) Define: conducting front-end analysis, curriculum analysis, learning outcome analysis and learning objective mapping, and learner analysis, 2) Design: selecting media and format, creating a flowchart and storyboard, and then developing the e-magazine, 3) Develop: conducting validation with material experts, media experts, and feasibility testing by students, 4) Disseminate: distributing the media through a flipbook platform. The results of this study indicate that: (1) The product developed is the E-Magazine Learning Medium for Low-Calorie Diet Pastry and Bakery. The E-Magazine can be accessed on the flipbook platform, 2) Based on research data obtained from material experts, the score was 3.38 in the "Very Feasible" category, from media experts, the score was 3.8 in the "Very Feasible" category, and from students, the score was 3.45 in the "Very Feasible" category. This indicates that the development of the E-Magazine Learning Medium for Low-Calorie Diet Pastry and Bakery is deemed feasible for use as a learning medium in Vocational High Schools for Culinary Arts. This initiative not only provided an innovative learning tool but also addressed obesity-related issues by integrating modern technology to engage Generation Z students effectively. Future research is recommended to further explore its impact on practical learning outcomes and continuously improve educational media.

Keywords: Development of learning media, e-magazine, low-calorie diet, pastry and bakery materials

INTRODUCTION

Globalization can have numerous positive impacts on education. It facilitates the quick search for information or knowledge. Globalization also enables students to foster creativity and enhance their learning abilities. With advancements in information and communication technology, students can now easily access various sources of knowledge from around the world, accelerating the learning process and broadening their horizons (Bernaldo & Fernández-Sánchez, 2022). Currently, Indonesia is implementing the Merdeka Belajar curriculum as an adaptation to the era of globalization. The Merdeka curriculum was inaugurated by the Minister of Education, Culture, Research, and Technology, Nadiem Makarim, in February 2022. The Merdeka Curriculum features diverse intramural learning, where content is optimized to give students ample time to deepen concepts and strengthen competencies, making learning more relevant and engaging (Jin, 2023). Educators have the flexibility to choose various teaching tools so that learning can be tailored to the

needs and interests of students. This aligns with the active learning approach emphasized in the Merdeka curriculum, where students are expected to be directly involved in the learning process (Rosmiati et al., 2021).

The use of learning media in the teaching and learning process can stimulate new desires and interests and have psychological effects (inner feelings, attitudes, and character) on students (Yusantika et al., 2018). Research shows that creative learning media can positively impact students' psychology, including their feelings and attitudes toward the material being taught (Rapoport, 2020). Media can provide information to students and vice versa in an intense and smooth manner. Efficiency and learning goals can be achieved if media is used creatively in teaching. The presence of learning media in the educational process will have positive impacts, such as influencing learning success. To ensure that media influences learning success, it must be educational and engaging (Kristiono & others, 2018). Educational and engaging media can enhance learning effectiveness, provided it is used appropriately by educators (Coyer et al., 2019). In this context, the role of teachers becomes crucial in designing and implementing learning media that aligns with current technological developments, including the use of gadgets and interactive learning applications (Ahmed & Mohammed, 2021).

Preliminary studies show that students use gadgets daily. This is because the age range of students is around 16-18 years, which falls into Generation Z. Although Generation Z students are very familiar with technology, many of them use gadgets more for gaming and socializing on social media than for learning (Abhijeet, 2023). To maximize the function of gadgets, interactive learning media can be integrated into them. One of the activities needed to enhance learning is designing learning media that facilitates learning. Media can ease learning by acting as an intermediary that transmits messages from the sender to the receiver (Nurfadilah, 2021).

Vocational High School 4 Yogyakarta is one of the vocational schools in Yogyakarta. The use of gadgets as a learning support through mobile learning has not been fully utilized by educators. Thus, learning at the school has not aligned with the current generation of students. One productive subject at Vocational High School 4 is Pastry and Bakery Products. This subject was chosen for research because, according to statistics from the Ministry of Agriculture, in 2018, the consumption of pastry and bakery products, such as sweet bread, increased by up to 500% since 2014. This increase continued during the pandemic in 2021, with Indonesia achieving the highest bread sales in Southeast Asia.

This subject focuses on low-calorie diet pastry and bakery products tailored to current market needs. According to a Ministry of Health survey, in 2023, 23.4% of Indonesia's adult population (aged >18 years) was categorized as obese. Obesity is the excessive accumulation of fat in the body, leading to health problems. A low-calorie diet is a strategic approach for weight loss, as greater weight loss, in terms of fat mass reduction, results in more significant positive health impacts (Zubrzycki et al., 2018).

Students need learning media that aligns with current technological developments, such as gadgets, to understand the material interactively. Learning media can also overcome limitations of space, time, energy, and sensory abilities, and can stimulate learning enthusiasm, provide stimulation, and experiences. In this subject, there is no gadget-based learning media that contains the material.

One proposed solution is the development of an E-magazine for the Pastry and Bakery Products subject, which can serve as a self-learning resource and engage students with the material being taught (Fadillah et al., 2021; Huang & Cheng, 2020). The E-Magazine for the Pastry and Bakery Products subject, focusing on low-calorie diet pastry and bakery products, is a medium that can be used as a tool to understand the material and as a self-learning resource. The E-Magazine for the Pastry and Bakery Products subject is expected to attract students' interest in the material presented. E-magazines are categorized as learning media because they fall into visual and/or multimedia media. The use of E-magazines is expected to assist in explaining various visualizations of lesson concepts that are difficult to explain conventionally. Thus, e-

magazines not only function as learning aids but also as a means to develop students' independence and responsibility in their learning process (Nurngaini, 2024).

In the context of a subject focused on low-calorie diets, E-magazines can provide relevant and useful information for students, given the rising obesity rates in Indonesia (Shin & Hutzal, 2018). With e-magazines, students can access recipes, techniques, and the latest information on industry trends directly, which can enhance their practical skills and prepare them for entering the workforce (Hakim, 2024). E-magazines can facilitate this communication, allowing students to gain insights directly from professionals in the Pastry and Bakery field and expand their networks (Asih, 2023; Hakim, 2024).

The use of e-magazines also aligns with the Merdeka Belajar initiative implemented in Indonesia, which emphasizes the importance of innovation in vocational education (Safaruddin, 2021). By integrating technology and digital media into the curriculum, e-magazines can help create a more flexible and adaptive learning environment that suits the characteristics of Generation Z, who grew up in the digital era (Vierke, 2024). This is important for increasing student motivation and engagement and preparing them for the challenges of an increasingly competitive workforce (Sonia, 2020).

The development of e-magazines in the context of the Merdeka curriculum has a crucial end goal, which is to support the achievement of learning outcomes (CP) in the Pastry and Bakery subject. In the Merdeka curriculum, there is an emphasis on more flexible, student-centered learning based on their needs and interests, allowing them to learn in a more independent and creative manner (Pratycia et al., 2023).

PURPOSE OF THE STUDY

This study aims to: (1) Develop an E-magazine learning medium on pastry and bakery products for a low-calorie diet for students, and (2) Test the feasibility of the E-magazine learning medium on pastry and bakery products for a low-calorie diet.

METHOD

This study falls under the category of research and development, also known as Research and Development (R&D). The concept of research and development refers to a process; research does not produce tangible and visible objects. The Research and Development method is a research method used to produce a specific product and test the effectiveness of that product (Sugiyono, 2011).

In this development research, a product will be produced: an E-magazine learning medium for the Pastry and Bakery subject, focusing on special diet desserts, using the 4D research model (Four D Models), which includes Define, Design, Develop, and Dissemination, as outlined in Figure 1.



Figure 1. The 4D Research Flow

The definition stage includes steps to determine the product and specifications to be developed (Sugiyono, 2011). The analysis involves front-end analysis, curriculum analysis, learning outcome analysis, learner characteristic analysis, and learning objective mapping.

In the design stage, activities are conducted to create a design for the predetermined product (Sugiyono, 2011). The chosen medium is the E-magazine Learning Medium for the Pastry and Bakery Subject, focusing on Low-Calorie Diets for the Culinary Arts class XI. The design stage includes: a) format

selection, b) media selection, c) flowchart creation, d) scriptwriting, e) storyboard creation, f) e-magazine media creation.

In the development stage, activities are conducted to transform the design into a tangible product and repeatedly test the product's validity until it meets the desired specifications (Sugiyono, 2011). At this stage, the created media is ready for content and media validation testing. After validation testing, improvements are made based on revisions and suggestions from media and content experts.

The dissemination stage involves activities to distribute the perfected product for maximum use by others (Sugiyono, 2011). This stage involves the dissemination of the developed and validated learning media product to a broader group, which can be used in other classes, schools, or relevant institutions requiring E-magazine learning media.

Research Location and Time

This research was conducted at SMK N 4 Yogyakarta, located at Sidikan Street No.60, Sorosutan, Kec. Umbulharjo, Kota Yogyakarta, Daerah Istimewa Yogyakarta 55161. The research timeline was adjusted to the schedule of the relevant parties, with data collection taking place from April to June 2024.

Research Population and Sample

The population in this study consists of class XI students in the Culinary Arts Program (2 classes totaling 70 students). The sample in this study is one class of 32 culinary students from class XI, selected using a cluster sampling approach. This sample was chosen because it possesses characteristics representative of the population and can reflect the needs and weaknesses of the existing learning media.

Cluster sampling was chosen for several reasons: first, this method allows for efficiency and ease of access to the sample, which in this case is a group of students in one class, saving time and resources. Second, the selected class is considered to have characteristics representative of the overall population, which is important to ensure that the research findings can be generalized. Third, cluster sampling is suitable when there are resource constraints, such as time and cost, making random sampling from the entire population impractical. Finally, this approach aligns with the research objective of developing and testing learning media in a specific and controlled context.

Data Collection Tools

According to Mulyatiningsih (2012), data collection methods involve systematic steps to gather data using instruments or other devices. The three main methods used are: observation, which involves systematic observation and recording of visible phenomena on the research subject to obtain supporting data; interviews, which use guidelines in the form of an outline of issues to assess students' learning competencies through interviews with teachers; and documentation, which gathers qualitative data from documents, with researchers using cameras to capture observation activities.

Instrument Validity and Reliability

A data collection tool or research instrument is a tool used to measure observed natural or social phenomena (Sugiyono, 2011). The research instrument used in this study is a questionnaire. The questionnaire is a closed-ended survey, allowing respondents to answer with provided choices. The questionnaire is given to media experts, content experts, and students as respondents. This questionnaire is structured using a Likert scale with four answer choices.

The instrument's validity in this study is assessed through a validation process conducted by content and media experts. This validation ensures that the questionnaire can measure aspects relevant to the research objectives. Content and media experts provide evaluations and feedback to refine the questionnaire, ensuring that the questions align with the taught material and are understandable by students.

The validation process by experts and limited-scale trials with students can be considered steps to ensure the instrument's consistency and reliability. Using a Likert scale in the questionnaire provides a consistent structure for evaluation, which can help achieve good reliability.

FINDINGS

Development of E-Magazine Learning Media for Pastry and Bakery for a Low-Calorie Diet

This development research aims to produce an E-Magazine learning medium that meets good and feasible criteria. The four stages of research undertaken are: (1) define, (2) design, (3) development, and (4) disseminate. The final product of this research is the E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet for Vocational High School class XI. Below is a general presentation of the evaluation data of the E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet, obtained from content experts, media experts, and limited-scale trials.

Define Stage

The define stage involves deciding and characterizing needs in the learning process and gathering information on the extent of development required. This stage involves establishing and defining the requirements needed in learning development, which includes front-end analysis, curriculum and core competency analysis, learning outcome and objective mapping analysis, and learner analysis.

In the front-end analysis stage, the researcher conducted an initial observation at SMK N 4 Yogyakarta to interview the teacher of the Pastry and Bakery Product subject. This was done to ensure that the resulting learning media aligns with the learning objectives outlined in the competency standards. Additionally, the initial analysis aimed to review the latest data in Indonesia regarding the adult population, which shows a high prevalence of obesity. This also helped determine the subject to be developed. The final analysis was conducted as a learning media needs analysis to identify problems as the basis for developing the Pastry and Bakery E-magazine.

In the curriculum and core competency content analysis stage, the author analyzed the content of the pastry and bakery subject, which includes the attitudes, knowledge, and skills that students must possess to master competencies in the culinary field. This subject is crucial for students after graduation, as it is expected to support them in pursuing employment, further studies, or entrepreneurship, especially as entrepreneurs capable of creating low-calorie pastry and bakery products beneficial to consumers.

The learning outcomes according to the syllabus for the pastry and bakery subject on a low-calorie diet include an indicator point in meetings 13-14, which is to analyze pastry and bakery for a low-calorie diet. The researcher selected this material to give students an overview of the expertise program in low-calorie diet pastry and bakery, which is a requirement in the culinary department. This aims to foster passion and encourage students to plan and engage in learning activities. Additionally, this subject supports pastry and bakery knowledge and skills, particularly in low-calorie diets, aligning with the goals of vocational high schools.

The next stage is the learning objective mapping, which involves identifying the goals to be achieved in the learning process using the developed media. The learning objectives are for students to explain the

concept of a low-calorie diet, identify food ingredients for a low-calorie diet, determine the tools and materials for making low-calorie pastry and bakery, outline the procedures for making low-calorie pastry and bakery, and determine the criteria for low-calorie pastry and bakery products.

The final stage of defining the e-magazine is learner analysis, which involves identifying the characteristics of the target learners for the development of learning tools. Learner analysis was conducted through interviews with the subject teacher. This interview aimed to identify student characteristics and understand their responses and attitudes during the learning process. The findings from this stage revealed that most students find it challenging to understand the material, and the media used does not align with the characteristics of Gen Z students. The research and development conducted are expected to produce learning media that captures students' attention and motivates them to be more active in learning activities.

Design Stage

The design stage aims to design the learning media tools. Six steps must be undertaken in this stage: media selection, format selection, flowchart creation, scriptwriting, storyboard creation, and e-magazine development.

Media selection involves identifying relevant learning media based on the material and characteristics of the learners. Media selection is also aligned with the latest curriculum analysis, learning outcome analysis, and learning objective mapping, as well as learner characteristics consistent with Generation Z or the 4.0 era.

Format selection is useful for designing the content of the E-Magazine for the Pastry and Bakery Product Subject, which includes core material, enrichment material, issues presented as articles, interactive quizzes, and links to the latest learning resources for students. Format selection is aligned with the media and learning approach to be used. After format selection, the next step is creating the product flowchart. The e-magazine flowchart includes the cover, authors, table of contents, introduction, learning outcomes, indicators, latest articles, material descriptions, quizzes, evaluation sheets, and closing.

Scriptwriting consists of material that provides an overview of the main content to be developed in the e-magazine, including: (1) the definition of pastry and bakery, (2) the definition of a low-calorie diet, (3) the requirements for a low-calorie diet, (4) tools and materials for making low-calorie pastry and bakery products, and (5) the benefits of a low-calorie diet.

The e-magazine storyboard includes the layout plan, visual components, headlines for each page, text/material on each page, and the number of pages to determine how many pages will be created. The storyboard facilitates the design process and ensures the media aligns with the initial goals and plans.

After creating the e-magazine framework/storyboard, the e-magazine is developed based on the storyboard, consisting of: (1) front page/cover, (2) authors page, (3) table of contents page, (4) introduction page, (5) article page, (6) quotes page, (7) info at a glance page, (8) concept map page, (9) learning outcomes and objective mapping page, (10) background page, (11) main material page, (12) enrichment material page, (13) quiz page, (14) evaluation sheet page, (15) references page, and (16) closing page. Figure 2 shows the cover page design.

Development Stage

In the development stage research, activities are conducted to transform the design into a tangible product and repeatedly test the product's validity until it meets the desired specifications (Sugiyono, 2011). This stage aims to produce a revised development product based on feedback from media experts, content experts, vocational high school culinary teachers, and vocational high school culinary students. Development stages include validation process and feasibility testing.

Content Expert Validation

In the content expert validation process, several aspects of the e-magazine are assessed, including presentation, graphic aspects, and the characteristics of the developed Pastry and Bakery e-magazine. Validation was conducted on June 3, 2024, and June 26, 2024. The validation results and feedback from content experts can be seen in Table 1.

Table 1. Content Expert Revisions

Feedback	Follow-up Actions
Ingredients for making pastry that are rare in Indonesia should not be included	Replace with ingredients that are abundant in Indonesia
Material sources from websites/internet should be replaced with those from books/international research	Replace and add high-quality and reliable sources
Words that are too formal should be changed to popular words because it's an e-magazine	Change the wording to be more casual and use popular terms
Adapted product recipes should be practiced or include original low-calorie pastry recipes	Add original recipes and analyze additional correct recipes
Convert foreign recipes to Indonesian measurements in grams	Change recipe measurements to grams and explain abbreviations
Use one example of a cake-making procedure, such as the creaming method, instead of bakery procedures	Add detailed explanation of the creaming method and include the cake-making procedure in the enrichment material
Move enrichment material to the end of the document	Relocate enrichment material from the beginning to the end
Adjust the criteria for results and ensure product examples and photos are only of cakes	Change the description and photos in the criteria for results
In the quiz section, one question is less relevant because puff pastry is not discussed	Replace one quiz question with a question about the creaming method



Figure 2. Cover and Closing Pages of the E-Magazine

The product revision by the content expert was conducted once as an improvement. During the evaluation and validation, the content expert provided feedback and comments on the material content developed by the researcher.

Media Expert Validation

Validation was conducted on May 31, 2024. During this validation, the media expert provided feedback on the e-magazine in terms of media aspects, including format, icon usage, appeal, and consistency of the e-magazine. The validation results and feedback from the media expert can be seen in the Table 2.

Table 2. Media Expert Revisions

Feedback	Follow-up Actions
Make the article more engaging and add a variety of images, enlarging them	Make the article more engaging by adding and enlarging related images
Use more casual language in the tips and tricks sub-section (strategies for achieving lower-calorie cakes)	Change the tips and tricks page to a casual language to attract students to read
Place the sub-section on prohibited food ingredients in the theory section	Change the layout of the sub-section on food ingredients
Pay attention to word breaks	Revise words with incorrect breaks
Lower the quiz background sound	Reduce the background sound on the Quizizz website (related media link)

The product revision by the media expert was conducted once as an improvement. During the evaluation and validation, the media expert provided feedback and comments on the media developed by the researcher.

Feasibility Testing of the E-magazine

The stage following approval by content and media experts is limited-scale feasibility testing. The limited-scale test was conducted by 32 students of class XI Culinary Arts at SMK Negeri 4 Yogyakarta. The feasibility test began with a brief explanation of the E-Magazine for the Pastry and Bakery Product Subject on a low-calorie diet, followed by distributing the e-magazine to students for reading and study. Subsequently, students provided evaluations and feedback through a feasibility questionnaire available online via Google Forms.

Table 3. Feasibility Assessment Criteria

Score Interval	Category
$X \geq \bar{x} + 1.5Bx$	Very Feasible
$\bar{x} + 1.5Bx > X \geq \bar{x}$	Feasible
$\bar{x} > X \geq \bar{x} - 1.5Bx$	Less Feasible
$X < \bar{x} - 1.5Bx$	Not Feasible

Source: Mardapi (2008)

Test Data Results

The test data description contains all the survey results used for the feasibility test in developing the E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet for Class XI Culinary Arts at SMK N 4 Yogyakarta. The questionnaires used include those for content experts, media experts, and student respondents. Content experts evaluated the material, media experts assessed the appeal of the e-magazine, and students conducted the feasibility assessment of the learning e-magazine. Students' evaluations were based on media appearance, media accessibility, learning content, material content, and the benefits of this learning e-magazine.

Results of the Content Expert Feasibility Test

The content expert test data was obtained from evaluations conducted by two content experts: lecturers in the Pastry and Bakery course at Yogyakarta State University. The content expert evaluation was based on the syllabus and learning outcomes used in vocational high schools for culinary arts. The results from the content expert evaluation were considered for the feasibility of the material presented in the learning e-magazine. The evaluation for content experts in Low-Calorie Diet Pastry and Bakery Learning included: alignment with objectives, alignment with 4.0 learning resources, and alignment with student characteristics. The results of the validation by content experts on these three aspects are shown in Table 4.

Table 4. Content Expert Evaluation Data

No.	Evaluation Indicator	Average Score	Category
1	Alignment with Objectives	3	Very Feasible
2	Alignment with Learning Material Sources	3.6	Very Feasible
3	Alignment with Student Characteristics	3.25	Very Feasible
Total Average Score		3.38	Very Feasible

Based on Table 4, it can be seen that the average score for each indicator evaluated by the content expert falls into the "Very Feasible" category. The material evaluation was reviewed in three aspects: alignment with objectives, alignment with 4.0 learning resources, and alignment with student characteristics. The indicator for alignment with objectives received an average score of 3, alignment with 4.0 learning resources received an average score of 3.6, and alignment with student characteristics received an average score of 3.25. The overall average score is 3.38, meaning that the material in the e-magazine for continental food processing and presentation is "Very Feasible" for use in Low-Calorie Diet Pastry and Bakery Learning for class XI Culinary Arts students at SMK Negeri 4 Yogyakarta.

Results of the Media Expert Feasibility Test

The media expert test data was obtained from evaluations conducted by one media expert, a lecturer in Culinary Arts Education. The media expert evaluation in Low-Calorie Diet Pastry and Bakery Learning was based on the appeal of the e-magazine, which included: media appearance, accessibility, content, learning, and the benefits of the e-magazine. The media expert's evaluation data for the e-magazine can be seen in Table 5.

Table 5. Media Expert Evaluation Data

No.	Evaluation Indicator	Average Score	Category
1	Media Appearance	3.7	Very Feasible
2	Accessibility	3.8	Very Feasible
3	Benefits	4	Very Feasible
Total Average Score		3.8	Very Feasible

Based on Table 5, it can be seen that the average score for each indicator evaluated by the media expert falls into the "Very Feasible" category. The e-magazine evaluation as a learning medium includes indicators such as media appearance, accessibility, and benefits. In this validation, the media appearance indicator of the e-magazine received an average score of 3.7, media accessibility received an average score of 3.8, and the benefits aspect received an average score of 4. The overall average score for media validation is 3.8, which means that the e-magazine for Low-Calorie Diet Pastry and Bakery Learning is "Very Feasible" for use as a learning medium in the pastry and bakery subject for a low-calorie diet at SMK Negeri 4 Yogyakarta.

Results of the Limited-Scale E-magazine Feasibility Test

The limited-scale feasibility test of the e-magazine was conducted to determine students' evaluations regarding the feasibility of the E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet. This test was conducted after content and media validation was approved by experts and deemed feasible for use with improvements, according to the feedback or suggestions provided. The E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet for class XI Culinary Arts was tested for feasibility on a limited-scale group of 32 students from class XI Culinary Arts at SMK Negeri 4 Yogyakarta. The results of the e-magazine usage trial can be seen in the table below.

The limited-scale feasibility test was conducted to determine the feasibility of the e-magazine, evaluated by 32 student respondents. Data collection from students was done by distributing an online questionnaire via Google Forms, which contained 20 statements and 4 alternative answers. The data from the limited-scale feasibility test of the E-Magazine for the Pastry and Bakery Product Subject is presented in the Table 6.

Table 6. Limited-Scale Feasibility Test Evaluation Data

No.	Evaluation Aspect	Average Score	Category
1	Media Appearance	3.6	Very Feasible
2	Media Accessibility	3.5	Very Feasible
3	Learning	3.4	Very Feasible
4	Material Content	3.4	Very Feasible
5	Benefits	3.4	Very Feasible
Total Average Score		3.45	Very Feasible

The students' evaluations from the limited-scale feasibility test, viewed from the aspect of media appearance, received an average score of 3.6, while the media accessibility aspect received a score of 3.5, and the e-magazine learning aspect received an average score of 3.4. Additionally, the material content aspect received an average score of 3.4, and the benefits aspect received an average score of 3.4. Overall, the average score for this feasibility test is 3.45, which means the E-Magazine for the Pastry and Bakery Product Subject on a Low-Calorie Diet is "Very Feasible" for use as a learning medium in the Low-Calorie Diet Pastry and Bakery subject at SMK N 4 Yogyakarta.

Dissemination Stage

The final stage is Dissemination, where the e-magazine, which has been revised and evaluated by experts, is distributed through the flipbook platform to facilitate general access by students and teachers. The e-magazine can be accessed via the following link: <https://heyzine.com/flip-book/d12b7a20d0.html>.

