
Sanitation and Hygiene Practices of Culinary Entrepreneurs in Tourist Villages During the New Normal Era

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ABSTRACT

This study investigates the implementation of hygiene and sanitation practices by culinary entrepreneurs in Mulo Tourism Village, focusing on food, equipment, personal, and environmental hygiene. It also explores tourist perceptions of these practices. Utilizing a mixed-methods approach with a case study design, data were gathered through observation, interviews, documentation, and questionnaires. The study involved Mulo Tourism Village managers, culinary entrepreneurs, and 100 tourists or consumers sampled from a population covering 2020 to 2022. The findings reveal that while food hygiene practices are generally well-implemented, some standards are not met, such as leaving food uncovered. Equipment hygiene is compromised due to the use of damaged tools, and personal hygiene is insufficient as some entrepreneurs neglect mask-wearing and proper attire. Environmental hygiene meets standards given the available facilities. Notably, 55% of respondents rate the overall hygiene and sanitation practices as moderate. These findings highlight areas needing improvement to enhance food safety and tourist satisfaction in Mulo Tourism Village.

Keywords: Hygiene and sanitation implementation, tourism village, culinary entrepreneurs

INTRODUCTION

The COVID-19 pandemic, originating in Wuhan, China in late 2019, rapidly escalated into a global health crisis. On January 30, 2020, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern. By March 2020, Indonesia had reported its first cases, and by May 2021, confirmed cases exceeded 1.7 million. The Indonesian government responded with stringent measures, including Large-Scale Social Restrictions, significantly affecting various sectors, particularly tourism. The tourism sector, including culinary businesses, faced substantial financial setbacks due to reduced activities and temporary closures.

The economic downturn was stark, with a survey indicating that culinary entrepreneurs experienced the most significant revenue declines, contributing to a 5.32% contraction in the second quarter of 2020. In

response, the government introduced health protocols under the new normal era to resume economic activities while preventing virus transmission. A notable initiative was Minister of Health Decree HK.01.07/Menkes/382/2020, which mandated health protocols for public places, including physical distancing, mask-wearing, and personal hygiene. Mulo Tourism Village in Gunungkidul, Yogyakarta, known for attractions like Goa Ngingrong and a tourism market, faced the challenge of adhering to these guidelines while reopening.

Despite its strategic location and facilities, Mulo Tourism Village's culinary sector faces the critical challenge of implementing strict hygiene and sanitation practices to prevent COVID-19 transmission. Ensuring proper hygiene is essential for maintaining food quality and consumer safety. However, inadequate adherence to these practices among culinary entrepreneurs could result in new COVID-19 clusters, posing a significant public health risk.

To address this issue, the government and various organizations have emphasized the importance of promoting hygiene and sanitation among culinary MSMEs (Alexandra, 2023). The implementation of health protocols and community outreach initiatives are vital steps towards achieving these goals. This study aims to fill the gap in understanding the actual implementation of hygiene and sanitation practices among culinary entrepreneurs in Mulo Tourism Village.

Training programs have proven essential in educating communities on hygiene, sanitation, and work safety practices related to culinary activities (Juniari & Pranadewi, 2021). These programs offer insights into hospitality, hygiene, and sanitation, providing individuals with the knowledge and skills necessary to maintain high standards of cleanliness in their culinary ventures. Such educational initiatives are crucial for ensuring that culinary entrepreneurs are well-equipped to adhere to health protocols.

Research emphasizes the significance of hygiene and sanitation in culinary tourism destinations. Culinary tourism contributes to the local economy and requires a focus on hygiene, sanitation, and hospitality to ensure a positive visitor experience (Antara, 2022). Restaurant owners must prioritize cleanliness and sanitation practices to enhance the dining experience and promote sustainable tourism development.

Additionally, studies on women empowerment in culinary enterprises underscore the role of training, coaching, and empowerment in standardizing culinary practices, including hygiene and sanitation protocols (Salain, 2024). Empowerment efforts are vital for ensuring food quality and safety in culinary establishments, particularly in tourist villages. These findings highlight the need for comprehensive training and support for culinary entrepreneurs to improve hygiene standards and promote sustainable tourism.

Research on food hygiene and sanitation practices among culinary MSMEs indicates a significant variation in adherence to standards. While some entrepreneurs follow strict protocols, others lack the necessary knowledge or resources to implement effective practices (Firdani, 2022). Factors such as personal hygiene, equipment sanitation, and environmental cleanliness are critical but often inadequately addressed (Rahman et al., 2018).

In Mulo Tourism Village, the challenge is compounded by the need to balance traditional culinary practices with modern health protocols. Studies have shown that training and community outreach can significantly improve hygiene practices among culinary entrepreneurs (Jores et al., 2018). However, there is a lack of specific data on the effectiveness of these interventions in the context of tourist villages during the new normal era.

By addressing these aspects, this research contributes to the existing body of knowledge on hygiene and sanitation practices in the tourism sector, particularly in the context of the COVID-19 pandemic. The findings will inform policy-making and the development of targeted interventions to enhance hygiene standards among culinary entrepreneurs, ultimately promoting safer and more sustainable tourism practices.

PURPOSE OF THE STUDY

The study aims to assess (1) food hygiene, (2) equipment hygiene, (3) personal hygiene, (4) environmental hygiene, and (5) tourist perceptions of these practices. This research provides critical insights for improving hygiene standards, ensuring public health, and supporting the sustainable reopening of tourist destinations during the pandemic.

METHOD

This study employs a mixed-methods approach with a case study design. Mixed methods involve the simultaneous use of both qualitative and quantitative research methods (Sugiyono, 2011). A case study is a detailed and systematic data collection process about individuals, events, or social settings using various methods, techniques, and sources to effectively understand how these elements function within their context (Arikunto, 2010). This research uses an embedded design in mixed methods, where one set of data supports the other by integrating different data sets (Arikunto, 2010). The research was conducted from November 2021 to November 2023 in Mulo Tourism Village, Mulo Village/Kelurahan, Wonosari District, Gunungkidul Regency, Yogyakarta Special Region.

Participants

The subjects of this research include the managers of Mulo Tourism Village as key instruments, culinary entrepreneurs as primary instruments, and the Tourism Office as a supporting instrument. The population of this research comprises consumers or tourists of Mulo Tourism Village. The research uses purposive sampling, selecting participants who have visited Mulo Tourism Village, particularly the Tourism Market area, during the pandemic from 2020 to 2022. The sample size was calculated using the Lemeshow formula, resulting in 100 samples.

Data Collection and Analysis

The research utilizes interviews, observations, documentation, and questionnaires for data collection. The instruments include interview guides, observation guides, documentation guides, and digital questionnaires. The study describes data obtained from interviews, observations, and documentation, as well as the results of the questionnaire analysis. Qualitative data from interviews, observations, and documentation will be analyzed using data reduction to simplify the findings by extracting the essence of the data until conclusions are drawn. Data display involves presenting data using tables, graphs, or charts for clear visibility, followed by drawing conclusions from the available data (Sugiyono, 2018) and describing them descriptively.

Quantitative data analysis using descriptive statistics provides an overview of the data in terms of mean, minimum, maximum, and standard deviation (Ghozali, 2018). Data processing includes calculating the mean and standard deviation using Microsoft Excel 2010 and then categorizing the results. The categories used are low, medium, and high, based on a three-tier scale.

FINDINGS AND DISCUSSION

Food Hygiene and Sanitation Practices of Culinary Entrepreneurs in Mulo Tourism Village Market

The data shows that the raw food materials used are fresh and of good quality. Dry and wet ingredients are stored separately. However, despite the culinary entrepreneurs' claims of proper food

storage, observations and documentation reveal that some food items are not adequately covered during the presentation.

Using high-quality ingredients results in good-quality food. According to the Minister of Health Decree No. 1096/Menkes/Per/VI/2011 on Food Services, processed food ingredients must be of good quality, fresh, not rotten, free of hazardous substances, and registered with the health department. This aligns with previous research by Hapsari (2018), which emphasizes the importance of processing high-quality ingredients.

Proper storage of food ingredients prevents contamination. The same decree states that food ingredients should be stored separately according to their characteristics and handled carefully from processing to serving. This finding is supported by Syafran (2020), who asserts that stored food should be placed in designated areas.

Good food presentation requires covering to prevent contamination from dust, germs, viruses, or bacteria. The Minister of Health Decree No. 1096/Menkes/Per/VI/2011 specifies that food must be properly covered and packaged to avoid contamination, as consuming contaminated food can be dangerous.

Equipment Hygiene and Sanitation Practices of Culinary Entrepreneurs in Mulo Tourism Village Market

Data from interviews indicate that the equipment used is mold-free. However, observations reveal some rattan equipment is moldy. While most equipment is made from safe materials, some culinary entrepreneurs use damaged tools. The equipment is cleaned with running water and soap, and wet and dry items are stored separately. Single-use items for packaging are disposed of after one use.

The Minister of Health Decree No. 1096/Menkes/Per/VI/2011 stipulates that equipment must meet hygiene and sanitation standards, be undamaged, and made of safe materials. Field observations indicate that the implementation of equipment hygiene and sanitation requires further guidance.

The same decree states that equipment cleaning must use appropriate cleaning agents or detergents. Syafran (2020) highlights that cleaning is essential to maintain equipment hygiene and sanitation, ensuring their usability.

Personal Hygiene and Sanitation Practices of Culinary Entrepreneurs in Mulo Tourism Village Market

Data collected through interviews, documentation, and observations show consistency across most aspects. The findings indicate that all culinary entrepreneurs are in good health and maintain personal hygiene, including clean nails, hair, and clothing. While they claim to wear the necessary protective gear, observations show some entrepreneurs do not wear aprons or masks during food preparation.

The Minister of Health Decree No. 1096/Menkes/Per/VI/2011 requires food handlers to be free of contagious diseases and cover any open wounds. This is consistent with Hapsari's (2018) study, which references the Minister of Health Decree No. 942/Menkes/SK/VII/2003 on Food Hygiene and Sanitation Requirements, stating that food handlers must not have easily transmissible diseases such as coughs, colds, or diarrhea. Therefore, culinary entrepreneurs must be in excellent health when handling food.

The same decree also mandates food handlers to wear aprons and head coverings. The government has also recommended wearing masks to prevent disease transmission, particularly during the pandemic. There is a need to reinforce the importance of wearing masks, as the virus spreads easily through the air. Food handlers must maintain personal hygiene, including washing hands before directly handling food.

Environmental Hygiene and Sanitation Practices of Culinary Entrepreneurs in Mulo Tourism Village Market

Data from interviews, documentation, and observations indicate consistency. The market has good air circulation, handwashing facilities with running water and soap, separate bins for organic and inorganic waste, and clean toilets. Overall, the market environment is clean, comfortable, and well-maintained.

The Minister of Health Decree No. 1096/Menkes/Per/VI/2011 specifies that business premises must have good air circulation, adequate lighting, waste disposal facilities, handwashing stations with soap, and clean toilets. Hapsari (2018) also notes that achieving environmental hygiene and sanitation involves clean water and soap, waste disposal facilities, and clean work areas.

Hygiene and Sanitation Practices According to Tourists/Consumers

Food Hygiene and Sanitation

Based on Table 1, 15% fall into the low category, 50% in the moderate category, and 35% in the high category, totaling 100%. The average scores for each sub-indicator were calculated using the average formula to identify the highest points. The quality of ingredients scored in Figure 1 was 3.56, presentation scored 3.45, and storage scored 3.38.

Table 1. Evaluation of Food Hygiene and Sanitation

Category Interval	Category	Frequency	Percentage
$X < 15$	Low	15	15%
$15 \leq X < 20$	Moderate	50	50%
$20 \leq X$	High	35	35%

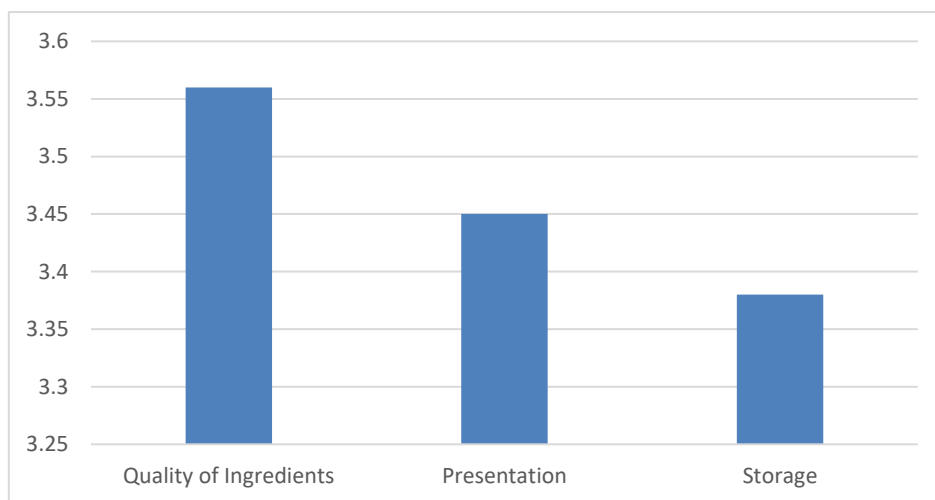


Figure 1. Sub-Indicator of Food Hygiene and Sanitation

Food Hygiene and Sanitation

Based on Table 2, 14% fall into the low category, 46% in the moderate category, and 40% in the high category, totaling 100%. The average scores for each sub-indicator were calculated using the average formula to identify the highest points. The equipment quality scored in Figure 2 was 3.38, and equipment usage and treatment scored 2.44.

Table 2. Evaluation of Equipment Hygiene and Sanitation

Category Interval	Category	Frequency	Percentage
$X < 17$	Low	14	14%
$17 \leq X < 23$	Moderate	46	46%
$23 \leq X$	High	40	40%

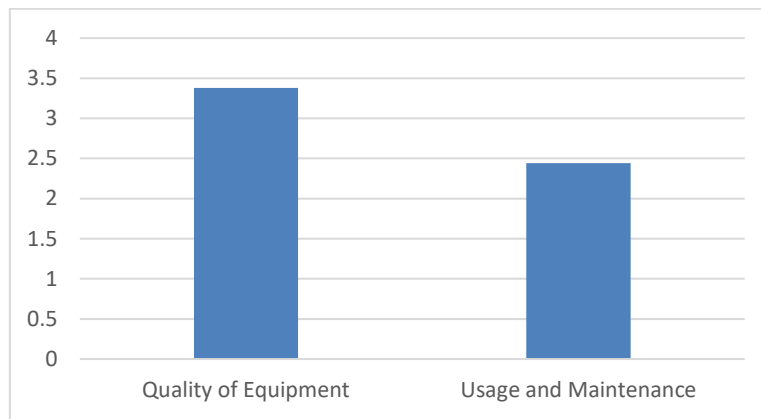


Figure 2. Sub-Indicator of Equipment Hygiene and Sanitation

Personal Hygiene and Sanitation

Based on Table 3, 17% fall into the low category, 51% in the moderate category, and 32% in the high category, totaling 100%. The average scores for each sub-indicator were calculated using the average formula to identify the highest points. The personal preparation scored in Figure 3 was 3.37, and cleanliness behavior scored 3.43.

Table 3. Evaluation of Personal Hygiene and Sanitation

Category Interval	Category	Frequency	Percentage
$X < 23$	Low	17	17%
$23 \leq X < 32$	Moderate	51	51%
$32 \leq X$	High	32	32%

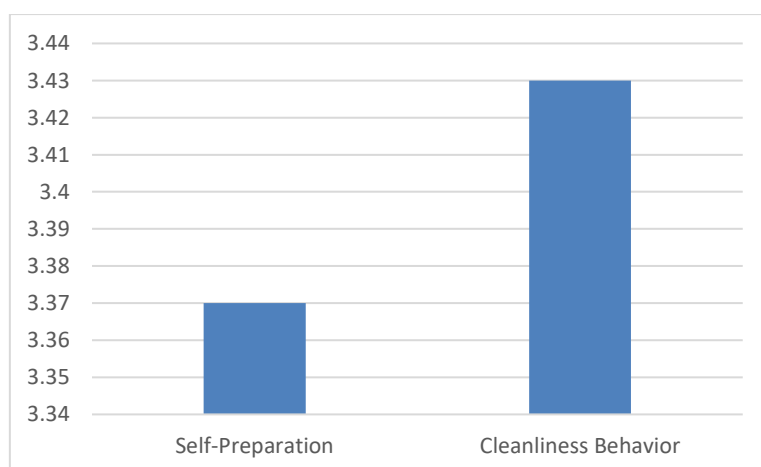


Figure 3. Sub-Indicator of Personal Hygiene and Sanitation

Hygiene Environment Sanitation

Based on Table 4, 8% of the hygiene environment sanitation falls into the low category, 59% into the moderate category, and 33% into the high category. No average point calculations were performed because there are no sub-indicators for environmental hygiene sanitation in this study.

Table 4. Evaluation of Hygiene Environment Sanitation

Category Interval	Category	Frequency	Percentage
$X < 20$	Low	8	8%
$20 \leq X < 28$	Moderate	59	59%
$28 \leq X$	High	33	33%

Overall Hygiene Sanitation

For the overall hygiene sanitation in Table 5, 14% falls into the low category, 55% into the moderate category, and 31% into the high category. The average scores for each sub-indicator in Figure 4 were calculated using the average formula to identify the highest points, resulting in 3.44 for food, 3.41 for equipment, 3.40 for personal hygiene, and 3.47 for the environment.

Table 5. Evaluation of Overall Hygiene Sanitation

Category Interval	Category	Frequency	Percentage
$X < 76$	Low	14	14%
$76 \leq X < 102$	Moderate	55	55%
$102 \leq X$	High	31	31%

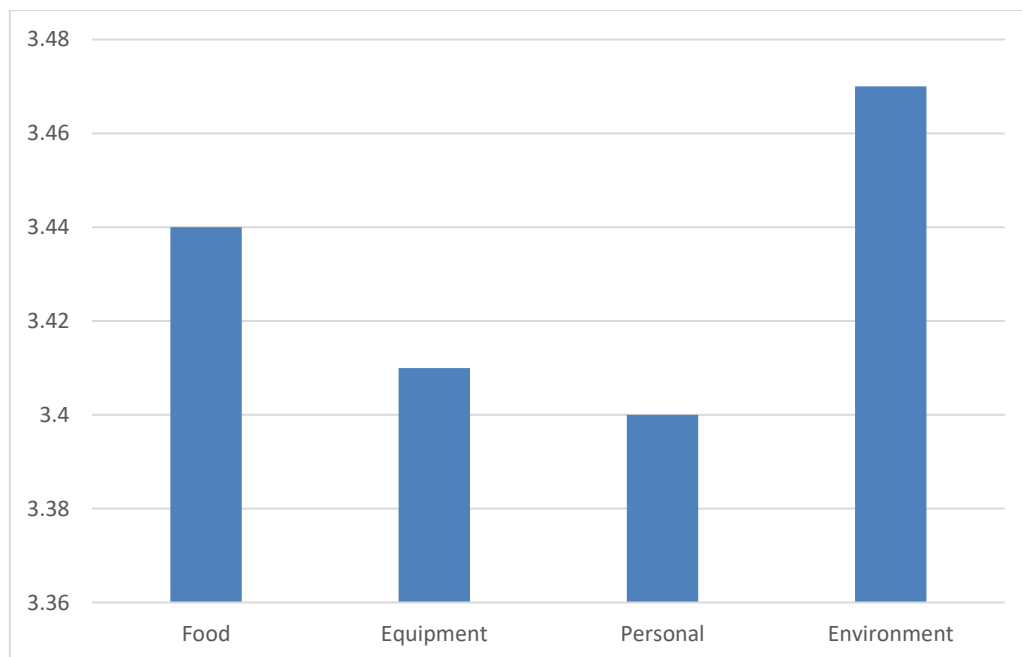


Figure 4. Sub-Indicator of Overall Hygiene Sanitation

The implementation of food hygiene and sanitation is still not optimal, falling into the moderate category with 50%. The average point calculation showed that storage has the lowest score, with consumers reporting that some food items were not covered. This contrasts with the statements of culinary entrepreneurs who claimed to have fully implemented hygiene and sanitation practices. The observations align with the questionnaire results given to tourists, revealing that not all aspects of food presentation are

properly covered. This finding is supported by documentation showing that some food presentations were indeed not adequately covered.

The aspects of equipment hygiene and personal hygiene also fall into the moderate category. This finding is consistent with observations and documentation, which indicate that some aspects do not meet the standards set by the Minister of Health Decree No. 1096/Menkes/Per/VI/2011.

The environmental aspect also falls into the moderate category. However, observations and documentation show different results. Facilities and the surrounding environment meet the requirements of the Minister of Health Decree on Food Service Hygiene Sanitation. The open space provides good air circulation and lighting, clean toilets, and an adequate number of trash bins and handwashing stations with soap.

DISCUSSION

The implementation of food hygiene and sanitation practices by culinary entrepreneurs in Mulo Tourism Village Market revealed significant gaps. Despite claims of proper food storage, observations showed that some food items were left uncovered, posing contamination risks. While high-quality ingredients were used, the presentation and storage practices need improvement. Equipment hygiene and sanitation were also inadequate, with some tools found to be damaged or moldy. This lack of adherence to guidelines highlights the necessity for better equipment maintenance and cleaning protocols. Personal hygiene among culinary entrepreneurs showed mixed results; although most maintained good hygiene, some did not consistently use protective gear such as aprons and masks. Environmental hygiene practices were generally satisfactory, featuring good air circulation, handwashing facilities, and waste management systems. However, overall implementation was moderate. Tourists' perceptions underscored the need for improved food and equipment hygiene, reinforcing the necessity of enhanced training and stricter enforcement of health protocols.

The implementation of food hygiene and sanitation practices by culinary entrepreneurs in Mulo Tourism Village Market revealed significant gaps. Despite claims of proper food storage, observations and documentation showed that some food items were left uncovered, posing contamination risks. This discrepancy highlights the need for continuous monitoring and stricter enforcement of food hygiene standards. High-quality ingredients were found to be used, but the presentation and storage practices need improvement. These findings align with previous research (Hapsari, 2018) and support the necessity of maintaining high standards in food handling to prevent health hazards.

Equipment hygiene and sanitation also fell short of standards, with some tools found to be damaged or moldy. This suggests a lack of adherence to the guidelines set by the Minister of Health Decree No. 1096/Menkes/Per/VI/2011, emphasizing the importance of using safe and undamaged equipment. The cleaning and maintenance of equipment must be enhanced to ensure hygiene and prevent contamination, corroborating the findings of Syafran (2020).

Personal hygiene among culinary entrepreneurs showed mixed results. While most entrepreneurs maintained good personal hygiene, some did not consistently use protective gear such as aprons and masks. This gap indicates a need for reinforced training and awareness programs about the importance of personal hygiene in food safety, as supported by the Minister of Health Decree No. 942/Menkes/SK/VII/2003 and the findings of Hapsari (2018).

The environmental hygiene and sanitation practices were generally satisfactory, with good air circulation, handwashing facilities, and waste management systems in place. However, the overall implementation was still categorized as moderate, indicating areas for improvement, particularly in maintaining consistent hygiene practices across all aspects of the market environment.

The moderate implementation of hygiene and sanitation practices in Mulo Tourism Village is consistent with findings from other studies in similar settings. For instance, Annas et al. (2021) reported that hygiene and sanitation practices in small food establishments often fall short of optimal standards due to limited resources and awareness. Similarly, Syafran (2020) highlighted that equipment and personal hygiene practices in traditional markets are frequently inadequate, leading to potential health risks. However, the relatively higher scores in environmental hygiene in this study contrast with Dewi (2022), who found that environmental sanitation in restaurants during the new normal era often remained substandard due to inconsistent adherence to health protocols.

The findings align with existing literature emphasizing the importance of maintaining high standards in food hygiene to prevent health hazards (Wulandari, 2023; Tiwari & Banerjee, 2019). Similar studies have found variations in adherence to good hygiene practices, indicating a need for continuous improvement and monitoring (Muchtar, 2020). Equipment hygiene is critical, as noted by Ndungu et al. (2015), who stress the importance of clean and sanitized equipment in food production settings. Observations from Nurlena (2024) also support the need for targeted enhancements in equipment hygiene. Personal hygiene practices are crucial for preventing foodborne diseases, as highlighted by Gulumbe et al. (2019) and Lawan et al. (2015), who found that good personal hygiene is essential for ensuring food safety. However, consistent use of protective gear remains a challenge, as indicated by Husain et al. (2016), who reported that training significantly improves personal hygiene practices among food handlers.