DISCUSSIONS

E-magazines as learning media offer significant advantages in the educational context, especially in vocational programs like Pastry and Bakery. One of the main advantages of e-magazines is their ability to present information interactively and engagingly. This can help students understand the material better, as stated by Fadillah et al. (2021). E-magazines can combine text, images, videos, and other multimedia elements, creating a richer and more immersive learning experience (Fadillah et al., 2021). In the context of vocational education, the use of e-magazines supports project-based learning methods, allowing students to engage directly in practical and applicable learning processes (Fadillah et al., 2021). With e-magazines,

students can access recipes, techniques, and the latest information on industry trends directly, enhancing their practical skills and preparing them to enter the workforce (Hakim, 2024).

E-magazines also serve as a platform for sharing knowledge and experiences between students and educators. In vocational education, collaboration between educational institutions and industry is crucial to ensure the curriculum meets the needs of the job market (Asih, 2023). E-magazines facilitate this communication, allowing students to gain direct insights from professionals in the Pastry and Bakery field and expand their networks (Hakim, 2024). The use of e-magazines aligns with the Merdeka Belajar initiative, which emphasizes innovation in vocational education (Safaruddin, 2021). By integrating technology and digital media into the curriculum, e-magazines help create a more flexible and adaptive learning environment, suited to the characteristics of Generation Z, who grew up in the digital era (Vierke, 2024). This is important for increasing student motivation and engagement, as well as preparing them for the challenges of an increasingly competitive workforce (Sonia, 2020).

The development of e-magazines as learning tools in vocational high schools has great potential to enhance learning effectiveness, especially in vocational programs like Pastry and Bakery. E-magazines serve as interactive information sources that support students in understanding the necessary material and skills. Research by Budiman et al. shows that e-learning-based learning media in vocational high schools can improve the quality of learning (Budiman et al., 2019). Satria et al. emphasize the importance of innovation in vocational education to address the challenges faced by vocational high school graduates (Satria et al., 2021). By utilizing modern and interactive learning media, students are better prepared to face the workforce. Research by Shaliha and Fakhzikril indicates that interactive elements in learning can increase student motivation (Shaliha & Fakhzikril, 2022). A well-designed e-magazine can serve as an effective tool to enhance student motivation in vocational high schools. Furthermore, Soesilo et al. reveal that effective online learning requires media that captures students' attention (Soesilo et al., 2022). E-magazines meet this need, thus engaging students more in learning. Research by Nisa et al. shows that technology-based learning media can improve student learning outcomes in vocational high schools (Nisa et al., 2021).

CONCLUSION

The development of an e-magazine for low-calorie pastry and bakery education at SMK N 4 Yogyakarta has shown a significant improvement in the learning experience of vocational students. With validation from content and media experts, as well as positive feedback from students, this e-magazine has proven to be a highly feasible and effective digital learning resource. The development process followed the 4D model: Define, Design, Develop, and Disseminate, ensuring that the resulting media aligns with curriculum needs and student characteristics. This e-magazine not only serves as an interactive learning tool but also motivates students in the culinary arts. For future research, it is recommended to evaluate its long-term impact on students' practical skills and knowledge achievements in the culinary field. Further research and development are needed to test the improvement in learning outcomes, practicality, and effectiveness of the e-magazine in practical lessons for Low-Calorie Diet Pastry and Bakery among students. Additionally, there is a need for the development of other learning media and methods as learning tools for students in practical implementation, so that students remain motivated to better understand both theory and practice and become more skilled.

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Innovative Foods with Red Bean Flour: A Sensory and Economic Analysis

Nur Aulia Wijayanti *

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

* Corresponding Author. E-mail: nurauliawijayanti@uny.ac.id

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ABSTRACT

Red beans are a food ingredient with limited applications and short shelf life. Given their rich nutritional profile, including high protein, fiber, and essential micronutrients, red beans serve as a valuable alternative ingredient in addressing nutritional deficiencies and promoting food security through the development of accessible and versatile food products. The aims of this study were developing the application of red bean flour as an alternative ingredient in food products, identify substitution formulas of red bean flour in food products that are acceptable to validators and panelists, evaluate consumer acceptance of the developed food products, and determine the selling price of the innovative food products as an outcome of the development process. The research method used was Research and Development (Define, Design, Develop, and Disseminate). This study resulted in 2 innovation products: Redbean Rollcake Pizza (Rebelliza) and Redbean Garlic Star (Rebegas) with 50% substitution of red bean flour, respectively. Sensory test was conducted by a team of experts (validators) and 30 semi-trained panelists consisting of students. The sensory attributes evaluated in the acceptance test included flavor, color, texture, and taste. Following the testing phase, the products were disseminated to the general public. The final results indicated that both products were well-received by the public. This research highlights the potential of red bean flour to enhance food security and improve nutritional diversity by offering sustainable and affordable alternatives to traditional ingredients.

Keywords: Culinary product, red bean, sensory test, substitution flour

INTRODUCTION

Red bean (*Phaseolus vulgaris* L.) is a widely cultivated legume in Indonesia, well recognized by the public. According to data from the Ministry of Agriculture (Kementerian Pertanian, 2015) the production of red beans in Indonesia reached 100,316 tons in 2014. The primary nutritional components of red beans include macronutrients such as carbohydrates (38.30% - 68.85%) and protein (10.56% - 46%), both of which are essential for human health. Additionally, red beans are a rich source of fiber, fat, and minerals, including iron, zinc, calcium, magnesium, phosphorus, potassium, and sodium (Mananga et al., 2021). Given their nutritional profile, red beans have the potential to serve as a high-value food source, contributing to enhanced community nutrition and food innovation. Specifically, red beans can support food security and contribute to food diversification. Red beans can serve as an alternative food source with potential applications as a substitution ingredient to enhance nutritional value. One practical approach is processing red beans into flour, which can be utilized in various innovative food products. This study highlights the

nutritional benefits and potential contribution of red bean flour in enhancing food security through diversification.

Previous research reported that the use of red bean flour as a substitute for wheat flour in making cupcakes can increase protein content and a glycemic index value of 58.1, classifying it as a medium-glycemic-index food, which makes it nutritionally suitable for individuals mindful of blood sugar levels (Rahman Asih et al., 2019). The substitution of red bean flour for sorghum flour had a significant effect ($p < 0.05\%$) on the increase in ash content, protein, fat, carbohydrates, energy, soluble fiber, insoluble fiber, total fiber, and antioxidant capacity of sorghum analog rice (Fauziyah et al., 2017). The combination of red bean flour with sago starch enhances its gluten-free value, making it a viable alternative for food products catering to individuals with gluten intolerance or celiac disease (Agustia et al., 2016b). Additionally, flour processing technology offers an effective solution for producing semi-finished products with extended shelf life, improved blending potential with other flours, and options for nutrient fortification. These properties, along with the ability to mold into various shapes and enable faster cooking times, align well with modern consumer demands for convenience and practicality in food preparation.

Bean flour is a semi-finished food product that can be used in cookie production and as a substitute for wheat flour in pastry and bakery products. However, one of the main drawbacks of legume-based food ingredients is their high beany odor, which can negatively affect consumer acceptance of the final products. The lipoxygenase enzyme present in red beans is responsible for producing a strong odor. Additionally, the high protein content in red beans contributes to the distinctive aroma characteristic of this food ingredient (Rumida et al., 2023). Additionally, the limited availability of comprehensive information on the characteristics of red bean flour in Indonesia has hindered its broader optimization and application in food product development. Therefore, this recipe development was conducted to introduce innovation in products utilizing red bean flour and to assess the acceptability of the final product among consumers.

PURPOSE OF THE STUDY

The aim of this research are as follows: (1) develop the application of red bean flour as an alternative ingredient in food products; (2) identify substitution formulas of red bean flour in food products that are acceptable to validators and panelists; (3) evaluate consumer acceptance of the developed food products; and (4) determine the selling price of the innovative food products as an outcome of the development process.

METHOD

Method of this research is a research and development (R&D) approach aimed at producing new products through a systematic development process. The research activities are integrated within the product development stages, requiring a combination of multiple research methods, including surveys, experimental research, and evaluation. The study was conducted at the Production Laboratory of the Department of Culinary and Fashion Engineering Education, Faculty of Engineering, Yogyakarta State University. The research was conducted from January to April 2016. This R&D study follows the 4D model (Define, Design, Develop, and Disseminate) as outlined by Endang Mulyatiningsih (2011). The define stage involves identifying reference recipes for the three baseline products to be developed. The design stage focuses on creating new recipe formulations, namely Rebelliza and Rebegas, using red bean flour as a substitution ingredient. The develop stage includes the first and second validation tests. The final stage, disseminate, involves introducing the products to the public through exhibitions open to the general audience.

This study commenced with preliminary research focusing on the production of red bean flour. The process involved several stages, beginning with the sorting of red beans to remove foreign materials such as gravel and dry leaves. The beans were then thoroughly washed using water, followed by steam blanching for 10 minutes. Subsequently, the steam-blanching red beans were soaked in water for 12 hours. The soaked beans were dried in an oven at a temperature of 60°C-70°C for 7 to 8 hours. Once dried, the red beans were ground using a grinder and sieved through a 100-mesh screen to obtain fine red bean flour. A detailed flow diagram illustrating the process of red bean flour production is presented in Figure 1.

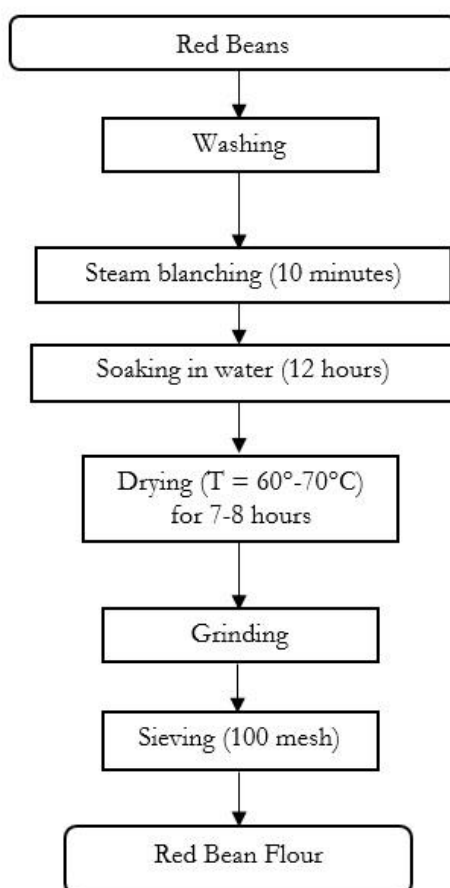


Figure 1. Flow Diagram of Red Bean Flour Production

Participants

This study developed two products: Redbean Rollcake Pizza and Redbean Garlic Star. The sample preparation involved several stages: identifying reference recipes as standards, formulating red bean flour substitution, conducting recipe trials, and producing the final products. The substitution percentages of red bean flour for each product were 0%, 25%, 50%, and 75%. The sensory attributes evaluated in the acceptance test included aroma, color, texture, and taste.

Data Collection and Analysis

Each product (sample) was validated by a team of experts (validators) to determine the percentage of red bean flour substitution that produced the best product. Furthermore, an acceptance test was conducted using the hedonic test method. The acceptance test was conducted by 30 semi-trained panelists consisting of culinary and fashion engineering education students of Faculty of Engineering, Yogyakarta State

University. The hedonic scale used in this study's hedonic test consisted of five levels: 1 = strongly dislike, 2 = dislike, 3 = moderately like, 4 = like, and 5 = strongly like.

FINDINGS

Redbean Rollcake Pizza (Rebelliza)

Product characteristics

Redbean Rollcake Pizza or Rebelliza is an innovative rollcake substitution of red bean flour with tuna fish pizza topping. The initial product design involved selecting a standard recipe according to the criteria, then this recipe will be used as a reference recipe. The reference recipe is substituted with Red Bean Flour with a different percentage of substitution. The red bean flour substitution recipe is outlined in Table 1.

Table 1. Rebelliza formula design

Ingredients	Red Bean Flour Substitution Formula			
	0%	25%	50%	75%
Red bean flour	0	12,5 g	50 g	37,5 g
Flour	50 g	37,5 g	50 g	12,5 g
Egg	4 eggs	4 eggs	4 eggs	4 eggs
Egg yolk	4 eggs	4 eggs	4 eggs	4 eggs
Margarine	100 g	100 g	100 g	100 g
Sugar	100 g	100 g	100 g	100 g
Ovalet	½ tsp	½ tsp	½ tsp	½ tsp
Maizena flour	5 g	5 g	5 g	5 g
Milk powder	5 g	5 g	5 g	5 g
Red food coloring	½ tsp	½ tsp	½ tsp	½ tsp

The best result of the four red bean flour substitution formulas was 50% substitution (see Table 2). This formula produces a soft texture, bright color and does not leave a distinctive aroma of red bean flour. The evaluation conducted by the validators rated the 50% red bean flour substitution formula as good, allowing the research to proceed to the next phase, the develop stage, to further refine the existing recipe.

Table 2. Characteristics of Substitution Formula Trial Results

Characteristics	Red Bean Flour Substitution Formula			
	0%	25%	50%	75%
Color	Light pink	Light pink	Slightly intense pink	Intense pink
Flavor	margarine sugar-like	margarine sugar-like	margarine sugar-like	margarine sugar-like
Texture	Extremely soft and mild	Soft and mild	Soft and mild	A little rough and heavy
Taste	Sweet and savory	Sweet and savory	Sweet and savory	Sweet and savory

Product Panelist Test

The panelist test was conducted at the Chemistry Laboratory of the Department of Culinary and Fashion Engineering, Faculty of Engineering, Yogyakarta State University. A total of 30 semi-trained panelists filled out the preference test forms that had been provided. The purpose of this panelist test is to determine the level of product acceptance from a small scale before finally being exhibited to the general public. The results of the panelist test can be seen in Table 3. This process helps in identifying any necessary improvements to the product based on panelist feedback, ensuring that the final product meets quality and

taste standards. Additionally, the feedback from the panelists provides valuable insights into consumer preferences, which can guide further product development and refinement.

Table 3. Panelist Acceptance of Rebelliza Products

Characteristics	Total Value	Average	Description
Flavor	98	3,26	Like
Color	103	3,43	Like
Texture	111	3,7	Like
Taste	103	3,43	Like

Data from the semi-trained panelist evaluation indicated that the flavor and taste of Rebelliza products were generally well-received and preferred. However, certain aspects require refinement, such as achieving an optimal balance between sweetness and savory flavors, which were noted as slightly imbalanced. Enhancing the intensity of the red bean aroma is also suggested to better emphasize its distinctive qualities. Furthermore, improvements in texture and mouthfeel are recommended to deliver a more cohesive and enjoyable sensory experience for consumers.

Exhibition

After passing the validation process and the semi-trained panelist test, to find out the public acceptance of Rebelliza products, an exhibition was held which was open to the general public. This exhibition was held at the Auditorium of YSU on Wednesday, April 19, 2017. In this exhibition, 75 products were provided for the general public, and each individual who sampled the product was required to complete a provided feedback form. The results of the hedonic test for the Rebelliza product are summarized in Table 4.

Table 4. General public acceptance of Rebelliza Products

Characteristics	Total Value	Average	Description
Flavor	215	3,25	Like
Color	227	3,43	Like
Texture	227	3,43	Like
Taste	223	3,37	Like

Based on the results of the recapitulation of the Rebelliza product liking test data at the exhibition, it is known that the aroma, color, texture and taste of Rebelliza products are accepted and liked by the public in Figure 2.



Figure 2. Rebelliza Product

Redbean Garlic Star (Rebegas)

Product characteristics

Redbean Garlic Star (Rebegas) is a cookie made with red bean flour substitution, characterized by a distinctive garlic stick flavor. Before the substitution, a standard recipe test was conducted, and the recipe that met the desired criteria was selected as the reference recipe. The reference recipe was then modified by substituting red bean flour at varying percentages. The red bean flour substitution recipe is outlined in Table 5.

Table 5. Rebegas product formula design

Ingredients	Red Bean Flour Substitution Formula			
	0%	25%	50%	75%
Red bean flour	0	43.75 g	87.5 g	131.25 g
Flour	175 g	131.25 g	87.5 g	43.75 g
Salt	5 g	5 g	5 g	5 g
Margarine	87.5 g	87.5 g	87.5 g	87.5 g
Egg	½ egg	½ egg	½ egg	½ egg
Garlic	1 clove	1 clove	1 clove	1 clove
Sugar	12.5 g	12.5 g	12.5 g	12.5 g

Table 6 shows that the use of red bean flour at higher concentrations significantly affects the texture of the cookies, making them harder. This is likely due to the high protein and fiber content in red bean flour, which can alter the gluten and reduce tenderness. However, a 50% substitution of red bean flour yielded the best results, producing cookies with a desirable crispy texture. The product exhibited a balanced garlic flavor, a savory and slightly salty taste, a crunchy texture, and a bright brown color. Despite these favorable characteristics, further improvements in color and texture are recommended to enhance the overall appeal and marketability of the product. This highlights the importance of optimizing the proportion of red bean flour to achieve a product that meets both sensory and structural quality standards.

Table 6. Characteristics of Substitution Formula Trial Results

Characteristic	Red Bean Flour Substitution Formula			
	0%	25%	50%	75%
Color	Bone yellow	Bone yellow	Brownish	Brownish
Flavor	Garlic-like	Garlic-like	Garlic-like	Garlic-like
Texture	Extremely crispy	crispy	Crispy	Firm
Taste	Savory	Savory	Savory	Redbean-like

Product Panelist Test

The panelist test was conducted at the Chemistry Laboratory of the Department of Culinary and Fashion Engineering, Faculty of Engineering, Yogyakarta State University. A total of 30 semi-trained panelists filled out the preference test forms that had been provided. The purpose of this panelist test is to determine the level of product acceptance from a small scale before finally being exhibited to the general public. The results of the panelist test can be seen in Table 7.

Table 7. Panelist Acceptance of Rebegas Products

Characteristics	Total value	Average	Description
Flavor	106	3.53	Like
Color	101	3.36	Like
Texture	109	3.63	Like
Taste	93	3.1	Like

Exhibition

After passing the validation process and the semi trained panelist test, to find out the public acceptance of Rebelliza products, an exhibition was held which was open to the general public. This exhibition was held at the Auditorium of YSU on Wednesday, April 19, 2017. In this exhibition, 75 products were provided for the general public, and each individual who sampled the product was required to complete a provided feedback form. The results of the hedonic test for the Rebegas product are summarized in Table 8.

Table 8. General public acceptance of Rebegas Products

Characteristics	Total value	Average	Description
Flavor	233	3,37	Like
Color	228	3,30	Like
Texture	242	3,50	Like
Taste	240	3,47	Like

The results of the acceptance test for the Rebegas product indicated that it was well received by the general public in Figure 3.



Figure 3. Rebegas Product

Selling price

According to Mulyadi (2005), the selling price is the amount charged to consumers, calculated based on the production costs plus non-production costs and the expected profit. Based on this definition, the formula for determining the selling price can be derived as Formula 1.

$$\text{Selling price} = \text{Production cost} + \text{Profit} + \text{Additional cost} \dots\dots\dots 1)$$

Production costs include the costs of raw materials and all costs incurred during the processing of raw materials into finished products ready for market. Profit refers to the expected earnings, which are flexible and can be adjusted according to desired targets. Additional costs such as distribution and marketing (10% of production cost) should be considered for broader commercialization.

Rebelizza Selling Price

One recipe of Rebelizza yields 10 packages. The selling price is determined by adding the total production cost and profit, which is $\text{Rp}46,605 + (50\% \times \text{Rp}46,605) + (10\% \times \text{Rp}46,605)$. This calculation

results in $Rp46,605 + Rp23,302 + Rp4,660 = Rp74,567$. Subsequently, the selling price per package is $Rp74,567 \div 10 = Rp7,456$, which is then rounded to $Rp7,500$ per package. Therefore, the selling price of Rebellizza is $Rp7,500$ per package. The detailed production costs of Rebellizza can be examined in Table 9.

Table 9. List of Ingredients for Rebellizza Product

Ingredients	Amount	Unit Price (Rp)	Adjusted Price (Rp)
<i>Raw materials costs</i>			
Flour	25 g	Rp 10,500/kg	Rp 300
Redbean flour	25 g	Rp 45,000/kg	Rp 1,100
Margarine	100 g	Rp 4,000/2ons	Rp 2,000
Egg	8 eggs	Rp 16,500/kg	Rp 8,250
Sugar	100 g	Rp 13,000/kg	Rp 1,300
Ovalet	½ tsp	Rp 2,500/50g	Rp 250
Maizena flour	5 g	Rp 6,000/¼kg	Rp 100
Milk powder	5 g	Rp 3,500/27g	Rp 600
Food coloring	½ tsp	Rp 2,500/btl	Rp 50
Tuna	100 g	Rp 90,000/kg	Rp 9,000
Onion	70 g	Rp 17,000/kg	Rp 1,000
Garlic	2 clove	Rp 6,000/1ons	Rp 100
Jalapeno	2 pcs	Rp 40,000/kg	Rp 1,000
Mushroom	50 g	Rp 8000/1ons	Rp 4,000
Cheese	50 g	Rp 12,000/¼ kg	Rp 2,400
Salt	10 g	Rp 500/1ons	Rp 50
Pepper	10 g	Rp 1000/11gr	Rp 900
Margarine	15 g	Rp 4,000/2ons	Rp 300
Tomato sauce	100 g	Rp 8,900/½kg	Rp 1,800
Water	50 cc	Rp 3,000/600ml	Rp 250
Packaging	10 pcs	Rp 7,000/100pcs	Rp 700
Label	10 pcs	Rp 6,000/150pcs	Rp 400
<i>Total raw materials cost</i>			Rp 35,850
<i>Additional costs</i>			
Fuel, Electricity and water, Equipment depreciation	10% x Rp 35,850		Rp 3,585
Workforce	20% x Rp 35,850		Rp 7,170
<i>Total costs</i>			Rp 46,605

Rebegas Selling Price

One Rebegas recipe yields 25 pieces. The selling price is determined by adding the total production cost and profit. The calculation is $Rp11,635 + (50\% \times Rp11,635) + (10\% \times Rp11,635)$, which results in $Rp11,635 + Rp5,817 + Rp1,163 = Rp18,615$. Subsequently, the selling price per piece is $Rp18,615 \div 25 = Rp744$, which is then rounded to $Rp800$ per piece. Therefore, the selling price of Rebegas is $Rp800$ per piece. This pricing strategy not only covers the production costs but also ensures a reasonable profit margin, making it sustainable for small-scale producers. By setting the price at $Rp800$, the product remains affordable for consumers while still being profitable. Additionally, this approach allows for potential reinvestment in product development and marketing efforts to expand its market reach.

Table 10. List of Ingredients for Rebegas Product

Materials	Amount	Unit Price (Rp)	Adjusted Price (Rp)
<i>Raw materials costs</i>			
Flour	87.5 g	Rp 10,500/kg	Rp 900
Redbean flour	87.5 g	Rp 45,000/kg	Rp 3,900
Margarine	87.5 g	Rp 4,000/2ons	Rp 1,750
Egg	½ egg	Rp 16,500/kg	Rp 500
Garlic	1 clove	Rp 6,000/1ons	Rp 50
Sugar	12.5 g	Rp 13,000/kg	Rp 200
Salt	5 g	Rp 500/1ons	Rp 25
Packaging	25 pcs	Rp 2,500/100pcs	Rp 625
Label	25 pcs	Rp 6,000/150pcs	Rp 1,000
<i>Total raw materials cost</i>			Rp. 8950
<i>Additional costs</i>			
Fuel, Electricity and water, Equipment depreciation	10% x Rp 8,950		Rp 895
Workforce	20% x Rp 8,950		Rp 1,790
<i>Total costs</i>			Rp 11,635

DISCUSSIONS

Rebelliza, or Redbean Rollcake Pizza, represents a novel culinary innovation that incorporates red bean flour as a partial substitute, inspired by a roll cake combined with tuna pizza topping. Findings from this study revealed that Rebelliza achieved optimal outcomes with a 50% substitution of red bean flour, resulting in a soft texture, bright color, and an absence of the distinctive aroma often associated with red bean flour. The unpleasant odor produced by red beans is due to the lipoxygenase enzyme contained in red beans which is active in the processing process (Agustia et al., 2016a). Consistent with findings from (Rahman Asih et al., 2019) this substitution level also demonstrated the best results in terms of color and taste acceptance in similar baked products, such as cupcakes. The research of Husna & Syarif, (2022) explained that the substitution of red bean flour in making traditional food “Putu Ayu” had a significant effect on the quality of color and texture. Previous research developed an innovative method for producing mooncake pie crusts by incorporating 100% red bean flour as a substitute. This approach resulted in a product that was highly appreciated for its flavor, aroma, color, and texture (Usman et al., 2022). In addition, red bean flour can be substituted in making chocolate biscuits with 70% concentration based on the acceptance of panelists with sensory attributes, such as color, aroma, taste, and texture (Larasintya Jesriani & Riska, 2021). This aligns with the increasing emphasis on incorporating legumes such as red beans into functional food products due to their nutritional and sensory advantages (Agustia et al., 2016b).

Sensory evaluations conducted by semi-trained panelists confirmed the high acceptability of Rebelliza across key attributes, including color, aroma, texture, and taste. Red bean flour is a valuable ingredient known for enhancing the nutritional profile of food products by providing significant amounts of protein, carbohydrates, dietary fiber, and essential micronutrients, such as iron and magnesium (Mananga et al., 2021). In line with research (Kurnianingtyas et al., 2014), shows that the addition of red bean flour can increase protein and fiber levels in food products. Furthermore, replacing traditional wheat flour with red bean flour contributes to a lower glycemic index, making the product more suitable for individuals aiming to manage their blood sugar levels. These findings highlight the potential of Rebelliza as a functional and

health-conscious food product that meets modern consumer demands for nutritious and flavorful alternatives.

Similarly, Rebegas, or Redbean Garlic Star, exemplifies another innovative product leveraging the benefits of red bean flour substitution, modeled as garlic-flavored stick cookies. Validator team assessments indicated that a 50% substitution of red bean flour produced the most favorable outcomes based on flavor, texture, and taste. This formulation delivered a balanced garlic flavor, a savory and slightly salty taste, a crunchy texture, and an appealing bright brown color. Sensory evaluations conducted by semi-trained panelists confirmed these results, demonstrating favorable acceptance across all attributes. Furthermore, exhibition feedback reinforced the positive reception, validating the product's market potential and consumer appeal.

The utilization of red bean flour not only improves the nutritional profile of Rebegas, providing protein, fiber, and essential minerals like iron and magnesium (Mananga et al., 2021) but also aligns with the increasing demand for healthier snack options among consumers (Rahayu et al., 2022; Sophia Perwita et al., 2021), incorporating garlic flavor enhances the sensory appeal of the product while offering potential health benefits, as garlic is known for its antimicrobial and antioxidant properties as it contains various compounds such as sulfur, allicin, and ajoene (Espinoza et al., 2020). To enhance nutritional diversity, red bean flour is commonly combined with other food ingredients, such as rice bran flour (Damayanti et al., 2020), mung bean flour for high protein snack bar (Dinda & Indrawati, 2023), mocaf flour for low energy high fiber snack bar (Pratama et al., 2020), cassava flour for emergency food bar (Hadiningsih et al., 2023), purple sweet potato as a alternative snack for diabetes mellitus (Zaddana et al., 2021), and black rice for low glycemic index (Ayunandha et al., 2021). Feedback from public exhibitions further emphasized the acceptability of Rebegas, suggesting its potential to satisfy consumer needs for both nutrition and flavor. These innovations underscore the adaptability of legumes in modern food applications, contributing to sustainable and health-oriented diets (FAO, 2019).

Moreover, the incorporation of legumes such as red beans into food products supports global objectives for sustainable food systems by providing an accessible and eco-friendly source of plant-based protein. This approach promotes dietary diversification and addresses food security challenges (FAO, 2019). Research has also demonstrated that substituting red bean flour in baked goods can enhance antioxidant capacity and deliver additional health benefits, making it an attractive option for health-conscious consumers (Rahayu et al., 2022). Such findings emphasize the dual potential of Rebelliza and Rebegas as innovative products that meet consumer preferences while addressing nutritional and sustainability goals.

CONCLUSION

This study successfully developed Rebelliza (Redbean Rollcake Pizza) and Rebegas (Redbean Garlic Star), incorporating red bean flour as a partial substitute (50% substitution for optimal results). Both products demonstrated high acceptability based on expert validation and sensory testing with semi-trained panelists and public exhibitions, showcasing their market potential. The established selling prices (Rp7,500 per package for Rebelliza and Rp800 per piece for Rebegas) indicate economic viability. The culinary innovations of Rebelliza and Rebegas have been positively received by both panelists and the public. These findings suggest the promising potential of red bean flour in creating functional, nutritious, and marketable food products that align with modern consumer demands and contribute to sustainable food systems. By integrating references and ensuring logical progression. Importantly, this research demonstrates the potential of red bean flour to enhance food security and nutritional diversity by providing a sustainable and affordable alternative ingredient, addressing the need for innovative and nutritious food products. The

findings contribute to a growing body of knowledge on utilizing underutilized legumes in food processing and offer practical implications for food entrepreneurs and the food industry in Indonesia.

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TikTok-Integrated Video Educational Resources on Basic Food Processing Techniques for Grade X Culinary Vocational High School Students

Ristya Candyka Alfiolita *, Sutriyati Purwanti 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

* Corresponding Author. E-mail: ristyacandyka.2022@student.uny.ac.id

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ABSTRACT

This study aims to: (1) Develop a TikTok application-based video learning medium on the basic techniques of wet and dry heat processing for Class X Culinary students at SMK Negeri 1 Kalasan; (2) Evaluate the feasibility test results of the TikTok application-based video learning medium based on feedback from content experts, media experts, teachers, and students. The method used in this study is Research and Development (R&D), which includes four stages: define, design, develop, and disseminate. Data collection was conducted at SMK Negeri 1 Kalasan using a Likert scale questionnaire. The feasibility test of the learning media was analyzed descriptively. The research results indicate: (1) The development of the TikTok-based video learning media on food processing techniques for Class X at SMK Negeri 1 Kalasan was carried out through four stages (4D): define (analysis of curriculum, students, material, and learning objectives), design (storyboard creation, scriptwriting, video production), develop (expert validation, revision, testing), and disseminate (distribution on TikTok, Instagram, WhatsApp); (2) The feasibility assessment of the TikTok-based video media showed scores from content expert I (91%), content expert II (100%), media expert (98%), and students (87%), all categorized as very feasible. This media is considered highly suitable as an engaging alternative learning resource for Class X Culinary students in the digital era.

Keywords: Basic food processing techniques, TikTok application, video learning media

INTRODUCTION

The development of learning media has become an important focus in the educational world, especially with the rapid advancement of technology. Learning media not only serve as aids but also as interactive platforms that can integrate technology into education, making the learning process more effective and efficient while enhancing student motivation (Daryanto, 2020). 21st-century learning reflects the rapid development of science and technology, which is transforming educational paradigms, including curriculum, media, and technology. Science and technology continue to evolve and impact education, providing solutions to prepare generations for the industrial revolution 4.0, with the internet supporting learning through social media. Most people have at least one social media account, and often more than one (Vidyana & Atnan, 2022). A currently popular and spotlighted social media platform is TikTok. According to data from Indonesia, as of January 2024, the number of TikTok users in Indonesia was recorded at 126.83 million people (Rizaty, 2024).

TikTok is a highly popular social media platform, especially among the younger generation, offering engaging and challenging short video features. The TikTok app can be accessed to view video content without needing an account (Rahardaya & Irwansyah, 2021). TikTok is particularly popular with Generation Z, those born between 1997 and 2012, due to its quick, creative, and interactive content. Although TikTok is becoming increasingly popular as a social media platform, its use as a learning medium in schools is still rarely implemented, including in Vocational High Schools (SMK). TikTok learning media, with a kinesthetic learning style approach, tends to facilitate learning through real experiences and practical activities (Alexandro et al, 2022).

Researchers observed that teachers are not fully aware of TikTok's potential as an educational learning medium at SMK Negeri 1 Kalasan, such as for brief explanatory videos, challenges, or skill demonstrations. TikTok appeals to students, but teachers feel the duration is too short to convey complex concepts and are not accustomed to presenting dense material in a short time. Conventional education is often considered less engaging for students who are used to interactive and fast content. Educators need to adapt methods with more relevant media, such as TikTok. The use of social media platforms like TikTok as interactive learning media aligns with the learning styles of today's youth. This is supported by findings (Isnaini, 2021) that technology-based media can make students more motivated and active in the learning process.

Teaching basic food processing techniques in the culinary department of vocational schools is essential for shaping students' skills and competencies. Basic food processing techniques, such as wet and dry heat processing, are often difficult to explain theoretically without the aid of direct visualization. Processes like frying, sautéing, or boiling require direct demonstrations to ensure students understand the correct techniques. The limitations in delivering material verbally often make it difficult for students to understand the concepts being taught, leading to less accurate practice of techniques (Wahyuni, 2017). This material requires a visual and interactive approach, with media such as videos, animations, and digital simulations to help students understand abstract concepts and apply techniques in real situations. These techniques are fundamental as they form the basis for various culinary applications, whether for household, food industry, or restaurant scales.

The learning process consists of five components: teacher communication, learning materials, learning media, students, and learning objectives (Wiarto, 2016). One important component in supporting the teaching and learning process is learning media. The Class X Culinary teacher at SMK Negeri 1 Kalasan revealed that the use of learning media is still limited to PowerPoint, indicating a lack of variety and innovation that can affect the effectiveness of learning and student engagement. Although learning using direct objects has been implemented, students still struggle to connect theory with practice in processing techniques due to the lack of direct visualization or step-by-step guidance.

Students often find it difficult to understand basic food processing techniques, especially the differences between wet and dry heat techniques. The application of techniques in the kitchen is not optimal due to a lack of understanding of temperature, time, and ingredient characteristics. A lack of varied and interactive teaching materials also hinders students' understanding, making it difficult for them to apply theory in kitchen practice. Learning media based on process visualization, such as food processing techniques, can provide students with a more real and practical learning experience. For example, in learning basic food processing techniques, videos showing cooking steps directly can provide a clear picture of the application of cooking techniques, which are difficult to explain through text or still images alone (Malyn-Smith & Angelie, 2020).

Researchers conclude that the development of interactive, engaging, and easily understood learning media is crucial. Audiovisual content effectively supports cognitive processes by combining visual aids with explanatory narration, making complex topics easier for students to digest. Additionally, audiovisual media can break down abstract concepts into more easily understood segments, especially for subjects requiring

step-by-step demonstrations (Mayer, 2023). The use of varied media is expected to increase students' interest and enthusiasm in learning basic food processing techniques, both inside and outside the classroom. Moreover, audiovisual media like TikTok videos are needed to prevent students from becoming bored and to keep them focused on the presented material.

This research contributes to the field of educational technology by exploring the integration of TikTok as a learning medium for basic food processing techniques in vocational high schools, particularly for Class X Culinary students. This study addresses the gap in utilizing popular social media platforms, such as TikTok, as educational tools often overlooked in traditional educational settings. By developing TikTok-based educational resources, this research aims to provide a new approach to teaching culinary skills, making complex concepts more accessible and understandable for students.

PURPOSE OF STUDY

The objectives of this research are (1) to develop TikTok application-based video learning media for wet and dry heat processing techniques, aiming to create a more interactive and engaging learning experience for students. (2) Furthermore, to assess the feasibility of the TikTok application-based video learning media with wet and dry heat processing techniques through evaluations from content experts, media experts, teachers, and students to ensure that the media is effective and meets learning needs.

METHOD

The research method used in the development of media is Research and Development (R&D), which aims to create specific products and test the effectiveness of a product. Products resulting from Research and Development (R&D) can include models, media, modules, books, evaluation tools, and learning devices. The procedure for developing learning media in this study follows the 4D model (Four D), which consists of the stages of define, design, develop, and disseminate (Mulyatiningsih, 2011).

Subjects and Objects of the Research

The research subjects consist of two content experts and one media expert. Additionally, the video's feasibility was tested by 36 Class X Culinary students at SMK Negeri 1 Kalasan, in accordance with Mulyatiningsih's guidelines (2011), which suggest involving a small number of teachers and students (around 30-100) in the distribution and testing stages of the product.

Data Analysis Technique

This study employs descriptive analysis techniques. Descriptive analysis is conducted by describing or illustrating the collected data as it is, without drawing conclusions that apply generally (Sugiyono, 2016). The product's feasibility analysis is tested using a Likert scale assessment. The Likert scale is a psychometric scale commonly used in survey research. Respondents use a Likert scale from 1 to 4 to assess feasibility, where 4 indicates strongly agree, 3 agree, 2 somewhat agree, and 1 disagree (Mulyatiningsih, 2023). The feasibility assessment scores for the development of learning media can be seen in Table 1. The assessment scores are then calculated using the Formula 1.

$$P(\%) = \frac{\sum x}{\sum xi} \times 100\% \dots\dots\dots 1)$$

The explanation of the symbols used in Formula 1 is as follows: P(%) represents the percentage of the score obtained. The symbol $\sum x$ indicates the total number of respondents for all items, while $\sum xi$ represents the total ideal score for one item (Akdon & Riduwan, 2011).

Table 1. Feasibility Assessment Scores for Learning Media Development

Category	Value
Strongly Agree	4
Agree	3
Somewhat Agree	2
Disagree	1

Source: (Mulyatiningsih, 2023)

After calculating the assessment scores, the next step is to interpret the data with an interval scale. This data is then converted into an ordinal scale to determine the quality of the feasibility of the developed product. Interval scale data is converted to ordinal in Table 2.

Table 2. Interval Scale Data to Ordinal

Score Range	Category
>80%	Very Feasible
66%-80%	Feasible
56%-65%	Not Feasible
<56%	Very Not Feasible

Soucre: Mulyatiningsih (2011)

Using the feasibility categories, the validation results can be assessed based on the established categories. This guideline is used to determine the feasibility criteria for learning videos, which are considered feasible if respondents' assessments meet at least the "feasible" criteria.

FINDINGS

The development of the research product conducted at SMK Negeri 1 Kalasan for Class X Culinary students used the 4D model, which includes define, design, develop, and disseminate stages. The 4D stages begin with define (curriculum analysis, student characteristic analysis, material analysis, and learning objective analysis), design (storyboard, script, and video production), develop (expert validation, product revision, and product testing), and disseminate (distribution of learning media). The product developed is a TikTok application-based video learning medium on the basic techniques of wet and dry heat processing.

Define Stage

The definition stage involves gathering information about the product to be developed and identifying problems in learning culinary basics in Class X Culinary at SMK Negeri 1 Kalasan. During the learning process, students experienced difficulties in distinguishing between wet and dry heat processing techniques, particularly in aspects of time, temperature, and ingredient characteristics. Additionally, the currently available media do not facilitate direct demonstrations or repeated practice, which are crucial in teaching food processing techniques. Moreover, the use of TikTok as a learning medium in culinary basics has not been implemented.

Design Stage

The design stage involves creating a product design to be developed. The product design must be clear and detailed (Sugiyono, 2018). This stage involves designing the content of the learning video on basic wet and dry heat processing techniques. It includes creating a storyboard as a general framework or main outline of the learning video, which encompasses visualization, duration, and video description. The ideas presented are then validated to ensure coherence.

After creating the storyboard, the next step is to create a script, which is a detailed plan of the media to be produced. The script consists of scenes, shot types, visual narratives, and text to be added to the video. The script content is based on teaching modules to ensure that the resulting learning video aligns with the expected learning outcomes and objectives.

Video production then takes place, with filming and voice recording conducted according to the storyboard and script. Video production is done at the researcher's home using a mobile phone camera and additional equipment like a tripod and lighting to support the video shooting process, ensuring the desired angles and adequate lighting.

The production results are then edited using the CapCut application, as shown in Figure 1. The editing process includes setting the duration of each segment, adding supportive visual effects, and adjusting sound quality to ensure that the material explanation is clear and easy to understand. The production and editing process results in 12 learning videos, which not only cover the researcher's profile and learning outcomes and objectives but also present core material on basic wet and dry heat processing techniques.

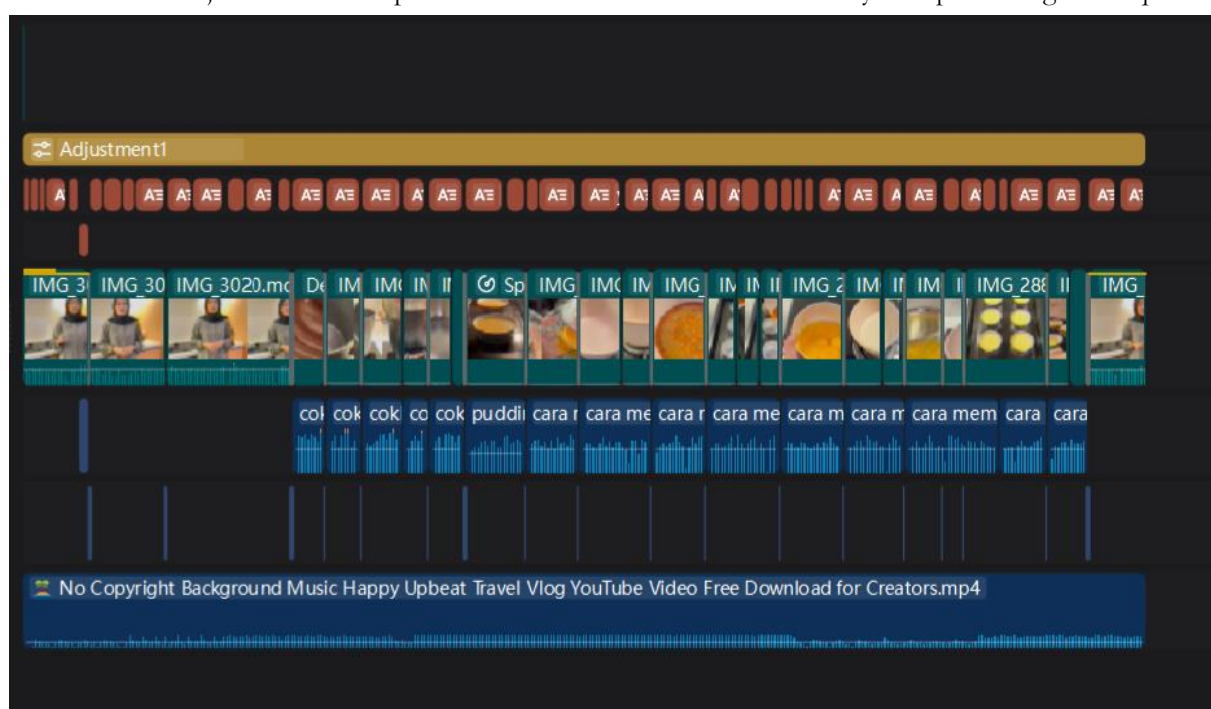


Figure 1. Video Editing Process Using CapCut Application

Development Stage

The development stage is the evaluation process conducted by content and media experts through validation, aiming to assess the feasibility of the developed product. The development stage, as outlined in the journal (Rohiman & Anggoro, 2019), serves as a crucial foundation for improving the developed learning media. In this stage, the researcher conducts validation from experts in the fields of content and media, which serves as a reference for revisions and improvements. Content expert validation I and II include assessing content quality and objectives, video quality, and learning quality. Meanwhile, media expert validation includes assessing media appearance, visuals, audio, and usability, as shown in Table 3.

The results show a score of 91% from Content Expert I, 100% from Content Expert II, and 98% from the Media Expert. Content experts suggested improvements, such as adding tools and materials used in processing techniques and additional examples of dishes for each technique. The media expert suggested paying more attention to the placement of explanatory text in the video. Proper text placement can enhance student focus on the core material without disrupting other visual elements, such as processing technique

demonstrations. The suggestions provided by content and media experts are used as a basis for revising the learning media to meet expectations.

Table 3. Validation Results from Content and Media Experts

Evaluation Aspect	Content Expert I	Content Expert II	Media Expert	Category
Content and Objectives Quality	83%	100%	-	Very Feasible
Video Quality	96%	100%	-	Very Feasible
Learning Quality	94%	100%	-	Very Feasible
Media Appearance	-	-	100%	Very Feasible
Visuals	-	-	100%	Very Feasible
Audio	-	-	92%	Very Feasible
Usability	-	-	100%	Very Feasible
Average	91%	100%	98%	Very Feasible

The validated learning media is then tested by 36 Class X Culinary students as users. The feasibility test evaluation is based on video quality, material suitability, and usefulness, as shown in Table 4. The total of these three evaluation aspects results in an average score of 87%, categorized as very feasible.

Table 4. Product Testing Results

Evaluation Aspect	Total Score	Max Score	Percentage (%)	Category
Video Quality	1012	1152	88%	Very Feasible
Material Suitability	365	432	84%	Very Feasible
Usefulness	634	720	88%	Very Feasible
Average	87%			Very Feasible

Students suggested enhancing the cover design and visual effects in each video. Adding more engaging visual elements can not only beautify the appearance but also attract students' attention from the start. This indicates that 'TikTok application-based video learning media is not only effective in delivering material but also capable of capturing students' attention and interest for further learning.

Dissemination Stage

The disseminate stage is the final step in the research and development of learning media, aiming to distribute 12 learning videos that have been deemed to meet the criteria as alternative learning resources for students and the general public through the TikTok application. The TikTok account link @dasarboga, containing the learning videos, is shared with teachers and can be accessed via the link https://www.tiktok.com/@dasarboga?_t=8p3ndHyypoW&_r=1, as shown in Figure 2. As of September 2024, the number of viewers for the learning videos on basic wet and dry heat processing techniques has reached 1,392 people/users with 182 likes. This figure indicates significant interest in the presented learning content, signifying that the media successfully captured users' attention.

The learning videos on basic wet and dry heat processing techniques are also disseminated through links uploaded on Instagram and WhatsApp platforms. Utilizing these two platforms is expected to broaden the video's reach and make it more accessible to students and other users. Instagram's attractive visual features allow for a more dynamic and engaging presentation of material. Additionally, the WhatsApp application facilitates direct sharing with friends and teachers. This dissemination strategy not only increases the visibility of the material but also encourages interaction and discussion among students, enriching the overall learning experience.



Figure 2. TikTok Account @dasarboga

DISCUSSIONS

The development of this learning media was conducted using the 4D model (define, design, develop, disseminate), which has proven effective in addressing challenges in the learning process for Class X Culinary students. The 4D model, developed by Thiagarajan and colleagues, consists of four main stages that provide a systematic framework for developing learning tools (Hariyanto et al., 2022; Ristanto, 2020). The problem identification process revealed that students had difficulty distinguishing between wet and dry heat processing techniques, highlighting the need to create learning media that is relevant and suited to student characteristics, especially in the context of Generation Z, who are very familiar with technology (Kul & Berber, 2022).

In the define stage, curriculum analysis and student characteristics provided a strong foundation for designing appropriate learning media. Students exposed to non-interactive methods that lack support for repeated practice require engaging and informative alternatives (Leslie, 2019). Therefore, introducing TikTok as a learning platform is an innovative step that leverages students' tendencies towards social media and visual content, which has been shown to increase student engagement in the learning process (Priyakanth et al., 2021).

In the design stage, using storyboards and scripts allowed for the development of clearly structured material. Source material from relevant culinary books ensures that the content delivered is not only engaging but also meets established curriculum standards (Sari, 2024). The scriptwriting process serves to detail each element of the video, enabling the information to be better understood by students (Eutsler, 2021).

In the develop stage, validation by content and media experts demonstrated that the product met high-quality standards. Validation results showing excellent scores from experts reflect the effectiveness of the video as a teaching aid (Huda et al., 2020). However, feedback to improve explanations related to tools and materials indicates that there is always room for improvement. This is important to ensure that learning media can continue to evolve and meet diverse student needs (Johnson et al., 2021).

Trials conducted by Class X Culinary students resulted in very positive feedback, with many students finding the material presented easy to understand. This indicates that the approach used in the video, including the use of simple and clear language, significantly enhances student comprehension (Darmawan, 2024). Suggestions to improve cover design and visual effects are important considerations that can enhance the video's visual appeal, making students more interested in watching and understanding the material presented. The results of the learning media assessment conducted by students align with (Sarip et al, 2022), showing that learning media that is easy to understand, has engaging material and design, and uses simple language tends to motivate students to revisit material they find challenging (Morris, 2018). This can increase students' interest in learning, as they find it easier and more engaging to repeatedly study the material.