The importance of these findings lies in their implications for public health and the sustainability of tourism in Mulo Tourism Village. Effective implementation of hygiene and sanitation practices is essential for ensuring food safety and enhancing consumer confidence, especially during the ongoing pandemic. Addressing gaps in food storage and personal hygiene through targeted training and stricter enforcement of health protocols could mitigate health risks and promote safer dining environments. The study suggests that infrastructure improvements in environmental hygiene can significantly enhance overall sanitation outcomes, offering a potential area for policy focus and investment. These findings contribute to the broader understanding of hygiene and sanitation practices in tourism contexts, providing valuable insights for policymakers and stakeholders in the tourism and culinary sectors (Wulandari, 2023; Tiwari & Banerjee, 2019; Muchtar, 2020; Ndungu et al., 2016; Nurlena, 2024; Gulumbe et al., 2019; Lawan et al., 2015; Husain et al., 2016).

CONCLUSION

This study sufficiently answers the research objectives by investigating the implementation of food, equipment, personal, and environmental hygiene and sanitation practices by culinary entrepreneurs in Mulo Tourism Village Market. The findings indicate that while high-quality ingredients are used, food presentation and storage practices need significant improvement. Equipment hygiene is compromised by the use of damaged tools, and personal hygiene is inconsistent, with some entrepreneurs not using protective gear. Environmental hygiene practices meet standards but still fall into the moderate category. These conclusions are based on comprehensive data collection and analysis, highlighting the importance of continuous monitoring and enforcement of hygiene standards to ensure food safety and public health. The study's implications suggest the need for targeted training programs, stricter regulatory enforcement, and ongoing research to improve hygiene practices in tourism markets, ultimately contributing to better health outcomes and economic stability.

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How School Environment, Family Background, and Entrepreneurial Spirit Affect Entrepreneurship Interest at SMK Negeri 6 Yogyakarta

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ABSTRACT

The study aims to determine the influence of (1) the school environment on entrepreneurial interest among Grade XI Culinary students, (2) the family environment on entrepreneurial interest among Grade XI Culinary students, (3) the entrepreneurial spirit on entrepreneurial interest among Grade XI Culinary students, and (4) the combined influence of the school environment, family environment, and entrepreneurial spirit on the entrepreneurial interest of students at SMK Negeri 6 Yogyakarta. This research is quantitative. The population consists of 140 students, with a sample of 104 students determined using the Slovin formula and simple random sampling technique. The prerequisite tests for analysis include linearity, multicollinearity, and heteroscedasticity tests. The analytical techniques used are multiple linear regression, F-test, t-test, and R^2 test. The results indicate that: (1) the school environment has a positive effect on entrepreneurial interest with the regression equation $Y = 0.229 + 0.243$, (2) the family environment has a positive effect on entrepreneurial interest with the regression equation $Y = 0.229 + 0.220$, (3) the entrepreneurial spirit has a positive effect on entrepreneurial interest with the regression equation $Y = 0.229 + 0.389$, and (4) the school environment, family environment, and entrepreneurial spirit collectively influence entrepreneurial interest with an R^2 value of 0.559 or 56%.

Keywords: School environment, family environment, entrepreneurial spirit, entrepreneurial interest

INTRODUCTION

Entrepreneurship is a vital opportunity for achieving a country's economic development. However, the number of entrepreneurs in Indonesia remains relatively low. According to the Central Bureau of Statistics (BPS), the number of entrepreneurs in Indonesia reached only 3.47% of the total population, approximately 9 million people. For a country to be considered a developing nation, at least 5% of its population should be engaged in business. Secondary education, especially Vocational High School, plays a unique role in producing graduates ready for employment. BPS data indicates that Vocational High School

graduates are among the highest unemployed, with 1,876,661 graduates unemployed as of February 2022 (National Labor Force Survey).

SMK Negeri 6 Yogyakarta is a Center of Excellence Vocational School, aiming to produce graduates absorbed in the workforce or becoming entrepreneurs through comprehensive vocational education aligned with industry needs. It also serves as a model for improving the quality of other Vocational High Schools. Unfortunately, from 2020 to 2022, there has been a significant decline in the number of graduates from SMK N 6 Yogyakarta who pursued entrepreneurship. In 2020, 21.70% of its graduates became young entrepreneurs, which dropped to 9.26% in 2021 and further to 6.60% in 2022.

The family environment significantly influences students' entrepreneurial interest as families play a crucial role in shaping attitudes, values, and interests, including entrepreneurial aspirations. The attitudes and behaviors of family members can profoundly impact students' views on entrepreneurship.

A student's entrepreneurial spirit encompasses attitudes, skills, and individual characteristics that support the ability to develop and run a business. Key elements include entrepreneurial attitude and motivation, entrepreneurial skills, self-confidence, mental resilience, and knowledge and education in entrepreneurship. Understanding the potential challenges within the entrepreneurial spirit can aid in developing strategies to enhance entrepreneurial interest.

Moreover, the school environment, comprising social elements (such as educators, peers, and school culture) and non-social elements (like curriculum and facilities), plays a vital role in nurturing students' entrepreneurial potential. Marini (2014) categorizes indicators of the school environment, encompassing factors such as the quality of educational staff, peer relationships, curriculum offerings such as Creative Products and Entrepreneurship, and practical learning opportunities through school facilities.

Teachers shape students' personalities and can guide them to become prospective entrepreneurs through exemplary behavior, promoting values like punctuality, hard work, and honesty. Positive relationships with peers create a comfortable learning environment and encourage students to strive for the best academic outcomes, significantly influencing their entrepreneurial enthusiasm by providing support, understanding, and assistance. The curriculum, as defined by Law No. 20 of 2003, includes subjects like Creative Products and Entrepreneurship, which stimulate students' entrepreneurial interests. Additionally, school facilities such as cooperatives, canteens, and production units play a crucial role in fostering students' entrepreneurial interests by offering practical learning experiences, teaching essential skills like financial bookkeeping and sales transactions, and preparing students for real-world entrepreneurial activities.

The family environment, as defined by Yusuf (2012), encompasses all physical, natural, or social phenomena affecting an individual's development. Key factors influencing personal development include family functionality, where functional families provide exemplary roles, mentorship, organization, and education, nurturing entrepreneurial skills and guiding children towards potential career paths, including entrepreneurship. Parental attitudes and behaviors significantly shape children's personalities and influence their development, including their entrepreneurial interests. Additionally, parents' socioeconomic status impacts the emphasis on children's involvement, curiosity, and creativity, with higher socioeconomic status fostering entrepreneurial interest through a focus on these attributes.

The entrepreneurial spirit, as described by Suryana (2011), encompasses creative and innovative traits essential for entrepreneurship, including self-confidence, task and result orientation, risk-taking, leadership, future orientation, and originality. Self-confidence, defined as the combination of attitudes and beliefs in one's abilities to accomplish tasks (Zimmerer, 2008), is crucial for entrepreneurial success. Task and result orientation involves valuing achievement, profit orientation, perseverance, determination, and a strong, energetic, and initiative-driven attitude. Entrepreneurs must also be willing to take calculated risks to succeed. Effective leadership is essential for organizing groups or organizations toward specific goals. Additionally, entrepreneurs should have a forward-looking perspective, aiming for sustainable business success. Lastly, creative and flexible individuals who are innovative and have unique ideas are more likely to succeed as entrepreneurs.

Entrepreneurial interest, according to Syah (2010), is a strong tendency and enthusiasm towards entrepreneurship. Internal factors include physical and psychological components such as attention, interest, motivation, hope, and needs. External factors include social and non-social environmental components, such as family, community, and school. Entrepreneurs identify and assess business opportunities, gather necessary resources, and take appropriate actions to ensure business success (Tedjasutisna, 2008). Safari (2003) notes that interest indicators include enjoyment, curiosity, attention, and involvement.

Recent research consistently highlights the significant influence of family background and entrepreneurship education on students' entrepreneurial interests (Hidayat & Yuliana, 2018; Arfah et al., 2023; Kusumawardani & Richard, 2020; Liu et al., 2022; Siregar & Marwan, 2020). Family background, particularly the presence of entrepreneurial role models and supportive environments, emerges as a crucial factor in fostering entrepreneurial aspirations among students (Lee et al., 2021; Andani, 2023; Harinie, 2019; Juliana et al., 2020).

Entrepreneurial education plays a pivotal role in enhancing students' motivation and interest in entrepreneurship (Arfah et al., 2023; Kusumawardani & Richard, 2020; Sukirman & Afifi, 2021). The interplay between family background and entrepreneurial education significantly influences entrepreneurial intention and interest (Kusumawardani & Richard, 2020; Hidayat & Veronica, 2022), with entrepreneurial self-efficacy identified as a key mediator in this relationship (Kusumawardani & Richard, 2020). Furthermore, the presence of an entrepreneurial spirit, shaped by family culture and educational experiences, correlates positively with heightened entrepreneurial interest among students (Setiani & Prakoso, 2019; Qosja & Druga, 2015).

The novelty of this research lies in its integrated approach, examining the combined effects of multiple influencing factors rather than treating them in isolation. By doing so, the study aims to offer a more holistic understanding of what drives entrepreneurial interest among Vocational High School students, which is critical for developing effective interventions and policies.

The scope of the study includes an in-depth analysis of the school environment, encompassing both social and non-social elements, family background, including parental influence and socioeconomic status, and the individual entrepreneurial spirit, characterized by attitudes, skills, and personality traits conducive to entrepreneurship. The findings will provide insights that can be used to enhance vocational education programs and support systems to better prepare students for entrepreneurial careers.

PURPOSE OF THE STUDY

This study aims to determine (a) the influence of the school environment on entrepreneurial interest among Grade XI Culinary students, (b) the influence of the family environment on entrepreneurial interest among Grade XI Culinary students, (c) the influence of entrepreneurial spirit on entrepreneurial interest among Grade XI Culinary students, and (d) the combined influence of the school environment, family environment, and entrepreneurial spirit on the entrepreneurial interest of students at SMK Negeri 6 Yogyakarta.

METHOD

This study is a quantitative research that employs simple random sampling. Data collection was carried out using questionnaires, and data analysis was performed using descriptive statistics and multiple regression analysis. The research was conducted from January to July 2023 at SMK Negeri 6 Yogyakarta. Questionnaires were directly distributed to the Grade XI Culinary students of SMK Negeri 6 Yogyakarta.

Participants

The study population consisted of 140 Grade XI Culinary students at SMK Negeri 6 Yogyakarta. A simple random sampling technique was used to ensure each member of the population had an equal chance

of being selected. The sample size was determined using the Slovin formula with a 5% significance level, resulting in 104 students being selected as samples. Questionnaires were distributed directly to these students to gather data on their perceptions and experiences related to the school environment, family background, and entrepreneurial spirit.

Data Collection and Analysis

Data were collected using closed-ended questionnaires. Validity was tested using content validity with Pearson's formula, and reliability was tested using Cronbach's Alpha. Data analysis included descriptive analysis, prerequisite analysis tests, and associative hypothesis testing.

Parameters measured in this study included the perceptions of the school environment, family environment, and entrepreneurial spirit, as well as the level of entrepreneurial interest among students. The questionnaires included items that assessed these parameters using a Likert scale. Content validity was ensured using Pearson's formula, and the reliability of the questionnaire was tested using Cronbach's Alpha to ensure consistency in the responses. Descriptive statistics provided an overview of the data distribution, while multiple regression analysis allowed for the examination of the influence of the independent variables on entrepreneurial interest.

Data analysis began with descriptive statistics to provide an initial overview of the data. This was followed by prerequisite analysis tests, including tests for normality, linearity, and multicollinearity, to ensure the data met the assumptions required for regression analysis. Multiple regression analysis was then conducted to determine the relationship between the independent variables (school environment, family environment, and entrepreneurial spirit) and the dependent variable (entrepreneurial interest). The significance of these relationships was evaluated using regression coefficients and t-tests. The regression coefficients indicated the direction and strength of the relationships, while the t-tests determined the statistical significance of each coefficient, providing insights into how each independent variable practically affects entrepreneurial interest.

Regression values and t-tests are practical tools in this context. The regression coefficient signifies the extent of change in the dependent variable with a one-unit change in the independent variable. For example, a regression coefficient of 0.243 for the school environment implies that for every unit increase in the perception of the school environment, there is a corresponding increase in entrepreneurial interest by 0.243 units. The t-test evaluates whether these coefficients are statistically significant, confirming the practical impact of the independent variables on entrepreneurial interest.

FINDINGS AND DISCUSSION

School Environment

The analysis of the school environment (Table 1) showed a mean value (M) of 37.13, a median (Me) of 36.00, a mode (Mo) of 36.00, and a standard deviation of 2.98. The results indicated that 18% of respondents rated the school environment as high, while 82% rated it as moderate, leading to the conclusion that the overall perception of the school environment was moderate.

Table 1. Distribution of School Environment Categories

Category	Interval Score	Frequency	Percentage
High	> 40 - 60	19	18%
Moderate	> 20 - 40	85	82%
Low	0 - 20	0	0%
Total		104	100%

Family Environment

The analysis of the family environment (Table 2) revealed a mean value (M) of 29.15, a median (Me) of 28.00, a mode (Mo) of 27.00, and a standard deviation of 3.04. The data showed that 30% of respondents had a supportive family environment, while 70% rated it as moderate, indicating that the family environment was generally perceived as moderate.

Table 2. Distribution of Family Environment Categories

Category	Interval Score	Frequency	Percentage
High	> 30 - 45	31	30%
Moderate	> 15 - 30	73	70%
Low	0 - 15	0	0%
Total		104	100%

Entrepreneurial Spirit

The entrepreneurial spirit analysis (Table 3) yielded a mean value (M) of 56.28, a median (Me) of 55.00, a mode (Mo) of 54.00, and a standard deviation of 5.02. The table above shows that there are 19 respondents (18%) with a high level of entrepreneurial spirit, and 85 respondents (82%) with a moderate level of entrepreneurial spirit. From these results, it can be concluded that the respondents' overall assessment of their entrepreneurial spirit is moderate.

Table 3. Distribution of Family Environment Categories

Category	Interval Score	Frequency	Percentage
High	> 60 - 90	19	18%
Moderate	> 30 - 60	85	82%
Low	0 - 30	0	0%
Total		104	100%

Entrepreneurial Interest

Table 4 showed a mean value (M) of 37.52, a median (Me) of 36.00, a mode (Mo) of 36.00, and a standard deviation of 3.79. The data indicated that 22% of respondents had high entrepreneurial interest, while 78% had moderate interest, leading to the conclusion that entrepreneurial interest among respondents was moderate.

Table 4. Distribution of Family Environment Categories

Category	Interval Score	Frequency	Percentage
High	> 40 - 60	23	22%
Moderate	> 20 - 40	81	78%
Low	0 - 20	0	0%
Total		104	100%

Classical Assumption Tests

This study uses three independent variables, necessitating classical assumption tests, including tests for multicollinearity and heteroscedasticity. The multicollinearity test aims to determine if there is a correlation between the independent variables in the regression model. The presence of multicollinearity can be identified by the tolerance and variance inflation factor (VIF) values. Multicollinearity is present if the tolerance value is below 0.10 and the VIF is above 10. The tolerance values for the school environment, family environment, and entrepreneurial spirit are 0.638, 0.610, and 0.669, respectively, all greater than 0.10. Additionally, the VIF values for the school environment, family environment, and entrepreneurial spirit are

1.568, 1.639, and 1.495, respectively, all less than 10. Based on this analysis, it can be concluded that the regression model in this study does not exhibit multicollinearity.

The heteroscedasticity test was conducted using a statistical analysis application and the Glejser test. A good regression model should not exhibit heteroscedasticity. The decision criterion is that if the significance value (sig) is greater than 0.05, heteroscedasticity is not present. The significance values for the school environment, family environment, and entrepreneurial spirit are 0.629, 0.082, and 0.890, respectively, all greater than 0.05. Therefore, it can be concluded that this study does not exhibit heteroscedasticity. The results of this study indicate that the regression model used passes the prerequisite regression tests.

Multiple Linear Regression Analysis

The regression coefficients for the school environment (0.243), family environment (0.220), and entrepreneurial spirit (0.389) were positive, indicating a positive influence on entrepreneurial interest. The regression model is $Y = 0.229 + 0.243X_1 + 0.220X_2 + 0.389X_3$. See Table 5.

Table 5. Multiple Linear Regression Analysis Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.229	3.39		0.68	0.946
School Env.	0.243	0.102	0.195	2.378	0.019
Family Env.	0.22	0.1	0.184	2.194	0.031
Entrepreneurial Spirit	0.389	0.061	0.514	6.424	0

The result of the multiple linear regression shows a constant value of 0.229. This constant of 0.229 indicates that if all independent variables (School Environment, Family Environment, and Entrepreneurial Spirit) are zero, the entrepreneurial interest is 0.229. A positive constant means there is an increase in entrepreneurial interest by 0.229.

The regression coefficient b_1 of 0.243 means that if the school environment (X_1) increases by 1%, the entrepreneurial interest will increase by 0.243%, assuming the other variables (Family Environment and Entrepreneurial Spirit) remain constant. The positive coefficient for the school environment indicates that it has a positive influence on entrepreneurial interest.

The regression coefficient b_2 of 0.220 means that if the family environment (X_2) increases by 1%, the entrepreneurial interest will increase by 0.220%, assuming the other variables (School Environment and Entrepreneurial Spirit) remain constant. The positive coefficient for the family environment indicates that it has a positive influence on entrepreneurial interest.

The regression coefficient b_3 of 0.389 means that if the entrepreneurial spirit (X_3) increases by 1%, the entrepreneurial interest will increase by 0.389%, assuming the other variables (School Environment and Family Environment) remain constant. The positive coefficient for entrepreneurial spirit indicates that it has a positive influence on entrepreneurial interest.

Simultaneous (F-Test)

The F-test (Table 6) showed an F value of 44.574 with a significance level of 0.000, indicating that the school environment, family environment, and entrepreneurial spirit collectively influence entrepreneurial interest.

Table 6. F-Test Result

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	834.183	3	278.061	44.574	000 ^a
Residual	623.817	100	6.238		
Total	1458.000	103			

Partial (T-Test)

The t-test results (Table 7) showed that the school environment (X1) had a significance value of 0.019, the family environment (X2) had a significance value of 0.031, and the entrepreneurial spirit (X3) had a significance value of 0.000, all less than 0.05, indicating that each variable individually influences entrepreneurial interest.

Table 7. T-Test Result

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.229	3.39		0.68	0.946
School Env.	0.243	0.102	0.195	2.378	0.019
Family Env.	0.22	0.1	0.184	2.194	0.031
Entrepreneurial Spirit	0.389	0.061	0.514	6.424	0

Coefficient of Determination (R² Test)

The Adjusted R Square value (see Table 8) was 0.559, indicating that 56% of the variance in entrepreneurial interest at SMK Negeri 6 Yogyakarta is explained by the school environment, family environment, and entrepreneurial spirit, while the remaining 44% is influenced by other factors not included in this study. Table 7 summarizes the regression model's goodness-of-fit statistics, including the R value, R Square, Adjusted R Square, and the Standard Error of the Estimate.

Table 8. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.756 ^a	0.572	0.55	2.49763

Multicollinearity Test and Heteroscedasticity Test

The multicollinearity test aims to test whether there is a perfect or near-perfect linear relationship (intercorrelation) between two or more independent variables in the regression model. In this study, the brand image perception and price perception variables both had a Tolerance value of 0.900 > 0.100 and a VIF value of 1.185 < 10.00, indicating that there is no multicollinearity issue with the brand image variable.

The heteroscedasticity test aims to assess whether there is a similarity of variance from one observation's residual to another in the linear regression model. The Glejser test results showed:

- 1) The brand image perception variable had a Sig. (2-tailed) value of 0.398 > 0.05, indicating no heteroscedasticity issue with the brand image variable.

- 2) The price perception variable had a Sig. (2-tailed) value of $0.797 > 0.05$, indicating no heteroscedasticity issue with the price variable.

t-Test (Partial Regression Coefficient)

To test the hypothesis partially between the independent variables and the dependent variable, the t-test results were interpreted by considering the significance value and comparing the t calculated value with the t table value. The t-test results in this study are explained as follows:

- 1) First Hypothesis Testing (H1): The significance value for the influence of the X1 (Brand Image) variable on the Y (Purchasing Decision) variable is $0.005 < 0.05$, and the t calculated value is $2.891 > t$ table value of 1.984 , so it is concluded that H1 is accepted, meaning there is an influence of brand image on purchasing decisions in online food delivery services.
- 2) Second Hypothesis Testing (H2): The significance value for the influence of the X2 (Price) variable on the Y (Purchasing Decision) variable is $0.000 < 0.05$, and the t calculated value is $5.045 > t$ table value of 1.984 , so it is concluded that H2 is accepted, meaning there is an influence of price on purchasing decisions in online food delivery services.

F-Test (Simultaneous Regression Coefficient)

This test aims to determine whether there is a significant influence between the independent variables (X) simultaneously on the dependent variable (Y). In this study, the significance value of X1 – X2 simultaneously on Y is $0.000 < 0.05$, and the F calculated value is $23.921 > F$ table value of 3.939 , so it is concluded that H3 is accepted, meaning there is a significant simultaneous influence of X1 – X2 on Y.

Coefficient of Determination and Predictor Contribution

This analysis aims to determine the percentage of influence exerted by the X variables simultaneously on the Y variable. In this study, the coefficient of determination (R^2) value is 0.330 or 33% . This means that the influence of the X1 and X2 variables simultaneously on the Y variable is 33% , while the remaining 67% is influenced by other variables outside the scope of this study.

Predictor contribution is an explanation of the amount of contribution each independent variable exerts on the dependent variable. In this study, the brand image perception variable influences purchasing decisions in online food delivery services by 9.9% , while the price perception variable influences purchasing decisions in online food delivery services by 23.1% .

DISCUSSION

The study's findings underscore the significant influence of the school environment, family environment, and entrepreneurial spirit on students' entrepreneurial interest at SMK Negeri 6 Yogyakarta. The regression analysis revealed that the school environment had a regression coefficient of 0.243 , indicating a positive impact on entrepreneurial interest. This aligns with Marini (2014), who emphasized the importance of teachers, peers, curriculum, and facilities in fostering entrepreneurial skills. The data also showed that 82% of respondents had a moderate perception of their school environment, suggesting that while the infrastructure and social support are adequate, there is potential for further enhancement to boost entrepreneurial inclinations.

The family environment also emerged as a critical factor, with a regression coefficient of 0.220. This result highlights the significant role of familial support, values, and economic status in shaping students' entrepreneurial aspirations. Notably, 70% of respondents perceived their family environment as moderate, underscoring the influence of familial dynamics on entrepreneurial interest. This finding corroborates previous studies by Yusuf (2012) and Georgescu and Herman (2020), which indicated that family background significantly impacts entrepreneurial intentions.

The entrepreneurial spirit was found to have the highest regression coefficient of 0.389, emphasizing the paramount importance of intrinsic factors such as self-confidence, risk-taking, and innovation in driving entrepreneurial interest. The data indicated that 82% of respondents had a moderate assessment of their entrepreneurial spirit, suggesting that while students possess the foundational traits necessary for entrepreneurship, there is a need for further development through targeted educational interventions and practical experiences.

The study's results are consistent with existing literature on the influence of the school environment, family background, and entrepreneurial spirit on entrepreneurial interest. The positive impact of the school environment is in line with findings by Marini (2014) and supported by subsequent studies, including Opod and Wuryaningrat (2022) and Shofwan et al. (2023), which demonstrated that a supportive school environment enhances students' entrepreneurial self-efficacy, motivation, and interest.

The significant role of the family environment aligns with previous research by Liu et al. (2022), Lee et al. (2021), and Harinie (2019), which highlighted the importance of familial support and values in fostering entrepreneurial intentions. These studies indicated that having entrepreneurial family members serves as crucial role models, fostering a culture that supports entrepreneurship. The moderate perception of the family environment in this study suggests that familial influence, while impactful, varies among students, reflecting differences in family dynamics and socioeconomic status.

The high impact of entrepreneurial spirit on entrepreneurial interest corroborates findings by Suryana (2011), Setiani and Prakoso (2019), and Qosja and Druga (2015), who identified self-confidence, task orientation, and risk-taking as critical components of entrepreneurial success. The moderate assessment of entrepreneurial spirit among respondents suggests that while foundational traits are present, there is room for enhancement through education and practical experiences, as supported by research from Arfah et al. (2023) and Sukirman and Afifi (2021).

The findings of this study have significant implications for educational policy and practice. The combined influence of the school environment, family environment, and entrepreneurial spirit explains 56% of the variance in entrepreneurial interest, demonstrating the interrelatedness of these factors. This comprehensive understanding can guide educational administrators in formulating policies and developing curricula that enhance entrepreneurship education.

The moderate perceptions of both the school and family environments suggest that there is potential for improvement in these areas to further enhance students' entrepreneurial inclinations. Schools can focus on creating more supportive and conducive learning environments, integrating practical entrepreneurial experiences into the curriculum, and fostering positive peer and teacher-student relationships. Additionally, involving families in entrepreneurship education and providing resources to support entrepreneurial activities at home can enhance familial support for students' entrepreneurial aspirations.

The high impact of entrepreneurial spirit highlights the need for targeted interventions to develop students' intrinsic entrepreneurial traits. This can be achieved through educational programs that emphasize self-confidence, risk-taking, innovation, and leadership skills. Practical experiences, such as internships, project-based learning, and entrepreneurship competitions, can provide students with opportunities to apply these traits in real-world settings, further reinforcing their entrepreneurial interest.

However, the study's limitations, including its focus on a single vocational school and reliance on self-reported data, suggest that future research should consider longitudinal studies across multiple institutions to validate these findings and explore additional factors influencing entrepreneurial interest. Integrating support systems involving schools, families, and community stakeholders is crucial for fostering a robust entrepreneurial ecosystem. Future research opportunities also lie in examining the impact of specific educational programs and interventions on developing entrepreneurial competencies among students.

CONCLUSION

This study sufficiently answers the research objectives by demonstrating that the school environment, family environment, and entrepreneurial spirit significantly influence the entrepreneurial interest of students at SMK Negeri 6 Yogyakarta. The findings highlight the necessity of enhancing the educational and familial support systems to foster entrepreneurial aspirations among students. The positive regression coefficients for each variable indicate that improvements in these areas can lead to increased entrepreneurial interest. The study's implications suggest that educational administrators should focus on creating a supportive school environment, encouraging family involvement, and nurturing students' entrepreneurial spirit through targeted programs. These findings provide a foundation for developing comprehensive strategies to promote entrepreneurship education, contributing to broader economic development goals. Future research should expand to include multiple institutions and longitudinal data to build on these findings and further understand the dynamics of entrepreneurial interest among vocational students.

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Development of Digital Comic Learning Media for Soup and Soto Processing Materials for Culinary Vocational Students

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ABSTRACT

The objective of this study is to develop digital comic-based learning media for the subject of Indonesian Soup and Soto Processing for 11th-grade Culinary Vocational High School students and to assess its feasibility. This research employs the Research and Development (R&D) methodology with the 4D model: Define, Design, Develop, and Disseminate, conducted at SMKN 4 Yogyakarta. Data collection methods include observation, interviews, and questionnaires. Data analysis is carried out using descriptive statistics. The developed digital comic media features an A5 size (21cm x 14.8cm) with a total of 29 pages, consisting of 1 cover page, 2 introductory pages, 24 content pages, 1 character page, and 1 conclusion page, covering the topics of soup and soto processing and presentation, including definitions, classification, characteristics, composition, criteria for results, processing techniques, and presentation techniques. The feasibility of the digital comic media was validated by both media and material validators, and the trial results from 11th-grade Culinary students at SMKN 4 Yogyakarta showed that 88% rated it as highly feasible and 12% rated it as feasible.

Keywords: Learning media, digital comics, Indonesian soup and soto processing materials, culinary vocational high school

INTRODUCTION

Education is an essential process for the development and maturation of individuals, as it involves changing attitudes and behaviors to foster growth (Waridah, 2017). Traditionally, education has been conducted through face-to-face interactions, but with advancements in technology, online learning has become increasingly prevalent. This shift necessitates innovative teaching methods to ensure effective delivery of educational content, whether in traditional or online settings (Budiyono, 2020). As educators, leveraging technological advancements to create engaging and effective learning media is crucial.

Learning media encompass various forms, including print, exhibition, audio, visual, multimedia, and networked computers (Yaumi, 2017). Visual media, in particular, offer realistic and comprehensible

depictions of materials, enhancing student understanding. Among these, comics and cartoons are valuable visual aids. Digital comics, aligned with the Industrial Revolution 4.0, provide a modern approach to visual storytelling that is easily accessible and engaging through applications or websites (Darmayanti, 2021). Their engaging format and clear illustrations can significantly enhance student interest and comprehension (Nugraheni et al., 2017).

At SMK N 4 Yogyakarta, a vocational high school specializing in culinary arts, the teaching of Indonesian food processing relies heavily on traditional methods such as lectures and PowerPoint presentations. This approach has resulted in reduced student interest and suboptimal learning outcomes. Specifically, in the subject of Indonesian Soups and Soto processing, a significant portion of students has scored below the minimum passing mark, indicating a need for more effective teaching methods.

To address this issue, it is proposed that digital comic learning media be developed and utilized. Digital comics can transform the delivery of educational content, making it more engaging and accessible for students. By incorporating clear visualizations and concise explanations, digital comics can facilitate a better understanding of complex culinary processes, thereby improving student performance and interest in the subject.

Research has shown that digital comics can significantly enhance learning experiences across various educational settings. For instance, the VARK model, which addresses different learning styles (visual, auditory, read/write, and kinesthetic), demonstrates that digital comics can cater to diverse student needs, making learning more inclusive and effective (Sutin et al., 2022). This model's application to vocational education, particularly in culinary arts, holds promise for improving student engagement and comprehension.

In vocational schools, digital comic learning media have been effectively developed using the ADDIE method, which involves analysis, design, development, implementation, and evaluation. This systematic approach ensures that the content is well-structured and aligned with learning objectives, leading to positive student responses and improved learning outcomes (Firdiana et al., 2021). Furthermore, studies comparing digital comics to other learning media, such as e-books, have found that digital comics are particularly effective in enhancing student engagement and understanding (Trimurtini et al., 2021).

Additional research highlights the broader applicability of digital comics in education. For example, mind mapping-based comics have been used to improve creative thinking and learning outcomes in subjects like mathematics (Andryani & Wibawa, 2021). This suggests that visual storytelling, as employed in digital comics, can stimulate creativity and critical thinking, which are essential skills in vocational education. These findings underscore the potential of digital comics to revolutionize teaching and learning practices in culinary education.

Despite the demonstrated benefits of digital comics in various educational contexts, there is limited research on their application in culinary vocational education, particularly for subjects like Indonesian Soups and Soto processing. While studies have validated the effectiveness of digital comics in improving engagement and comprehension, their use in culinary schools remains underexplored. This gap presents an opportunity to investigate the specific impact of digital comics on culinary students' learning experiences and outcomes.

Moreover, the integration of cultural elements in educational content has shown to enhance learning experiences. However, there is a lack of studies exploring the incorporation of Indonesian culinary culture into digital comics for educational purposes. This gap highlights the need for research that not only evaluates the effectiveness of digital comics but also considers the cultural relevance and context of the learning material.

Lastly, existing studies primarily focus on the development and validation of digital comics for theoretical subjects. There is a need for research that examines the practical application of digital comics in

hands-on subjects like culinary arts, where students must understand both theory and practice. Addressing these gaps can provide valuable insights into the potential of digital comics to enhance vocational education.

The novelty of this study lies in its focus on applying digital comics to culinary vocational education, specifically for Indonesian food processing materials. By integrating cultural elements and addressing both theoretical and practical aspects of the subject, this study aims to fill the existing research gaps and provide a comprehensive solution to improve learning outcomes. The scope of the study includes the development of digital comics, their implementation in the classroom, and the assessment of their impact on student engagement, understanding, and performance in Indonesian Soup and Soto Processing.

PURPOSE OF THE STUDY

The purpose of this study is to develop digital comic-based learning media for the subject of Indonesian Soup and Soto Processing for 11th-grade Culinary Vocational High School students at SMK N 4 Yogyakarta and to evaluate its feasibility. This study aims to enhance student engagement and improve their understanding and performance in the subject by utilizing clear visualizations and concise explanations through easily accessible digital comics.

METHOD

This study employs a Research and Development (R&D) approach, which is a research method used to produce specific products and test their effectiveness (Sugiyono, 2018). The R&D process follows the 4D procedure: Define, Design, Develop, and Disseminate. The research was conducted at SMK N 4 Yogyakarta in June 2023. The research procedure consists of four stages:

1. Define Stage: This stage involves several activities such as classroom observations, interviews, and documentation.
2. Design Stage: This stage involves preparing the initial design by classifying the material, creating the storyline, revising, and developing the media.
3. Develop Stage: This stage includes the development phase consisting of expert validation of the content, expert validation of the media, limited trials, and large-scale trials.
4. Disseminate Stage: This stage involves disseminating the teaching materials to educators and students by uploading the media to a website and creating a QR code.

Participants

The population for this study consists of all 11th-grade students at SMK N 4 Yogyakarta, divided into three classes. From this population, a small-scale trial sample of 10 students was selected using simple random sampling. A large-scale trial (media feasibility test) was conducted with 36 11th-grade students. Additionally, one subject matter expert, one media expert, and one PPMI subject teacher served as validators for the digital comic media on Indonesian soups and soto.

Data Collection and Analysis

Data for the creation of the digital comic on Indonesian soups and soto were obtained from observations, interviews, and the syllabus and lesson plans (RPP) for the subject of soup and soto processing and presentation. The instruments used for data collection in this research include observation sheets, interview guides, and questionnaires (Arikunto, 2013). The media feasibility instruments from media and content experts consist of 40 items, while the student media feasibility instrument consists of 30 items, using a Likert scale of 1-4: 1) Very unfeasible; 2) Unfeasible; 3) Feasible; 4) Very feasible (Sugiyono, 2018). The data analysis technique used in this research is descriptive statistics (Sugiyono, 2018).

FINDINGS

Development Process of the Indonesian Soup and Soto Comic Media

The development of the comic media was carried out in four stages: Define, Design, Develop, and Disseminate.

Define Stage

The Define stage involved classroom observations and interviews. The observations in the 11th-grade Culinary classes 5 and 6 at SMKN 4 Yogyakarta revealed that the teaching methods were still traditional, primarily lectures using PowerPoint presentations, where the teacher provided the material, and students took notes. Eight students expressed boredom during the lessons, indicating that the method did not engage their interest in learning. During practical sessions, students still struggled to understand the procedures for preparing soups and soto, resulting in a lack of comprehension of the material.

Subsequently, interviews were conducted with the PPMI teacher at SMKN 4 Yogyakarta. The interview results showed that teachers found it challenging to make students understand and focus during lessons. The teachers' limited ability to create engaging media meant they primarily used PowerPoint presentations. Students indicated more interest when lessons included attractive visual media.

An analysis of learning components was conducted by collecting the 2013 curriculum syllabus and relevant lesson plans (RPP) for the subject of Indonesian soup and soto presentation. To improve student understanding and maintain focus, an engaging medium like a comic with soup and soto content was deemed necessary.

Design Stage

The Design stage involves the creation of the comic media. The first step is to design the storyline, aligned with KD 3.14 and 4.14, which analyze and prepare Indonesian soups and soto. The content includes definitions, classifications, compositions, processing techniques, presentation techniques, and criteria for Indonesian soups and soto. The second step involves designing the comic characters, Andi and Rina, as illustrated in Figure 1.



Figure 1. Andi and Rina's characters

The next step is to draft the script. The script contains the dialogue for the Indonesian soup and soto comic, adjusted based on the PPMI material for processing and presenting soups and soto, in accordance with the curriculum standards. The script development process includes the initial script, first revision, final script, cover, introduction, content, character profiles, and conclusion.

Develop Stage

The third and final stage is finishing, where final touches are added to the comic, such as shading and various effects. In this stage, the product is created according to the design plans. The comic consists of 29 pages: 1 cover page, 2 introduction pages, 24 comic pages, 1 character profile page, and 1 conclusion page. The comic then undergoes validation by media and content experts. Feedback from these experts is used to improve the comic media. A small-scale trial is conducted with 10 students from the 11th grade at SMK N 4 Yogyakarta, followed by a large-scale trial with 33 students from the 11th-grade Culinary class 5 at SMK N 4 Yogyakarta.

Disseminate Stage

After the trials, with 88% rating the media as highly feasible, the digital comic is made accessible to the public by uploading it to the Universitas Negeri Yogyakarta website and generating a QR code (Figure 2) for the comic on Indonesian soup and soto processing.



Figure 2. QR Code Digital Comic Soup Processing and Indonesian Soto

Media Feasibility Test Results

Content Validator Results

The content validator recommended adding images to the classification table of Indonesian soto as shown in Figure 3 (a). Additionally, they suggested including characteristics and criteria for Indonesian soups and soto to align with the competency indicators. Figure 3 (b) presents the additional material to match the competency indicators.

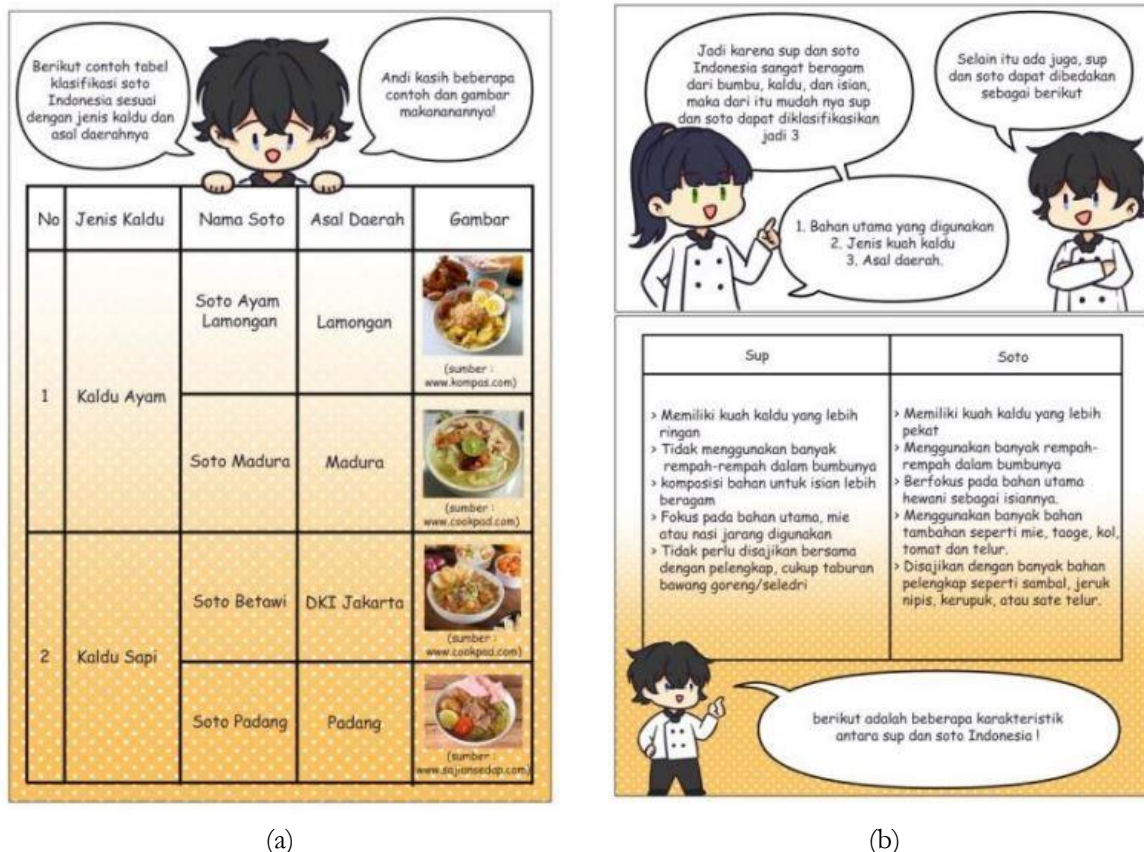


Figure 3. Screenshot of Material Includes: (a) Image After Revision of the Soto Classification Table, (b) Additional Material to Adapt Competencies

Media Validator Results

The media validator suggested that the comic story on Indonesian soup and soto include more recipe diversity beyond just chicken soto, adding two more types: Soto Betawi and Soto Ikan Cakalang, as shown in Figure 4. The introduction and conclusion regarding learning objectives were also added.

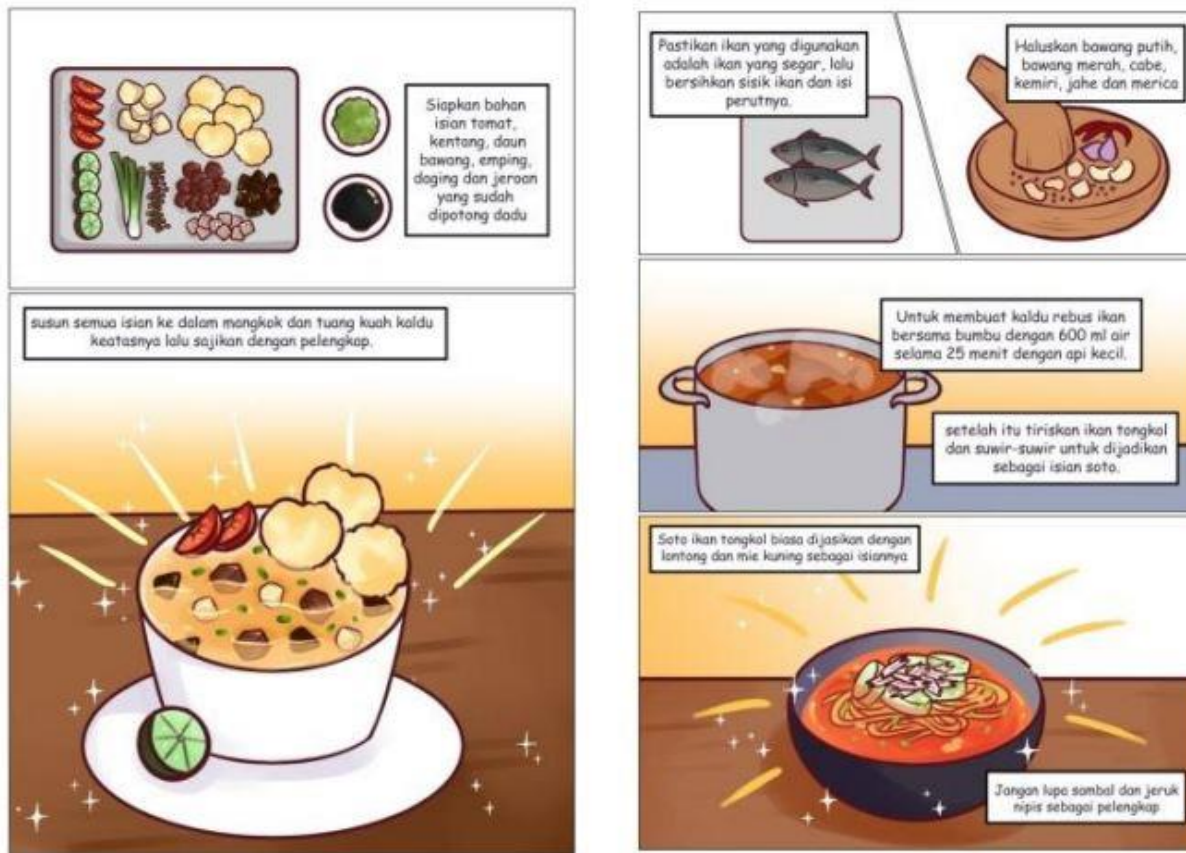


Figure 4. Screenshot of The Content of Soto Betawi Dishes and Soto Ikan Cakalang

Student Feasibility Test Results

Small-Scale Trial

This phase involved testing the media with 10 11th-grade students at SMK N 4 Yogyakarta. Data collection took place on June 12, 2023. Students evaluated the material, media, and comic design, providing feedback through questionnaires. Students were given time to read and understand the comic material on Indonesian soups and soto, followed by a questionnaire with 30 feasibility items in Table 1. There are 8 students rated the media as highly feasible and 2 students rated it as feasible.

Table 1. Descriptive Results of Limited Scale Test Statistics

Interval	Category	Frequency (f)	Percentage (%)
$97.5 < X \leq 120$	Highly feasible	8	80%
$74 < X \leq 97.5$	Feasible	2	20%
$52.5 < X \leq 75$	Unfeasible	0	0%
$30 < X \leq 52.5$	Very unfeasible	0	0%
Total		10	100%

Large-Scale Trial

A large-scale trial was conducted with 36 11th-grade Culinary students at SMK N 4 Yogyakarta on June 13, 2023. Students evaluated the comic media based on the quality of the material, design, and usefulness for learning about Indonesian soups and soto. Feedback was collected through a 30-question questionnaire. Based on Table 2, 32 students rated the media as highly feasible and 4 students rated it as feasible.

Table 2. Descriptive Statistical Results of Large-Scale Trials

Interval	Category	Frequency (f)	Percentage (%)
$97.5 < X \leq 120$	Highly feasible	32	88%
$74 < X \leq 97.5$	Feasible	4	12%
$52.5 < X \leq 75$	Unfeasible	0	0%
$30 < X \leq 52.5$	Very unfeasible	0	0%
Total		36	100%

DISCUSSION

Development Process of the Indonesian Soup and Soto Comic Media

The development of the digital comic learning media for Indonesian Soup and Soto processing began with the define stage, involving curriculum analysis, student characteristics assessment, and material selection. The curriculum implemented at SMK N 4 Yogyakarta is the 2013 curriculum. Analysis of student characteristics, conducted through interviews and observations, revealed that students at SMK N 4 Yogyakarta prefer visually rich materials, which align with Munadi's (2013) assertion that media selection should match student characteristics and needs. The data indicated that students found visual aids more engaging and easier to understand, supporting the choice of digital comics for their attention-grabbing and memory-enhancing qualities (Toh et al., 2017).

Clip Studio Paint (CSP) was selected for creating the comic, due to its user-friendly interface and comprehensive tools, outperforming other software like Photoshop used by Carolin (2019). The comic's format was A5 with Comic Sans MS font in size 11, designed to cover all competency indicators for Indonesian soups and soto processing. The language used was everyday vernacular, ensuring accessibility for students. The final product included 29 pages, covering all necessary content, and was validated by media and content experts, leading to enhancements such as additional material to meet competency indicators, new recipes, and tailored introductory and concluding sections in line with the 2013 curriculum.

Feasibility of the Indonesian Soup and Soto Comic Media in the PPMI Subject

The feasibility of the digital comic media for the Indonesian Soup and Soto Processing material was assessed through validation by media and content experts, both of whom rated it as highly feasible. A small-scale trial with ten students showed that 80% rated it highly feasible, while 20% found it feasible. In a larger trial involving 36 11th-grade culinary students at SMK N 4 Yogyakarta, 88% rated the comic media as highly feasible. These findings align with Carolin's (2019) study on the feasibility of digital comics in other educational settings, which also received high feasibility ratings.

Similarly, research by Andriani (2019) demonstrated that digital comics in mathematics classes significantly improved student understanding. The feasibility of the comic media was evaluated on several aspects, including design, media presentation, and alignment with basic competencies. The design aspect focused on layout, font, illustrations, and language, while alignment with basic competencies ensured the quality and relevance of the material presented.

The development and implementation of digital comic learning media for Indonesian Soup and Soto processing material have significant implications for vocational education. The high feasibility ratings from both media and content experts, as well as positive student feedback, underscore the potential of digital comics to enhance learning engagement and comprehension (Sutin et al., 2022). By catering to diverse learning styles through the VARK model, digital comics offer an inclusive and effective learning medium (Sutin et al., 2022).