The disseminate stage marks the final step in this development, where the distribution of learning videos through TikTok and other social media platforms opens opportunities to reach a wider audience. High viewer numbers and interactions indicate that this learning media is not only well-received but also successfully captures the attention of students and other users (Los et al., 2021). A dissemination strategy involving Instagram and WhatsApp provides easy access and enhances interaction between students and teachers, as well as among students themselves (Umar & Ameen, 2021).

The development of TikTok-based video learning media shows great potential in improving the quality of education at SMK Negeri 1 Kalasan. Digital generation students are more attracted to media that utilizes technology, allowing platforms like TikTok to enable students to learn independently, revisit material, and access information easily at any time (Scholz & Vyugina, 2019). The use of modern technology that aligns with student characteristics can create a more enjoyable and effective learning experience. Relevant media not only enhances student understanding but also makes the material more engaging and clear in its delivery (Fahrina et al, 2020). It is hoped that the results of this research can inspire the development of more innovative learning media in the future, thus meeting the ever-evolving educational needs.

Research Limitations

The limitation lies in the explanation of processing examples, as not all techniques can be practiced solely through video. Although videos can provide a clear visual representation of each step, some

techniques require direct experience and more in-depth guidance for optimal understanding. Users who do not have a TikTok account can only access learning videos through shared links, preventing them from exploring the full content available on the platform. To access all learning videos completely, users are required to create a TikTok account, which may be a barrier for some students who are reluctant or do not have the time to sign up. Images of tools such as pressure cookers, salamanders, and grills featured in the video were sourced from the internet, as the researcher had limitations in providing these tools physically. The use of internet images aims to ensure that students can still see and recognize these tools, even if they cannot be demonstrated directly in the learning video.

CONCLUSION

The development of learning media products for basic wet and dry heat processing techniques using the R&D method with the 4D model resulted in TikTok-based learning videos. The process began with curriculum analysis, student characteristics, and learning issues. In the design stage, storyboards and scripts were created for 12 informative and engaging videos. Validation from content expert I with a score of 91%, content expert II with a score of 100%, and media expert with a score of 98% indicated that the media is engaging and easy to understand, with suggestions for visual improvements. The dissemination of videos through TikTok, Instagram, and WhatsApp reached many students. The research results show that appropriate media can enhance student understanding and interest in learning, making TikTok an effective platform. The feasibility test showed a score of 87%, indicating that the media is very feasible as an attractive alternative learning resource in the digital era for Class X Culinary students. This research contributes to the development of social media-based educational resources, specifically TikTok, to facilitate the understanding of complex culinary concepts.

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The Correlation Among Knowledge, Attitude, and Instant Food and Beverage Consumption Patterns on the Nutritional Status of Culinary Students

Nafiah Adhuha Ramadhani *, Titin Hera Widi Handayani 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

* Corresponding Author. E-mail: nafiahadhuha.2019@student.uny.ac.id

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ABSTRACT

This study seeks to ascertain: (1) the nutritional knowledge level of class XII Culinary students; (2) the attitudes of class XII Culinary students toward the consumption of instant food and beverages; (3) the behaviors of class XII Culinary students concerning the consumption of instant food and beverages; (4) the nutritional status of class XII Culinary students; (5) the correlation between the knowledge of class XII Culinary students and their nutritional status regarding the consumption of instant food and beverages; (6) the correlation between attitudes and the nutritional status of class XII Culinary students in relation to the consumption of instant food and beverages; (7) the correlation between behaviors and the nutritional status of class XII Culinary students at SMK Negeri 3 Wonosari regarding the consumption of instant food and beverages. This research employs a quantitative descriptive methodology. The population comprised 103 pupils, with a sample of 87 individuals selected using the Isaac and Michael table and the Simple Random Sampling method. The data analysis employed the Chi-Square test, namely univariate and bivariate analysis. The findings indicated that the majority of students possessed adequate nutritional knowledge and favorable attitudes towards healthy eating habits; however, the study revealed no significant correlation between nutritional knowledge ($p = 0.550$), attitudes ($p = 0.974$), and the consumption of instant food ($p = 0.221$) concerning students' nutritional status. The nutritional status of the majority of pupils was classified as overweight (39.1%), normal (36.8%), and underweight (20.7%). These findings indicate the necessity for extensive educational programs to enhance healthy eating habits and underscore the significance of a balanced diet, particularly among adolescents. This research endorses continuous public health efforts to enhance dietary selections and general well-being among the youth.

Keywords: Attitudes, behaviors, instant food and beverages, knowledge, nutritional status

INTRODUCTION

Instant food and drinks have long been popular among various groups in Indonesia, both in the have consistently enjoyed popularity across diverse demographics in Indonesia, encompassing both the medium and upper economic strata. Individuals find convenience in the availability of instant meals and beverages. Each year, enterprises involved in the production of instant food and beverages expand. According to BPS statistics from the second quarter, the proportion of quick food and beverage enterprises was 2.9% in 2021 and increased to 6.32% in 2022. (Hasibuan et al., 2021). The substantial demand for instant food and beverages is attributed to their benefits; they are regarded as quick, readily accessible, and convenient due to the expedited manufacturing process. Some instant foods and drinks can be consumed immediately, and

they possess an extended shelf life. Nonetheless, there are concerns that these convenience foods and beverages are detrimental to health. A prevalent degenerative disease now emerging in Indonesia is renal failure. Between early 2024 and June 2024, there were 308 reported cases of kidney failure, including those aged 17 years. Ira Purnamasari, a Health Expert at Muhammadiyah University of Surabaya, stated that cases of kidney failure among youngsters in Indonesia are expected to rise in 2024 (Sahal, 2024). Kidney failure is a disorder characterized by diminished renal function in the filtration of metabolic waste. Metabolic waste intended for excretion by the urinary system accumulates in the kidneys, ultimately leading to renal failure over time. Moreover, renal failure is attributed to adolescents frequently ingesting sodium-rich foods, including fast food, canned or packaged items, and sugary beverages like soft drinks, which are classified as convenience foods and drinks.

Excessive use of quick foods and beverages poses significant health risks, particularly for individuals undergoing growth, due to the presence of food additives such as monosodium glutamate (MSG), the sweetener aspartame, and other synthetic compounds (Wahyuni, 2017). The Jakarta Consumer Institute (LKJ) has determined that 9 of 48 food kinds frequently ingested by children contain artificial sweeteners associated with cancer or neurological diseases, namely cyclamate, saccharin, and aspartame.

Presently, a significant advancement in the food sector is the proliferation of companies producing instant food and beverages, which will influence public consumption, particularly among adolescents aged 15 to 18 years. SMK Negeri 3 Wonosari, a culinary program situated in Gunungkidul Regency, Special Region of Yogyakarta Province, predominantly comprises students aged 16 to 18 years, categorizing them as adolescents. Following interviews, grade 12 students in the culinary program at SMKN 3 Wonosari exhibit a tendency to consume instant food and beverages, indicating a preference for purchasing snacks from the canteen rather than bringing their own provisions.

Some students predominantly select quick noodles and soft beverages for their morning and lunch meals. Students, particularly those specializing in culinary arts, have been informed about nutritious meals through Nutritional Science courses in school. However, it remains to be determined whether students possess prior information acquired from the Nutritional Science curriculum about quick food and beverages. The researcher seeks to ascertain the practical applicability of the knowledge acquired by grade XII students specializing in culinary arts at SMKN 3 Wonosari in relation to life or health.

Hidayat's 2020 research revealed that 89% of online food purchasers were students (Hidayat 2020). The study indicated a correlation between the frequency of online food ordering and four incidences among students. Students typically order fast meals online. Between 2017 and 2020, data was acquired from four nationally representative sources in the United States: the National Health Interview Survey (2015–2018), the National Health and Nutrition Examination Survey (NHANES) (2017–2020), the Behavioral Risk Factor Surveillance System (2016–2020), and the Health & Retirement Study (2016). Respondent-assessed health and obesity were chosen as markers of preferred health. An analysis of the dietary quality of overweight and obese people through the examination of disparities in Healthy Eating Index-2015 (HEI-2015) scores, utilizing data from the 2015–2018 National Health and Nutrition Survey. In a study of 6,746 overweight and obese people (aged ≥ 20 years), severe obesity was frequent at 27%, particularly among women, non-Hispanic blacks, and individuals with lower education and income (Zhao & Araki, 2024).

A review of pertinent data indicates that the consumption of instant or fast food has led to an excessive increase in caloric, fat, and sugar intake among youths. Instant meal is characterized by low fiber content and elevated salt levels. The increased consumption of fast food by teenagers correlates with a heightened risk of obesity within this demographic. According to data from the World Health Organization (WHO, 2016), over 1.9 billion adults aged 18 and older are overweight, with 600 million classified as obese. Consequently, it is estimated that approximately 13% of the adult population is obese, comprising 11% of males and 15% of females. In class XII Culinary Arts at SMKN 3 Wonosari, comprising 103 students, 29

students (33.3%) were classified as underweight, 32 students (43.7%) as normal weight, 17 students (19.5%) as overweight, and 3 students (3.4%) as obese. Researchers observed that pupils were underweight and overweight, necessitating further investigation into several factors of rapid food and beverage intake among class XII Culinary Arts students at SMKN 3 Wonosari.

PURPOSE OF THE STUDY

This study seeks to ascertain (1) the nutritional knowledge level of class XII Culinary Arts students; (2) the attitudes of class XII Culinary Arts students towards the consumption of instant food and beverages; (3) the behaviors of class XII Culinary Arts students concerning the consumption of instant food and beverages; (4) the nutritional status of class XII Culinary Arts students; (5) the correlation between the nutritional knowledge of class XII Culinary Arts students and their nutritional status in relation to instant food and beverages; (6) the correlation between attitudes and the nutritional status of class XII Culinary Arts students regarding instant food and beverages; (7) the correlation between behaviors and the nutritional status of class XII Culinary Arts students at SMK Negeri 3 Wonosari concerning instant food and beverages.

METHOD

This study employs a quantitative methodology, utilizing data gathering via knowledge assessments and questionnaires, examined by the Chi-Square test in both univariate and bivariate contexts. This research was carried out from November 2023 to June 2024 at SMK Negeri 3 Wonosari. Knowledge assessments and surveys were administered directly to the class XII Culinary Arts students of SMK Negeri 3 Wonosari.

Participants

The study population comprised 103 class XII Culinary Arts students at SMK Negeri 3 Wonosari. This study employed Simple Random Sampling to guarantee that every member of the population had an equal opportunity of selection. The sample for this study was established using the Isaac and Michael table at a significance level of 1%, resulting in 87 class XII Culinary Arts students from SMK Negeri 3 Wonosari.

The questionnaire was administered individually to the Culinary Arts students of class XII at SMK Negeri 3 Wonosari. Each student was provided the questionnaire immediately and instructed to complete it under the researcher's supervision to ensure comprehension and precision of the responses. This also enables the researcher to offer clarification if there are inquiries that the students do not comprehend.

Data Collection and Analysis

The data collection process was conducted in multiple phases. The researcher informed the students about the study's objective and significance to ensure genuine and candid participation. Subsequently, questionnaires and knowledge assessments were administered to students randomly, in accordance with the established Simple Random Sampling method. Data were obtained directly from students as the primary source.

The knowledge assessment employed the Guttman scale to evaluate students' understanding of nutrition. The questionnaire employed the Likert scale to assess students' attitudes and behaviors about the consumption of quick foods and beverages. Observations were undertaken to comprehend the context and surroundings that influenced students' dietary habits.

During data collection, various challenges encountered included students' difficulty in comprehending certain questionnaire items and the potential for social bias in responding to sensitive topics.

To address this issue, the researcher was present during the completion of the questionnaire to offer clarifications and confirm that students comprehended each item accurately.

Objectivity was preserved by administering the questionnaires under uniform conditions and free from external influence. Furthermore, the researcher employed a basic random sampling method to mitigate selection bias and guarantee sample representativeness.

This study employed univariate and bivariate analysis approaches for data analysis. Univariate analysis was employed to delineate the frequency distribution and proportion of each variable, encompassing independent variables (nutritional knowledge, consumption behavior, and attitudes towards instant food and beverages) and the dependent variable (nutritional status), which were displayed in tabular format. Simultaneously, bivariate analysis was performed to illustrate the correlation between independent and dependent variables, investigating the relationship between the two variables. Researchers employed various ways to mitigate potential bias. The study instrument was evaluated for validity and reliability prior to its application. Validity was assessed by comparing the coefficient of determination (r count) with the r table value, whilst reliability was evaluated using Cronbach's Alpha. The test findings indicated that the instrument employed was both valid and trustworthy. The validity of the instrument items is deemed satisfied if the coefficient of determination (r count) is greater than or equal to the table coefficient (r table) at a significance level of $\alpha = 5\%$. The coefficient of determination for this sample is 0.349. According to the validity test results, all statement items, with the exception of B18, exhibited a computed r value exceeding the r table, which ranged from 0.507 to 0.809. B18, however, recorded a value of 0.571, which is below 0.349, hence it was deemed invalid. Consequently, the evaluated instrument satisfies the overall validity criteria, with the exception of item B18, which is deemed invalid, and is suitable for subsequent research.

This study employed the Cronbach Alpha formula for the reliability test, establishing a minimum reliability threshold of >0.70 . A Cronbach Alpha score exceeding 0.70 indicates reliability. The outcomes of the reliability assessment are presented in Table 1. According to Table 1, the Cronbach's alpha value is 0.747, exceeding the r table value of 0.349, thus indicating that the data is credible.

Table 1. Results of the Reliability Test

Alpha Cronbach	N of Item
0.747	26

FINDINGS

The findings of this study reveal that despite possessing substantial nutritional knowledge and favorable attitudes towards healthy food, the consumption of quick food remains elevated and does not significantly impact their nutritional status. This indicates that information and attitudes alone are insufficient to alter food behavior. The results are delineated according to univariate and bivariate analysis.

Univariate Analysis

This analysis was conducted to investigate the frequency distribution of each variable's data, which was assessed using direct measurement. Subsequently, an analytical test was performed using SPSS, yielding the following Table 2. The respondents' nutritional knowledge was categorized into two classifications: proficient and deficient, with a threshold of 80 denoting proficiency. A score below 80 was deemed unsatisfactory. According to the findings, 44 of the 87 responders (50.6%) have adequate nutritional knowledge. This indicates that fifty percent of the population possesses a sufficient comprehension of nutrition, which is essential for informed dietary choices.

Table 2. Univariate Analysis of Nutritional Acumen

Interval	Category	Frequency	Percentage (%)
Knowledge > 80	Good	44	50.60%
Knowledge < 80	Not good	43	49.40%
Total		87	100%

According to Table 3, the majority of students exhibited a favorable disposition towards rapid food intake, with 68 students (78.2%) indicating their agreement. This perspective indicates that despite possessing adequate nutritional knowledge, students still perceive rapid food favorably, likely due to its ease and convenience.

Table 3. Univariate Analysis of Attitudes

Category	Frequency	Percentage (%)
Strongly Disagree	0	0%
Disagree	2	2.30%
Agree	68	78.20%
Strongly Agree	17	19.50%
Total	87	100%

Table 4. Univariate Analysis of Actions

Category	Frequency	Percentage (%)
Never	0	0%
Once a Year	1	1.10%
Once a Month	31	35.60%
Once a Week	46	52.90%
<3 Times a Day	8	9.20%
3 Times a Day	1	1.10%
Total	87	100%

According to Table 4, the frequency of instant food and beverage consumption is classified into six categories: three times a day, less than three times a day, once a week, once a month, once a year, and never consuming. The predominant frequency of instant food consumption is weekly, with 46 students (52.9%) indicating this level of consumption. This suggests a relatively elevated consumption pattern, potentially affected by social behaviors and the accessibility of convenience meals.

Table 5. Univariate Analysis of Nutritional Status

Category	Frequency	Percentage (%)
Normal	32	36.80%
Overweight	34	39.10%
Obesity	3	3.40%
Underweight	18	20.70%
Total	87	100%

Table 5 indicates that the majority exhibit adequate (normal) nutritional status; yet, there are students with inadequate nutritional status. The number of respondents in the normal and overweight categories was similar, with 32 respondents (36.8%) in the normal group and 34 respondents (39.1%) in the overweight category. This indicates that despite possessing adequate nutritional knowledge, patterns of quick food consumption might lead to suboptimal nutritional status.

Bivariate Analysis

This study is necessary to demonstrate the correlation between the dependent and independent variables. The study of the variables involves assessing the correlation between the two variables. The outcomes of the test are in Table 6.

Table 6. Correlation between Knowledge and Nutritional Status

Knowlede	Category				Total	Sig (p)
	1.00	2.00	3.00	4.00		
0.00	22	27	3	14	66	0.550
1.00	10	7	0	4	21	
Total	32	34	3	18	87	

The findings of the chi-square correlation test in Table 6 indicate a p-value of 0.550, which above 0.05, so leading to the acceptance of Ho. If the null hypothesis is accepted, it can be inferred that there is no substantial correlation between nutritional knowledge and nutritional status. Chi-square analysis indicates no significant correlation between nutritional awareness and students' nutritional state (p-value = 0.550). This indicates that despite students possessing substantial knowledge, it is insufficient to influence their nutritional state. Additional factors, like dietary practices and social context, may exert greater influence.

Table 7. Correlation between Attitudes and Nutritional Status

Attitude	Category				Total	Sig (p)
	1.00	2.00	3.00	4.00		
0.00	17	19	2	10	48	0.974
1.00	15	15	1	8	39	
Total	32	34	3	18	87	

The chi-square correlation test results in Table 7 indicate a p-value of 0.974, which exceeds 0.05, hence leading to the acceptance of Ho. If the null hypothesis is accepted, it can be inferred that there is no significant correlation between attitudes towards and intake of quick food and beverages and nutritional status. A favorable disposition towards convenience food does not necessarily imply that pupils will exhibit inadequate nutritional status, suggesting that attitudes do not always translate into behaviors.

Table 8. Correlation of Actions to Nutritional Status

Actions	Category				Total	Sig (p)
	1.00	2.00	3.00	4.00		
0.00	18	16	0	11	45	0.221
1.00	14	18	3	7	42	
Total	32	34	3	18	87	

Table 8 indicates that no significant correlation exists between the consumption of quick meals and nutritional status (p-value = 0.221). This indicates that while the use of quick food is prevalent among students, factors like physical activity and total diet may play a more significant role in determining their nutritional condition.

DISCUSSIONS

The discussion highlights the multifaceted relationship between students' nutritional knowledge, attitudes, behaviors, and their nutritional status. Despite the majority of Grade XII Culinary Arts students at SMKN 3 Wonosari demonstrating proficient nutritional knowledge, this awareness does not consistently translate into healthier eating habits, as evidenced by the frequent consumption of instant foods. Their neutral to positive attitudes toward instant food, shaped by convenience, peer influence, and immediate gratification, further contribute to this paradox. While 39.1% of students are classified as overweight, the

findings reveal no significant correlations between nutritional knowledge, attitudes, or consumption behaviors and students' nutritional status, emphasizing the role of external factors such as food accessibility, cost, and social norms. These insights underscore the need for holistic interventions that integrate education, environmental changes, and behavioral strategies to foster long-term improvements in nutritional health.

Students' Nutrition Knowledge

According to data derived from a nutrition knowledge assessment administered to 87 class XII Culinary Arts students at SMK Negeri 3 Wonosari, the findings indicated that 44 students (50.6%) possessed proficient nutrition knowledge, attributed to their prior instruction in nutrition science during class XI, resulting in a substantial understanding of nutritional concepts among the respondents. Students understand the definitions, classifications, content, effects, roles of supplementary components, categories of product knowledge, and calculations of nutrient content in instant food and beverage items. Prior research indicates that comprehensive nutrition knowledge does not consistently correlate with healthy eating behaviors, particularly when external factors like peer influence and food accessibility are involved (Baker & Friel, 2014; Xu et al., 2022). This signifies the necessity for a more holistic approach to nutrition education that emphasizes both information acquisition and behavioral modification.

Attitudes Towards Instant Food Consumption

The findings from a Likert scale questionnaire administered to 87 students in class XII Culinary Arts at SMK Negeri 3 Wonosari indicate that respondents exhibited a favorable disposition towards decision-making, particularly in the selection of food and beverages. The findings indicated that participants could assess attitudes of interest, offer reactions, articulate remarks, exert influence, extend invitations, and embrace risks associated with the consumption of quick food and beverages.

Students exhibit a neutral to positive attitude towards instant meals, while possessing sound nutritional understanding. Research (Afifah, 2017) on Planned Behavior indicates that attitudes are shaped by perceptions regarding the advantages and repercussions of deviant behavior in adolescents. Students may perceive instant food as convenient and flavorful, despite their awareness of its long-term health consequences. Individual experience, the impact of significant others, the effect of culture, mass media, and educational systems. Harahap's (2020) research findings indicated a significant correlation between media knowledge, attitudes, and fast food selection. The Immediate Gratification Theory (Arikunto, 2017) elucidates students' propensity to opt for immediate rewards despite associated health hazards. To alter this mindset, efforts such as health campaigns highlighting the immediate advantages of nutritious foods and regulating the accessibility and pricing of convenience foods are necessary. The study's findings indicated that students possess favorable attitudes towards quick foods, despite their awareness of the associated adverse effects. This disposition is shaped by multiple elements, encompassing individual experiences and social effects from peers (Wang et al., 2015; Asakura et al., 2021). Afifah's (2017) research indicated that perceptions of the immediate advantages of quick foods frequently surpass recognition of their long-term health hazards. Consequently, more focused interventions, such as health campaigns highlighting the advantages of nutritious diets, are necessary to alter this mindset (Collado-Soler et al., 2023).

Behaviors of Grade XII Culinary Arts Students at SMKN 3 Wonosari Regarding the Consumption of Instant Food and Beverages

According to data derived from research utilizing the Food Frequency Questionnaire (FFQ), which assessed the consumption frequencies of 33 varieties of instant foods and beverages among 87 grade XII

Culinary Arts students at SMK Negeri 3 Wonosari, findings indicate that despite possessing substantial knowledge regarding nutrition and the adverse effects of instant food, the students exhibit a pronounced consumption pattern. Approximately 46 pupils (52.9%) partake in instant food intake at least weekly, highlighting a disparity between awareness and actual consumption behaviors.

Despite possessing substantial knowledge regarding nutrition, the prevalence of instant food intake is elevated, with 46 pupils (52.9%) partaking in instant food at least once weekly. This signifies a disparity between knowledge and consuming behaviors. The Theory of Planned Behavior (TPB) posits that behaviors are shaped by attitudes, subjective standards, and perceived behavioral control (Whitehead & Seaton, 2016). In this environment, social norms favoring rapid food consumption and limitations on access to nutritious food are critical determinants in students' choices to consume instant food (Wang et al., 2015).

According to Nasrudin's (2016) Theory of Planned Behavior (TPB), students' behaviors are shaped by their attitudes, subjective standards, and perceived behavioral control. Despite students recognizing the significance of nutritious meals, peer social norms favoring convenience foods and limitations such as accessibility and cost of healthy options affect their choices. Kurdanti (2014) asserted that peer social influence is also significant. The Immediate Gratification Theory posits that the allure of rapid gratification from fast food surpasses the long-term advantages of nutritious meals. To alter this behavior, it is essential to implement nutrition education, environmental modifications, and campaigns that emphasize the advantages of nutritious diet.

Nutritional Status of Grade XII Culinary Arts Students at SMKN 3 Wonosari

The nutritional status of students is determined by the interplay of their knowledge, attitudes, and behaviors about food consumption. The survey revealed that 34 pupils (39.1%) were classified as overweight, whereas 32 students (36.8%) were deemed to have a normal nutritional status. This data indicates that while the majority of students possess a solid understanding of nutrition, the practice of consuming calorie-dense, nutrient-poor quick foods may adversely impact their nutritional health. Suswanti's (2013) Nutrition Transition Theory posits that the rise in fast food consumption and a decline in worldwide physical activity have contributed to the escalation of overweight and obesity, particularly among adolescents. Studies indicate that heightened fast food consumption and reduced physical exercise elevate the incidence of obesity in teenagers (Wakwoya, 2023).