While the digital comic media requires some teacher facilitation to explain types of Indonesian soups and soto, the ease of access and readability on smartphones address common issues related to physical books. The limitations of digital comics, such as the reliance on static images, highlight areas for future improvement, such as incorporating interactive elements to further enhance student engagement. Overall, the study contributes to the growing body of evidence supporting the use of digital comics in vocational education, particularly in culinary arts, and offers a practical solution to improve student outcomes in Indonesian Soup and Soto processing.

CONCLUSION

The development of the Indonesian soup and soto comic media followed the 4D model, encompassing the define, design, develop, and disseminate stages. The digital comic, created in A5 page size (21cm x 14.8cm) with Comic Sans MS font size 11, was tailored to align with the learning material and covered all competency indicators for the processing and presentation of Indonesian soups and soto. The feasibility of the digital comic media was rated highly feasible by both content and media experts. The trial conducted with 36 11th-grade Culinary students at SMK N 4 Yogyakarta showed that 88% of the students rated it as highly feasible and 12% rated it as feasible. This indicates that the Indonesian soup and soto digital comic can be effectively used as a learning medium in the PPMI subject for 11th-grade Culinary students. Based on the research findings, it is recommended to enhance the comic media by including more comprehensive content on Indonesian soups and soto and adding a wider variety of recipes. This digital comic can serve as a valuable reference and learning medium for culinary vocational students, college students, and anyone interested in learning about the preparation and presentation of Indonesian soups and soto.

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Development of Animated Videos for Nutritional Value Calculation for Agricultural Processing Vocational Students

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ABSTRACT

The objective of this research is to develop and evaluate the feasibility of a whiteboard animation video explaining the calculation of nutritional value information. This study employs the R&D (Research and Development) method using the 4D model (define, design, development, disseminate). The first stage, define, involves analyzing the problem, learners, curriculum, and material. The design stage includes the preparation of materials, storyboard, video script, animated images, and the formation of a production team. Development is the production phase of the media and validation by media and material experts. Dissemination involves the open distribution of the video via uploading to YouTube. The production of the video was dynamic and constrained by costs, labor, and time, necessitating further feasibility validation by users. The research results include: 1) A 12-minute and 54-second video discussing nutritional information and its calculation, uploaded to the Boga UNY YouTube channel. 2) The evaluation results show a high feasibility level, with a score of 95.56% by media experts and 96.89% by material experts. User assessments indicate a score of 90.05% by 30 students from the XII Agribusiness Agricultural Product Processing class at SMK N 1 Pandak. The video is considered highly suitable for use as an educational medium, thus not requiring immediate reproduction.

Keywords: Calculation of nutritional value information, animated educational video

INTRODUCTION

Digitalization is a key feature influencing various aspects of life in the era of the Fourth Industrial Revolution. This transformation presents significant challenges in industries, education, and politics. The ability to leverage digital technology is crucial in today's workforce. Both education and industry must develop transformation strategies that consider human resources with competencies in technology.

A crucial aspect supporting this transformation is the level of digital technology mastery. The teaching and learning process must integrate digital technology. Information and Communication Technology (ICT) is vital for educational advancement at all levels (Tatnall, 2020). The use of technology in education can

enhance the efficiency and quality of students' tasks and unlock the potential for developing new skills (Mourtzis et al., 2018).

Education continues to evolve with technological advancements. Education 4.0 introduces digital learning that combines the flexibility of distance learning with face-to-face social interaction. It emphasizes competencies, practical experience, and the shift of teachers' roles to mentors (Goldin et al., 2022). Teachers need to transform traditional teaching methods into innovative, student-centered approaches, catering to Generation Z.

Generation Z, raised in a technology-driven culture, requires flexible, technology-based learning (Scholz & Vyugina, 2019). They possess different thinking and problem-solving abilities compared to other generations with limited technological skills (Malyn-Smith & Angelie, 2020). They independently seek information on the internet and prefer engaging audiovisual learning methods (Cilliers, 2017).

Audiovisual technology is an effective tool for interacting with students (Ramlatchan, 2019), and video technology has become a popular educational medium. Effective educational media should engage students, make learning enjoyable, and convey information clearly and concisely (Martin & Bolliger, 2018). The use of media is essential as it allows students to explore further and understand messages through direct actions (Mfreke Umoh & Bassey, 2020).

Educational videos are one of the best methods in learning. TechSmith (2020) found that 83% of people prefer watching videos over reading text or listening to audio. Over 70% of YouTube users use the platform to solve problems.

Videoscribe, software for creating hand-drawn animation videos, is an effective tool for delivering engaging and interactive educational material (Air et al., 2015b). Videoscribe enables users to create attractive videos without special training (Lindsay, 2015). In the digital era, educational media such as videos provide better access and enhance self-learning abilities. Videoscribe, as hand-drawn animation video-making software, is an effective tool in the learning process.

The development of video is an ever-changing field that requires continuous adjustment. Effective video production must follow the latest trends, technologies, and techniques. However, video production is constrained by costs, time, and labor (Korkut et al., 2015), and once completed, it is difficult to change. Before deciding to reproduce a video, its relevance must be considered.

Vocational High Schools aim to train job skills and produce work-ready graduates. One of the competencies in SMK is Agribusiness of Agricultural Product Processing (APHP), which involves understanding agricultural products and processing them. APHP graduates are expected to have skills in processing agricultural products and preserving materials, as well as an understanding of food quality and safety.

The development of educational media focuses on core competency 3.11, which is the evaluation of basic material quality testing, part of the Basic Quality Control of Agricultural Products subject. This competency is foundational in the field of Agribusiness of Agricultural Product Processing, aiming to strengthen the understanding of agricultural product testing, including chemical tests such as carbohydrates, proteins, fats, water, and ash in agricultural materials.

Educational media are needed to support learning in SMK. The use of educational video media with material on calculating nutritional values on product packaging is important due to the lack of similar media. This video can help students understand the Basic Quality Control of Agricultural Products material more deeply. It is expected to facilitate student learning, aid in material comprehension, and provide an overview of product processing, thereby assisting teachers in delivering the Basic Quality Control of Agricultural Products material.

PURPOSE OF THE STUDY

The purpose of this study is to develop and evaluate the feasibility of a whiteboard animation video that explains the calculation of nutritional value information, specifically designed to enhance the learning

experience of students in the Agribusiness of Agricultural Product Processing program at Vocational High Schools. The study aims to integrate digital technology into the educational process, improve the quality and efficiency of teaching and learning, and support teachers in delivering complex material in an engaging and understandable format. Additionally, the study seeks to assess the effectiveness of this educational media in facilitating student comprehension and its potential impact on educational outcomes.

METHOD

This study employs the Research and Development (R&D) method, which aims to create and test specific products (Sugiyono, 2014). The R&D method involves creating new products through surveys, experiments, action research, and evaluation (Mulyatiningsih, 2011). The products can include models, media, books, modules, evaluation tools, and more. These products are tested in cycles with evaluation and revision before being widely implemented or used in real situations. The development model used in this study is the 4D model, consisting of the stages: define, design, develop, and disseminate.

The defined stage of the research was conducted from August 2019 to March 2020 at SMK Negeri 1 Pandak. The design and development stages took place from August 2019 to March 2020 at UNY. The final dissemination was conducted in July-August 2023 at SMK Negeri 1 Pandak among students of the Agribusiness Agricultural Product Processing program to evaluate the video's feasibility after four years of development.

Participants

The primary data source for this research is obtained through questionnaires. The subjects include two material experts and one media expert. Additionally, the video was evaluated by 30 students from the Agribusiness Agricultural Product Processing program at SMK Negeri 1 Pandak, following Mulyatiningsih's (2011) guideline, which recommends involving a limited number of teachers and students (around 30-100) in the product distribution and testing phase.

Data Collection and Analysis

Data on the feasibility of the educational media were collected using closed-ended questionnaires administered to media experts, material experts, and students. Respondents used a Likert scale from 1 to 4 to assess feasibility, where 4 indicates very feasible, 3 feasible, 2 not feasible, and 1 very not feasible (Widyoko, 2012). The assessment results were based on respondents' answers to the questionnaires.

The data collection instrument was a questionnaire that evaluated the feasibility of the educational video. The questionnaire for media experts focused on aspects of media usage and benefits. The questionnaire for material experts assessed educational content, material, and video benefits. Meanwhile, the questionnaire for students included evaluations of learning, media, material, and video benefits. The data collection instrument follows the research methodology of Purwaningsih (2021), which is similar in developing educational videos using the R&D method and the 4D model. This research shares characteristics with the development of whiteboard animation videos using Sparkol Videoscribe.

This study uses descriptive analysis with descriptive statistics to assess the feasibility of the educational video. Data were collected using a 4-point Likert scale, measuring positive and negative responses to statements. Feasibility assessment was based on scores documented in Table 1.

Questionnaire results were processed by summing the ratings from all respondents for each question and then dividing by the number of respondents. Likert scale data from questionnaires are considered interval scale data. The numerical data from respondents were interpreted qualitatively and compared with the interval scale as per Mulyatiningsih (2011), shown in Table 2, after percentage calculations were completed.

Table 1. Feasibility Assessment Scores

Assessment Aspect	Score
Very Feasible (SL)	4
Feasible (L)	3
Not Feasible (TL)	2
Very Not Feasible (STL)	1

Table 2. Media Feasibility Categories

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

Using the feasibility categories in Table 2, the validation results can be assessed according to the established categories. This guideline is used to determine the feasibility criteria for the educational animation video. The animation video is considered feasible if the respondents' assessment meets at least the "feasible" criteria.

FINDINGS

The whiteboard animation video for vitamins was developed using the 4D approach as follows:

Define

The problem analysis, learners, and curriculum were analyzed in the define stage. Observations were conducted at SMK N 1 Pandak. Based on the curriculum and material analysis, SMK N 1 Pandak uses a student-centered learning approach, but the use of technology has not been fully explored. The teacher of Basic Quality Control of Agricultural Products stated that there was no existing educational media on the calculation of nutritional information.

The development focuses on core competency 3.11, evaluating the basic quality testing of materials, which is part of the Basic Quality Control of Agricultural Products course. This competency supports the understanding of agricultural product testing, including chemical tests for carbohydrates, proteins, fats, water, and ash in agricultural materials.

Analysis of student characteristics revealed that students' learning styles align with Generation Z traits, preferring individual, engaging, visual, and technology-based learning. However, educational media at SMK N 1 Pandak is limited to verbal media such as presentations, handouts, and books. The school has internet and generator facilities that can support ICT use in learning. Based on the define stage analysis, this study will develop a whiteboard animation video for calculating nutritional value information.

Design

The first step was to prepare the material. This stage involved breaking down the core and basic competencies in the SMK N 1 Pandak curriculum, including learning objectives and indicators. After the breakdown, validation was carried out by an expert with expert judgment, and revisions were made as needed, such as adjusting the nutritional requirement calculations using the latest standards.

The material was developed into a storyboard with two parts: visual and narration. The storyboard aimed to provide an overall view of the video flow and facilitate the scriptwriting process. The storyboard was organized into a table with columns for scene number, visual source, and narration. The narration

writing process involved drafting, feasibility assessment, and revision. The narration was written in conversational language, avoiding overly technical or complex terms (Clark & Mayer, 2016). Vocabulary use was simple and direct (Anggraeni et al., 2021a; Anggraeni et al., 2021b). The visual sources were animated images designed using Paint Tool Sai software through stages such as design, sketching, consultation, and coloring. Both material and media experts evaluated the storyboard.

The video production team included a scriptwriter and validator, illustrator, image format editor, voice-over artist, audio editor, and animator. Team members were selected based on their skills, experience in video development (Hansch et al., 2015), and their ability to create character designs and artistic skills suited to VideoScribe characteristics. The whiteboard animation video used colored images. The voice-over artist was chosen for their clear voice, lack of a strong local accent, and appropriate intonation. Figure 1 shows the storyboard development flow for the visual part, including design, sketching, sketch revision, and image coloring.

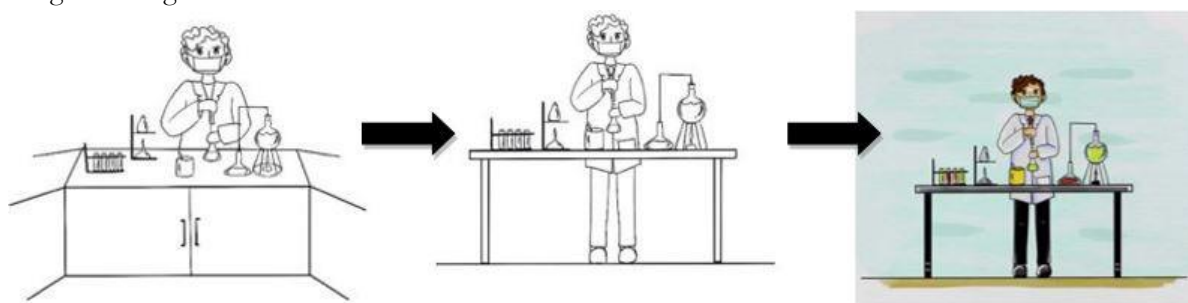


Figure 1. Storyboard Development Flow for Visuals

Develop

The animation video was developed using VideoScribe software. The initial animated images were created in JPEG format, then converted to SVG format using Inkscape. Only SVG format images draw well in VideoScribe (Air et al., 2015a). The voice-over was recorded using a Zoom H4N digital voice recorder with a condenser microphone and edited using Adobe Premier Pro.

After approval of the animated images and audio recordings, the animation process used VideoScribe software and audio integration with Filmora. The laptop specifications used were an HP Elitebook G1 Intel Core i5-4300U Haswell Up to 2.4GHz with 8GB RAM. The video was produced in mp4 format with a duration of 12 minutes and 54 seconds.

The produced video was evaluated for feasibility by media experts and material experts. The results of the feasibility test are presented in Table 3.

Table 3. Feasibility Test Results by Experts

Aspect	Material Expert	Media Expert	Category
Usage	97.50%	90.00%	Very Feasible
Benefit	100%	100%	Very Feasible
Media	-	96.67%	Very Feasible
Learning	95.83%	-	Very Feasible
Material	97.32%	-	Very Feasible
Total	96.89%	95.56%	Very Feasible

Figure 2(a) shows the video thumbnail on YouTube with an attractive image reflecting the content. One main feature of whiteboard animation is showing hand movements while drawing or writing, as shown in Figures 2(b), 2(c), and 2(d). The introduction includes general information on nutrition labels and proximate analysis in the laboratory, seen in Figures 2(b) and 2(c). The content on nutritional information calculation is shown in Figure 2(d). Each scene's duration was adjusted to match the voice-over narration.

Unlike typical whiteboard animation videos, this study used colored images to capture Generation Z students' attention. The video ends with a mind map summarizing all the material, as shown in Figure 2(e).

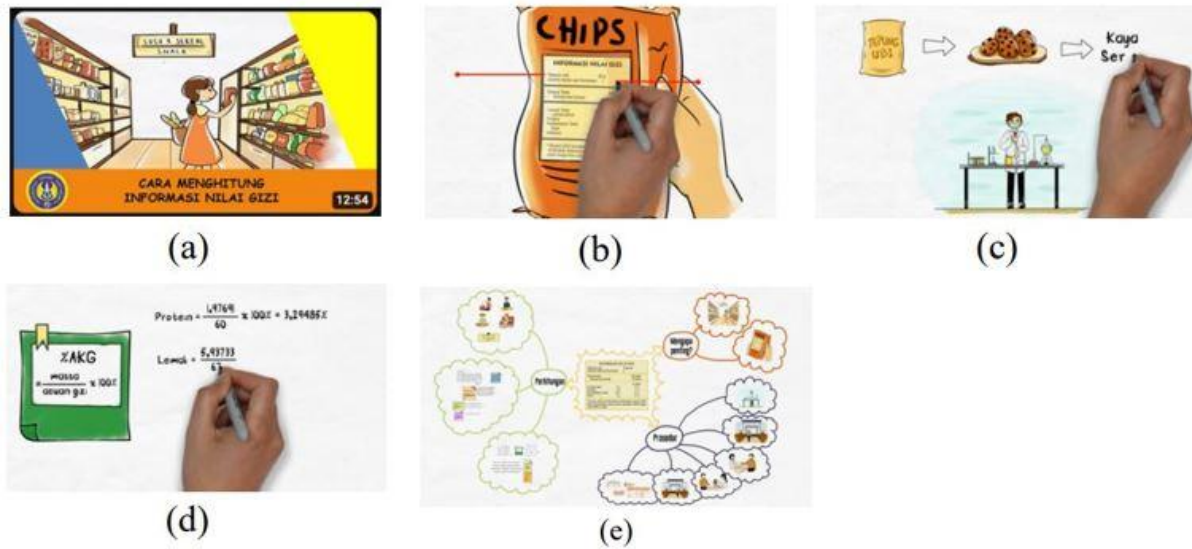


Figure 2. Nutritional Value Calculation Video Includes: (a) Thumbnail on YouTube, (b) Nutritional Information, (c) Proximate Analysis in the Laboratory, (d) Nutritional Value Calculation, and (e) Mind Mapping of the Entire Video Content

The results showed material expert scores of 86.25% and media expert scores of 96.21%, and by Rinawati et al. (2021), which showed material expert scores of 90.96% and media expert scores of 98.96%. Media experts suggested improvements to the video, including naming the video developers and possibly displaying proximate analysis in text form at the 2:35 mark. These suggestions will be considered for future revisions if time permits. Validation by material experts indicated the need to revise the nutritional requirement calculations to comply with the latest regulations, specifically the Indonesian National Agency of Drug and Food Control Regulation No.09 of 2016 on Nutrition Label References. These revisions will be revalidated until the material experts confirm the video's feasibility as an educational medium.

Disseminate

After incorporating feedback from material and media experts, the revised video was finalized with a duration of 12 minutes and 54 seconds. It was then openly disseminated by uploading it to the Boga UNY YouTube channel on March 21, 2020, accessible via this link, considering that over 70% of YouTube viewers use the platform to solve their problems (TechSmith, 2020). The nutritional value calculation video has garnered 9,710 views, 286 likes, and 0 dislikes over three years. It has also received positive feedback from the public, particularly from small business owners who found it beneficial based on the comments received.

With the dynamic progression of times, the 2013 curriculum has been replaced by the independent curriculum in 2023. Hence, a feasibility assessment by users was necessary to ensure that the video developed under the 2013 curriculum in 2019-2020 remains applicable under the new curriculum in 2023. The video is expected to benefit students and teachers by enhancing the quality of education under the new curriculum. The results of the feasibility assessment are shown in Table 4.

Table 4. User Feasibility Test Results

Aspect	Feasibility	Category
Learning	90.42%	Very Feasible
Media	91.02%	Very Feasible
Material	90.21%	Very Feasible
Benefit	91.67%	Very Feasible
Usage	86.94%	Very Feasible
Total	90.05%	Very Feasible

The difference in assessments between experts and students can be attributed to generational differences. Students, being part of Generation Z, are highly skilled in technology as they have grown up in the digital era. They are active users and adept at utilizing technology (Scholz & Vyugina, 2019). As digital natives, Generation Z students have different technological abilities than previous generations (Malyn-Smith & Angelie, 2020), giving them deeper insights into educational videos.

Video production evolves dynamically (LinkedIn, 2023), is constrained by costs, labor, and time (Korkut et al., 2015), and is difficult to modify once completed. The feasibility test of the nutritional value calculation video developed in 2019-2020, conducted with users in 2023, received positive feedback with a score of 90.05%. This indicates that the video is still highly suitable for use as an educational medium and remains relevant to current competencies, thus not requiring immediate redevelopment.

DISCUSSION

The study aimed to develop and evaluate the feasibility of a whiteboard animation video explaining the calculation of nutritional value information for students in the Agribusiness Agricultural Product Processing program at Vocational High Schools. The research employed the 4D model, encompassing define, design, develop, and disseminate stages. The problem analysis, conducted at SMK N 1 Pandak, identified a gap in the use of technology for teaching nutritional value calculation, aligning with the student-centered learning approach but lacking educational media. This aligns with previous findings by Tatnall (2020), highlighting the necessity of integrating ICT into education to enhance learning outcomes.

The feasibility evaluation by media and material experts indicated high feasibility levels, with scores of 96.89% and 95.56% respectively, corroborating the effectiveness of whiteboard animation as an educational tool. These findings are consistent with previous research by Surya et al. (2021) and Rinawati et al. (2021), who reported high feasibility scores for educational videos. The high feasibility rating suggests that the animation video meets the educational needs and preferences of Generation Z students, who favor engaging, visual, and technology-based learning methods (Scholz & Vyugina, 2019).

The user feasibility test conducted in 2023, three years after the video's initial dissemination, yielded a total feasibility score of 90.05%, further validating the video's suitability as an educational medium under the new independent curriculum. This ongoing relevance highlights the video's adaptability and effectiveness in enhancing the quality of education, as evidenced by its positive reception and significant viewership on YouTube.

The study contributes to the field of educational administration by demonstrating the practical application of R&D in developing educational media that effectively bridges curriculum changes and technological advancements. It underscores the importance of continuous evaluation and adaptation of educational tools to meet evolving educational standards and student needs. The research also offers valuable insights into the integration of digital media in vocational education, providing a model for future developments in educational technology.

However, the study faced limitations, including constraints on production costs, time, and resources, which are common challenges in video production (Korkut et al., 2015). These limitations suggest the need for sustainable funding and resource allocation strategies in future research and development projects. Additionally, the dynamic nature of technology and curriculum changes necessitates ongoing updates and revisions to maintain the relevance and effectiveness of educational media.

Future research should explore the long-term impact of such educational tools on student learning outcomes and engagement. It should also investigate the potential for scaling and adapting these tools across different educational contexts and subjects. By addressing these areas, future studies can further enhance the contributions of educational technology to the field of educational administration and management, particularly in areas such as educational leadership, policy and planning, academic economics, and educational politics.

In conclusion, the whiteboard animation video developed in this study has proven to be a highly feasible and effective educational tool, meeting the needs of both educators and students. Its success underscores the value of integrating innovative digital media into educational practices, paving the way for future advancements in educational technology and administration.

Product Limitations

The whiteboard animation educational video on calculating nutritional value information has several limitations, including:

- 1) The research only includes a feasibility test and does not cover the effectiveness of the learning.
- 2) The Basic Quality Control material is only partially explained in the video.
- 3) The video is uploaded on YouTube, requiring devices and internet data.
- 4) Limitations in video production skills necessitate collaboration with third parties, leading to a longer development duration.
- 5) Limited time for further video improvements.

CONCLUSION

The educational video was developed using the 4D approach (define, design, development, disseminate) and focuses on calculating nutritional value information for the Basic Quality Control of Agricultural Products course. The video content covers the importance of nutritional information on product packaging, the details on nutrition labels, how to obtain proximate analysis results, and the process of converting these results into nutritional value information. With a duration of 12 minutes and 54 seconds, the video was uploaded to the Boga UNY YouTube channel. The material experts rated the video at 96.89%, and media experts gave a score of 95.56%. User evaluations resulted in a score of 90.05%. These high ratings indicate that the video is highly suitable for use as an educational tool and does not require immediate redevelopment. The findings suggest that integrating engaging and visually appealing educational media like whiteboard animation videos can significantly enhance the learning experience for Generation Z students, who prefer interactive and technology-based learning methods. Future efforts should focus on maintaining the relevance and updating the content as needed to align with evolving educational standards and technological advancements.

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Fast Food Consumption Habits of Undergraduate and Applied Bachelor's Degree Culinary Arts Students

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ABSTRACT

The purpose of this study is to determine (1) knowledge, (2) attitudes, (3) actions, (4) the relationship between knowledge and attitudes, (5) the relationship between knowledge and actions, and (6) the relationship between attitudes and actions of Undergraduate and Applied Bachelor's Degree Culinary Arts students from the 2020 cohort at the Faculty of Engineering, Universitas Negeri Yogyakarta, regarding fast food consumption habits. This research is a survey-type study. The population consists of all Undergraduate and Applied Bachelor's Degree Culinary Arts students from the 2020 cohort, totaling 236 students. A sample of 148 students was selected using the Slovin formula with a 5% error margin through Proportional Purposive Sampling. The research instruments included a knowledge test (32 items), an attitude questionnaire (27 items), and an action data sheet using the FFQ, all of which were tested for validity and reliability. Data analysis was conducted using descriptive statistics and chi-square tests. The results show: (1) 85% of students have very high knowledge about fast food consumption, while 15% have high knowledge; (2) 7% have a very high attitude, 68% have a high attitude, and 25% have a moderate attitude towards fast food consumption; (3) actions towards fast food consumption show 13% very frequent, 60% frequent, 17% quite frequent, and 10% adequate; (4) knowledge does not influence attitudes with a p-value of 0.236 ($p > 0.05$); (5) knowledge does not influence actions with a p-value of 0.236 ($p > 0.05$); (6) attitudes influence actions with a p-value of 0.035 ($p < 0.05$).

Keywords: Knowledge, attitudes, actions, fast food consumption habits

INTRODUCTION

Fast food refers to food that can be prepared and served quickly, typically offered by fast food restaurants or street vendors specializing in quick meals. These foods generally have consistent taste quality and are easily accessible. Examples of fast food include burgers, fries, pizza, and fried chicken (Atinkut, et al., 2018). In contrast, ready-to-eat food, as defined by Ricci et al. (2018), refers to foods that have been pre-processed and cooked, allowing for immediate consumption without further cooking. These foods are often

packaged conveniently and can be found in cans, plastic, or vacuum-sealed packaging. Examples include instant noodles, canned soups, and frozen meals. Instant food refers to items that can be quickly and easily prepared without complex cooking processes, typically requiring only hot water or soaking. Examples of instant food include instant noodles, instant porridge, and instant coffee (Eftimov, et al., 2020).

The primary difference between these three types of food lies in their preparation time and convenience level. Fast food is quickly prepared by specialized vendors, ready-to-eat food has been pre-cooked and packaged for convenience, while instant food is designed for quick preparation and consumption. However, fast food often contains high levels of calories, fat, protein, sugar, and salt, but low fiber (Lowanga et al., 2021). Excessive consumption of fast food can lead to nutritional imbalances and obesity (Widyantara et al., 2014). High fat, salt, and sugar content, along with synthetic additives in fast food, can lead to various diseases, from mild to severe, including diabetes, arthritis, hypertension, heart attacks, strokes, and cancer. Nowadays, these degenerative diseases are not only affecting older individuals but also the younger generation (Agustina, 2022).

In Indonesia, fast food consumption habits are influenced by several factors, both internal (education, occupation, age) and external (environmental, sociocultural, mass media). Habits form behaviors, which encompass three domains: knowledge, attitude, and action. Research by Rahman et al. (2019) and Akmal (2019) indicate that higher knowledge levels correlate with increased frequency of fast food consumption. The third factor influencing fast food consumption habits is actions, which were notably impacted by the COVID-19 pandemic. Initially, to prevent the spread of COVID-19, educational institutions were closed, and online learning was implemented (Putri et al., 2017). While these measures helped reduce COVID-19 transmission, they also affected physical activity, dietary patterns, sleep schedules, social habits, and the mental health of students, ultimately influencing changes in nutritional status (Maharani & Santoso, 2022; Sari et al., 2023; Ningrum et al., 2022).

Culinary Arts students from the 2020 cohort at the Faculty of Engineering, Universitas Negeri Yogyakarta, have nutrition courses as part of their curriculum. Observations reveal that these students frequently consume fast food, despite their awareness of its negative aspects. Interviews with several respondents indicate that they consume fast food because it is affordable, tasty, easily accessible, and convenient. Limited allowances from parents (due to living away from home and staying in boarding houses) also contribute to their frequent fast food consumption.

Studies on fast food consumption habits among adolescents and students have been reported. Research by San Murdoko and Frisca (2023) and Psaltopoulou et al. (2021) noted an increase in overweight and obesity during the COVID-19 pandemic, with 70 (34.8%) subjects consuming fast food ≥ 3 times per week, indicating a relationship between fast food consumption habits and nutritional status. Similarly, Suhada and Asthiningsing (2020) and Stavridou et al. (2021) found a significant relationship between peer influence and knowledge with fast food consumption habits.

While previous studies have examined the general impact of fast food consumption on health and its prevalence among various populations, there is a lack of focused research on the specific habits and influencing factors among Culinary Arts students who have educational exposure to nutrition. This gap is crucial because understanding how knowledge and education in nutrition influence actual eating habits can help develop more effective health education programs.

PURPOSE OF THE STUDY

The purpose of this study is to determine (1) knowledge, (2) attitudes, (3) actions, (4) the relationship between knowledge and attitudes, (5) the relationship between knowledge and actions, and (6) the

relationship between attitudes and actions of Undergraduate and Applied Bachelor's Degree Culinary Arts students from the 2020 cohort at the Faculty of Engineering, Universitas Negeri Yogyakarta, regarding fast food consumption habits.

METHOD

This study employed a mixed-methods approach, utilizing both quantitative and qualitative methodologies through a survey design. The research was conducted from December 2021 to June 2022 at the Department of Culinary and Fashion Education, Faculty of Engineering, Universitas Negeri Yogyakarta.

Participants

The population of this study included all Undergraduate and Applied Bachelor's Degree Culinary Arts students from the 2020 cohort, totaling 236 students. The sampling method used was Proportional Purposive Sampling, with a sample size of 148 students determined using the Slovin formula with a 5% margin of error. This sample included students from three classes each in the Undergraduate and Applied Bachelor's Degree programs, ensuring representation across the cohort.

Data Collection and Analysis

Data were collected using a structured approach, comprising a knowledge test with 32 items, an attitude questionnaire with 27 items, and an FFQ (Food Frequency Questionnaire) for actions. All instruments were tested for validity and reliability. The data analysis was conducted using descriptive statistics and chi-square tests to explore relationships between variables.

The researchers, well-versed in educational research and survey methodologies, conducted the data collection and analysis. Their competencies ensured accurate and reliable data handling and interpretation.

FINDINGS AND DISCUSSION

The findings of this study are presented systematically, responding directly to the research objectives. Relevant quotations, examples, tables, and diagrams are included to support the findings.

Knowledge

The knowledge level about fast food consumption among students was very high (84%) and high (16%). The results in Table 1 suggest that the students' education, particularly in nutrition courses, significantly contributed to their knowledge levels.

Table 1. Distribution of Knowledge Levels

Category	Knowledge		Knowing		Understanding		Application		Average Percentage
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	
Very High	123	84%	144	97%	144	97%	134	91%	92.25%
High	22	16%	3	2%	4	3%	6	4%	6.25%
Moderate	0	0%	1	1%	0	0%	8	5%	1.50%

The data presented in Table 1 provides a comprehensive view of the distribution of knowledge levels among students regarding fast food consumption. The findings are noteworthy and provide several insights into the educational impact on students' understanding of nutritional topics.

The majority of students (84%) fall into the "Very High" category for knowledge about fast food consumption. This is further reinforced by the high percentages in the knowing (97%), understanding (97%), and application (91%) dimensions. Such a high level of knowledge suggests that the students have a robust understanding of the subject matter, likely due to the rigorous academic curriculum that includes extensive nutrition courses.

The data indicates that the students' education, particularly their coursework in nutrition, has significantly contributed to their high knowledge levels. The courses likely cover various aspects of nutrition, including the negative impacts of fast food consumption, which has equipped the students with the necessary information to make informed decisions about their dietary habits.

While the overall knowledge levels are high, there are some variations in the different dimensions of knowledge: Almost all students (97%) are aware of the basic facts about fast food consumption (knowing). The same high percentage (97%) understand the implications of these facts (Understanding). A slightly lower percentage (91%) apply this knowledge in practical contexts. This slight drop could indicate that while students understand the theoretical aspects, applying this knowledge consistently in their daily lives might be more challenging (Application).

A small fraction of students falls into the "High" (16%) and "Moderate" (1.5%) categories. This suggests that while the overall educational impact is strong, there are still areas for improvement to ensure that all students achieve the highest level of knowledge and application.

Attitudes

The majority of students (68.20%) fall into the "High" category for attitudes towards fast food consumption. This suggests that most students have a generally positive or favorable attitude towards fast food, recognizing both its convenience and its potential health impacts (see Table2).

Table 2. Distribution of Attitude Levels

Category	Attitude		Acceptance		Response		Appreciation		Responsibility		Average Percentage
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	
Very High	10	7%	39	26%	19	13%	15	10%	18	12%	13.60%
High	101	68%	102	69%	109	74%	90	61%	102	69%	68.20%
Moderate	37	25%	6	4%	20	14%	43	29%	24	16%	17.60%
Low	0	0%	1	1%	0	0%	8	0%	4	3%	0.80%

The majority of students (68%) fall into the High category for attitudes towards fast food consumption. This suggests that most students have a generally positive or favorable attitude towards fast food, recognizing both its convenience and its potential health impacts.

A significant proportion of students (69%) have a high level of acceptance towards fast food consumption. This indicates a broad acknowledgement and acceptance of fast food as a part of their diet. 74% of students respond highly towards the consumption of fast food, meaning they recognize and perhaps act on their attitudes towards fast food consumption. With 61% in the high category, students show a high level of appreciation for fast food, likely due to its convenience, taste, and accessibility. 69% of students exhibit a high sense of responsibility towards their consumption habits, understanding the health implications and trying to manage their consumption accordingly.

Only 13.60% of students fall into the Very High category on average. This suggests that while many students have positive attitudes, fewer have the strongest possible positive attitudes towards fast food. This could reflect a balanced view where students are aware of both the benefits and drawbacks of fast food consumption.

The Moderate category has an average of 17.60%, indicating that a significant minority of students have moderate attitudes towards fast food consumption. This group might be more neutral, neither strongly favoring nor opposing fast food. The Low category averages at 0.80%, showing very few students have low attitudes towards fast food consumption. This suggests that negative attitudes towards fast food are rare among this cohort.

Actions

The data presented in Table 3 provides a detailed overview of the distribution of action levels among students regarding their fast food consumption habits. The findings are insightful and highlight key aspects of student behavior. The frequency of fast food consumption was very high (13%), often (60%), quite often (17%), and sufficient (10%).

A significant portion of the students consume fast food frequently, indicating that fast food is a regular part of their diet (60%). A smaller, yet notable group of students consumes fast food very frequently, which suggests a high dependence on fast food for their daily nutritional needs (13%). The Quite Often category (17%) represents students who consume fast food quite frequently but not as regularly as those in the "Often" category. This suggests a moderate level of fast food consumption where students may balance their diet with other food options. The smallest group of students falls into the "Sufficient" category (10%), indicating that they consume fast food occasionally, possibly due to a higher awareness of healthy eating practices or other dietary preferences.

The high percentages in the "Often" and "Very Often" categories raise concerns about the nutritional quality of the students' diets. Regular consumption of fast food, which is often high in calories, fats, sugars, and salts, can lead to various health issues such as obesity, diabetes, and cardiovascular diseases. This pattern suggests that students may prioritize convenience and taste over nutritional value, which is a common trend among young adults.

Table 3. Distribution of Actions Levels

Category	Frequency	Percentage
Very Often	19	13%
Often	89	60%
Quite Often	25	17%
Sufficient	15	10%

Relationship between Knowledge Level and Attitudes

Based on Table 4, it is known that the p-value is 0.636, which is greater than 0.05, thus the null hypothesis (Ho) is rejected. This means that there is no significant relationship between the knowledge level of Undergraduate and Applied Bachelor's Degree Culinary Arts students and their attitudes.

Table 4. Relationship between Knowledge Level and Attitudes

		Attitude Level								Total	
		Very High		High		Moderate		Low		f	Pct.
		f	Pct.	f	Pct.	f	Pct.	f	Pct.		
Knowledge Level	Very High	9	6%	82	55%	33	22%	0	0%	124	84%
	High	1	1%	19	13%	4	3%	0	0%	24	16%
	Moderate	0	0%	0	0%	0	0%	0	0%	0	0%
	Low	0	0%	0	0%	0	0%	0	0%	0	0%
Total										148	100%
p-value										0.636	

This research finding aligns with the study conducted by Putri (2021), which also indicated no significant relationship between knowledge and attitudes, with a p-value of 0.750, which is greater than 0.05. The results from Putri's (2021) study suggest that having good or sufficient knowledge does not guarantee

that adolescents will consume fast food healthily. This is because there are other factors influencing fast food consumption patterns besides knowledge. These factors include attitudes, parental education, mass media, sociocultural influences, environment, interests, and age (Surbakti & Carolina, 2021).

Most adolescents can obtain information about fast food consumption patterns through electronic media (Internet), which contains a vast amount of information. However, not all this information is necessary or beneficial.

Relationship between Knowledge Level and Actions

Based on Table 5, it is known that the p-value is 0.236, which is greater than 0.05, thus the null hypothesis (Ho) is rejected. This means that there is no significant relationship between the knowledge level of Undergraduate and Applied Bachelor's Degree Culinary Arts students and their actions. This finding is supported by the research conducted by Sinulingga (2021), which stated that there is no relationship between knowledge and the practice of consuming fast food, with a p-value of 0.778. Similarly, Putri (2021) found no relationship between knowledge and the actions of consuming fast food, with a p-value of 0.831.

The high knowledge levels among students can be attributed to their educational background, as the Culinary Arts program includes nutrition courses. Additionally, students can access information about fast food from various media sources, such as social media and television. They choose fast food due to its quick preparation, which saves time and can be served anywhere and anytime. Fast food outlets are perceived as hygienic, affordable, and offering a variety of food that meets their preferences. Fast food is also considered trendy, modern, and fashionable among young people (Milner Jr, 2013).

Table 5. Relationship between Knowledge Level and Actions

		Action Level								Total	
		Very Often		Often		Quite Often		Sufficient		f	Pct.
		f	Pct.	f	Pct.	f	Pct.	f	Pct.		
Knowledge Level	Very High	15	10%	73	49%	21	14%	15	10%	124	84%
	High	4	3%	16	11%	4	3%	0	0%	24	16%
	Moderate	0	0%	0	0%	0	0%	0	0%	0	0%
	Low	0	0%	0	0%	0	0%	0	0%	0	0%
Total										148	100%
p-value										0.236	

Relationship between Attitude and Actions Level

Based on Table 6, it is known that the p-value is 0.035, which is less than or equal to 0.05, thus the null hypothesis (Ho) is accepted. This means that there is a significant relationship between the attitudes of Undergraduate and Applied Bachelor's Degree Culinary Arts students and their actions. This finding is consistent with the study by Putri (2021), which reported a relationship between attitudes and the actions of consuming fast food ($p = 0.000$). From the attitudes shown by students towards statements about fast food consumption, it can be seen that Undergraduate and Applied Bachelor's Degree Culinary Arts students exhibit poor eating behaviors. This is due to the influence of friends or social groups, limited time to cook healthy food due to busy schedules, and the nutritional imbalance and preservatives in fast food. If this consumption pattern becomes habitual, it will negatively impact the nutritional status of young adults,

leading to degenerative diseases (heart disease, cancer, and stroke) as their life expectancy increases (Gómez-Gómez & Zapico, 2019).

Table 6. Relationship between Attitude Level and Actions

		Actions Level								Total	
		Very Often		Often		Quite Often		Sufficient		f	Pct.
		f	Pct.	f	Pct.	f	Pct.	f	Pct.		
Attitude Level	Very High	2	1%	7	5%	0	0%	1	1%	10	7%
	High	13	13%	58	39%	18	12%	12	8%	101	68%
	Moderate	4	4%	24	16%	7	5%	2	1%	37	25%
	Low	0	0%	0	0%	0	0%	0	0%	0	0%
Total										148	100%
p-value										0.035	

CONCLUSION

The study aimed to determine the knowledge, attitudes, and actions of Undergraduate and Applied Bachelor's Degree Culinary Arts students from the 2020 cohort at the Faculty of Engineering, Universitas Negeri Yogyakarta, regarding fast food consumption habits. The findings reveal that the majority of students have very high levels of knowledge about fast food consumption, significantly influenced by their nutrition education. However, this knowledge does not significantly affect their attitudes or actions, as indicated by the p-values (0.236 for both relationships). In contrast, there is a significant relationship between attitudes and actions ($p = 0.035$), suggesting that students' attitudes play a crucial role in their consumption behaviors. Despite their high knowledge levels, students frequently consume fast food due to convenience, taste, and social influences. This indicates the need for more practical, behavior-oriented educational programs to bridge the gap between knowledge and healthy eating practices. Implementing workshops, interactive sessions, and awareness campaigns could help students make more informed dietary choices, ultimately improving their overall health and well-being.

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The Influence of Brand Image and Price Perception on Online Food Delivery Purchase Decisions

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ABSTRACT

This study aims to determine: (1) consumer perception of brand image in online food delivery services; (2) consumer perception of price in online food delivery services; (3) the level of consumer purchasing decisions in online food delivery services; (4) the influence of brand image perception on online food delivery purchasing decisions; (5) the influence of price perception on online food delivery purchasing decisions; and (6) the combined influence of brand image and price perception on online food delivery purchasing decisions. This research is a descriptive quantitative study using survey techniques. The population of this study consists of 5,098 students from the Faculty of Engineering at Yogyakarta State University. The sample size was determined using Slovin's formula, resulting in 100 participants, with samples collected using accidental sampling. The research instrument was a closed questionnaire (Google Form) with a Likert scale (1-4), tested for validity and reliability. Data analysis techniques included descriptive analysis and multiple linear regression with prerequisite tests, including normality, linearity, multicollinearity, and heteroscedasticity tests. The results showed that: (1) consumer perception of brand image is high, with an average score of 27.85; (2) consumer perception of price is high, with an average score of 28.65; (3) the level of purchasing decisions is high, with an average score of 47.1; (4) brand image perception influences purchasing decisions by 9.9%; (5) price perception influences purchasing decisions by 23.1%; and (6) simultaneously, brand image and price perception influence online food delivery purchasing decisions by 33%, with the remaining 67% influenced by other variables not examined in this study.

Keywords: Brand image, price perception, online food delivery, purchasing decision, consumer perception

INTRODUCTION

Current students belong to Generation Z, characterized as digital natives because they were born when the internet was already developed. The age range of Generation Z spans from 1995 to 2012 (WJ Schroer Company, 2004). Generation Z is diverse, global, and influential on culture and societal attitudes. Notably, Generation Z is adept at leveraging technological changes in various aspects of their lives.

Stillman & Stillman (2018) provide a comprehensive overview of Generation Z, identifying seven key characteristics: digital, fear of missing out (FOMO), hyper-customization, driven, realistic, Weconomist, and do-it-yourself (DIY). FOMO is a significant challenge for daily life, characterized by a high curiosity about various things, especially new ones. When Generation Z receives information that does not meet their needs, they may feel anxious and unable to act. They tend not to miss any notifications on their smartphones due to their high curiosity for the latest information, making them heavily dependent on their smartphones and worried about missing out on information.

Generation Z has both positive and negative traits. Their high curiosity about information enhances their technological proficiency, enabling them to independently seek out what they need. They are also multitaskers, often engaging in multiple activities simultaneously, such as reading, talking, watching, and listening to music. However, they can be impatient and prefer instant solutions to problems (Bakti & Safitri, 2017).

Because they favor instant gratification, Generation Z utilizes available technology to meet their daily needs, including obtaining food. Online food delivery services have become a solution for those who value efficiency, offering time-saving purchases, ease of payment transactions, and a variety of menu options. However, the convenience of online food delivery also fosters a tendency towards laziness and consumerism (Zuhara, 2022). This aligns with the phenomenon of students using online food delivery due to laziness or "mager" (reluctance to move) to buy food offline, making online food delivery an attractive alternative. Research by Maretha et al. (2020) supports this, indicating that laziness, busy schedules, and avoiding traffic lead students to choose online food delivery apps.

Several online food delivery services are available in Indonesia, with Gofood, Grabfood, and Shopeefood being the most popular. According to CLSA research, Gofood and Grabfood are the largest players in Indonesia. Astuti & Anggresta (2022) note that Grabfood launched in 2015, Gofood in 2016, and Shopeefood in 2020. Despite being relatively new, Shopeefood attracted 55% of consumers within its first week of launch in 2022 (Kusuma & Hermawan, 2020).

The presence of various online food delivery apps has intensified competition, not only among the apps themselves but also among merchants. Merchants, whether individuals or groups, operate as sellers of goods or services with physical or online stores partnered with online food delivery services. Each merchant has its own brand image, defined as a set of beliefs, ideas, impressions, and perceptions held by individuals or communities about a brand (Huda, 2020). Brand image includes three variables: corporate image, user image, and product image. It represents trust, which is crucial and based on experience, transaction sequences, and interactions that meet consumer expectations. The challenge arises when consumers face numerous merchant options selling similar types of food, making it difficult to choose.

Price is another key factor in consumer purchasing decisions, with competitive and relatively low prices being particularly attractive. However, online food delivery prices are generally higher than offline purchases due to additional costs like service fees, order fees, parking fees, and delivery charges. Furthermore, product prices are higher due to extra profit-sharing with the third-party delivery app.

PURPOSE OF THE STUDY

Based on these considerations, this study aims to determine: (1) consumer perception of brand image in online food delivery services; (2) consumer perception of price in online food delivery services; (3) the level of consumer purchasing decisions in online food delivery services; (4) the influence of brand image perception on online food delivery purchasing decisions; (5) the influence of price perception on online food delivery purchasing decisions; and (6) the combined influence of brand image and price perception on online food delivery purchasing decisions.

METHOD

This research is a survey study with a descriptive quantitative approach. In a survey study, information is collected from respondents using a questionnaire (Sugiyono, 2017). This study has two independent variables: brand image perception and price perception, and one dependent variable: purchasing decision. This study was conducted from August 2022 to July 2023 at the Faculty of Engineering, Yogyakarta State University.

Participants

The population used in this study consists of 5,098 students from the Faculty of Engineering, Yogyakarta State University. The sampling technique used in this study is accidental sampling, where the sample is taken based on incidental or specific opportunities when anyone suitable as a data source is encountered (Sugiyono, 2017). The sample criteria in this study are students of the Faculty of Engineering, Yogyakarta State University who use online food delivery services. The researcher determined the sample using Slovin's formula, resulting in 100 respondents.

Data Collection and Analysis

The data collection technique is the method used by the researcher to obtain the required information in a study. The data collection technique used in this research is a survey with a questionnaire method, where the instrument is a closed questionnaire (Google Form).

The validity test was conducted on 30 respondents. The result showed that the r table value for the number of respondents (N) 30 is 0.361. Items 1 – 30 have an r calculated value $>$ r table value of 0.361 ($n = 30$; $\alpha = 5\%$). Therefore, it can be concluded that these items are valid and can be used for data collection (see Table 1).

Table 1. Reliability Test

Variable	Cronbach's Alpha	Description
Brand Image (X1)	0.776	Reliable
Price (X2)	0.772	Reliable
Purchasing Decision	0.843	Reliable

Based on Table 1, it is shown that all variables have a Cronbach's Alpha $>$ 0.7, so it can be concluded that they are reliable and thus each item is suitable for use as a measurement tool.

This study uses descriptive analysis, which includes general data of respondents. Basic/prerequisite assumption testing includes normality test, linearity test, multicollinearity test, and heteroscedasticity test. Hypothesis testing is conducted using multiple linear regression analysis, coefficient of determination, and Effective Contribution (EC).

FINDINGS

Brand Image Perception

The brand image perception variable, which has three indicators: corporate image, product image, and user image, was measured using a questionnaire containing eight questions with answer options where the maximum value is 4 and the minimum value is 1. The sample consisted of 100 respondents, so the highest possible score is 32 and the lowest is 8. Based on the data obtained, the brand image perception variable has a mean (M) value of 27.85. The frequency distribution data were then grouped into several categories of consumer perception of the brand image using the Ideal Mean (M_i) = 20 and Ideal Standard Deviation (SD_i) = 4. The categories of consumer perception of brand image can be seen in Table 2.