The calorically dense and nutritionally deficient food observed among students at SMKN 3 Wonosari increases the risk of obesity. Furthermore, 20.7% of students are classified as underweight, potentially because to insufficient food consumption. The Energy Imbalance Theory proposed by Ubro (2014) posits that hunger is associated with a discrepancy between energy consumption and expenditure. Interventions include nutrition education, enhanced access to nutritious foods, and the promotion of physical activity are essential for improving students' nutritional status (Martyniuk et al., 2016).

Correlation between Knowledge and Nutritional Status

The chi-square test yielded a p value of 0.550, beyond 0.05, signifying an absence of a meaningful association between students' awareness of quick food and beverages and their nutritional status. This indicates that despite students' awareness of nutrition and the hazards associated with quick food, this awareness does not substantially influence their nutritional status (Widhalm et al., 2018). Understanding nutrition, while significant, is insufficient to alter an individual's dietary habits without the reinforcement of desire and additional external influences (Setyawan, 2018). At SMKN 3 Wonosari, despite pupils possessing knowledge regarding nutrition and the hazards of quick food, this awareness does not substantially correlate with their nutritional state. The chi-square test yielded a p value of 0.550, indicating an absence of a

meaningful association between students' knowledge and their nutritional state. This finding aligns with the research conducted by Siregar et al. (2023), which also indicated that nutritional awareness did not have a substantial impact on nutritional status. Additional factors, including cost, accessibility, and consumption patterns, may exert greater influence (Zerfu & Biadgilign, 2018; Myszkowska-Ryciak & Harton, 2018).

Correlation between Attitude and Nutritional Status

Moreover, the correlation between students' views towards the use of quick food and beverages and their nutritional state yielded analogous findings. The statistical test yielded a p value of 0.974, beyond 0.05, which signifies an absence of a significant correlation between students' attitudes towards quick food and their nutritional state. The results demonstrate that despite students' negative opinions towards rapid food intake, their nutritional health remains unaffected. Students' negative opinions towards instant meals do not consistently influence their consumption behavior. Notoatmodjo (2010) posits that attitudes stem from beliefs and emotions, yet do not invariably translate into behaviors. Kotler & Keller (2016) shown that product beliefs can affect attitudes; however, external factors like price and accessibility exert a greater influence. Hanum et al. (2022) discovered that adverse sentiments towards fast food did not alter consumption patterns. At SMKN 3 Wonosari, despite the presence of negative views, environmental factors and social habits exert a greater influence on consumption behavior, resulting in no significant correlation between attitudes and students' nutritional status.

Correlation Between Actions and Nutritional Status

Notoatmodjo (2014) asserts that behaviors are indicative of attitudes and knowledge, yet are shaped by external influences, including the social environment. Despite possessing adequate knowledge and attitudes regarding the hazards of quick food, pupils at SMKN 3 Wonosari continue to consume it due to habitual behavior and convenient accessibility. Research conducted by Kholyfah et al. (2023) indicates that fast food consumption does not consistently correlate with nutritional status. At SMKN 3 Wonosari, the consumption of quick meals did not exhibit a significant correlation with students' nutritional status ($p = 0.221$), highlighting the necessity for more comprehensive interventions to impact nutritional status.

CONCLUSION

The data analysis results indicate that the nutritional knowledge of class XII Culinary Arts students is categorized as good, with a knowledge level of 50.6%. The class XII Culinary Arts students exhibit a favorable disposition towards the consumption of instant food and beverages, with 78.2% of students indicating agreement. Furthermore, the frequency of consumption is notably high, as 52.9% of students report consuming instant food and drinks once a week. The nutritional status of class XII Culinary Arts students predominantly falls within the overweight group at 39.1%, while 36.8% exhibit normal nutritional status and 20.7% are classified as underweight. No substantial correlation exists between knowledge and nutritional status for the consumption of instant food and beverages, as students' nutritional knowledge does not directly influence their daily dietary selections ($p = 0.550$). No substantial correlation exists between attitudes towards nutritional status, since the social environment and familial behaviors affect the manifestation of students' attitudes ($p = 0.974$). No substantial correlation exists between actions and nutritional status, while other factors including total diet and physical activity have a greater influence on pupils' nutritional status ($p = 0.221$). This study yields various recommendations for schools and parents. Initially, school policies must be revised to enhance the availability of nutritious foods, including the provision of additional healthy selections in school cafeterias. Nutrition education programs for parents and

students should be enhanced to increase knowledge of the significance of healthy eating habits. Third, advertising highlighting the enduring advantages of nutritious foods and the health hazards associated with processed foods must be executed sustainably (Nor et al., 2019; Antwi et al., 2020). Consequently, a comprehensive and cohesive strategy can assist in addressing the obstacles encountered in modifying food habits among adolescents.

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The Connection Between Knowledge and Skills in the Cookie Domain within Pastry and Bakery Programs

Latifah Nurul Qomarotul Nikmah *, Rizqie Auliana 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

* Corresponding Author. E-mail: latifahnurul.2018@student.uny.ac.id

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ABSTRACT

This study aims to analyze the relationship between students' knowledge and skills in cookie making at SMK Negeri 3 Klaten. The research method used is quantitative correlational, with a purposive sample of 35 students from Class XII Boga 1. Data were collected through knowledge tests and performance assessments. The average knowledge score was 78, while the average skill score was slightly higher at 82.9. Statistical analysis showed a very strong positive correlation of 0.963 between knowledge and skills, significant at the 0.05 level. These results indicate that students' theoretical understanding of cookies greatly influences their practical skills in cookie making. The validity and reliability of the instruments were tested using factor analysis and Cronbach's Alpha to ensure data accuracy. This study emphasizes the importance of vocational education that integrates theory and practice to better prepare students for careers in the culinary field. The implications of this study highlight the need for more effective teaching strategies that combine knowledge acquisition with skill development. By enhancing these two aspects, student learning outcomes in pastry and bakery subjects can be improved, potentially reducing unemployment rates among vocational school graduates.

Keywords: Cookies, skills, knowledge, vocational high school

INTRODUCTION

The establishment of Vocational High Schools (SMK) aims to develop skills in a particular field to prepare students to enter the workforce as productive individuals and to grow into job creators through entrepreneurship (Pemendikbud Number 34 of 2018). Graduates of Vocational High Schools (SMK) are expected to have the individual ability to work and engage in entrepreneurship in their chosen field, which is the core of vocational education (Sutikno, 2013; Tauhid, 2022).

The general objective of vocational education focuses on its primary function: preparing students to work in specific fields (Hanafi, 2013). However, according to the Official Statistics Report published by the Central Statistics Agency in May 2020, the open unemployment rate for SMK graduates decreased from 8.92% in 2018 and 8.63% in 2019 to 8.49% in 2020. Despite the annual decrease, SMK graduates contribute the most to the open unemployment rate compared to other educational levels (Satria, 2024). Referring to the 2013 curriculum, the competencies of SMK graduates are a combination of knowledge, attitude, and skills, reflecting behavioral changes from the learning process that enable them to perform specific tasks with the abilities required by the workforce or industry (Sari, 2023; Subjianto et al., 2020). This study was conducted to examine the relationship between knowledge and skills because the assessment process for

these aspects is systematically carried out for each KD, with scores presented numerically, allowing for statistical analysis of their relationship. Understanding the relationship between knowledge and skills can help teachers develop the media and learning methods used. Meanwhile, attitude assessment is conducted through teacher observation of student behavior, which does not affect the use of learning methods and media.

Mubarak (2011) defines knowledge as everything that a person knows through personal experience. According to Bloom's theory, knowledge is the understanding of something according to its meaning through perception. After cognitive and affective learning outcomes, there are psychomotor learning outcomes. The preparation, processing, and final results of completed tasks form the basis for assessing psychomotor or skill learning outcomes (Djazari and Sagoro, 2011).

The Pastry and Bakery Product Subject is one of the productive training subjects in the Tourism Vocational High School's Culinary Arts program (Sari, 2019). The role of the productive subject teacher is to provide learning material prepared in the Lesson Implementation Plan (RPP), which includes competency standards, basic competencies, competency achievement indicators, learning objectives, teaching materials, time allocation, and learning methods (Joko, 2021). Student learning outcomes in the Pastry and Bakery Product Subject at SMK Negeri 3 Klaten have not yet met the expected Minimum Completeness Criteria (KKM) of 70. This is evident from the test scores of Class XI students in the Pastry and Bakery Product Subject, where 19 out of 36 students (53%) scored below the KKM. Student learning outcomes obtained through the assessment process can be influenced by the methods and media used in learning (Saputra et al., 2020).

Cookie material is one of the topics studied in the Pastry and Bakery Product Subject. The achievement indicators for the Basic Competency (KD) of cookie material include the definition of cookies, cookie classification, tools and ingredients for making cookies, cookie-making stages, criteria for good cookies, and making various types of cookies in the Pastry and Bakery Product Subject Syllabus for Class XI at SMK Negeri 3 Klaten. The choice of cookie material as the research object is due to cookies being a popular product in the pastry world, the diverse skills required in cookie-making, and the wide variety of cookies, allowing researchers to explore different types of cookies for assessing student skills and providing an understanding of the skills needed in the pastry industry.

Cookie material was chosen as the focus of this research because it has several advantages relevant to the learning objectives at SMK. First, cookies are a popular product in the pastry world, making mastery of cookie-making techniques highly beneficial for students pursuing careers in the culinary industry. Second, cookie-making involves various skills, from ingredient selection and mixing techniques to baking temperature control, all of which are essential competencies in the pastry and bakery field. Third, the diverse variety of cookies allows students to explore creativity and innovation in product creation, enhancing their practical skills. Fourth, cookies have a broad market potential, so cookie-making skills can support students in entrepreneurship. Therefore, cookie material provides an ideal opportunity to measure the relationship between students' theoretical knowledge and practical skills. Students' knowledge of cookie material is expected to be measured through the competency achievement indicators set in the syllabus, which include definitions, classifications, and cookie-making techniques (Kurniawan et al., 2021).

Several studies have investigated the relationship between knowledge and skills in various fields. Research conducted by Laviana (2021) found a relationship between knowledge and practical results in fashion-making among SMK students. Research by Hakim et al. (2022) on the contribution of theoretical learning outcomes to practical skills in lathe machining also showed a relationship between the two. Akmal's (2018) research on the relationship between mastery of yeast dough theory and practical bread-making results in SMK showed a strong relationship between theoretical mastery and students' practical results. Raharjo's (2016) research on the relationship between theoretical understanding and work facilities with

practical achievements in milling techniques showed that theoretical understanding, work facilities, and students' practical achievements are interrelated.

Several studies have discussed the relationship between students' knowledge and skills in various fields. However, there has been no research on the relationship between students' knowledge and skills in the Pastry and Bakery Product Subject, specifically cookie material. Therefore, this study aims to examine the relationship between knowledge and skills in cookie material in the Pastry and Bakery Product Subject at SMK Negeri 3 Klaten.

Students' knowledge of cookie material is one of the assessment competencies aimed at measuring students' cognitive abilities in cookie material. The cognitive domain competency achievement indicators for cookie material in the learning syllabus include the definition of cookies, cookie classification, tools and ingredients for cookie-making, stages of cookie-making, and criteria for good cookies. Students' skills in cookie material are one of the assessment competencies at SMK aimed at determining students' abilities in performing tasks in cookie-making practice. The skill domain competency achievement indicators for cookie material in the syllabus include making various types of cakes from cookie dough (Pastry and Bakery Product Subject Syllabus for Class XI at SMK Negeri 3 Klaten).

This study aims to identify the relationship between students' knowledge and skills in cookie material in the Pastry and Bakery Product Subject at SMK Negeri 3 Klaten. Therefore, the results of this study are expected to provide insights for educators in developing more effective learning strategies to enhance students' competencies comprehensively.

METHOD

This study is a quantitative correlational research using nonparametric inferential statistical methods. It was conducted to determine the relationship between two variables: knowledge and skills.

Participants

The population in this study consists of students at SMK Negeri 3 Klaten who have completed the cookie material in the Pastry and Bakery Product Subject. Observations showed that the students who studied the cookie material were in Class XII, divided into 4 classes with a total of 142 students. The sample was determined using purposive sampling, resulting in a sample of 35 students from Class XII Boga 1. The sample size of 35 students was determined based on Krejcie and Morgan's (1970) table, which provides sample sizes for specific populations with a 95% confidence level and a 5% margin of error.

Data Collection and Analysis

Data collection in this study used knowledge tests and performance assessments. The knowledge test was used to assess students' knowledge of cookie material, based on the competency achievement indicators in the subject syllabus. The knowledge test consisted of 22 multiple-choice questions with 4 answer options. Performance assessment was conducted to evaluate students' practical skills in cookie-making, from preparation to the final product. The instruments used were adopted from previous studies by Laviana (2021) and Akmal (2018), which have been proven valid and reliable in the vocational education context.

The knowledge test, consisting of multiple-choice questions, was designed based on competency achievement indicators in the syllabus. This type of test was chosen for its ability to objectively and systematically measure students' cognitive understanding. The validity of the instrument was tested using factor analysis, while its reliability was tested with Cronbach's Alpha, yielding satisfactory results.

Performance assessment was conducted by observing students' skills during the cookie-making practice, from preparation to the final product. The assessment used a Likert scale from 1 to 5, where 1 indicates very poor skills and 5 indicates excellent skills.

Data analysis techniques began with descriptive statistical analysis, including calculating the average score, class interval calculation, and determining the variable tendency table. Hypothesis testing in this study used Spearman rank correlation. Sugiyono (2019) states that data in Spearman rank correlation tests are ordinal for both variables and do not need to be normally distributed.

Prerequisite analysis tests were conducted using the Kolmogorov-Smirnov normality test and Levene's test for homogeneity of variance. The normality test results showed that the data were not normally distributed, so the analysis continued with nonparametric techniques. The homogeneity of variance test showed that the variance among groups was homogeneous, validating the use of Spearman Rank correlation analysis.

The decision on the correlation between knowledge and skills variables can be concluded by examining the significance value obtained. If the Sig. value is less than 0.05, it can be concluded that there is a relationship between the two variables. The relationship between the two variables becomes stronger as the correlation coefficient value approaches a certain number.

Table 1. Correlation Strength Levels

Correlation Coefficient Value	Correlation Strength
0.00 - 0.25	Very weak
0.26 - 0.50	Moderate
0.51 - 0.75	Strong
0.76 - 0.99	Very strong
1.00	Perfect

FINDINGS AND DISCUSSIONS

Descriptive Analysis of Knowledge Test

The results of the students' knowledge test on cookie material showed a highest score of 91, a lowest score of 64, and an average score of 78. Based on Table 2 and Figure 1, the frequency of students' knowledge on cookie material mostly falls within the class interval of 77.5-81, with 16 students (46%).

Table 2. Frequency Distribution of Cookie Material Knowledge

Class Interval	Frequency	Percentage
64 - 67.5	1	3%
68.5 - 72	11	31%
73 - 76.8	0	0%
77.5 - 81	16	46%
82 - 85.5	0	0%
86.5 - 90	5	14%
91 - 94	2	6%
Total	35	100%

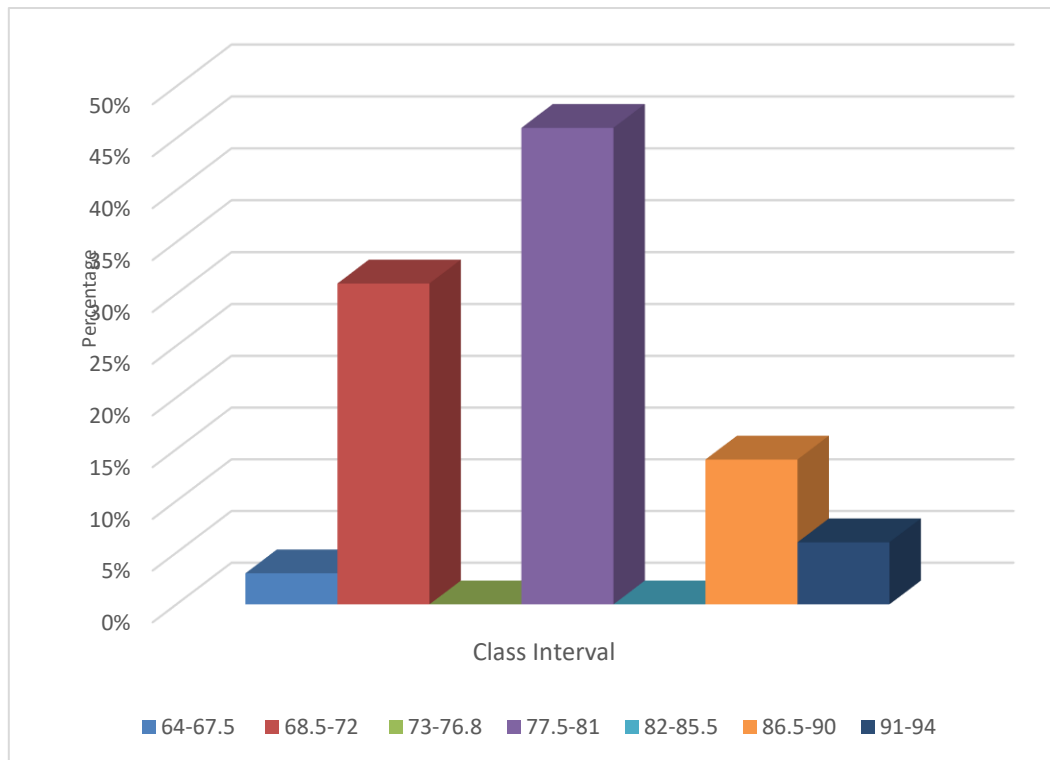


Figure 1. Percentage Frequency of Cookie Material Knowledge

The results of the students' knowledge test on cookie material showed a diverse distribution of scores. The highest score achieved was 91, while the lowest was 64, with an overall average of 78. Table 2 shows the frequency distribution of students' knowledge scores. Sixteen students (46%) fell within the class interval of 77.5-81, indicating the largest concentration in this range. Table 3, which classifies knowledge tendencies, shows that the majority of students (15 students or 43%) are in the "Good" category. Although the average indicates a fairly good understanding, the presence of students with below-average scores highlights the need for more differentiated learning strategies to reach all students. This aligns with the importance of effective vocational education that not only focuses on theory but also integrates hands-on practice relevant to students' areas of expertise (Wardina et al., 2019). It is also important to consider that interactive and experience-based learning methods, such as project-based learning or inquiry-based learning, can enhance students' practical skills (Varadarajan & Ladage, 2022; King et al., 2016).

Table 3. Knowledge Tendency Distribution of Cookie Material

Class Interval	Category	Frequency	Percentage
$x \geq 87$	Very Good	2	3%
$87 > x \geq 79$	Good	15	31%
$79 > x \geq 72$	Fairly Good	8	0%
$x < 72$	Poor	10	0%
Total		35	100%

Based on Table 3, the majority of students' knowledge scores on cookie material fall into the "Good" category, with 15 students (43%).

Descriptive Analysis of Performance Assessment

The results of the performance assessment of practical cookie-making skills showed a highest score of 94, a lowest score of 74, and an average score of 82.9.

Table 4. Frequency Distribution of Cookie Material Skills

Class Interval	Frequency	Percentage
74-76	10	29%
77-79	0	0%
80-82	5	14%
83-82	5	14%
86-88	5	14%
89-88	5	14%
92-94	2	14%
Total	35	100%

Based on Table 4, the majority of students' skills in cookie material fall within the class interval of 74-76, with 10 students (29%). Based on Table 5, students' skills in cookie material in the "Very Good," "Fairly Good," and "Poor" categories have the same frequency, with 10 students each (29%). Figure 2 presents a visual bar chart of these percentages. The visual highlights the peak at the 74-76 interval and the absence of students in the 77-79 interval. The consistent percentages for the intervals 80-82 through 89-91 would be shown as bars of equal height, and the lower percentage for the 92-94 interval would be a shorter bar. Each of these intervals has a frequency of 5 students, accounting for 14% of the total each. This uniform distribution suggests that students' skills are spread relatively evenly across these intervals, except for the gap at 77-79.

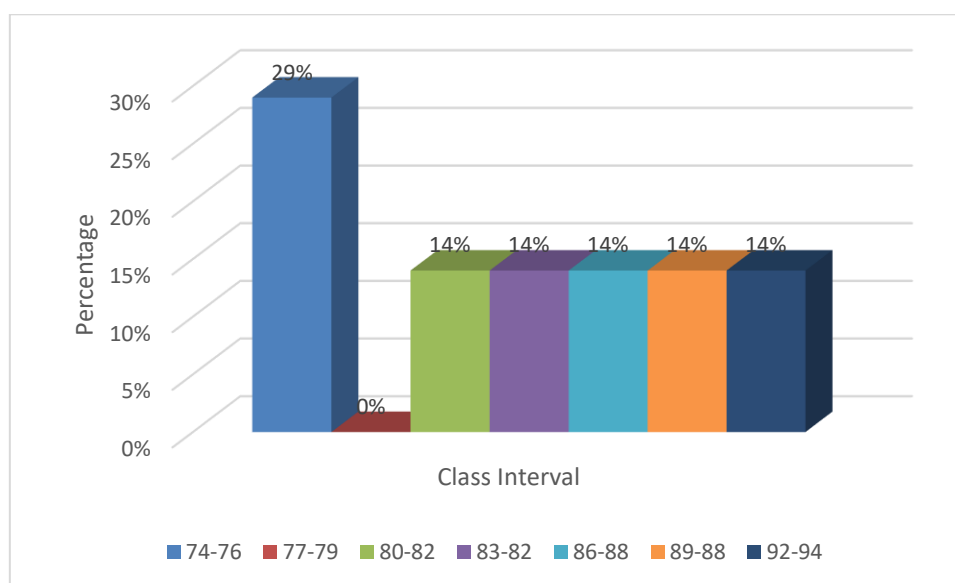


Figure 2. Percentage Distribution of Cookie Material Skills

The performance assessment of practical cookie-making skills showed a highest score of 94 and a lowest score of 74, with an average of 82.9. Table 4 displays the frequency distribution of skill scores. Ten students (29%) fell within the class interval of 74-76, which is the largest group. Table 5 classifies skill tendencies. Interestingly, the "Very Good," "Fairly Good," and "Poor" categories have the same frequency (10 students or 29% each). This indicates a disparity in skill mastery among students, although the average shows overall good performance. These results highlight the importance of training programs that prioritize practical skills and involve various stakeholders, such as industry and educational institutions, to enhance student competence (Wu, 2015). Furthermore, previous practical experience and the learning methods used also play a crucial role in shaping students' skills (FU, 2024).

Table 5. Skill Tendency Distribution of Cookie Material

Class Interval	Category	Frequency	Percentage
$x \geq 89$	Very Good	10	29%
$89 > x \geq 84$	Good	5	14%
$84 > x \geq 79$	Fairly Good	10	29%
$x < 79$	Poor	10	29%
Total		35	100%

Hypothesis Testing

The results of hypothesis testing using Spearman rank can be seen in Table 6. Based on Table 6, the obtained significance value is 0.000, indicating that the knowledge and skills variables are correlated because $0.000 < 0.05$. The table shows a correlation coefficient of 0.963. The correlation coefficient value indicates that the research data has a very strong correlation.

Table 6. Hypothesis Testing Results

Correlation			Knowledge	Skills
Sperman'sho	Knowledge	Correlation	1000	0.963**
		coefficient Sig. (2-Tailed)		0.000
		N	35	35
	Skills	Correlation	0.963	1.000
		coefficient Sig. (2-Tailed)	0.000	0.000
		N	35	35

****.** Correlation is significant at the 0.01 level (2-tailed).

Hypothesis testing using Spearman Rank correlation (Table 6) shows a significance value of 0.000. Since this value is less than 0.05, there is a significant correlation between the knowledge and skills variables. A correlation coefficient of 0.963 indicates a very strong relationship between students' knowledge and skills in cookie material. These findings support the idea that good theoretical mastery contributes to success in practice (Boonsri et al., 2019) and aligns with the goals of vocational education to produce graduates with knowledge and skills relevant to industry needs (Ali et al., 2017). These results also emphasize the importance of integrating theory and practice in vocational education curricula (Almetwazi et al., 2020; McKenzie & Mellis, 2017). A balanced curriculum between theory and practice will better prepare students to face challenges in the workforce ("Research on Issues Related to Lifelong Vocational Skills Training for Vocational Undergraduate Teachers," 2023).