Table 2. Categorization of Brand Image Perception

No.	Formula	Value	Frequency	Percentage (%)	Category
1	$X < Mi - 1SDi$	16-Aug	0	0	Low
2	$Mi - 1SDi \leq X < Mi + 1SDi$	16 - 24	4	4	Moderate
3	$Mi + 1SDi \leq X$	24 - 32	96	96	High
Total		100	100		

Based on Table 2, it can be seen that 96 out of 100 respondents fall into the high category. Thus, it can be concluded that consumer perception of brand image in online food delivery services is high at 96%, with a mean score of 27.85.

Price Perception

The price perception variable, which has four indicators: price affordability, price appropriateness with product quality, price competitiveness, and price appropriateness with benefits, was measured using a questionnaire containing eight questions with answer options where the maximum value is 4 and the minimum value is 1. The sample consisted of 100 respondents, so the highest possible score is 32 and the lowest is 8. Based on the data obtained, the price perception variable has a mean (M) value of 28.65. The frequency distribution data were then grouped into several categories of consumer perception of price using the Ideal Mean (Mi) = 20 and Ideal Standard Deviation (SDi) = 4. The categories of consumer perception of price can be seen in Table 3. Based on Table 3, it can be concluded that consumer perception of price in online food delivery services is "high," with 96 out of 100 respondents falling into the high category at 96%, with a mean score of 28.65.

Table 3. Categorization of Price Perception

No.	Formula	Value	Frequency	Percentage (%)	Category
1	$X < Mi - 1SDi$	16-Aug	0	0	Low
2	$Mi - 1SDi \leq X < Mi + 1SDi$	16 - 24	4	4	Moderate
3	$Mi + 1SDi \leq X$	24 - 32	96	96	High
Total		100	100		

Purchasing Decision

The purchasing decision variable has five indicators: need recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior, measured using a questionnaire containing 14 questions with answer options where the maximum value is 4 and the minimum value is 1. The sample consisted of 100 respondents, so the highest possible score is 56 and the lowest is 14. Based on the data obtained, the purchasing decision variable has a mean (M) value of 47.1. The frequency distribution data were then grouped into several categories of consumer levels regarding purchasing decisions using the Ideal Mean (Mi) = 35 and Ideal Standard Deviation (SDi) = 7. The categories of consumer perception of brand image can be seen in Table 4. The level of purchasing decisions in online food delivery services is "high," with 77 respondents falling into the high category at 77%, with a mean score of 47.1.

Table 4. Categorization of Purchasing Decision Level

No	Formula	Value	Frequency	Percentage (%)	Category
1	$X < Mi - 1SDi$	14 - 28	0	0	Low
2	$Mi - 1SDi \leq X < Mi + 1SDi$	28 - 42	23	23	Moderate
3	$Mi + 1SDi \leq X$	42 - 56	77	77	High
Total		100	100		

Normality Test

The normality test aims to determine whether the residual values are normally distributed. This test was conducted using the IBM SPSS Statistic 21 program with the Kolmogorov-Smirnov test. If Sig. > 0.05, the data distribution of the variable can be considered normal. The normality test results in this study showed an Asymp Sig. 2-tailed value of 0.924 > 0.05. From these results, it can be concluded that the residual values are normally distributed.

Linearity Test

The linearity test is used to determine whether the model used is linear. This study showed a Sig value of 0.389 > 0.05 for the brand image perception variable on purchasing decisions (X1 to Y) and a Sig value of 0.376 > 0.05 for the price perception variable on purchasing decisions (X2 to Y), indicating that the relationship between the independent variables and the dependent variable is linear. This means that the correct model for this study is a linear model, as a non-linear relationship between the independent and dependent variables cannot be analyzed using linear regression.

Multicollinearity Test

The multicollinearity test aims to test whether there is a perfect or near-perfect linear relationship (intercorrelation) between two or more independent variables in the regression model. In this study, the brand image perception and price perception variables both had a Tolerance value of 0.900 > 0.100 and a VIF value of 1.185 < 10.00, indicating that there is no multicollinearity issue with the brand image variable.

Heteroscedasticity Test

The heteroscedasticity test aims to assess whether there is a similarity of variance from one observation's residual to another in the linear regression model. The Glejser test results showed:

- 1) The brand image perception variable had a Sig. (2-tailed) value of 0.398 > 0.05, indicating no heteroscedasticity issue with the brand image variable.
- 2) The price perception variable had a Sig. (2-tailed) value of 0.797 > 0.05, indicating no heteroscedasticity issue with the price variable.

t-Test (Partial Regression Coefficient)

To test the hypothesis partially between the independent variables and the dependent variable, the t-test results were interpreted by considering the significance value and comparing the t calculated value with the t table value. The t-test results in this study are explained as follows:

- 1) First Hypothesis Testing (H1): The significance value for the influence of the X1 (Brand Image) variable on the Y (Purchasing Decision) variable is 0.005 < 0.05, and the t calculated value is 2.891 > t table value of 1.984, so it is concluded that H1 is accepted, meaning there is an influence of brand image on purchasing decisions in online food delivery services.
- 2) Second Hypothesis Testing (H2): The significance value for the influence of the X2 (Price) variable on the Y (Purchasing Decision) variable is 0.000 < 0.05, and the t calculated value is 5.045 > t table value of 1.984, so it is concluded that H2 is accepted, meaning there is an influence of price on purchasing decisions in online food delivery services.

F-Test (Simultaneous Regression Coefficient)

This test aims to determine whether there is a significant influence between the independent variables (X) simultaneously on the dependent variable (Y). In this study, the significance value of X1 – X2 simultaneously on Y is $0.000 < 0.05$, and the F calculated value is $23.921 > F$ table value of 3.939, so it is concluded that H3 is accepted, meaning there is a significant simultaneous influence of X1 – X2 on Y.

Coefficient of Determination

This analysis aims to determine the percentage of influence exerted by the X variables simultaneously on the Y variable. In this study, the coefficient of determination (R^2) value is 0.330 or 33%. This means that the influence of the X1 and X2 variables simultaneously on the Y variable is 33%, while the remaining 67% is influenced by other variables outside the scope of this study.

Predictor Contribution

Predictor contribution is an explanation of the amount of contribution each independent variable exerts on the dependent variable. In this study, the brand image perception variable influences purchasing decisions in online food delivery services by 9.9%, while the price perception variable influences purchasing decisions in online food delivery services by 23.1%.

DISCUSSION

Online food delivery services have become an alternative option for purchasing food and beverages. By utilizing these services, consumers can easily order food or drinks through their smartphones. In Yogyakarta, a city known for its student population, many students from various parts of the country, especially those pursuing higher education, often use online food delivery services due to practical considerations regarding time, effort, and cost.

In this study, the majority of students use the ShopeeFood platform, with 93 out of 100 respondents (93%) preferring it over other applications like GoFood and GrabFood. Although ShopeeFood is newer compared to GoFood and GrabFood, this has not diminished its usage intensity as an online food delivery service. The newness of ShopeeFood has led to numerous promotions that attract students. This is supported by research from Astuti & Anggresta (2022), which found that ShopeeFood includes various marketing features such as free delivery vouchers, discounts of 20% - 50%, and bundling offers.

The category of products most frequently ordered by students through online food delivery services is main meals, with 95% of orders falling into this category. This indicates that students tend to use online food delivery services to order staple foods. This finding aligns with research by Suaib & Amir (2020), which shows that students are more likely to order main meals rather than snacks on GoFood.

The most frequently ordered brand of food or beverages among students at the Faculty of Engineering, Yogyakarta State University, is Gacoan, with the largest percentage at 44% compared to other brands.

The data obtained in this study show that brand image perception and price perception, both partially and simultaneously, influence purchasing decisions in online food delivery services. Brand image is a perception that someone holds about a particular product. In online food delivery services, brand image refers to perceptions of the quality of a product based on various aspects such as the credibility of the store or merchant selling the product, popularity, quality, quantity, product attributes, and the confidence it provides after consumption. The results indicate that the brand image variable has a t-value of 2.891 with a significance value of 0.005 ($0.000 < 0.05$) and a positive regression coefficient of 0.537, proving that brand image perception positively influences purchasing decisions. This shows that consumers, especially students

at the Faculty of Engineering, Yogyakarta State University, consider brand image as a significant factor in their purchasing decisions for online food delivery. This finding is consistent with research by Arifta & Aulia (2023), which also found that brand image has a positive and significant influence on purchasing decisions.

Price in online food delivery services is the amount consumers must pay to obtain a product, serving as a measure of the benefits received. The results show that the price perception variable has a t-value of 5.045 with a significance value of 0.000 ($0.000 < 0.05$) and a positive regression coefficient of 0.969, proving that price positively influences purchasing decisions. This indicates that consumers, particularly students at the Faculty of Engineering, Yogyakarta State University, consider price an essential factor in their purchasing decisions for online food delivery. This finding aligns with research by Dwijantoro & Syarief (2021), which states that price has a positive and significant influence on purchasing decisions.

The F-test results show an F-value of 23.921 with a significance of 0.000 ($0.000 < 0.05$), proving that brand image perception and price perception simultaneously influence purchasing decisions in online food delivery services.

The categorization of variables shows that consumer perception of brand image is "high," with an average score of 27.85. This indicates that indicators within the brand image perception variable, such as store/merchant credibility, product attributes, product quality, product quantity, consumer lifestyle, social status, and consumer personality, are significant considerations in purchasing decisions for online food delivery. This relates to the respondent description, where the subjects are students who are in a productive age group, emphasizing the influence of lifestyle as a sub-indicator in the brand image perception variable.

Other data indicating that brand image perception is a consideration in purchasing decisions for online food delivery services show that the majority of students using these services are female, with a percentage of 59%. Women tend to be more impulsive and have higher consumption rates than men (Kusuma & Hermawan, 2020), which relates to the consumer lifestyle sub-indicator within the brand image perception variable.

Consumer perception of price in online food delivery services is categorized as "high," with an average score of 28.65. This shows that indicators within the price perception variable, such as price affordability (including purchasing power and flexibility), price appropriateness with product quality (including quality satisfaction), price competitiveness (including low prices and promotions/discounts), and price appropriateness with benefits (including efficiency and quality obtained), are significant considerations in purchasing decisions for online food delivery. This is supported by data from this study showing that most students at the Faculty of Engineering, Yogyakarta State University, have a monthly allowance of less than Rp. 1,000,000, with a percentage of 41%. The amount of allowance determines students' expenditures, including food purchases (Wulansari, 2019). Therefore, price appropriateness is a significant consideration for students in making purchasing decisions for online food delivery.

The level of purchasing decisions in online food delivery services is categorized as "high," with an average score of 47.1. This indicates that indicators within the purchasing decision variable, such as need recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior, are essential considerations for consumers before making a purchase through online food delivery services.

CONCLUSION

Based on the data analysis and discussion, it can be concluded that consumer perception of brand image and price in online food delivery services is categorized as "high," with 96% for both, and average scores of 27.85 and 28.65, respectively. This indicates that consumers significantly consider both the brand image and price of each product. The level of purchasing decisions is also categorized as "high," at 77%, with an average score of 47.1, suggesting frequent use of online food delivery services, particularly among students. Brand image perception positively and significantly affects purchasing decisions with an influence of 9.9%, while price perception has an influence of 23.1%. Together, these variables influence purchasing

decisions by 33%, indicating that other factors not examined in this study account for the remaining 67%. The findings imply that online food delivery service providers should focus on enhancing their brand image and maintaining competitive pricing to attract and retain customers. Further research could explore additional factors influencing purchasing decisions to provide a more comprehensive understanding of consumer behavior in this sector.

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Enhanced Calcium Content in Puli Crackers through Fortification of Free-Range Chicken Pasta

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ABSTRACT

This research aims to: (1) develop a nutrient-rich formula for free-range chicken Puli crackers; (2) identify the formula most preferred by panelists; (3) determine the nutritional content of the crackers using the proximate method; (4) assess changes in calcium levels during processing; (5) evaluate the portion size that meets calcium requirements; and (6) determine the shelf life of the crackers. The research was conducted in three stages: production of the crackers, preference testing, and nutritional content analysis. Production and preference testing took place at the PTBB FT UNY laboratory from March to June 2010, while nutritional analysis was performed at the CV Chem-Mix Pratama laboratory in July 2010. The preference test utilized the Hedonic method with 30 panelists, including 25 students and five lecturers from the Culinary Engineering Education Study Program PTBB FT UNY. Nutritional analysis included proximate analysis and fiber content measurement, covering water, ash, fat, protein, and carbohydrate contents. The results of this research are: (1) product formula variations of 10%, 30%, and 50% free-range chicken; (2) the 30% formula was the most preferred by panelists; (3) proximate analysis revealed water content of 2.4929%, ash content of 3.0289%, protein content of 15.1557%, fat content of 9.7012%, and carbohydrate content of 66.7105%; (4) calcium content decreased from fresh free-range chicken to pre-cooked chicken by 0.8532%, and from pre-cooked chicken to crackers by 0.5170%, with the final calcium content in the crackers being 1.2062%; (5) each serving of the crackers (2.5 g, or one piece) contains 0.02% of the recommended daily calcium intake (800 mg), and a 50 g package contains 1% of the recommended intake; (6) the shelf life of the crackers packaged in plastic is one month at room temperature (25-30°C).

Keywords: Fortification, chicken pasta, calcium content, Puli crackers

INTRODUCTION

The public's great interest in consuming free-range chicken stems from the superior taste of its meat compared to that of broiler chicken. Free-range chickens are raised in more natural conditions, which is

believed to contribute to the enhanced flavor and quality of their meat (Bagus Harianto, 2010). This preference has driven an increasing demand for free-range chicken to meet consumer needs.

Fortification is the process of adding essential nutrients to food products to enhance their nutritional value (Pangestuti, 2004). One potential application of fortification is in the production of Puli crackers by incorporating calcium from free-range chicken bones. This process can be achieved by creating a pasta from free-range chicken carcasses, which can then be added to the crackers, thus increasing their calcium content and nutritional value.

Despite the benefits of consuming free-range chicken, there is a need to address nutritional deficiencies, particularly calcium, in the general population. Puli crackers, a traditional snack, offer an excellent medium for fortification with calcium. Utilizing free-range chicken bones for this purpose not only enhances the nutritional profile of the crackers but also adds value to the product.

The general solution proposed is to develop a fortified version of Puli crackers by incorporating calcium-rich free-range chicken pasta. This approach leverages the natural rearing methods of free-range chickens, which are known to improve the quality of chicken products, and combines it with the nutritional benefits of calcium fortification.

Fortifying free-range chicken pasta to increase the calcium content in Puli crackers involves incorporating calcium-rich ingredients into the pasta, such as calcium-fortified soy or egg white protein, which can significantly enhance the calcium content (Rachman, 2019). Additionally, the choice of rearing system for the chickens plays a crucial role in the quality of the final product. Studies have shown that free-range rearing systems not only improve the overall product quality of chickens but also positively impact their microbial richness (Chen, 2018).

Furthermore, free-range chickens have access to natural environments, which can influence their gut microbial diversity and overall gut health (Hou L. S., 2020); (Hou L. S., 2019). This natural rearing method ensures that the chickens are healthier and their by-products, such as bones used in pasta, are of higher quality and nutritional value.

However, it is essential to consider potential risks associated with free-range systems. Free-ranging chickens may be more susceptible to *Salmonella* contamination due to exposure to wild birds and other carriers of the bacteria (Bailey, 2005). Therefore, stringent biosecurity measures should be implemented to mitigate such risks (Scott, 2018). Moreover, free-range chickens can serve as important sentinels for parasites like *Toxoplasma gondii*, highlighting the need for monitoring and control measures (Hamilton, 2019).

The existing literature provides substantial evidence on the benefits of fortifying food products with calcium to address nutritional deficiencies. Studies have demonstrated the effectiveness of incorporating calcium-fortified ingredients, such as soy and egg white protein, into various food products to enhance their nutritional value (Rachman, 2019). Furthermore, the advantages of free-range rearing systems in improving the quality of chicken products have been well-documented (Rachman, 2019); (Hou L. S., 2020); (Hou L. S., 2019).

However, there remains a gap in the specific application of these findings to traditional food products like Puli crackers. While the benefits of free-range rearing and calcium fortification are clear, their combined application in Puli crackers has not been extensively explored. Additionally, the potential risks associated with free-range rearing, such as *Salmonella* contamination and exposure to parasites, necessitate further investigation to develop effective mitigation strategies (Bailey, 2005); (Hamilton, 2019).

Based on its nutritional content, it is highly expected that the free-range chicken Puli cracker product will become one of the foods that can fulfill nutritional needs, especially calcium content, for the general public. Therefore, consuming free-range chicken Puli crackers is highly recommended.

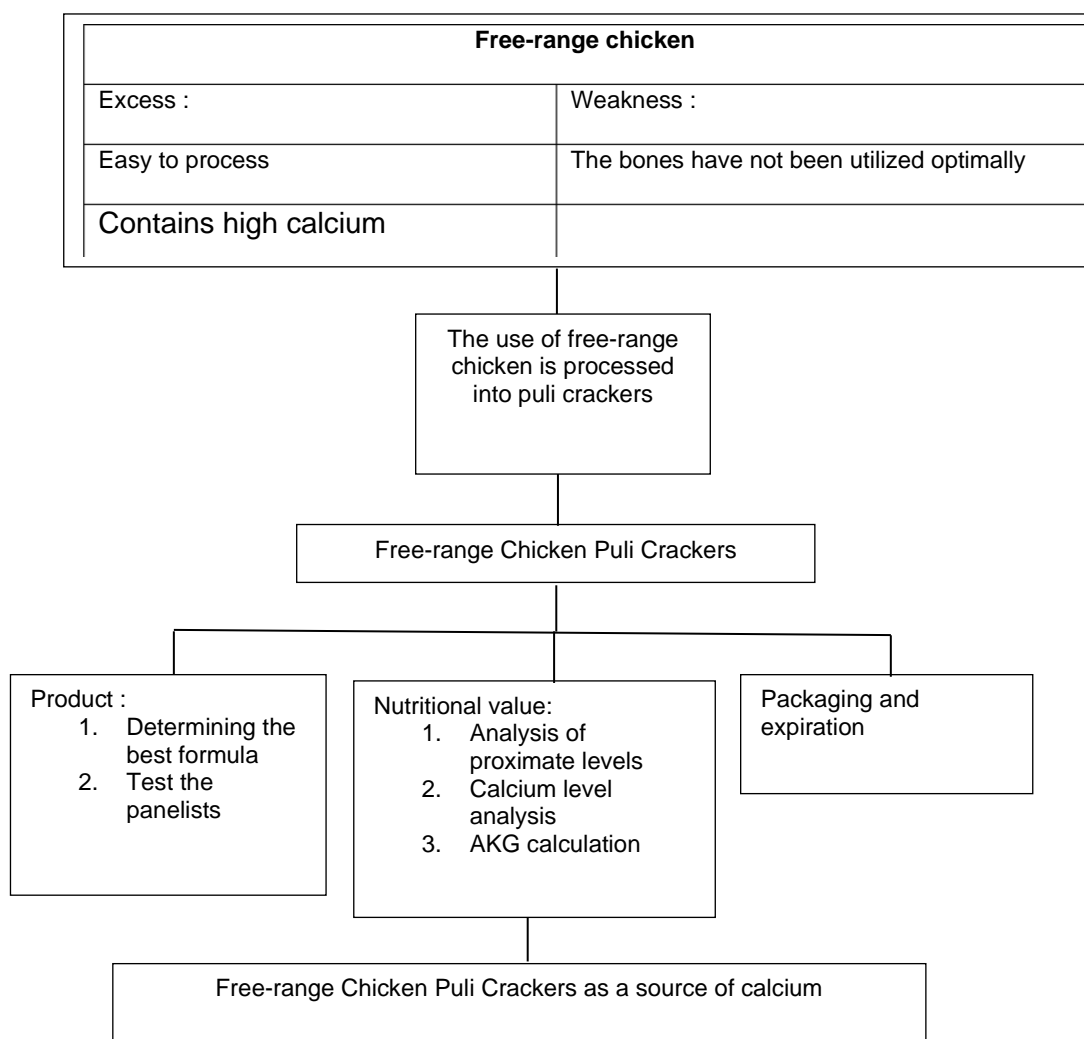


Figure 1. Framework Flowchart

The objective of this study is to develop a fortified version of Puli crackers by incorporating calcium-rich free-range chicken pasta. This innovative approach aims to enhance the nutritional value of Puli crackers, particularly their calcium content, to better meet the dietary needs of the general public. The novelty of this research lies in the unique combination of free-range chicken rearing and calcium fortification in a traditional food product, which has not been extensively studied.

The scope of the study includes evaluating the calcium content and overall nutritional profile of the fortified Puli crackers, assessing the quality and safety of the free-range chicken pasta, and examining consumer acceptance of the fortified product. By addressing these aspects, the study aims to contribute to the development of nutritious, high-quality food products that can enhance public health and meet consumer demands.

PURPOSE OF THE STUDY

The aim of this research are as follows: (1) Develop a nutrient-rich formula for free-range chicken Puli crackers; (2) Identify the most preferred formula among panelists; (3) Analyze the nutritional content

using the proximate method; (4) Assess changes in calcium levels during processing; (5) Determine the portion size required to meet daily calcium needs; (6) Establish the shelf life of the crackers.

RESEARCH METHODS

The materials used in this research included free-range chicken carcasses obtained from local farms, used for making the chicken pasta. Other ingredients required for making the Puli crackers were rice flour, water, and seasoning, which were sourced from standard suppliers. For the fortification process, calcium-fortified ingredients such as soy and egg white protein were utilized, as highlighted in previous studies (Rachman, 2019). The reagents and chemicals for the proximate analysis and fiber content analysis were procured from certified suppliers to ensure accuracy and reliability in the nutritional analysis (Hou L. S., 2020).

Participants

The sample preparation involved three stages: making the free-range chicken Puli crackers, conducting liking tests, and analyzing nutritional content. Initially, the free-range chicken carcasses were processed into pasta using a milling or blender process. This pasta was then mixed with rice flour and other ingredients to create the cracker dough. The dough was shaped into crackers and baked until crisp. Three samples were prepared with varying percentages of free-range chicken pasta (10%, 30%, and 50%), coded as 100, 101, and 102, respectively. These samples were prepared at the PTBB FT UNY laboratory from March to June 2010.

The experimental set-up for this research comprised three main stages: production, preference testing, and nutritional analysis. The production of the free-range chicken Puli crackers involved creating three different formulations with varying levels of chicken pasta. Preference testing was conducted using the Hedonic method, involving 30 panelists (25 students and five lecturers from the Culinary Engineering Education Study Program at PTBB FT UNY). The panelists rated the samples based on appearance, texture, taste, and overall acceptance. Nutritional content analysis was performed at CV Chem-Mix Pratama laboratory in July 2010, using proximate analysis to determine water, ash, fat, protein, and carbohydrate content (Bailey, 2005); (Scott, 2018).

Data Collection and Analysis

The parameters measured in this study included the proximate composition of the fortified Puli crackers, specifically water content, ash content, fat content, protein content, and carbohydrate content. Additionally, the fiber content of the crackers was analyzed. The liking test parameters included sensory attributes such as appearance, texture, taste, and overall acceptance, assessed using a Hedonic scale. Each sample was coded (100, 101, 102) and evaluated by the panelists to determine the preferred formulation (Chen, 2018); (Hou L. S., 2019).

Data from the liking tests and nutritional analysis were statistically analyzed using Analysis of Variance (ANOVA) to identify significant differences between the different formulations of the Puli crackers. The Hedonic method results were analyzed descriptively to summarize panelists' preferences. The proximate analysis data were also statistically evaluated to determine the impact of varying levels of free-range chicken pasta on the nutritional content of the crackers. This approach ensured a rigorous assessment of the data, enabling reliable conclusions to be drawn from the study (Hamilton, 2019); (Hou L. S., 2020).

FINDINGS

Presto Cooking of Free-Range Chicken

The process of presto cooking free-range chicken involves subjecting the chicken to high pressure with the aid of water steam and heating for approximately two to three hours. This high pressure causes the bones of the free-range chickens to become soft.

Product Formula Results for Free-Range Chicken Puli Crackers

Table 1 shows that the texture characteristics of free-range chicken Puli crackers in formula 1 differ from those in formulas 2 and 3. This is due to the lower amount of free-range chicken used in formula 1 (10%) compared to formula 2 (30%) and formula 3 (50%).

Table 1. Product Formula of Free-range Chicken Puli Crackers

No	Free-range Chicken Puli Crackers	Characteristics			
		Taste	Flavor	Color	Texture
1	Control	Tasty	Tasty	White	Crunchy
2	Formula 1	Tasty	Tasty	Whitish Yellow	Crunchy
3	Formula 2	Tasty	Free-range Chicken	Golden Yellow	Crunchy
4	Formula 3	Tasty	Free-range Chicken	Brown	Slightly Crunchy

Liking Test Results for Free-Range Chicken Puli Crackers

The panelists' liking test results indicate no significant difference between formula 2 and formula 3. However, the color preference for formula 1 and formula 2 was significantly different from that for formula 3. No significant differences were found in the aroma preference among the three formulas. The taste preference for formula 2 was not significantly different from that for formula 3. The texture preference for all three formulas did not show any significant differences.

Nutrient Content in Free-Range Chicken Puli Crackers Using Proximate Analysis

Table 2 indicates that the free-range chicken Puli crackers have a high carbohydrate content, which contributes to the non-crisp texture of the crackers.

Table 2. Analysis Results of Free-range Chicken Puli Crackers

Sample	Type of Analysis	Analysis Results		Sample Mean
		Repetition I	Repetition II	
Free-Range Chicken Puli Crackers	Water content (%)	2,5012	2,4847	2,49295
	Ash content (%)	3,0069	3,0510	3,02895
	Protein content (%)	15,1110	15,2003	15,1556
	Fat content (%)	9,7672	9,6352	9,7012
	Fiber content (%)	2,9818	2,8400	2,9109
	Carbohydrate (%)	66,633	66,7880	66,7105
	Calcium (%)	1,21302	1,1994	1,20621

Changes in Calcium Levels in Free-Range Chicken Puli Crackers During Processing

The analysis shows no significant difference in the calcium levels of the free-range chicken Puli crackers during processing.

Calculation of the Portion of Free-Range Chicken Puli Crackers to Meet Calcium Requirements

Free-range chicken Puli crackers are considered a snack. The recommended daily calcium intake is 800 mg. The calcium content of free-range chicken Puli crackers meets 0.02% of the total recommended calcium consumption. To meet daily calcium needs, one should consume other calcium-rich food sources in addition to these crackers.

Determination of Expiry Date for Free-Range Chicken Puli Crackers

Sensory tests were conducted with two panelists after storing the free-range chicken Puli crackers for one week, two weeks, three weeks, and four weeks in secondary packaging (plastic measuring 12 x 25 x 08). The panelists compared the aroma, texture, taste, and color of the stored crackers with those of freshly made crackers. The results suggest that the crackers have a shelf life of one month when stored at room temperature (25-30°C).

DISCUSSION

The study's findings demonstrate the effectiveness of fortifying Puli crackers with free-range chicken to enhance their calcium content. Proximate analysis of the crackers revealed the following nutritional composition: 2.4929% water, 3.0289% ash, 15.1557% protein, 9.7012% fat, and 66.7105% carbohydrates. Notably, the calcium content of the fortified crackers was measured at 1.2062%, which represents a significant increase in calcium levels compared to traditional crackers. Additionally, sensory evaluation indicated that the formula containing 30% free-range chicken was the most preferred among panelists, suggesting that the fortification did not adversely affect the product's sensory attributes.

The enhanced calcium content observed in the fortified Puli crackers aligns with previous studies that highlight the efficacy of calcium fortification in improving nutritional profiles of food products (Cormick et al., 2021; Palacios et al., 2020). Similar fortification strategies have been applied successfully in other food matrices, such as pasta, where calcium sources like eggshell powder and nano-calcium have been utilized to increase calcium levels (Prayitno et al., 2022; Nugraha & Bata, 2021). The nutritional benefits observed in this study are consistent with findings from Palacios et al. (2022) and Afzal (2020), who reported that calcium fortification is a cost-effective method to address dietary deficiencies. Furthermore, the minimal reduction in calcium content during processing, as evidenced in this study, corroborates the findings of Durotoye et al. (2022), who noted improved physicochemical properties in fortified products.

The implications of these findings are significant both scientifically and practically. From a scientific perspective, the study contributes to the body of knowledge on food fortification by demonstrating that incorporating free-range chicken can substantially enhance the calcium content of Puli crackers without compromising their sensory qualities. This aligns with the recommendations by Cormick et al. (2020) and Wagner et al. (2005) on the importance of adhering to regulatory guidelines to ensure the safety and effectiveness of fortified foods. Practically, the fortified crackers offer a viable solution for populations at risk of calcium deficiency, providing an accessible and enjoyable means to increase calcium intake. This study's approach also presents a model for future fortification efforts in various food products, potentially aiding in broader public health initiatives aimed at improving dietary mineral intake.

CONCLUSION

This study successfully developed and evaluated fortified Puli crackers using free-range chicken pasta, focusing on enhancing their calcium content. The variations in product formulas included three different concentrations of free-range chicken pasta: formula I with 10%, formula II with 30%, and formula III with 50%. Sensory evaluation using the Hedonic method revealed that panelists preferred formula II, which contained 30% free-range chicken pasta. Nutritional analysis through proximate analysis demonstrated that the Puli crackers had a water content of 2.4929%, ash content of 3.0289%, protein content of 15.1557%, fat content of 9.7012%, and carbohydrate content of 66.7105%. Calcium content analysis showed a reduction during processing, with fresh free-range chicken calcium levels decreasing by 0.8532% after cooking and by 0.5170% after pressure-cooking. The final calcium content in the Puli crackers was 1.2062%. Each 2.5 g serving of free-range chicken Puli crackers, consisting of one piece, provided only 0.02% of the recommended daily calcium intake (800 mg). Furthermore, the study established that the shelf life of these crackers, when packaged in plastic and stored at room temperature (25°C to 30°C), was one month. These findings contribute significantly to the development of nutrient-enriched traditional food products, highlighting the potential of free-range chicken pasta fortification to improve calcium intake. Future research should focus on optimizing fortification levels and investigating consumer health impacts over longer periods. This study underscores the importance of innovative approaches in food fortification, aiming to enhance public health and meet nutritional needs effectively.

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Consumer Preferences in Consuming Padang Cuisine in Yogyakarta City: An Examination of Individual, Environmental, and Food Characteristics Factors

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ABSTRACT

This study investigates consumer preferences for Padang cuisine in Yogyakarta, focusing on individual, environmental, and food characteristic factors. The research utilized a survey method, gathering data from 75 respondents across three popular Padang restaurants near Universitas Negeri Yogyakarta. The demographic analysis revealed that the majority of respondents were young adults, primarily students with limited income. Individual factors, including physiological and cognitive aspects, significantly influenced consumer preferences, as supported by previous studies (Chen & Antonelli, 2020; Mattes, 2009). Environmental factors, such as cultural and social influences, also played a crucial role, aligning with findings by Verbeke & López (2005) and Bell et al. (2011). Food characteristics, particularly taste, aroma, and presentation, were the most significant determinants of consumer preference. The study highlights the need for Padang restaurant owners to focus on affordability, quality, and flavor adaptation to meet local preferences while maintaining cultural authenticity. These insights contribute to the broader understanding of consumer preferences for traditional cuisines and offer practical recommendations for enhancing customer satisfaction and business growth.

Keywords: Preferences, consumer preferences, Padang cuisine, Padang restaurants

INTRODUCTION

Traditional foods are integral to the cultural heritage of local communities, developed through generations using both cultivated and naturally sourced ingredients (Harmayani, 2017). Indonesia, with its rich cultural diversity, boasts a wide array of traditional foods spanning regions such as Sumatra, Java, Kalimantan, Bali, Sulawesi, Nusa Tenggara, and Papua. According to Winarno (2016), traditional foods in Indonesia are categorized into appetizers, main courses, and desserts, with notable examples like rujak, rendang, and kolak, respectively.

Among these, rendang, a dish originating from the Minangkabau ethnic group in West Sumatra, has garnered international acclaim. UNESCO recognized rendang as one of the world's most delicious foods and a part of the world's intangible cultural heritage (Effendi, 2018). This recognition underscores the global appeal of traditional Indonesian cuisine, particularly Padang cuisine, which is celebrated for its rich flavors derived from coconut milk and spicy chili peppers.

Padang cuisine, characterized by its diverse and flavorful dishes such as rendang, sate padang, and gulai tauco, has a significant presence across Indonesia, including in Yogyakarta. The proliferation of Padang restaurants outside West Sumatra, especially in Yogyakarta, introduces variations in taste to cater to local preferences. Notably, Padang cuisine in Yogyakarta often adapts to a sweeter palate compared to its original spicy and rich flavors (Effendi, 2018).

Given these variations, understanding consumer preferences for Padang cuisine in Yogyakarta becomes essential. Consumer preferences are subjective tastes influenced by individual and environmental factors (Indarto, 2011). These preferences not only impact consumer satisfaction but also drive loyalty towards specific foods. Hence, identifying these preferences can help restaurateurs tailor their offerings to meet local demands more effectively.

Research on consumer food preferences highlights several influencing factors, including taste, freshness, convenience, and health considerations. For instance, studies on meat consumption preferences in Ogun State, Nigeria, revealed the significance of taste and freshness in consumer choices ("Evaluation of Socio-Economic Characteristics, Preference and Consumption Pattern of Meat Among the Inhabitants of Yewa in Ogun State, Nigeria", 2017). Similarly, Chironi et al. (2021) emphasized the role of spices in shaping consumer preferences for various cuisines.

Ethnic food preferences are also shaped by cultural awareness and exposure. Verbeke and López (2005) demonstrated how ethnic food familiarity influences consumer willingness to try and adopt new foods. Moreover, research on consumer segments within the organic food market by Nasir and Karakaya (2014) and the willingness to pay for low-carbon agricultural products by Geng et al. (2022) provide insights into how health orientation and environmental consciousness impact food choices.

Additionally, during the COVID-19 pandemic, consumer behavior towards food consumption underwent significant changes due to health concerns and social norms (Isaskar & Perwitasari, 2021). Studies by Hsu et al. (2021) on sustainable agro-food consumption and by Vermeir & Verbeke (2006) on the gap between consumer attitudes and behavioral intentions towards sustainable food consumption further elucidate the influence of external factors on consumer preferences.

Despite extensive research on consumer food preferences, specific studies focusing on traditional Indonesian cuisines like Padang cuisine are limited. Most existing studies, such as those by Bell et al. (2011) on ethnic food awareness and Shen & Chen (2020) on consumer purchase intentions for innovative food products, provide a broader understanding of food preferences but do not address regional variations in traditional cuisines.

Moreover, the impact of local adaptations on consumer preferences for traditional foods, especially in urban settings like Yogyakarta, remains underexplored. While Effendi (2018) highlighted the adaptation of Padang cuisine to local tastes, comprehensive studies that quantify these preferences and identify the key influencing factors are scarce.

Therefore, there is a need for targeted research to fill this gap by examining how individual, environmental, and food-related factors specifically influence consumer preferences for Padang cuisine in Yogyakarta. This study aims to address this gap by providing empirical insights into these preferences and their implications for restaurateurs.

PURPOSE OF THE STUDY

The objective of this study is to investigate consumer preferences for Padang cuisine in Yogyakarta, focusing on the influences of individual factors, environmental factors, and the characteristics of the food itself. This research is novel as it specifically addresses the adaptations and preferences of Padang cuisine outside its region of origin, providing valuable insights for restaurant owners to enhance customer satisfaction and loyalty.

The scope of the study includes a detailed analysis of consumer preferences through surveys and interviews, aiming to identify key factors that drive these preferences. By understanding these factors, the study will contribute to the broader literature on food preferences and offer practical recommendations for improving the culinary experience of Padang cuisine in urban settings like Yogyakarta.

METHOD

This study utilized a survey research methodology as defined by Neuman (2003), where information is gathered from respondents via questionnaires to assess beliefs, opinions, characteristics, and behaviors. The research was conducted at three widely recognized Padang restaurants near Universitas Negeri Yogyakarta: Rumah Makan Padang “Padang Murah,” Rumah Makan Padang “Kawan Lamo,” and Rumah Makan Padang “Sabana Murah.” These restaurants were selected due to their widespread presence and popularity in Yogyakarta. The study spanned six months, from February to July 2023, targeting a population of 250 individuals who patronized these restaurants.

Participants

The sampling technique employed in this study was purposive sampling, which ensures that the sample meets specific predetermined characteristics. The sample size was calculated using the Slovin formula to ensure adequate representation of the population. Data collection involved distributing questionnaires both offline and online, with 60% of the questionnaires administered directly to respondents and 40% distributed via Google Forms through smartphones and social media platforms.

Data Collection and Analysis

The experimental set-up involved the design and distribution of a questionnaire to measure consumer preferences for Padang cuisine in Yogyakarta. The questionnaire assessed three main factors: individual factors, environmental factors, and food characteristics. Individual factors (X1) included biological, physiological, psychological, and cognitive aspects. Environmental factors (X2) encompassed cultural, religious, and economic influences. Food characteristics (X3) covered aspects such as ingredient selection, preparation methods, and sensory attributes (colour, aroma, taste, and texture). Consumer preference (Y) was defined as the level of liking or preference for various Padang dishes.

The parameters measured in this study included consumer preferences, which were quantified using a structured questionnaire based on a Likert scale. The questionnaire contained 40 items (see Table 4), divided into sections corresponding to individual factors, environmental factors, and food characteristics. Responses were collected on a four-point Likert scale: Strongly Like, Like, Dislike, and Strongly Dislike, to avoid neutral responses. Construct validity of the questionnaire was established through expert judgment, followed by revisions based on expert feedback, and pilot testing with 30 respondents outside the main sample.

Statistical analysis was conducted using both descriptive and inferential methods. Descriptive statistics summarized the data to provide insights into the central tendencies and variability of consumer preferences. Inferential statistics involved multiple regression analysis to test hypotheses regarding the

relationships between independent variables (X1: Individual Factors, X2: Environmental Factors, X3: Food Characteristics) and the dependent variable (Y: Consumer Preferences). This analysis included t-tests, F-tests, and the calculation of determination coefficients to evaluate the significance and strength of these relationships (Neuman, 2003). Additionally, reliability analysis was performed using Cronbach's Alpha to ensure the internal consistency of the questionnaire (Table 1). Normality and multicollinearity tests were also conducted to validate the assumptions of the regression analysis (Tables 2 and 3).

Table 1. Reliability Test of Individual Factors

Variable	N of Items	Cronbach's Alpha
Individual Factors	10	0.801
Environmental Factors	9	0.813
Food Characteristic Factors	10	0.77
Consumer Preferences	11	0.768

Table 2. Normality Test

Unstandardized Residual	
N	75
Normal Parameters (a,b)	
Mean	0
Std. Deviation	2.44217774
Most Extreme Differences	
Absolute	0.068
Positive	0.068
Negative	-0.045
Kolmogorov-Smirnov Z	0.586
Asymp. Sig. (2-tailed)	0.882

Table 3. Multicollinearity Test

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistics
	B	Std. Error	Beta		
(Constant)	8.21	3.866		2.124	0.037
Individual Factors	0.366	0.111	0.339	3.291	0.002
Environmental Factors	0.252	0.109	0.236	2.325	0.023
Food Characteristics	0.234	0.087	0.269	2.71	0.008

FINDINGS

Respondent Demographics

The respondents were categorized based on gender, age, occupation, region of origin, monthly income, and the Padang restaurants they frequented. The demographic characteristics of the respondents can be seen in Table 4.

Among the respondents, there were 39 males and 36 females, indicating a higher number of male respondents at 39 (52%). Regarding age, 1 respondent (1.3%) was under 18 years old, 71 respondents

(94.7%) were aged between 18-25 years, and 3 respondents (4%) were over 25 years old. This data indicates that the majority of respondents were aged between 18-25 years, accounting for 71 respondents (94.7%).

Occupation-wise, 67 respondents were students, 4 were self-employed, and each of the following occupations had 1 respondent: private employee, fresh graduate, government employee, and architect. Thus, the majority of respondents were students, with a total of 67 (89.5%).

The regional origin of respondents included various areas: 1 respondent (1.3%) each from North Sumatra, Jambi, Bangka Belitung Islands, Lampung, Banten, DKI Jakarta, Central Kalimantan, North Kalimantan, Central Sulawesi, and Maluku; 9 respondents (12%) from West Sumatra; 5 respondents (6.6%) each from West Java and East Java; 17 respondents (22.6%) from Central Java; 26 respondents (34.6%) from the Special Region of Yogyakarta; and 3 respondents (4%) from West Kalimantan. Therefore, the largest group of respondents originated from the Special Region of Yogyakarta, totalling 26 (34.6%).

In terms of monthly income, 38 respondents earned less than 1 million, 30 respondents earned between 1-3 million, and 7 respondents earned more than 3 million. The majority of respondents earned less than 1 million monthly, totalling 38 (51.3%).

Regarding the frequency of visiting Padang restaurants, 34 respondents (45.3%) visited 1-2 times a month, 24 respondents (32%) visited 3-5 times a month, and 17 respondents (22.6%) visited more than 5 times a month. Therefore, the majority visited Padang restaurants 1-2 times a month, totalling 34 respondents (45.3%).

The respondents most frequently visited the Padang restaurant "Sabana Murah 3 UGM," with 38 respondents. Additionally, 25 respondents frequented "Padang Murah," and the least frequented was "Kawan Lamo," with 12 respondents.

Table 4. Demographic Characteristics of the Respondents

Category	Subcategory	Number of Respondents	Percentage
Gender	Male	39	52%
	Female	36	48%
Age	< 18 years	1	1.30%
	18-25 years	71	94.70%
	> 25 years	3	4%
Occupation	Student	67	89.50%
	Self-employed	4	5.30%
	Private Employee	1	1.30%
	Fresh Graduate	1	1.30%
	Government Employee	1	1.30%
	Architect	1	1.30%
Region of Origin	North Sumatra	1	1.30%
	Jambi	1	1.30%
	Bangka Belitung Islands	1	1.30%
	Lampung	1	1.30%
	Banten	1	1.30%
	DKI Jakarta	1	1.30%
	Central Kalimantan	1	1.30%
	North Kalimantan	1	1.30%

Category	Subcategory	Number of Respondents	Percentage
Monthly Income	Central Sulawesi	1	1.30%
	Maluku	1	1.30%
	West Sumatra	9	12%
	West Java	5	6.60%
	East Java	5	6.60%
	Central Java	17	22.60%
	Special Region of Yogyakarta	26	34.60%
	West Kalimantan	3	4%
	< 1 million	38	51.30%
	1-3 million	30	40%
> 3 million	7	9.30%	
Frequency of Visiting Padang Restaurants	1-2 times/month	34	45.30%
	3-5 times/month	24	32%
	> 5 times/month	17	22.60%
Most Frequented Padang Restaurants	Sabana Murah 3 UGM	38	-
	Padang Murah	25	-
	Kawan Lamo	12	-

Individual Factors Influencing the Consumption of Padang Cuisine

Individual factors were assessed using 10 questions, resulting in a highest score of 40 and a lowest score of 22. The analysis revealed a mean (M) score of 32.1867, a median (Me) score of 32, a mode (Mo) score of 34, and a standard deviation (SD) of 3.746055. With 7 class intervals, a data range of 18, and a class width of 2.6, the distribution showed that 14.6% (11 respondents) fell into the high category, 72% (54 respondents) into the medium category, and 13.3% (10 respondents) into the low category. Thus, individual factors predominantly influenced the medium category, involving 54 respondents (72%). See Table 5.

Table 5. Distribution of Individual Factor Frequencies

No.	Interval	Frequency	Percentage (%)
1	38.6-40.9	11	14.6
2	36-38.5	21	28
3	33.5-35.9	16	21.3
4	31-33.4	14	18.6
5	28.5-30.9	8	10.7
6	26-28.4	3	4
7	22-25.9	2	2.6
Total	-	75	100

Environmental Factors Influencing the Consumption of Padang Cuisine

Environmental factors, measured by 9 questions, yielded a highest score of 36 and a lowest score of 20. The analysis showed a mean (M) score of 27.1733, a median (Me) score of 26, a mode (Mo) score of 26, and a standard deviation (SD) of 3.46945. With 7 class intervals, a data range of 16, and a class width of 2.3,

the most common environmental factor frequency occurred in the 24.8-27.1 interval, involving 40% (30 respondents), while the least frequent was in the 34.4-36.7 interval, with 2.6% (2 respondents).

Table 6. Distribution of Environmental Factor Frequencies

No.	Interval	Frequency	Percentage (%)
1	34.4-36.7	2	2.6
2	32-34.3	7	9.4
3	29.6-31.9	11	14.6
4	27.2-29.5	10	13.4
5	24.8-27.1	30	40
6	22.4-24.7	10	13.4
7	20-22.3	5	6.6
Total	-	75	100

Food Characteristics Influencing the Consumption of Padang Cuisine

Food characteristics were evaluated with 10 questions, resulting in a highest score of 40 and a lowest score of 25. The analysis showed a mean (M) score of 36.39, a median (Me) score of 38, a mode (Mo) score of 40, and a standard deviation (SD) of 3.862. With 7 class intervals, a data range of 15, and a class width of 2.1, the highest frequency of food characteristics occurred in the 38.2-40.3 interval, involving 40% (30 respondents), and the lowest frequencies were in the 25-27.1 and 27.2-29.3 intervals, each with 2.7% (2 respondents).

Consumer Preferences in Consuming Padang Cuisine

Consumer preferences, evaluated through 11 questions, resulted in a highest score of 80 and a lowest score of 46. The analysis revealed a mean (M) score of 60.72, a median (Me) score of 60, a mode (Mo) score of 60, and a standard deviation (SD) of 7.266. With 7 class intervals, a data range of 34, and a class width of 4.9, the most common preference frequency was in the 56-60.9 interval, involving 41.3% (31 respondents), while the least frequent was in the 72-75.9 interval, involving 4% (3 respondents). The distribution showed that 15.7% (11 respondents) fell into the high category, 74.6% (56 respondents) into the medium category, and 10.7% (8 respondents) into the low category. Therefore, consumer preferences predominantly fell into the medium category, involving 56 respondents (74.6%).

The Influence of Individual Factors on Consumer Preferences in Consuming Padang Cuisine

Hypothesis testing was conducted to determine the influence of individual, environmental, and food characteristic factors on consumer preferences in consuming Padang cuisine. Table 7 shows the t-test results for individual factors, revealing a t-value of 3.321. Since the t-value is greater than 1.996, it indicates that individual factors significantly influence consumer preferences in consuming Padang cuisine.

The Influence of Environmental Factors on Consumer Preferences in Consuming Padang Cuisine

Table 7 presents the t-test results for environmental factors, revealing a t-value of 2.821. Since the t-value is greater than 1.996, it indicates that environmental factors significantly influence consumer preferences in consuming Padang cuisine.

Table 7. t-Test for Individual, Environmental, and Food Characteristic Factors

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error		
(Constant)	8.21	3.866	Beta	2.124
Individual Factors	0.476	0.341	0.423	3.321
Environmental Factors	0.452	0.209	0.439	2.821
Food Characteristic Factors	0.634	0.187	0.547	3.210

The Influence of Food Characteristics on Consumer Preferences in Consuming Padang Cuisine

Table 7 presents the t-test results for food characteristic factors, revealing a t-value of 3.210. Since the t-value is greater than 1.996, it indicates that food characteristics significantly influence consumer preferences in consuming Padang cuisine.

The Combined Influence of Individual, Environmental, and Food Characteristic Factors on Consumer Preferences in Consuming Padang Cuisine

The individual factors (X1) contribute 22.25% to consumer preferences, environmental factors (X2) contribute 25.15%, and food characteristic factors (X3) contribute 36.81%. Therefore, food characteristics are the most dominant variable influencing consumer preferences in consuming Padang cuisine, with a contribution of 36.81%.