CONCLUSION

This study examined the relationship between knowledge and skills in cookie-making among 35 twelfth-grade culinary students at SMK Negeri 3 Klaten. Students demonstrated good theoretical understanding (average score of 78) and high practical skills (average score of 82.9). A strong positive correlation ($r = 0.963$, $p < 0.000$) was found between knowledge and skills, highlighting the importance of integrating theory and practice in culinary education. The findings suggest a need for balanced curriculum design and differentiated instruction to address individual student needs and improve overall competency, ultimately enhancing employability in the culinary industry. While this study provides valuable insights into the relationship between knowledge and skills in cookie-making, further research could explore the effectiveness of specific teaching methods in enhancing both knowledge and skills. Investigating the impact of different pedagogical approaches on student learning outcomes would be beneficial. Additionally,

expanding the study to include a larger and more diverse sample of students from different culinary schools could enhance the generalizability of the findings.

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SWOT Analysis of the Marketing Strategy for *Empon-Empon* Products by the Mekar Women's Farming Group

Mawar Berliana Sari ^{1*}, Minta Harsana ² 

¹ Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

² Applied Bachelor of Culinary Arts Study Program, Universitas Negeri Yogyakarta, Indonesia

* **Corresponding Author. E-mail: mawarberliana.2019@student.uny.ac.id**

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ABSTRACT

This study analyzes the marketing strategy of processed *empon-empon* products by the Women's Farming Group (KWT) Mekar in the Special Region of Yogyakarta using SWOT analysis integrated with Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE). The IFE analysis identifies the strengths of KWT Mekar, such as product quality and variety, as well as its weaknesses, including simple packaging, minimal promotion, and low profits. The EFE analysis reveals opportunities, such as the trend of healthy products and the potential for digitalization, and threats, such as competition and raw material price fluctuations. The results of the SWOT analysis position KWT Mekar in the growth quadrant, indicating significant potential for business development. Based on the SWOT matrix, a marketing strategy is designed to focus on leveraging strengths to capture opportunities (SO), addressing threats with strengths (ST), utilizing opportunities to overcome weaknesses (WO), and mitigating weaknesses to avoid threats (WT). This strategy includes improving packaging quality, developing structured promotion programs (both online and offline), enhancing human resource quality through training, and expanding the market through partnerships and the use of digital platforms. This study provides important implications for the development of KWT Mekar and similar micro-enterprises in the agricultural sector, with strategic recommendations expected to increase income, business sustainability, and member empowerment.

Keywords: Community empowerment, *empon-empon*, marketing strategy, SWOT analysis, women's farming group

INTRODUCTION

The Women's Farming Group (KWT) Mekar in the Special Region of Yogyakarta (DIY) has been active since 2018, running the Kampung *Empon-Empon* program that leverages local potential. Their flagship processed *empon-empon* products include kunir asem syrup, temulawak powder, and ginger dodol. However, KWT Mekar's income has fluctuated, especially after the Covid-19 pandemic. Despite various efforts, such as participating in exhibitions and improving product quality, marketing issues persist. This indicates the need for a more effective and targeted marketing strategy to support the sustainability of KWT Mekar's business.

KWT Mekar has great potential as a producer of regional specialty products that contribute to village empowerment. However, marketing instability is caused by two main factors: first, the lack of an appropriate marketing strategy; and second, the suboptimal internal and external factors supporting marketing,

promotion, and human quality. Therefore, this research is important to identify these factors and formulate an appropriate marketing strategy to increase income and business sustainability for KWT Mekar.

The main problem in this research is the fluctuation in KWT Mekar's income due to the lack of an appropriate marketing strategy and the suboptimal internal and external factors supporting the marketing of processed empon-empon products. This causes uncertainty in business sustainability and member empowerment for KWT Mekar.

The general proposed solution is to identify and analyze the internal and external factors affecting the marketing of KWT Mekar's processed empon-empon products. This analysis will serve as the basis for formulating an appropriate and effective marketing strategy to increase income and business sustainability for KWT Mekar.

An appropriate marketing strategy is crucial for the success of a business, including KWT Mekar (Tjiptono, 2015; Nitisusastro, 2019). This strategy must consider the marketing environment, both internal and external (Jauch & Gluek, 2004; Wahyudi, 2014). The internal environment includes controllable strengths and weaknesses, such as the marketing mix (product, price, place, promotion, people, process, physical evidence) according to Kotler & Keller (2009). Meanwhile, the external environment includes uncontrollable factors such as demographics, economy, natural environment, technology, legal politics, and socio-culture (Kotler & Keller, 2009).

SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is an appropriate tool to identify these internal and external factors (Rangkuti, 2013). This analysis helps determine the business position and formulate an appropriate strategy. Previous research has shown the success of SWOT analysis in formulating marketing strategies for various types of businesses, including SMEs (Chotimah, 2019; Setyawan, 2015; Pasaribu, 2018). Therefore, SWOT analysis is chosen as the main method in this research.

Previous research has shown the importance of SWOT analysis in formulating marketing strategies, especially for small and medium enterprises (SMEs) in the agriculture and fisheries sectors (Octorayanti et al., 2022; Mustofa et al., 2021; Viviana & Victor, 2022; Namotemo et al., 2021). Grošelj & Stirn (2015) also emphasized the importance of combining SWOT analysis with other methods to enhance strategic decision-making. However, there is still a research gap regarding the specific application of SWOT analysis to the marketing of processed empon-empon products by KWT in Indonesia. This research aims to fill this gap by providing a comprehensive overview of the appropriate marketing strategy for KWT Mekar.

The aim of this research is to identify the internal and external factors affecting the marketing of processed empon-empon products and to formulate an appropriate marketing strategy for these products at the Women's Farming Group Mekar. The novelty of this research lies in the specific application of SWOT analysis in the context of marketing processed empon-empon products by KWT Mekar in DIY, which has not been extensively studied before. The scope of the research includes SWOT analysis of the marketing strategy for KWT Mekar's processed empon-empon products, covering internal and external analysis, as well as strategic implications that can be drawn based on the results of this analysis.

METHOD

This study uses both qualitative and quantitative data. Qualitative data were obtained through in-depth interviews with members of KWT Mekar and direct observations of the production and marketing processes of processed *empon-empon* products. Quantitative data were collected through sales and production cost data over a specific period. The analysis method used is SWOT analysis, combined with Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) to provide a comprehensive overview (Nurhalizah, 2024). This analysis refers to a framework that combines internal (strengths and weaknesses) and external

(opportunities and threats) environmental analysis to determine business positioning and formulate appropriate marketing strategies.

Participants

The sample in this study includes KWT Mekar and the processed empon-empon products they produce. Data were collected through structured interviews with KWT Mekar members to gather information about production processes, marketing, and challenges faced. The interviews focused on aspects relevant to SWOT analysis, including the strengths, weaknesses, opportunities, and threats faced by KWT Mekar. Data collection also involved direct observation of the production and marketing processes of processed *empon-empon* products. This method refers to qualitative and descriptive approaches used in several previous studies (Kurniawan, 2023; Adiningrum et al., 2022).

Data Collection and Analysis

Data collection techniques included observation, questionnaires, interviews, and documentation. The research instruments measured observed social events. The instruments used were interview question lists and questionnaires. In this study, construct validity tests were conducted to determine the alignment of questionnaire statements with the phenomena occurring at the research location. Validity in this study considers expert opinions. Table 1 shows the grid of interview instruments and Table 2 shows grid of questionnaire instrument.

Table 1. Interview Instrument Grid

No.	Indicator	Sub Indicator
1	Product	a. Product quality b. Product variety c. Product appearance
2	Promotion	a. Advertisement appeal b. Competitor publicity
3	Price	a. Competitor product prices b. Discounts
4	Place	a. Access b. Visibility
5	People	a. Service people b. Customer
6	Process	a. Ease of ordering b. Distribution speed c. Response to complaints
7	Physical Evidence	a. Production infrastructure

This study uses a qualitative and quantitative descriptive approach. Qualitative data were thematically analyzed to identify the strengths, weaknesses, opportunities, and threats faced by KWT Mekar. Quantitative data, including sales and production cost data, were used to support the qualitative analysis and provide a more comprehensive picture. SWOT analysis was used to identify and evaluate internal and external factors affecting KWT Mekar's marketing performance (Tasdik, 2022; Ary & Sanjaya, 2020). IFE and EFE were used to provide quantitative assessments of internal and external factors (Nurhalizah, 2024). The results of the IFE and EFE analyses were then integrated with SWOT analysis to formulate an appropriate marketing strategy.

Table 2. Questionnaire Instrument Grid

Strengths (Kekuatan)	Weaknesses (Kelemahan)	Opportunities (Peluang)	Threats (Ancaman)
Guaranteed product quality	Very simple product appearance	Collaboration with various parties	Large-scale industry competitors
Varied products	No structured promotion program	Opening of online sales	Competitors with cheaper prices
Good service quality	Limited quantity and quality of HR	Expansion of consumers through tourist villages	Increase in raw material prices
Easily obtainable raw materials	Thin profit margins	Wide market share	More profitable job opportunities for members

The parameters measured in this study include the internal strengths and weaknesses of KWT Mekar (e.g., product quality, packaging, promotion, HR, profit), as well as external opportunities and threats (e.g., market trends, competition, raw material prices). Data were collected through interviews, observations, and literature studies. Parameter measurement was conducted using a Likert scale to assess the weight and rating of each factor in the IFE and EFE matrices (Nurhalizah, 2024). Qualitative data were descriptively analyzed to identify emerging themes and patterns. The results of the analysis were then used to construct a SWOT matrix and formulate an appropriate marketing strategy.

Data analysis in this study uses both qualitative and quantitative approaches. Qualitative data were descriptively analyzed to identify themes and patterns emerging from interviews and observations. Quantitative data, including sales and production cost data, were analyzed to support the qualitative analysis and provide a more comprehensive picture. SWOT analysis was used to identify and evaluate internal and external factors affecting KWT Mekar's marketing performance (Supriastuti & Rahayu, 2021; Wardhana et al., 2023). The IFE and EFE methods were used to provide quantitative assessments of internal and external factors (Nurhalizah, 2024). The results of the IFE and EFE analyses were then integrated with SWOT analysis to formulate an appropriate marketing strategy. No inferential statistical tests were used as the research focus is on descriptive and interpretative analysis. This study also refers to the combination of SWOT analysis with other methods as conducted by Pradnyawathi (2022), although it does not specifically use the EFI matrix.

FINDINGS

Internal Factor Analysis

Based on interviews focusing on internal factors, KWT Mekar has identified several strengths and weaknesses that affect the marketing strategy of their processed *empon-empon* products. Among the strengths are guaranteed product quality, product variety, good service, easy availability of raw materials, and adequate production tools. However, they also face some weaknesses, such as simple packaging design, lack of structured discount and promotion programs, absence of digital promotion, perception of KWT Mekar as a side job, and low sales profit.

The document also highlights the strategic approach taken by KWT Mekar in analyzing its operational environment. In-depth internal and external analyses were conducted to identify key factors affecting the business. Internal analysis emphasizes evaluating the organization's strengths and weaknesses, while external analysis highlights opportunities and threats in the market. KWT Mekar uses analysis tools such as the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices to visualize the organization's position in relation to identified factors. This structured approach enables the formulation of an appropriate marketing strategy, designed to leverage strengths, reduce weaknesses, capitalize on

opportunities, and protect against potential threats. This strategy is crucial for enhancing KWT Mekar's organizational effectiveness and competitive advantage.

The SWOT analysis conducted on the marketing strategy of the Women's Farming Group (KWT) Mekar's processed *empon-empon* products yielded comprehensive findings regarding the strengths, weaknesses, opportunities, and threats faced. The Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) analyses (see Tables 3 and 4) provide a quantitative overview of internal and external factors. The IFE matrix identifies KWT Mekar's internal strengths, particularly in guaranteed product quality (high weighted rating), product diversity, good service, ease of raw material access, and sufficient production tools. Significant internal weaknesses include simple product packaging (low weighted rating), lack of structured promotion and discount programs, minimal use of digital promotion, perception of KWT Mekar as a side job, and low sales profit.

Table 3. IFE Matrix

Internal Factor	Item Weight	Rating	Weighted Rating
<i>Strengths</i>			
Point 1	0.108	4	0.43
Point 2	0.099	4	0.395
Point 3	0.112	4	0.448
Point 4	0.11	4	0.442
Point 5	0.103	3	0.309
<i>Weaknesses</i>			
Point 1	0.1	3	0.3
Point 2	0.094	3	0.283
Point 3	0.091	1	0.091
Point 4	0.091	1	0.091
Point 5	0.091	2	0.183
Total			2.972

External Factor Analysis

Based on interviews focusing on external factors, KWT Mekar has identified opportunities and threats affecting the marketing strategy of their processed *empon-empon* products. Opportunities that can be leveraged include collaboration with universities or related institutions for training programs, collaboration with the government in tourist village programs, opening online sales channels through platforms like Shopee and Tokopedia, and having loyal regular customers. However, KWT Mekar also faces threats such as the presence of large-scale industry competitors, competitors offering cheaper prices, more effective competitor promotions through Instagram Ads or endorsements, and other more profitable jobs for members, such as rice harvests.

The document provides an in-depth analysis of KWT Mekar's internal and external environment, including the identification of strengths, weaknesses, opportunities, and threats through SWOT analysis. Additionally, the development of the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices helps assess the business's position in the market. The results of this evaluation are important for formulating an appropriate marketing strategy aimed at enhancing KWT Mekar's competitive advantage and supporting its growth in the market. By leveraging existing strengths and opportunities and addressing weaknesses and threats, KWT Mekar can strategically direct its steps toward sustainable growth and success.

The EFE analysis shows that external opportunities are more dominant than threats. Key opportunities include the increasing trend of consuming healthy and natural products, as well as the significant potential for utilizing digital platforms for marketing. External threats to be aware of include tight market competition and fluctuations in raw material prices. The total weighted rating score difference between opportunities and threats shows a significant gap (1.333), indicating great potential for growth if opportunities can be effectively utilized.

Table 4. EFE Matrix

External Factor	Item Weight	Rating	Weighted Rating
<i>Opportunities</i>			
Point 1	0.127	4	0.508
Point 2	0.14	4	0.56
Point 3	0.125	4	0.501
Point 4	0.125	3	0.376
<i>Threats</i>			
Point 1	0.118	1	0.118
Point 2	0.114	1	0.114
Point 3	0.122	1	0.122
Point 4	0.129	2	0.258
Total			2.556

The external opportunity factors for KWT Mekar are greater than the threat factors, with a difference of 1.333. This value is obtained from the difference between the subtotal weighted rating of opportunity factors (1.945) and the subtotal weighted rating of threat factors (0.612).

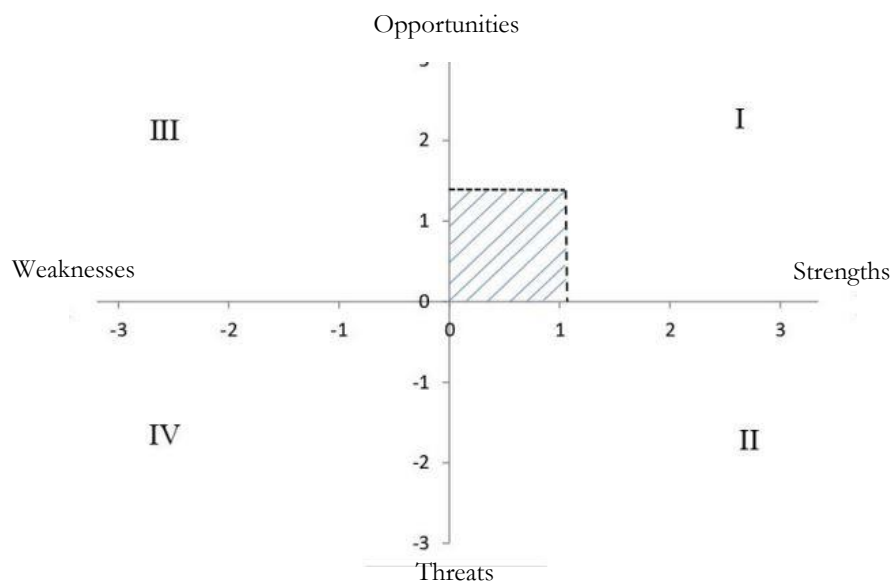


Figure 1. SWOT Analysis Diagram

The X-coordinate point on the SWOT analysis diagram is arranged based on the difference between the subtotal weighted rating of strengths and weaknesses. The Y-coordinate point is determined from the difference between the subtotal rating of opportunities and threats. The diagram shows that KWT Mekar is in Quadrant I, indicating a growth position for the business.

The SWOT diagram in Figure 1 and the SWOT Matrix in Table 5 integrate internal and external factors, positioning KWT Mekar in Quadrant I (growth) in the SWOT analysis diagram. This indicates a strategic and advantageous business position, where internal strengths can be leveraged to capture external

opportunities. The SWOT Matrix further formulates specific strategies (SO, ST, WO, WT) that can be implemented to maximize growth potential and minimize risks. The results of this analysis provide a strong foundation for formulating an appropriate and targeted marketing strategy for KWT Mekar. Quantitative data from the IFE and EFE matrices, combined with qualitative analysis from the SWOT diagram and matrix, provide a comprehensive and measurable understanding of KWT Mekar's marketing conditions.

Based on the calculations, KWT Mekar's internal strengths are greater than its weaknesses by 1.076. This value is obtained from subtracting the subtotal weighted rating of strengths (2.024) from the subtotal weighted rating of weaknesses (0.948).

SWOT Matrix

The marketing strategy formulation that KWT Mekar can implement is outlined in the SWOT Matrix in Table 5.

Tabel 5. Matriks SWOT

IFE/EFE	Strengths (S)	Weaknesses (W)
	<ul style="list-style-type: none"> • Guaranteed product quality • Varied product offerings • Good service quality • Easily obtainable raw materials • Adequate production tools 	<ul style="list-style-type: none"> • Very simple packaging and design • No structured discount and promotion program • No digital promotion • KWT Mekar perceived as a side job • Low sales profit
Opportunities (O)	Strategy (SO)	Strategy (WO)
• Opportunities for collaboration with universities or related parties for training programs	• Conduct regular training for members to improve quality, service quality, and product development.	• Conduct structured promotions and discounts at certain events
• Opportunities for collaboration with the government for tourist village programs	• Initiate opening of offline and online stores with the government	• Increase prices in line with quality improvements for different market segments
• Opening online sales channels	• Regularly participate in events offered for market expansion	• Apply for grant funds for agricultural product development
• Having loyal regular customers		
Threats (T)	Strategy (ST)	Strategy (WT)
• Large-scale industry competitors	• Focus on existing market segments	• Improve packaging quality without significantly increasing production costs
• Competitors with cheaper prices	• Conduct regular promotions through online media	• Capture a wider market share that aligns with KWT's capabilities
• More effective competitor promotions		
• More profitable jobs for members		

Based on the SWOT Matrix, there are four strategies that KWT Mekar can implement to maximize product marketing, including SO (strength opportunities), ST (strength and threats), WO (weakness opportunities), and WT (weakness and threats) strategies. Referring to theoretical studies on the grand strategy matrix and SWOT analysis diagram, it is stated that businesses in Quadrant I occupy a growth position, meaning the business is in a perfectly strategic position and can be advantageous. In the research results showing KWT Mekar in Quadrant I of the SWOT analysis diagram, the most appropriate marketing

strategy focuses on product penetration and development. Business operators have business strengths and can leverage various opportunities. Therefore, it is concluded that the most appropriate marketing strategy for KWT Mekar is to implement the SO (strength opportunities) strategy.

The findings of this study, which examined the marketing strategy of KWT Mekar's processed *empon-empon* products through SWOT analysis, contribute significantly to the understanding of marketing strategies in the context of micro-enterprises, particularly in the agricultural sector. The findings regarding KWT Mekar's internal strengths and weaknesses align with the emphasis by Octorayanti et al. (2022) and Mustofa et al. (2021) on the importance of understanding internal factors to formulate effective strategies. The product quality, identified as KWT Mekar's main strength, supports Hanafie et al.'s (2020) findings on the correlation between product quality and marketing performance. However, internal weaknesses such as simple packaging and minimal digital promotion indicate the need to enhance marketing strategies, in line with Sumarni & Faddila's (2023) suggestions on the importance of modern marketing understanding for micro-enterprises.

The analysis of external opportunities and threats in this study reinforces Rahmadani & Jefriyanto's (2021) findings on the importance of capitalizing on market trends, in this case, the trend of healthy and natural products. The potential use of digital technology, identified as a major opportunity, aligns with findings by Hidayah et al. (2021) and Sengkey (2023) on the importance of digital marketing for micro-enterprises in the modern era. However, threats such as competition and raw material price fluctuations highlight the need for adaptive and resilient strategies, as suggested by Sumarni & Faddila (2023) regarding the importance of innovative marketing strategies in facing competition.

The findings of this study have broad and significant implications, both academically and practically, regarding the marketing strategy of KWT Mekar's processed *empon-empon* products and the development of micro-enterprises, particularly in the agricultural sector. KWT Mekar's position in Quadrant I (growth) on the SWOT analysis diagram, supported by high scores on the EFE and IFE matrices, indicates great growth potential. However, this potential can only be realized with the implementation of appropriate and targeted strategies, in line with the recommendations derived from the SWOT matrix.

Practically, this study provides a comprehensive guide for KWT Mekar to improve its marketing performance. Recommendations for improving packaging quality, developing structured promotion programs (online and offline), enhancing human resources through training, and expanding the market through collaboration and the use of digital platforms are concrete steps that can be implemented. Implementing the SO (Strength-Opportunities) strategy, which leverages internal strengths to capture external opportunities, is expected to increase income, business sustainability, and member empowerment for KWT Mekar. Increasing sales profits, which is KWT Mekar's main weakness, can be achieved through the WO (Weakness-Opportunities) strategy combined with the SO strategy.

Academically, this study contributes to the development of theory and practice of marketing strategies for micro-enterprises in the agricultural sector. The use of SWOT analysis integrated with the IFE and EFE matrices provides a more comprehensive and measurable analytical framework compared to previous studies. These findings can be used as a reference for future research that aims to study marketing strategies for micro-enterprises in the agricultural sector with similar characteristics. Furthermore, this study can inspire the development of policies and community empowerment programs in the agricultural sector, focusing on enhancing marketing capacity and utilizing digital technology. In conclusion, this study provides valuable implications for both the specific development of KWT Mekar and the broader development of marketing strategy theory and practice for micro-enterprises in the agricultural sector. This study surpasses previous research (Chotimah, 2019; Setyawan, 2015; Pasaribu, 2018) with its specific focus on processed *empon-empon* products and the context of KWT in DIY. The use of IFE and EFE analysis, in addition to SWOT analysis, provides a more quantitative and comprehensive picture. As a result, this study not only

identifies appropriate marketing strategies (SO, ST, WO, WT) but also provides a deeper understanding of the factors influencing the success of these strategies. Thus, this study makes a valuable contribution, both theoretically and practically, to the development of marketing strategies for micro-enterprises in the agricultural sector and community empowerment. The specific and measurable strategy recommendations, based on comprehensive SWOT analysis, make this study more applicable and beneficial for KWT Mekar and similar groups.

CONCLUSION

This study successfully identified the internal and external factors affecting the marketing strategy of KWT Mekar's processed *empon-empon* products through SWOT analysis integrated with IFE and EFE. The analysis results place KWT Mekar in a growth position, indicating significant potential for business development. KWT Mekar's main strengths lie in product quality and variety, while its main weaknesses are simple packaging, minimal structured promotion, and low profits. The main opportunities arise from the market trend of healthy and natural products and the potential use of digital platforms. The main threats include market competition and raw material price fluctuations.

Based on these findings, a marketing strategy was designed to focus on leveraging strengths to capture opportunities (SO), addressing threats with strengths (ST), utilizing opportunities to overcome weaknesses (WO), and mitigating weaknesses to avoid threats (WT). This strategy includes improving packaging quality, developing structured promotion programs (online and offline), enhancing human resources through training, and expanding the market through collaboration and the use of digital platforms.

This study provides important implications for the development of KWT Mekar and similar micro-enterprises in the agricultural sector. The implementation of the recommended strategies is expected to increase income, business sustainability, and member empowerment for KWT Mekar. Future research can examine the implementation of the recommended strategies and their impact on KWT Mekar's marketing performance in more detail. Additionally, further research can explore more innovative and adaptive marketing strategies in response to dynamic market changes.

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Realization of the Merdeka Curriculum in Culinary Fundamentals Education for Grade X at Vocational High School

Namira Nursaffana Maharrifqa *, Fitri Rahmawati

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

*Corresponding Author. E-mail: namiranursaffana.2020@student.uny.ac.id

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ABSTRACT

The objectives of this research are: (1) To explain the planning, implementation, and evaluation of the Merdeka Curriculum in the teaching of Basic Culinary Skills for Grade X; (2) To identify obstacles in the implementation of the Merdeka Curriculum in teaching Basic Culinary Skills for Grade X; (3) To describe efforts in implementing the Merdeka Curriculum in teaching Basic Culinary Skills for Grade X. This study employed a qualitative method with SMK Negeri 4 Yogyakarta as the research subject. Data were collected through observations, interviews, and document analysis. Research informants included the Vice Principal of Curriculum, the Head of the Culinary Department, and Basic Culinary Skills teachers. Data analysis techniques encompassed data collection, data reduction, data presentation, and conclusion drawing. Data validity was ensured through source triangulation. The research findings are: (1) Learning implementation includes learning planning (Understanding Learning Outcomes, Formulating Learning Objectives, Developing Learning Objective Pathways, Planning Learning Activities and Assessments). The learning models applied were Project-Based Learning (PjBL) and Discovery Learning, using audiovisual learning media. Evaluation was conducted through reflective activities; (2) Identified obstacles include teachers' limited capacity to implement differentiated learning, shortages of both teaching staff and adequate practice facilities, as well as students' lack of independence, persistence, and self-confidence when engaging in sales practices; (3) Efforts made to address these issues include teachers' participation in training programs, enhanced coordination among teachers to foster creativity in active classroom learning, inviting guest instructors, and providing additional support to students to boost their self-confidence, independence, and entrepreneurial resilience. This study concludes that continuous support through educational policy is essential to enhance the effectiveness of the Merdeka Curriculum implementation in vocational high schools.

Keywords: Entrepreneurship, fundamental culinary skills, learning evaluation, Merdeka curriculum, project-based learning

INTRODUCTION

One of the key aspects driving a nation's progress is education. Education involves a conscious and systematic process of transmitting skills and knowledge from one generation to the next to develop desired behaviors (Rahman and Munandar 2022). Several elements are integral to education, including institutions, administrators, teachers, organizers, facilities, media, and students, who represent the future leaders of the world. In educational institutions, a learning guideline known as the curriculum serves as a reference. The curriculum guides educators in conducting teaching and learning activities. Indonesia has undergone multiple curriculum revisions and modifications (Fatmawati and Yusrizal 2020).

The Merdeka Curriculum (Kurikulum Merdeka) policy was initially implemented in a limited number of pioneer schools in 2021. By August 2023, the Merdeka Curriculum was rolled out on a larger scale in educational institutions nationwide (Kemendikbudristek 2022). The core of the Independent Learning policy is to restore educational management authority through granting schools flexibility in planning, implementing, and evaluating educational programs, with support from local governments. The adoption of the Merdeka Curriculum is expected to achieve the nation's educational goals effectively. According to the Merdeka Curriculum guidebook, learning components have been revised, including those in vocational education.

The implementation of the Merdeka Curriculum in vocational education in Indonesia aims to increase the relevance and quality of graduates amid the dynamic demands of the industry (Kemendikbudristek, 2023). This curriculum emphasizes flexibility in the teaching-learning process by positioning students as the center of learning and teachers as facilitators. However, its implementation at vocational high schools (SMKs), particularly in the Basic Culinary Skills program, faces several challenges due to the technical and entrepreneurial skills required.

Vocational high schools aim to enhance intelligence, knowledge, character, moral conduct, and life skills, enabling students to pursue higher education or enter the workforce. One of the goals of vocational education is to prepare professional workers in specific fields, producing graduates ready to face globalization and change. Technological advancements continuously impact industry and societal needs (Utama, et al. 2020). SMK Negeri 4 Yogyakarta, a tourism-oriented vocational school, has implemented the Merdeka Curriculum since 2022. The curriculum shift from the 2013 Curriculum to the Merdeka Curriculum has introduced several changes, particularly in learning content.

The 2013 Curriculum followed a scientific approach. In Grade X vocational education, particularly in culinary studies, subjects included Sanitation, Hygiene, and Occupational Safety; Basic Culinary Arts; Food Material Knowledge; Basic Cooking; and Nutrition Science. In contrast, the Merdeka Curriculum consolidates these subjects into a single productive subject called Basic Culinary Skills. This subject is mandatory for Grade X students at SMK Negeri 4 Yogyakarta. According to the learning outcomes, Basic Culinary Skills encompass six elements: Culinary Industry Business Processes; Global Culinary and Technological Developments; Culinary Professions and Entrepreneurship (Foodpreneurs and Job Profiles); Implementation of Excellent Service in the Culinary Industry; Cleanliness, Health, Safety, and Environmental Sustainability (CHSES); and Comprehensive Basic Cooking Practices (Kemendikbudristek 2022).

At SMK Negeri 4 Yogyakarta, implementing the Merdeka Curriculum in Basic Culinary Skills faces significant obstacles, including limited practice facilities, a shortage of competent teachers, and low student independence and confidence in entrepreneurial practices. Preliminary observations reveal that about 45% of teachers remain stuck in conventional teaching paradigms, while 60% of students show high dependence on teacher guidance during cooking practice. These findings underscore the need for teacher capacity-building and adequate infrastructure to support Project-Based Learning (PjBL) and Discovery Learning.

Another challenge is the limited implementation of differentiated learning due to insufficient teacher training. Data show that only 30% of teachers have attended training related to the Merdeka Curriculum since 2022. Additionally, limited internet access and digital teaching materials further hinder the learning process. These conditions highlight the importance of greater support from local governments and educational institutions in facilitating teacher capacity development and providing supporting infrastructure. Using a qualitative case study approach, this research aims to offer practical contributions and policy recommendations to strengthen curriculum implementation in similar vocational schools across Indonesia.

PURPOSE OF THE STUDY

Based on the problem background, the research objectives are: (1) To explain the planning, implementation, and evaluation of the Merdeka Curriculum in the teaching of Basic Culinary Skills for Grade X; (2) To identify obstacles in the implementation of the Merdeka Curriculum in teaching Basic Culinary Skills for Grade X; (3) To describe efforts to implement the Merdeka Curriculum in the teaching of Basic Culinary Skills for Grade X.

METHOD

This research uses a qualitative approach, which is a type of research that describes a problem and aims to explain a phenomenon systematically and accurately (Fiantika, et al. 2022). The study conducted is a field research with a case study approach. Field research is used to obtain accurate and relevant data through direct observation in the field. Meanwhile, the case study approach is applied because the research focuses on a newly implemented educational program, the Merdeka Curriculum (Kurikulum Merdeka), in schools, particularly vocational high schools. As stated by Zulkifli Noor, a case study is research conducted on a system of programs, activities, events, or a group of individuals under specific conditions (Noor, 2015).

The research was conducted at SMK Negeri 4 Yogyakarta, located at Sidikan Street No. 60, Sorosutan, Umbulharjo District, Yogyakarta City, DIY, between January and July 2024. The data used in this research consists of primary and secondary data. The research data includes documents related to learning planning, teaching modules, curriculum guidelines, and academic evaluation reports from the school. Additional sources include digital teaching materials such as e-books and audiovisual media used in learning.

Participants

In this study, data collection involved interviews, observations, and documentation. Interviews were conducted with selected informants, namely the Vice Principal of Curriculum, the Head of the Culinary Program, and the Basic Culinary Skills teachers, to explore the research issues in-depth. A total of six informants were interviewed, and selected to represent both decision-makers and educators. As stated, the informants were not chosen randomly but based on specific criteria (Kumara, 2018). Observations were carried out to collect information on the planning, implementation, and evaluation of learning, as well as the availability of facilities and infrastructure. Documentation involved the collection of school documents, such as the school profile, teacher and student numbers, teaching modules, and images related to the implementation of the Merdeka Curriculum in Basic Culinary Skills for Grade X. To ensure the validity of the collected data, source triangulation was used to compare data from interviews, observations, and documentation. According to Norman K. Denkin, cited by (Susanto et al., 2023), triangulation of data sources involves the use of various data collection methods. The variety of perspectives obtained helps in gaining a more comprehensive understanding to reach the truth.

Data Collection and Analysis

In qualitative research, both pre-field and field data analysis techniques are used (Saleh, 2017). In the pre-field analysis, several steps need to be carried out and prepared by the researcher, which will later become the research procedure in the field. This analysis includes the research design, the determination of the research site, field observations, research permits, and other research requirements. According to Miles and Huberman (1992:20), cited by (Abdussamad, 2021), data analysis in qualitative research includes data collection, data reduction, data presentation, and drawing conclusions.

Data collection is carried out through interviews, observations, and documentation using appropriate strategies that focus on the data collection process. Data reduction involves summarizing and selecting the key elements and focusing on what is important according to the research objectives. The researcher uses tools to facilitate data recording during the data collection process, as the data obtained in the field is extensive. During interviews, the researcher uses a mobile phone to record audio, enabling clear and thorough analysis. Data reduction ensures that no data deviates from the research objectives.

Data presentation involves the combination of information from the collected data, followed by conclusions that may present opportunities for further actions. After data reduction, the next step is to present the data obtained. Conclusions depend on the quality of field notes, coding, storage, and the researcher's skills, and may not emerge until data collection is complete (Sidiq & Choiri, 2019). After data is collected, the researcher analyzes its validity using source triangulation by comparing and reviewing information obtained from various sources. All data is analyzed using a descriptive qualitative approach to ensure accurate and relevant results according to the research focus. Conclusion drawing through triangulation is conducted to obtain credible data analysis results (Haryoko et al., 2020).

FINDINGS

The implementation of the Merdeka Curriculum in the Basic Culinary Skills learning for Grade X is carried out through the planning of lessons, such as creating teaching modules. The learning process is conducted using the Project-Based Learning (PjBL) and Discovery Learning models, with audio-visual media and learning resources from digital books, the internet, and YouTube. Evaluation of the learning process is done by providing reflections in the form of formative assessments, as detailed in the triangulation table below:

Learning Planning

The learning planning process in the implementation of the Merdeka Curriculum is carried out through several systematic stages. Based on interviews, observations, and documentation conducted on July 18, 2023, it was found that the planning process begins with socializing the Merdeka Curriculum. The Vice Principal of Curriculum provides information related to the learning phases for each grade, which is then followed by discussions among teachers. This discussion aims to understand the Learning Achievements to be used.

Teachers collaboratively formulate Learning Objectives according to the needs of each class. They also prepare the Learning Flow and design teaching modules along with assessments that align with the Merdeka Curriculum standards. This process ensures that all elements of lesson planning are well integrated. The observation showed that teachers have developed and used Teaching Modules in the learning process. These modules are designed based on the guidelines agreed upon during the discussions, including learning objectives, the material to be taught, and the assessment methods used to measure students' achievements. Figure 1 shows socialization of the Merdeka Curriculum.

Based on the data collected, the steps followed by the teachers align with the procedures set in the Merdeka Curriculum, namely: (1) Understanding the Learning Achievements set out in the curriculum; (2) Formulating Learning Objectives collaboratively; (3) Structuring the Learning Flow that includes all competencies to be achieved; (4) Planning the learning process and assessments to ensure optimal learning outcomes. These steps ensure that lesson planning is carried out effectively, supporting the achievement of educational goals expected in the implementation of the Merdeka Curriculum.



Figure 1. The socialization of the Merdeka Curriculum

Learning Implementation

The implementation of learning in the Merdeka Curriculum is carried out through several important stages involving various teaching methods and media. Based on interviews, observations, and documentation, teachers start the lessons by greeting students, praying together, checking attendance, and providing an overview and motivation before beginning the lesson, in accordance with the Teaching Module.



Figure 2. Learning Implementation: (a) Teacher Opened a Lesson, (b) Students Present Findings

Project-Based Learning (PjBL) and Discovery Learning models are being increasingly adopted by educators to foster a more engaging and explorative learning environment. These models leverage audio-visual learning media, such as PowerPoint slides, videos, and real-life props, to enhance the learning experience (see Figure 3). By incorporating these tools, teachers aim to create a dynamic classroom atmosphere where students can actively engage with the material. Additionally, students are encouraged to explore learning resources beyond traditional textbooks, utilizing digital books, the internet, and platforms like YouTube. This approach not only broadens the scope of learning but also empowers students to take charge of their educational journey, promoting self-directed learning and critical thinking skills.

Despite these advancements, the implementation of differentiated learning within these models remains suboptimal. Differentiated learning is essential for addressing the diverse needs of students, yet teachers have not fully embraced grouping students based on their individual learning requirements. This gap indicates a need for more tailored instructional strategies that cater to varying learning styles and paces. By not grouping students according to their specific needs, opportunities for maximizing each student's potential are missed. To enhance the effectiveness of PjBL and Discovery Learning, educators must

integrate differentiated learning practices, ensuring that all students receive the support and challenges they need to thrive. This would involve assessing students' unique learning profiles and adapting instruction to meet these diverse needs, ultimately fostering a more inclusive and effective learning environment.



(a)



(b)

Figure 3. Learning Media Used: (a) Audio-Visual Media, (b) Real-Life Props

In teaching entrepreneurship, teachers use the Discovery Learning method, which requires reinforcement through hands-on practice (see Figure 4). At the end of the semester, simple entrepreneurial practices are carried out through a Market Day event designed to enhance students' entrepreneurial spirit. Based on the observation of the Market Day on September 8, 2023, it was found that students were selling various snacks and drinks tailored to the tastes of Generation Alpha.



(a)



(b)

Figure 4. Learning Methods: (a) The Market Day as a hands-on entrepreneurial practice, (b) Cooking Entrepreneurship Practice

Furthermore, on May 16, 2024, the entrepreneurship practice showed that the products marketed by students were very diverse and reflected their developing creativity. Overall, the learning process followed the guidelines of the Merdeka Curriculum, although there is still room for further development in the application of differentiated learning and optimization of the teaching models used.

Learning Evaluation

The evaluation of learning in the Merdeka Curriculum implementation is conducted through formative and summative assessments. Based on interviews, observations, and documentation, formative assessments are carried out after completing a topic to assess students' understanding. This reflection process is done through various methods, such as multiple-choice questions, essays, either on paper or via Google Forms. Some teachers also conduct direct evaluations by asking students questions orally. Figure 5 describes how reflection is implemented.



Figure 5. Reflection Activities as Learning Evaluation

Observations conducted on August 7, 14, and 15, 2023, revealed that after completing a topic, teachers conducted reflections in the form of formative assessments. These assessments aim to monitor students' learning progress regularly and improve the learning process if necessary.

Summative assessments are carried out at the end of each semester to evaluate overall learning achievements. With the structured implementation of formative and summative assessments, teachers are able to identify students' learning needs and take relevant corrective actions to enhance the effectiveness of the learning process.

Barriers and Efforts to Overcome Barriers

The barriers to the implementation of the Merdeka Curriculum at vocational high schools include various aspects, ranging from the limited number and competence of teachers to inadequate practical room facilities for Grade X. Based on interviews, observations, and documentation, it was found that specific training for differentiated learning for vocational school teachers has not been implemented, so its application in the classroom is still not optimal (see Figure 6). Some teachers are still trapped in the paradigm of the previous curriculum, which hinders innovation in the learning process.



Figure 6. Practical Room

Moreover, unstable internet signals and the limited number of reference books available for students pose significant challenges. Some productive books for certain subjects are not available in sufficient quantities to be distributed individually to students. Another identified challenge is the lack of students' self-confidence in entrepreneurship practices, such as offering products with inadequate language and passive behavior when managing their stalls. Some students were even seen sitting idly without being actively involved in the buying and selling process. Figure 7 shows practical tools.



(a)



(b)

Figure 7. Practical Tools: (a) Kitchen Tools, (b) Lesson Books

The observation showed that there are only seven practical rooms available, while the actual need for practical space to support learning is far from adequate. The teachers' schedules often clash, indicating a shortage of sufficient human resources. Although efforts to strengthen entrepreneurial learning have begun in Grade X, the development of students' confidence and communication skills still needs to be improved through more intensive and continuous guidance.

Efforts to overcome these barriers in the implementation of the Merdeka Curriculum include several strategic actions. Based on interviews, observations, and documentation, teachers are encouraged to attend relevant training, such as training on School Empowerment and differentiated learning, to improve their competence. In addition, the school proactively invites guest teachers to provide additional material to support students' skills development.

Observations on April 29, 2024, revealed that guest teachers were invited to provide material on excellent service in the industry. In the practical lessons, students also participated in cooking classes focused on pastry and bakery, where they learned to make cookies and *Crombolloni* with guidance from guest teachers who are experts in the field. Figure 8 shows the guest teacher was being demonstrated cooking.



Figure 8. Guest Teachers

To maximize the learning process, group learning methods are implemented so that students can help each other and discuss if they face challenges such as internet access issues. Teachers also actively provide encouragement and motivation to students who lack confidence, are shy, or are reluctant to participate in the entrepreneurial practices. With these measures, the implementation of the Merdeka Curriculum is expected to run more effectively and provide a more meaningful learning experience for the students.

DISCUSSION

Learning Planning

In the Basic Culinary Skills course at SMK Negeri 4 Yogyakarta, Grade X Phase E, there are 6 elements in the Learning Achievements. Based on discussions and the needs of the students, the teachers refined these into 4 key elements: Basic Culinary Skills, Sanitation and Hygiene, Food Material Knowledge, and Entrepreneurship. Basic Culinary Skills and Food Material Knowledge cover the element of Comprehensive Basic Practice; Sanitation and Hygiene includes elements of Cleanliness, Health, Safety, and Environmental Sustainability; Entrepreneurship includes elements such as the Culinary Business Process, Global Culinary Development and Technological Advances in the Culinary Field, Foodpreneurs and Job Profiles in the culinary industry; and Excellent Service in the industry.

Learning Implementation

Based on the research findings through interviews, observations, and documentation, it was found that teachers begin lessons with greetings, group prayers, and attendance checks, and provide a perception and motivation as an introduction before starting the lesson. These initial steps follow the guidelines outlined in the Teaching Modules prepared by the teachers. This can be aligned with the theory of (Rusmaini, 2019) that opening activities aim to create a mentally ready and attentive atmosphere for students, as well as to build student motivation so they become more enthusiastic and engaged in the lesson. Therefore, these initial activities involve not only greetings and attendance checks but also motivation and a perception.

Based on research findings through interviews, observations, and documentation, teachers deliver material using teaching models, media, and learning resources tailored to the needs of the students. According to the diagnostic test results, students prefer audio-visual media, so teachers predominantly use PowerPoint presentations and show videos, along with direct media tools. The teaching model is adjusted to student-centered learning, where the teacher acts as a facilitator to improve students' independence, understanding, and responsibility. Thus, the Project-Based Learning (PjBL) and Discovery Learning models are used, and for learning resources, teachers use government-issued modules as references while giving students the freedom to explore materials from various sources such as digital books, the internet, and YouTube. Project-Based Learning and Discovery Learning are examples of constructivist learning approaches.

This aligns with the Constructivist Learning Theory, which is a process of constructing knowledge through abstracting experiences as a result of students' interactions with real-life contexts, whether personal, natural, or social (Wahab & Rosnawati, 2021). According to (Masgumelar, 2021), constructivism is closely related to the Discovery Learning model because it gives students the freedom to build their own knowledge through a learning model designed by the teacher. Meanwhile, according to (Arsya & Fahira, 2021), Discovery Learning is a teaching model that emphasizes the process of independently and actively understanding a concept, where the teacher acts as a supervisor. On the other hand, Project-Based Learning is a constructivist model based on projects that present real-life problems to students, enabling them to generate permanent knowledge.

The teaching media used include visual media, such as LCDs, PowerPoint slides, and audio-visual media, like videos. This aligns with Faisal Anwar's statement that using visual media in teaching helps students easily understand the material presented by the teacher as the visual media facilitator (Anwar et al., 2022). Visual media presents learning content through displays such as OHP, LCD projectors, and slides,

while audio-visual media reinforces the information that students receive because they not only hear but also see, strengthening their understanding (Anwar, et al. 2022).

Based on research findings through interviews, observations, and documentation, the application of entrepreneurship elements in the curriculum has led to increased entrepreneurial spirit among students, as well as greater innovation and creativity in their work. This is in line with the findings in the journal "Analysis of Factors Affecting Entrepreneurial Attitude" (Rukmana, 2018), which identified six factors influencing entrepreneurship: self-efficacy, persistence, independence, creativity, decision-making ability, and entrepreneurial education.

Learning Evaluation

Based on the research findings, the evaluation process is carried out using formative assessments through observation during the discussion and presentation process. This allows teachers to assess how well students can provide solutions to the given problems. In addition, teachers evaluate students' ability to process a product, calculate food costs, determine raw material prices, selling prices, profits, and any losses. Furthermore, teachers use objective tests at the end of each lesson. These objective tests consist of multiple-choice questions, short answers, and essays to assess understanding of the material. This aligns with Anindito Aditomo's theory that assessment is an inseparable part of the learning process and is crucial as input for lesson planning in the classroom, including diagnostic assessments, formative assessments, and summative assessments (Aditimo, 2024).

Barriers

Every policy faces challenges in its implementation, including the implementation of the Merdeka Curriculum. According to (Astini, 2022), the challenges faced by the Merdeka Curriculum include: "Education must take advantage of innovations like Artificial Intelligence, Internet of Things (IoT), Virtual/Augmented Reality in education, and Big Data; Educators or teachers must be proficient in transferring learning material and inspire students to think creatively and critically; Education leaders must be competent." Based on data, the barriers identified include insufficient training, as Basic Culinary Skills teachers have only received socialization and guidance from the school regarding how to implement the Merdeka Curriculum. Additionally, the number and competence of teachers are still inadequate, requiring them to understand and apply differentiated learning. The facilities for Grade X practical rooms are also limited, as the kitchen facilities are prioritized for Grades XI and XII, leaving Grade X to wait for the upper classes to finish their practical sessions. Moreover, the issue of internet signal instability needs attention.

The implementation of differentiated learning has not been optimal. Differentiation itself means grouping students based on their abilities, such as grouping students who are skilled, somewhat skilled, or not skilled (Kemendikbudristek, 2022). This requires time for adjustment, making it difficult for teachers to implement it effectively. Additionally, there is resistance to change from the previous curriculum to the Merdeka Curriculum mindset. Furthermore, some students lack confidence and are reluctant to promote the products they are selling. This is problematic since self-confidence and persistence are key factors in entrepreneurial attitudes, as discussed in the journal "Analysis of Factors Affecting Entrepreneurial Attitude" by (Rukmana, 2018).

Efforts

In an educational unit like a Vocational High School, changes are necessary to address the challenges faced, including the implementation of the Merdeka Curriculum. As mentioned by (Astini, 2022) "Educators

or teachers should minimize their role as the sole provider of learning material (the center of learning); Teachers should become tutors, facilitators, and inspirers, true learners who motivate students, creating a "Free Learning" environment; Teachers must be skilled in presenting learning material and inspire creativity in students." One solution proposed is to encourage teachers to participate in training outside of school. By attending training, teachers will broaden their knowledge and better understand how to implement the Merdeka Curriculum, including how to apply differentiated learning.

Teachers also collaborate within their fields to foster creativity. Additionally, efforts have been made to invite guest teachers to address the shortage of kitchen facilities and create study groups in the classroom so students can discuss the material and address challenges such as internet signal issues and limited books. To shift the mindset from the old curriculum to the new one, teachers have begun implementing project-based learning, placing the focus on the students themselves.

These findings highlight the importance of developing teachers' capacities through continuous training so they can implement the learning models in line with the Merdeka Curriculum guidelines. Activities such as thematic training and inviting guest teachers can enrich teachers' skills in designing interactive learning that meets the needs of the culinary industry (Astini, 2022). The practical implication of these findings is the need for educational policies that support intensive training programs and the provision of adequate practical facilities. These recommendations are relevant for policymakers and educational institutions aiming to improve the effectiveness of implementing the Merdeka Curriculum in vocational schools throughout Indonesia.

CONCLUSION

The implementation of the Merdeka Curriculum in the Basic Culinary Skills course at SMK Negeri 4 Yogyakarta has been carried out effectively. Teachers have planned the lessons by understanding the Learning Outcomes, formulating Learning Objectives, designing the Learning Pathway, and planning Learning and Assessment. The lessons are delivered by providing a perception and motivation, using Project-Based Learning (PjBL) and Discovery Learning models, as well as audio-visual media. The entrepreneurship elements applied have fostered the entrepreneurial spirit and creativity of the students. Evaluation is carried out through formative test reflections.

Barriers to the implementation of the Merdeka Curriculum in the Basic Culinary Skills course at SMK Negeri 4 Yogyakarta include teachers not participating enough in training, insufficient teacher numbers and competencies, teachers not yet attending training, unoptimized differentiated learning, and the need for mindset adaptation. In addition, the school infrastructure still lacks sufficient kitchen facilities for practical sessions, and the internet signal is inadequate to support the learning process. Furthermore, students' self-confidence, independence, and persistence in entrepreneurship need further strengthening.

Efforts to overcome the barriers in implementing the Merdeka Curriculum in the Basic Culinary Skills course at SMK Negeri 4 Yogyakarta include continuously encouraging teachers to attend training, fostering coordination among teachers to enhance creativity in creating active classroom learning. Inviting guest teachers helps address the limited space and teacher competencies, and teachers should provide stronger support to students to increase their self-confidence, independence, and persistence in entrepreneurship. The practical implications of this research include the need for enhanced policy support for the provision of continuous training and adequate practical facilities. Recommendations for future research include further exploration of the impact of differentiated learning on students' technical skills and entrepreneurship at vocational schools.

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Gastronomic Exploration of Kalasan Fried Chicken in the Local Culinary Culture of Yogyakarta

Angela Auralia Krisna *, Marwanti 

Study Program of Culinary Technology Education, Universitas Negeri Yogyakarta, Indonesia

*Corresponding Author. E-mail: angelaauralia.2020@student.uny.ac.id

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ABSTRACT

This study explores the gastronomy of Kalasan fried chicken at the Kalasan Fried Chicken Industrial Center in Dusun Bendan, Tirtomartani Village, Kalasan Subdistrict, Sleman Regency, Yogyakarta, Indonesia. The research investigates the industrial center's profile, serving as a platform for Kalasan fried chicken producers, and explores the gastronomy of Kalasan fried chicken through its history, cultural significance, geographical context, processing techniques, product variations, and marketing strategies. Employing a qualitative methodology with an ethnographic approach, data were collected through observation, interviews, and documentation from three informants: the head of the association and two Kalasan fried chicken producers. Triangulation was used to ensure data validity. The findings reveal that the Kalasan Fried Chicken Industrial Center, established in 2016, comprises 40 active members. The historical analysis traces the dish's origins to Mbok Berek's business, with its cultural significance primarily as a popular dish rather than a ceremonial one. The geographical context includes three poultry slaughterhouses (RPAs) supporting efficient production. Traditional processing techniques maintain authenticity, while product variations cater to consumer preferences. Producers leverage technological advancements for marketing and sales expansion. The study concludes that the Kalasan Fried Chicken Industrial Center not only promotes a rich culinary heritage but also fosters growth within the culinary industry in Yogyakarta.

Keywords: Culinary, gastronomy, industrial center, Kalasan fried chicken, Yogyakarta

INTRODUCTION

Food holds a broad and significant meaning and is essential for living beings. Food systems and cultures emerge from the interaction of spatial aspects and food availability, distribution, access, and consumption patterns (Wachyuni, 2023). The expressions "we are what we eat" and "we are what we don't eat" imply that food can form part of our identity. It can also be understood that food serves as an identity in culture or even more broadly as a national identity. According to UNESCO data (2016), the reading interest of the Indonesian population is very low, only 0.001%. This means that out of 1,000 Indonesians, only 1 person regularly reads. Indonesia ranks 60th out of 61 countries in terms of reading interest. Ambarwati (2019) argues that low food literacy can lead to a nation's identity crisis. In Indonesia, the general literacy level is still low, including in the food sector, which could result in Indonesia losing its culinary identity.

Indonesia is a vast archipelago with diverse cultures in each region. The Special Region of Yogyakarta is a province in Indonesia known for its rich culture and unique culinary variety. The people of Yogyakarta

maintain their continuously evolving traditions and culture, particularly culinary culture (Gardjito et al., 2017). This is evidenced by the many traditional foods that retain their authenticity despite numerous innovations and developments in the culinary field. There is a need for further documentation of Yogyakarta's culinary heritage to explain its connection to the culture of the people from past to present (Gardjito et al., 2017).

Kalasan Fried Chicken is a distinctive dish made from broiler chicken, red chicken, or free-range chicken, fried and served with crispy bits. The hallmark of the fried chicken produced by the Kalasan Fried Chicken Industrial Center is the crispy bits made from tapioca flour, with the fried chicken presented in an open form. There are many producers in the Industrial Center in Dusun Bendan, most of whom have inherited the business from their grandparents (Nursubiyantoro, 2019). The Kalasan Fried Chicken Industrial Center is not widely known, and people are unaware of the origins of Kalasan Fried Chicken. Research by Mustikasari et al. (2020) indicates that the Kalasan Fried Chicken Industrial Center Group faces challenges in marketing knowledge, attractive packaging, and the limited role of social media in sales and product introduction.

This issue highlights the need for a comprehensive exploration of Kalasan Fried Chicken gastronomy. A general solution offered is to document and analyze Kalasan Fried Chicken from various aspects, including history, culture, geographical landscape, processing and presentation techniques, product variations, and marketing strategies. This research is expected to provide a deeper understanding of Kalasan Fried Chicken and its role in Yogyakarta's culinary culture.

Food and food-related activities encompass many aspects, such as types of food, food origins, food preparation, cooking techniques, and food presentation (Wachyuni, 2023). These important aspects are often not understood by the public, who only recognize Kalasan Fried Chicken organoleptically. However, the origins of Kalasan Fried Chicken can serve as important history and identity. The aspects described above can be studied through a discipline known as gastronomy.

Gastronomy is the study of food and its culture in the context of delicious dining (Winarno, 2017). This definition explains that gastronomy plays an important role in establishing Kalasan Fried Chicken as a cultural identity. The culture and traditional foods of Indonesia are treasures that must be preserved. Gastronomic studies generally encompass four main elements: history, culture, geographical landscape, and cooking methods (Ketaren, 2017). Besides representing culture, gastronomy can be of national interest because it can define cultural identity and become a tourist attraction. By 2030, the Ministry of Tourism aims for 35% of international tourists to visit Indonesia for gastronomic tourism.

Exploration is the activity of seeking information about a situation to reveal new knowledge. Exploration is highly beneficial if its results are well-documented. Many of Indonesia's culinary riches and diversity have not been polished and officially recorded (Ketaren, 2021). This needs to be addressed in research discussing the gastronomic exploration of Kalasan Fried Chicken so that consumers and the public fully understand it. Based on this description, research on the "Gastronomic Exploration of Kalasan Fried Chicken in the Local Culinary Culture of the DIY Province" is important to document Indonesia's traditional foods to prevent them from being lost.

Gastronomic exploration of chicken dishes, as studied in various research, includes aspects of culinary tradition, culinary tourism development, and cultural influences in processing and presentation (Putri et al., 2017; Rahimah et al., 2022; Shelinna, 2023). Chicken dishes are viewed not only as food ingredients but also as symbols of cultural richness and culinary tradition. These studies show the great potential of chicken dishes to attract tourists and promote local culture, as well as their contribution to economic growth.

Moreover, gastronomic exploration also considers aspects of innovation and health. Research shows good acceptance of roasted chicken recipes with healthy ingredients for consumers at risk of diabetes

(Hollis-Hansen, 2023). Innovations in presentation, utilizing technology and computational methods, can enhance the appeal of chicken dishes in the global market (Shukla & Ailawadi, 2019; Ahn et al., 2011). Using ingredients with harmonious flavor compounds can create a more satisfying culinary experience.

Thus, a comprehensive gastronomic approach that integrates aspects of history, culture, geography, processing techniques, innovation, and marketing is the right solution to explore Kalasan Fried Chicken and its role in Yogyakarta's culinary culture.

The research gap is evident from the lack of comprehensive documentation on the history, culture, and processing techniques of Kalasan Fried Chicken. Previous studies have focused more on marketing aspects and the challenges faced by industrial centers (Mustikasari et al., 2020) without delving deeper into the broader gastronomic aspects. Therefore, this research aims to fill this gap by conducting a comprehensive gastronomic exploration of Kalasan Fried Chicken.

PURPOSE OF THE STUDY

The objective of this study is to understand the profile of the Kalasan Fried Chicken Industrial Center in Dusun Bendan and to conduct a gastronomic exploration of Kalasan Fried Chicken by examining aspects such as history, culture, geographical landscape, processing and presentation techniques, product variations, and marketing. The novelty of this research lies in the comprehensive gastronomic approach to Kalasan Fried Chicken, which has not been done before. This research is expected to contribute to the preservation and development of Yogyakarta's traditional culinary heritage.

The scope of this research includes the Kalasan Fried Chicken Industrial Center in Dusun Bendan, Yogyakarta. The analysis will focus on the Kalasan Fried Chicken produced by this industrial center. Data will be collected through observation, interviews, and documentation studies. The research findings are expected to provide valuable information for product development, marketing, and the preservation of Kalasan Fried Chicken as a cultural culinary heritage of Yogyakarta.

METHOD

The study employed a qualitative methodology with an ethnographic approach (Creswell, 2014). Data collection involved observations of the production process, structured interviews with three informants (one head of the association and two producers), and documentation of relevant materials. The informants were selected using purposive and snowball sampling techniques (Mulyatiningsih, 2023). Data analysis utilized triangulation to ensure validity, comparing information from interviews, observations, and documents (Mulyatiningsih, 2023). No specific equations were used to obtain data, as the study focused on qualitative aspects of the production process.

The parameters assessed included the profile of the Kalasan Fried Chicken Industrial Center, the historical and cultural aspects of the dish, the geographical landscape influencing production, the processing techniques employed, product variations, and marketing strategies. The study explored these parameters through direct observation of the production process, interviews with key informants, and analysis of relevant documents. The focus was on understanding the qualitative aspects of the Kalasan Fried Chicken production and its cultural context (Ketaren, 2017).

Data collection techniques are a necessary process in research and are an important part. The data collection techniques used in this study include three methods: observation, interviews, and documentation (Sahir, 2021). Qualitative data analysis involves three stages: data reduction, data presentation, and drawing conclusions or verification. This is necessary to ensure that qualitative research does not become too broad (Sahir, 2021).

The technique used for data validity is triangulation. Triangulation involves collecting data from different sources to verify the truth and uncover deeper information. If the information obtained from interviews, observations, documents, and interviews with other data sources is consistent, then the information is considered accurate and reliable (Mulyatiningsih, 2023).

FINDINGS

Profile of the Kalasan Fried Chicken Industrial Center

Dusun Bendan is a hamlet located in Tirtomartani Village, Kalasan Subdistrict. According to the official website of Tirtomartani Village, Dusun Bendan consists of 10 RT (neighborhood units) and 437 households, with a total of 1,261 residents living in Dusun Bendan. The hamlet has potential in the culinary field as well as tourist attractions, including Candisari Temple, Sendang Ayu, and An-Nurumi Mosque, which is known for its unique and colorful architecture.

The Kalasan Fried Chicken Industrial Center is located at Jl. Raya Solo-Jogja km 14, Dusun Bendan, Tirtomartani Village, Kalasan Subdistrict, Sleman Regency, D.I. Yogyakarta. The association is chaired by Mr. Ibnu Nugroho and is named the Kalasan Fried Chicken Industrial Center Maju Makmur Association. Currently, the Kalasan Fried Chicken Industrial Center has 40 active members who produce fried chicken. It is known that 35 Kalasan fried chicken owners are women, while the remaining 5 are men. There are no geographical restrictions for association members in the Kalasan Fried Chicken Industrial Center.

The Maju Makmur Association of the Kalasan Fried Chicken Industrial Center is non-coercive and open to Kalasan fried chicken producers. The association does not have specific regulations such as price setting, product variation, or marketing, allowing members to freely determine their prices, product variations, and market segmentation. The election system for the chairman is also not formally and definitively regulated.

The association was formed together in 2011 and was officially recognized by the Regent of Sleman as the Kalasan Fried Chicken Industrial Center in 2016. Government recognition has impacted the association, as it allows the government to provide assistance and facilities channeled through the association to ensure that aid and facilities are well-distributed to Kalasan fried chicken producers within the association.

Most of the association's current members have inherited the business from their parents, indicating that Kalasan fried chicken has been around for a long time and holds many stories. The recipe passed down through generations is preserved and maintained for its authenticity to this day. Current technological developments have not significantly affected the production process of Kalasan fried chicken at the Kalasan Fried Chicken Industrial Center. Although recipes can be modified to suit tastes, many still retain the traditional recipes passed down through generations.

Gastronomy of Kalasan Fried Chicken

Historically, Kalasan fried chicken was a dish created by Nini Ronodikromo, who was called Mbok Berek by the locals because she had a child who often cried, or "berek-berek" in Javanese. She attempted to create a fried chicken recipe and started selling it, which became well-known and popular, leading her to employ residents of Dusun Bendan to help sell it. Later, Mbok Berek's employees, including Mrs. Suharti, began selling their own fried chicken, leading to success that continues to this day. It was named Kalasan fried chicken because it originated in Dusun Bendan, Kalasan. Today, Dusun Bendan has been recognized as the Kalasan Fried Chicken Industrial Center, consisting of more than 40 fried chicken producers.

Culturally, Kalasan fried chicken does not have cultural elements in its form or preparation. It is a dish made and intended as a daily side dish without symbolic meaning in traditional ceremonies or local

traditions. Kalasan fried chicken entrepreneurs in the Dusun Bendan Industrial Center can still accept orders for ayam ingkung (whole chicken) for traditional ceremonies. The production process, from cutting to serving the chicken, still follows the same flow and methods to maintain authenticity. This long-standing process continues to be practiced today as a cultural habit.

Geographically, Kalasan Fried Chicken is a center that sells exclusively Kalasan fried chicken and its accompaniments, such as crispy bits and sambal (chili sauce). No other standout products exist besides Kalasan fried chicken. The industrial center's location is equipped with facilities necessary for producers to produce Kalasan fried chicken, such as a chicken slaughterhouse (RPA) and shops selling various spices and vegetables. The center focuses on selling cooked Kalasan fried chicken, so there are no chicken farms in Dusun Bendan. There is no division of trade areas, as all producers have their market segmentation, allowing them to freely sell their products. There are also newcomers who sell, but they have a history of being residents of Dusun Bendan or have relatives who are Kalasan fried chicken entrepreneurs in Dusun Bendan.

Regarding processing techniques, obtaining raw materials for making Kalasan fried chicken, sambal, and crispy bits poses no challenges, as everything is easily accessible. The processing of Kalasan fried chicken is still done traditionally, preserving its authentic taste. There are slight differences in processing techniques for each type of chicken: broiler chickens are cooked using gas stoves, while laying hens and free-range chickens are cooked using firewood due to differences in chicken texture. Packaging now uses cardboard with complete and attractive labels. Table 1-Table 4 describes the ingredients and steps for making Kalasan fried chicken, sambal, and crispy bits. Figure 1 shows the result of Kalasan Fried Chicken.

Table 1. Ingredients for Kalasan Fried Chicken & Crispy Bits

No.	Ingredient
Kalasan Fried Chicken	Salt, garlic, flavor enhancer
Crispy Bits	Chicken broth, eggs

Table 2. Ingredients for Chili Sauce

Producent	Ingredients
AG Mbak Yanti/Ita	Red chili, tomato, a bit of shrimp paste, shallots, garlic
AG Pandoyo-Endah	Red/green chili, shallots, garlic
AG Ibu Sri Heryani	Red chili, a bit of tomato, shrimp paste, shallots, garlic

Table 3. Steps for Making Kalasan Fried Chicken

No.	Steps
1	Wash and clean the broiler chicken after receiving it from the supplier.
2	Arrange the cleaned chicken, with giblets such as gizzards and feet placed at the bottom.
3	After the feet and giblets, stack the chicken pieces on top.
4	Prepare the marinade seasoning (garlic, salt, flavor enhancer).
5	Add the ground seasoning into the pot with the arranged chicken.
6	Add a bit of chicken broth to the marinade mixture.
7	Add clean water until the chicken is completely submerged.
8	Cover the pot with a weight on top, then boil for 30 minutes, let it sit, and drain.
9	Before frying, coat the chicken with a thin layer of flour batter to ensure it is beautifully colored and crispy.*
10	Fry until cooked and golden brown.
11	Drain the chicken to separate the oil.
12	The chicken is ready to be served.

Table 4. Steps for Making Crispy Bits

No	Step
1	Mix all the ingredients into the batter bowl.
2	Stir the batter until well combined.
3	Heat the oil until very hot.
4	Before frying, keep stirring the batter to ensure the flour is mixed and doesn't settle.
5	When the oil is very hot, pour the batter little by little.
6	When the crispy bits turn golden brown, remove and drain.



Figure 1. Shape of Kalasan Fried Chicken

Product Variations

The product variations available from Kalasan fried chicken producers at the Kalasan Fried Chicken Industrial Center are quite similar to one another. Generally, the main product is fried chicken with options for broiler, laying, and free-range chickens. Besides different chicken types, there are several variations in chicken dishes, including grilled, *bacem* (sweet soy sauce), sweet fried, *ingkung areh* (whole chicken), etc. However, only a small number of producers offer these products daily. Most producers only provide Kalasan fried chicken as a staple product, but they can still accept orders for other types of chicken dishes, provided that consumers place their orders in advance (not available daily).

The prices offered by each producer vary, as each has its market segmentation. The general price range is between Rp80,000 and Rp110,000, depending on the type of chicken chosen. The majority of Kalasan fried chicken producers offer whole chicken orders, customized chicken, and boxed rice meals.

Marketing

Kalasan fried chicken producers have their respective markets for selling their products. Some producers already have stalls in markets across DIY and Central Java because, before the advent of online sales applications, they sold their products in the DIY-JATENG market area.

Currently, the development of communication technology has facilitated interactions between producers and consumers. Online sales applications provide benefits and convenience in selling and purchasing culinary products. Additionally, social media offers ease for producers in promoting their products, making them more accessible to a wider range of consumers.

FINDINGS

This study reveals the profile of the Kalasan Fried Chicken Industrial Center in Dusun Bendan, which consists of 40 active members and is led by Mr. Ibnu Nugroho. Unlike Nursubiyantoro's (2019) findings, which focused on the development of oil-draining technology, this study provides a more comprehensive overview of this industrial center, including social, economic, and cultural aspects. Nursubiyantoro's (2019) research only highlighted production aspects, while this study covers broader gastronomic aspects, including history, culture, geographical landscape, processing techniques, product variations, and marketing. The strength of this research lies in the thorough exploration of the gastronomic aspects of Kalasan Fried Chicken, which has not been deeply discussed in previous literature, as highlighted by Gardjito et al. (2017), who only emphasized the need for documentation of Yogyakarta's culinary heritage.

Mustikasari et al.'s (2020) research discussed marketing and packaging strategies, but this study provides a more detailed analysis of the marketing practices carried out by producers, including the use of social media and online platforms. Although Hasnah et al. (2021) and Riyadi et al. (2023) discussed Yogyakarta's culinary gastronomy, this study focuses more specifically on Kalasan Fried Chicken, providing a deeper understanding of the history, culture, and production practices of this local culinary dish. This study also significantly contributes to the understanding of Indonesian gastronomy, as discussed by Ketaren (2017, 2021), by emphasizing the uniqueness and distinctiveness of Kalasan Fried Chicken in the context of Yogyakarta's local culture. Unlike previous studies that may have focused on one or two aspects, this research integrates various aspects to provide a holistic view of Kalasan Fried Chicken.

The findings of this study have significant scientific and practical implications. Scientifically, this research enriches the body of knowledge on Indonesian gastronomy, particularly Yogyakarta's culinary heritage. This study contributes to a more comprehensive understanding of Kalasan Fried Chicken, not only as a culinary product but also as an integral part of the culture and history of Dusun Bendan. The findings can serve as a reference for future research that aims to delve deeper into specific aspects of Kalasan Fried Chicken, such as the economic analysis of the industrial center or studies on the impact of technology on the preservation of traditional culinary practices. This research also provides empirical evidence on the importance of documenting traditional culinary practices, as suggested by Umar et al. (2017) and Gardjito et al. (2017), to prevent the loss of Indonesia's culinary heritage.

Practically, the findings of this study can be utilized by various parties. For Kalasan Fried Chicken producers, this research can offer insights into effective and efficient marketing strategies, including the use of social media and online platforms. This study can also help producers improve product quality and packaging while maintaining the authenticity of traditional flavors and processing techniques. For local governments, this research can serve as a basis for formulating policies to support the development of culinary industrial centers and the preservation of local culinary heritage. This study can also be used as promotional material for Yogyakarta's culinary tourism, particularly Kalasan Fried Chicken, to attract both domestic and international tourists. For the general public, this research can enhance appreciation for

Indonesia's culinary richness and the importance of preserving culinary heritage. By understanding the history, culture, and production process of Kalasan Fried Chicken, the public can better appreciate the values contained within and support the sustainability of this traditional culinary business. In conclusion, this study provides valuable contributions both scientifically and practically, supporting the preservation of Indonesia's culinary heritage and local economic development.

CONCLUSION

This study explored the gastronomy of Kalasan fried chicken within the local culinary culture of Yogyakarta's DIY Province. The research revealed that the Kalasan Fried Chicken Industrial Center in Dusun Bendan, established in 2011 and officially recognized in 2016, serves as a collaborative hub for 40 active producers. While lacking formal regulations, the association facilitates government training and support, empowering producers to independently determine pricing, marketing strategies, and menu variations. The historical analysis traced the dish's origins to Mbok Berek, whose recipe and methods have been passed down through generations. While not intrinsically linked to traditional ceremonies, Kalasan fried chicken holds a significant place in local cuisine. The study also highlighted the evolution of production methods, from traditional techniques to the incorporation of modern technologies like freezers and blenders, while maintaining the dish's authenticity. Finally, the research demonstrated the diverse marketing strategies employed by producers, ranging from traditional market stalls to online platforms, showcasing the adaptability of this culinary tradition in the face of technological advancements. Future research could focus on formalizing the association's structure and exploring further innovations while preserving the authenticity of this cherished culinary heritage.

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Consumer Decision-Making in Halal Product Purchases at Bakpia Pathok 25 Based on the Theory of Planned Behavior
Luthfiyyah Ariana, Nani Ratnaningsih

Exploring Students' Knowledge and Interest in Food Styling and Photography within Culinary Arts Programs at Vocational Colleges
Aina Afifah binti Azali, Zahidah Ab-Latif, Elia Md Zain

Creation of E-Magazine Learning Resource for Pastry and Bakery Products Courses Focused on Low-Calorie Diets
Intan Diah Kusuma, Mutiara Nugraheni

Innovative Foods with Red Bean Flour: A Sensory and Economic Analysis
Nur Aulia Wijayanti

TikTok-Integrated Video Educational Resources on Basic Food Processing Techniques for Grade X Culinary Vocational High School Students
Ristya Candyka Alfiolita, Sutriyati Purwanti

The Correlation Among Knowledge, Attitude, and Instant Food and Beverage Consumption Patterns on the Nutritional Status of Culinary Students
Nafiah Adhuha Ramadhani, Titin Hera Widi Handayani

The Connection Between Knowledge and Skills in the Cookie Domain within Pastry and Bakery Programs
Latifah Nurul Qomarotul Nikamh, Rizqie Auliana

SWOT Analysis of the Marketing Strategy for Empon-Empon Products by the Mekar Women's Farming Group
Mawar Berliana Sari, Minta Harsana

Realization of the Merdeka Curriculum in Culinary Fundamentals Education for Grade X at Vocational High School
Namira Nursaffana Maharrifqa, Fitri Rahmawati

Gastronomic Exploration of Kalasan Fried Chicken in the Local Culinary Culture of Yogyakarta
Angela Auralia Krisna, Marwanti

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