DISCUSSION

The demographic analysis of respondents reveals a varied profile, highlighting key aspects that influence consumer preferences for Padang cuisine in Yogyakarta. Among the 75 respondents, 39 were male (52%) and 36 were female (48%). The age distribution shows a predominance of young adults, with 94.7% (71 respondents) aged 18-25 years, and only a small fraction below 18 or above 25 years. The majority of respondents were students (89.5%), with the rest being professionals such as self-employed individuals, private employees, fresh graduates, government employees, and architects. Geographically, most respondents were from Yogyakarta (34.6%), followed by Central Java (22.6%) and West Sumatra (12%).

Income-wise, 51.3% of respondents earned less than 1 million IDR per month, 40% earned between 1-3 million IDR, and 9.3% earned over 3 million IDR. In terms of dining frequency at Padang restaurants, 45.3% visited 1-2 times per month, 32% visited 3-5 times per month, and 22.6% visited more than 5 times per month. The most frequented restaurant was “Sabana Murah 3 UGM” (50.7%), followed by “Padang Murah” (33.3%) and “Kawan Lamo” (16%).

The demographic data suggests that Padang cuisine is particularly popular among young adults and students in Yogyakarta. This is consistent with previous studies indicating that economic factors and convenience significantly influence food choices among younger populations (Higenyi, 2014; "Evaluation of Socio-Economic Characteristics, Preference and Consumption Pattern of Meat Among the Inhabitants of Yewa in Ogun State, Nigeria", 2017). The high representation of students, who typically have lower income levels, underscores the need for affordable dining options, which Padang restaurants seem to fulfill effectively.

Individual factors, such as physiological and cognitive aspects, were found to play a significant role in shaping consumer preferences. The analysis showed a mean score of 32.19 for individual factors, with the majority (72%) falling into the medium category. This aligns with research by Chen & Antonelli (2020) and Mattes (2009), which highlights the importance of physiological satisfaction and cognitive perceptions in food choice. Consumers tend to choose foods that satisfy their hunger and align with their knowledge and positive past experiences, indicating a strong influence of these factors on their preference for Padang cuisine.

Environmental factors also significantly impacted consumer preferences, as shown by the frequency distribution. Most respondents (40%) scored in the interval 24.8-27.1, indicating that cultural and social influences are crucial. This is supported by studies from Verbeke & López (2005) and Bell et al. (2011), which demonstrate that cultural familiarity and social context play significant roles in food preferences. The adaptation of Padang cuisine to local tastes in Yogyakarta, such as adjusting spiciness levels to suit local preferences, further highlights the importance of these environmental factors.

The findings have several scientific and practical implications. Scientifically, the study supports the multifactorial nature of food preferences, integrating individual, environmental, and food characteristic factors (Chen & Antonelli, 2020; Bryła, 2019). The significant role of cognitive and physiological factors among young consumers suggests that future research should focus on these dimensions to better understand age-specific food preferences and decision-making processes.

Practically, Padang restaurant owners in Yogyakarta should tailor their offerings to meet the specific needs and preferences of their primary customer base, which is predominantly young adults and students. Strategies could include maintaining affordable prices, offering student discounts, and modifying flavors to align with local tastes, which tend to favor less spicy and slightly sweeter dishes. Leveraging social media and peer recommendations can also enhance customer engagement and loyalty, as young consumers often rely on these platforms for dining choices.

Furthermore, maintaining cultural authenticity while allowing for regional adaptations can help preserve the traditional appeal of Padang cuisine while making it accessible and enjoyable for a broader audience. This balance is crucial for sustainable business growth and cultural preservation. Overall, understanding and catering to the complex interplay of individual, environmental, and food characteristic factors can help Padang restaurants in Yogyakarta attract and retain a loyal customer base, thereby enhancing their competitive edge in the market.

CONCLUSION

This study examined consumer preferences for Padang cuisine in Yogyakarta, considering individual factors, environmental factors, and food characteristics. The findings reveal that the majority of respondents are young adults, predominantly students, who favor affordable dining options. Individual factors, particularly physiological and cognitive aspects, significantly influence consumer preferences, aligning with existing literature that highlights the importance of hunger satisfaction and informed food choices (Chen & Antonelli, 2020; Mattes, 2009). Environmental factors, such as cultural and social influences, also play a crucial role, with local adaptations of Padang cuisine to suit regional tastes further enhancing its appeal (Verbeke & López, 2005; Bell et al., 2011).

The study found that food characteristics, including taste, aroma, and presentation, are critical determinants of consumer preference. The regression analysis indicated that food characteristics had the most substantial impact on consumer preferences, followed by environmental and individual factors. This underscores the importance of maintaining high-quality food standards and adapting flavors to meet local preferences while preserving the authenticity of Padang cuisine.

Practically, these findings suggest that Padang restaurant owners should focus on affordability, quality, and flavor adaptation to attract and retain customers. Marketing strategies that leverage social media and emphasize cultural authenticity can further enhance consumer engagement. Future research could explore more diverse demographic groups and other regional adaptations to provide a broader understanding of consumer preferences for traditional cuisines.

Overall, this study contributes to the existing body of knowledge by highlighting the complex interplay of factors influencing consumer preferences for Padang cuisine in Yogyakarta. It offers valuable insights for restaurateurs aiming to meet consumer demands and supports the sustainable growth and cultural preservation of Padang cuisine.

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Culinary Economic and Social Impacts of Mega-Sporting Events: A Comprehensive Literature Review

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ABSTRACT

The abstract provides a concise summary of the comprehensive literature review on the culinary economic and social impacts of mega-sporting events, focusing on key findings, methodologies, and conclusions. Mega-sporting events like the Olympic Games and FIFA World Cup significantly influence host cities' culinary sectors, driving economic growth and social engagement. This review identifies how these events boost local economies through increased food-related revenues, job creation, and enhanced visibility of local culinary businesses. The social impacts include heightened community engagement and cultural exchange, contributing to a stronger sense of national identity and public diplomacy. However, challenges such as economic disparities, environmental concerns, and the effects of the COVID-19 pandemic are also discussed. The review utilizes a systematic approach to evaluate the literature, offering insights and recommendations for maximizing positive outcomes while addressing potential drawbacks. By highlighting best practices and strategic planning, the review aims to guide stakeholders in harnessing the opportunities presented by mega-sporting events to foster sustainable and inclusive development in the culinary sector.

Keywords: Mega-sporting events, culinary impacts, economic growth, cultural exchange, community engagement

INTRODUCTION

Mega-sporting events can have significant economic and social impacts on host cities and communities, especially concerning the growth of culinary impacts. Sporting events can influence culinary economic growth in various ways, contributing to the overall economic and social fabric of the host location. This section explores the multifaceted ways in which mega-sporting events affect culinary economic growth and the broader implications for host cities and communities.

Mega-sporting events such as the Olympic Games and the FIFA World Cup are often linked to substantial regeneration projects, infrastructure development, and the creation of new tourist attractions, shopping, and dining facilities (Ritchie et al., 2009). These events bring significant economic benefits,

including increased tourism, job creation, and enhanced local business activities. The culinary sector, in particular, can experience a surge in demand as visitors seek to explore local cuisines, leading to a boost in food-related revenues.

The impact on tourism varies depending on several factors such as the type of event, the countries participating, and the timing of the event (Fourie & Santana-Gallego, 2011). Understanding the community-level impact of hosting these events is crucial for garnering local support, recognizing benefits, and comprehending the multifaceted impacts on the economy, tourism, and overall well-being of the community (Navitas, 2024). Culinary tourism, driven by these events, can lead to sustained economic growth and improved living standards for local populations.

Mega-sporting events offer unique opportunities for the culinary industry to flourish. The influx of tourists during these events increases demand for food services, encouraging local restaurants, food vendors, and hospitality businesses to expand their offerings. This surge in demand can result in higher revenues and profitability for these businesses, contributing to the local economy (Povilanskas & Kontautienė, 2017).

From a sociological perspective, sports mega-events create opportunities for commercial and property developers in urban areas, contributing to the growth of consumer capitalism (Hörne, 2015). These events often lead to the development of new dining facilities and the enhancement of existing ones to cater to the diverse culinary preferences of international visitors. Consequently, local culinary businesses benefit from increased visibility and customer base, driving economic growth in the sector.

Mega-sporting events also facilitate social impacts by enhancing community engagement and promoting cultural exchange. Culinary experiences are integral to these events, providing a platform for showcasing local food traditions and fostering social interactions among attendees. The positive perceptions of residents towards these events often increase post-event, leading to a better understanding of how communities perceive the event's effects on their lives (Ribeiro et al., 2020).

Events like the Olympic Games and the FIFA World Cup can influence national identity and public diplomacy through nation branding (Knott et al., 2016). Hosting such events allows countries to highlight their culinary heritage, attracting international attention and fostering cultural exchange. This not only boosts tourism but also promotes a sense of pride and unity among local residents, enhancing social cohesion and community spirit.

While the economic benefits of mega-sporting events are well-documented, there is ongoing debate about their true worth, particularly regarding potential negative social and environmental impacts (Jones, 2001). The significant investments required for infrastructure development, including dining facilities, can strain local resources and lead to economic disparities. Additionally, the COVID-19 pandemic has presented challenges to hosting such events, leading to cancellations, postponements, and rescheduling, as observed with the Tokyo 2020 Olympic Games (Swart & Mammadov, 2022).

Moreover, the social implications of mega-sporting events extend beyond economics. These events can affect community spirit, socialization, and human capital within local communities. Concerns have been raised about the displacement of host community residents and the denial of human rights abuses associated with these events (Rocha & Xiao, 2022; Hörne, 2017). Furthermore, security and surveillance measures linked to mega-events have become more prominent, impacting the daily experiences of participants and local residents (Giulianotti & Klauser, 2012).

Culinary tourism, driven by mega-sporting events, plays a significant role in promoting local food, supporting tourism, boosting local economies, and preserving culinary traditions (Gündüz, 2024). Understanding the impacts of culinary interventions, especially in the context of promoting healthy eating habits, has been highlighted as a successful approach compared to traditional nutrition education programs (Domper, 2024).

The COVID-19 pandemic has also shed light on the sustainability and resilience of culinary tourism. Insights from studies on the impacts of the pandemic on culinary tourism, particularly on small vendors and businesses, provide valuable information for policymakers and industry stakeholders to develop strategies for recovery and long-term sustainability (Gaffar et al., 2022; Wati, 2024).

PURPOSE OF THE STUDY

The purpose of this review is to comprehensively examine the culinary economic and social impacts of mega-sporting events. Mega-sporting events, such as the Olympic Games and the FIFA World Cup, are globally recognized for their potential to drive substantial economic and social changes within host cities and nations. This review aims to explore how these events influence the culinary sector, thereby contributing to the broader economic and social landscapes of the hosting regions. By understanding these impacts, stakeholders can better harness the opportunities presented by such events while mitigating potential drawbacks.

METHOD

The methodology for this literature review involved a systematic approach to identify, evaluate, and synthesize relevant literature on the culinary economic and social impacts of mega-sporting events. The process comprised several steps, ensuring comprehensive coverage and robust analysis.

Literature Search and Selection

The review utilized multiple academic databases, including Google Scholar, JSTOR, PubMed, and ScienceDirect, to access peer-reviewed journals, conference papers, and other scholarly publications. These databases were chosen for their extensive coverage of sports, tourism, hospitality, and economic studies.

Keywords and phrases used in the search included "mega-sporting events," "culinary impacts," "economic benefits," "social impacts," "Olympic Games," "FIFA World Cup," "tourism," "cultural exchange," "food services," "public health," and "sustainability." Boolean operators (AND, OR, NOT) were employed to refine the search results and ensure a focused collection of relevant studies.

Studies were included if they:

1. Addressed the economic or social impacts of mega-sporting events.
2. Discussed the role of culinary services in these events.
3. Were published in peer-reviewed journals or reputable sources within the last 20 years.
4. Provided empirical data or substantial theoretical analysis relevant to the review's objectives.

Studies were excluded if they:

1. Focused solely on non-culinary aspects of mega-sporting events.
2. Were not available in English.
3. Lacked rigorous methodological frameworks or peer review.

Titles and abstracts of the identified articles were screened to assess their relevance. Full texts of potentially relevant studies were then retrieved for a more detailed evaluation.

Data Extraction and Synthesis

A data extraction form was used to systematically collect information from the selected studies. Extracted data included: Author(s) and publication year; Title of the study; Objectives and scope; Methodology; Key findings and conclusions; Relevance to the culinary economic and social impacts of mega-sporting events.

The extracted data were analyzed thematically to identify common themes, patterns, and gaps in the literature. Themes included economic benefits (direct and indirect), social impacts (community engagement, cultural exchange), public health and nutrition, and sustainability practices.

The thematic analysis was used to synthesize the findings, integrating insights from multiple studies to provide a comprehensive understanding of the topic. This synthesis highlighted the multifaceted impacts of culinary services at mega-sporting events and informed the development of recommendations for maximizing positive outcomes.

Validation and Review

The preliminary findings and synthesized themes were subjected to peer review by experts in sports management, tourism, and culinary studies. Their feedback was incorporated to enhance the rigor and reliability of the review.

Based on the peer review, necessary revisions were made to ensure clarity, coherence, and academic integrity. This iterative process helped refine the final review and ensure it met high scholarly standards.

FINDINGS AND DISCUSSION

Overview of Mega-Sporting Events

Definition of Mega-Sporting Events

Mega-sporting events are large-scale sports competitions that attract significant international attention and participation. These events are characterized by their ability to generate substantial economic, social, and cultural impacts on the host cities and nations. Examples of mega-sporting events include the Olympic Games, FIFA World Cup, and the Commonwealth Games. These events typically occur periodically, often every four years, and involve extensive planning and preparation by the host countries to accommodate athletes, officials, spectators, and global media coverage (Ritchie et al., 2009).

Key Characteristics and Examples

Mega-sporting events share several key characteristics that distinguish them from smaller or regular sporting events. These characteristics include:

Global Reach and Participation: Mega-sporting events involve participants from numerous countries, drawing spectators and media from around the world. This global reach amplifies their economic and social impacts, as they attract millions of viewers and tourists. For instance, the FIFA World Cup and the Olympic Games are broadcast to billions of people globally, making them prime opportunities for international visibility and nation branding (Knott et al., 2016).

Economic Impact: The economic implications of hosting mega-sporting events are profound. These events can stimulate local economies through increased tourism, infrastructure development, and job creation. Host cities often invest heavily in building or upgrading sports facilities, transportation networks, and hospitality services to cater to the influx of visitors. For example, the 2012 London Olympics led to significant urban regeneration projects and boosted the local economy through tourism and infrastructure improvements (Povilanskas & Kontautienė, 2017).

Social and Cultural Influence: Mega-sporting events have the power to influence social and cultural dynamics within host communities. They provide a platform for cultural exchange and promote national pride and unity. The cultural programs and ceremonies associated with these events showcase the host nation's heritage and traditions, fostering a sense of community and global interconnectedness. The 2008 Beijing Olympics, for instance, was an opportunity for China to showcase its cultural heritage and modernization efforts on a global stage (Ribeiro et al., 2020).

Infrastructure Development: Hosting mega-sporting events often necessitates extensive infrastructure development, including the construction of sports venues, accommodation facilities, and transportation systems. These developments can leave lasting legacies for host cities, enhancing their capacity to host future events and improving the quality of life for residents. However, the sustainability and long-term benefits of such investments are subjects of ongoing debate (Jones, 2001).

Nation Branding and International Relations: Mega-sporting events serve as platforms for host nations to enhance their international image and diplomatic relations. The events provide an opportunity to project a positive image to the world, attract foreign investment, and boost tourism. This aspect of nation branding is crucial for countries seeking to enhance their global standing and economic prospects (Hörne & Manzenreiter, 2004).

Economic and Social Significance

Mega-sporting events hold profound economic and social significance for host cities and communities. Their ability to attract global attention and generate substantial revenue makes them pivotal in driving economic development and fostering social cohesion.

Mega-sporting events are often linked to major regeneration projects, infrastructure development, and the creation of new tourist attractions, shopping, and dining facilities (Ritchie et al., 2009). These events stimulate the local economy through various channels. Firstly, the influx of tourists leads to increased spending on accommodation, dining, transportation, and entertainment, thereby boosting local businesses and creating job opportunities. For instance, the 2012 London Olympics generated approximately \$5.2 billion in additional economic activity and supported over 70,000 jobs in the UK (Povilanskas & Kontautienė, 2017).

Secondly, the significant investments in infrastructure development associated with hosting mega-sporting events have lasting benefits. Improvements in transportation networks, sports venues, and public utilities enhance the city's capacity to host future events and improve the quality of life for residents. For example, the transportation infrastructure upgrades for the Beijing 2008 Olympics included the expansion of the subway system, which continues to benefit the city's residents and visitors (Fourie & Santana-Gallego, 2011).

Furthermore, these events can lead to increased foreign direct investment as countries and corporations seek to capitalize on the heightened visibility and improved infrastructure. The economic impact extends beyond the immediate benefits, as the enhanced global profile of the host city can attract tourists and investors long after the event has concluded (Knott et al., 2016).

The social impacts of mega-sporting events are equally significant. These events often foster a sense of community pride and national identity. Hosting such high-profile events provides a platform for cultural exchange and promotes social cohesion by bringing together people from diverse backgrounds. The ceremonies and cultural programs associated with these events showcase the host nation's heritage and foster a sense of unity and pride among its citizens (Ribeiro et al., 2020).

Moreover, mega-sporting events can have a transformative effect on local communities by enhancing social infrastructure and human capital. For instance, volunteering programs associated with these events provide opportunities for skills development and community engagement. The London 2012 Olympics saw over 70,000 volunteers, whose involvement not only contributed to the event's success but also fostered a culture of volunteerism and civic participation (Taks et al., 2015).

However, the social impacts are not uniformly positive. There are concerns about the displacement of local communities, the exacerbation of social inequalities, and the potential for human rights abuses. For example, the preparations for the Rio 2016 Olympics involved the displacement of thousands of residents

from informal settlements, highlighting the need for careful consideration of the social costs associated with such events (Rocha & Xiao, 2022).

In conclusion, the economic and social significance of mega-sporting events is multifaceted. While these events can drive substantial economic growth and foster social cohesion, they also pose challenges that need to be managed to ensure that the benefits are equitably distributed and sustainable. Understanding these impacts is crucial for maximizing the positive outcomes of hosting mega-sporting events (Swart & Mammadov, 2022; Acha-Anyi, 2022).

Historical Perspectives

The history of mega-sporting events is rich and complex, reflecting the evolution of global sports culture and the increasing significance of these events in economic, social, and political contexts. Understanding the historical development of mega-sporting events provides insight into their current impacts and the ways in which they have shaped host cities and communities over time.

The concept of mega-sporting events dates back to ancient times, with the Olympic Games being one of the earliest examples. The ancient Olympics, held in Olympia, Greece, began in 776 BCE and were a significant cultural and religious event that drew participants from various city-states. These early games laid the foundation for the modern Olympic Games, which were revived in 1896 in Athens by Pierre de Coubertin (Ritchie et al., 2009).

Since their revival, the Olympic Games have evolved into one of the most prestigious and widely recognized sporting events globally. The scale and scope of the Games have expanded significantly, with the inclusion of new sports, the participation of more countries, and the introduction of the Winter Olympics in 1924. Each edition of the Games has seen advancements in infrastructure, technology, and global participation, reflecting broader socio-economic trends and geopolitical shifts (Povilanskas & Kontautienė, 2017).

Historically, mega-sporting events have been catalysts for economic and social transformations in host cities. The 1964 Tokyo Olympics are often cited as a turning point for Japan, showcasing its post-war recovery and technological advancements. The Games led to significant infrastructure developments, including the construction of highways, railways, and sports facilities, which had lasting economic benefits (Knott et al., 2016).

Similarly, the 1992 Barcelona Olympics are celebrated for their role in urban regeneration. The event transformed Barcelona into a leading tourist destination, with extensive redevelopment of the waterfront, improvement of transportation systems, and the creation of new public spaces. This transformation not only boosted the city's economy but also enhanced its global image and cultural appeal (Ribeiro et al., 2020).

In recent years, the scale and complexity of mega-sporting events have continued to grow. The 2008 Beijing Olympics and the 2016 Rio de Janeiro Olympics exemplify the modern era of these events, characterized by massive investments, extensive media coverage, and significant socio-economic impacts. The COVID-19 pandemic has further highlighted the vulnerabilities and challenges associated with hosting mega-sporting events, as seen with the postponement of the Tokyo 2020 Olympics (Swart & Mammadov, 2022).

Looking forward, the future of mega-sporting events will likely involve greater emphasis on sustainability, inclusivity, and technological innovation. Host cities and organizers are increasingly aware of the need to balance economic gains with social and environmental responsibilities, ensuring that the legacy of these events is positive and enduring (Acha-Anyi, 2022).

Culinary Dimensions of Mega-Sporting Events

Food plays an integral role in the experience of sport events, contributing significantly to the economic, social, and cultural dimensions of these occasions. The presence of diverse and appealing food options not only enhances the spectator experience but also drives economic activity and fosters cultural exchange. This section explores how food intersects with sport events, emphasizing its economic contributions, its role in fan engagement, and its cultural significance.

The economic impact of food at sport events is substantial. Concessions, food stalls, and dining facilities within and around stadiums generate significant revenue, supporting local businesses and creating jobs. For instance, professional sport entities recognize the profit potential of concessions, with some experts suggesting that these food and beverage sales represent a main point of game day revenue (Seaman, 2021). Studies indicate that many teams set ticket prices to complement a maximized expenditure at concessions, using targeted marketing practices that incorporate food and beverage into promotions (Seaman, 2021).

Mega-sporting events, such as the Olympic Games and FIFA World Cup, amplify these economic benefits. The influx of international visitors increases demand for food services, encouraging local restaurants and food vendors to expand their offerings. This surge in demand can lead to higher revenues and profitability for these businesses, contributing to the local economy (Povilanskas & Kontautienė, 2017). Moreover, the development of new dining facilities and the enhancement of existing ones to cater to diverse culinary preferences further boost the economic impact of food at these events (Knott et al., 2016).

Food is a crucial element in enhancing the overall spectator experience at sport events. Traditional and innovative food offerings engage fans, creating memorable experiences that go beyond the sporting action. The availability of unique and high-quality food options can significantly impact fan satisfaction and their intention to return to future events (Seaman, 2021).

Concessions at sport events often include local specialties and gourmet options, reflecting the host city's culinary heritage. For example, Boston's TD Garden, home of the Bruins hockey team, offers clam chowder and gourmet lobster rolls, while New Orleans' Smoothie King Center, home of the Pelicans basketball team, features an array of Creole culinary specialties (Seaman, 2021). These offerings not only cater to the tastes of diverse audiences but also enhance the cultural experience of attending a sport event.

Additionally, food traditions at sport events contribute to the atmosphere and sense of community among fans. Tailgating, for example, is a cherished pre-game ritual in American football, where fans gather to share food and socialize, creating a festive and communal environment. This tradition fosters a sense of belonging and enhances the overall game day experience (Ribeiro et al., 2020).

Food at sport events serves as a medium for cultural exchange and representation. Mega-sporting events, which attract international audiences, provide a platform for showcasing the host nation's culinary heritage. This cultural representation through food promotes national pride and facilitates intercultural dialogue among visitors.

Culinary offerings at these events often include a blend of local and international cuisines, reflecting the diverse backgrounds of participants and spectators. This diversity in food options not only caters to varied tastes but also highlights the cultural richness of the host city. For instance, the 2016 Rio Olympics featured a "Taste of Rio" food festival, showcasing Brazilian cuisine and promoting local culinary traditions to an international audience (Seaman, 2021).

Moreover, the integration of local culinary elements into the event's food offerings can enhance the cultural identity of the host city and contribute to its branding as a tourist destination. This cultural exchange through food can leave a lasting impression on visitors, encouraging them to explore more about the host city's culture and traditions (Knott et al., 2016).

Economic Aspects of Culinary Services

The economic aspects of culinary services at mega-sporting events are significant, encompassing direct and indirect benefits that contribute to the overall economic impact on host cities and communities. These events create substantial revenue streams through food and beverage sales, support local businesses, generate employment opportunities, and drive infrastructural development.

One of the primary economic benefits of culinary services at mega-sporting events is the generation of significant revenue. Concession stands, food stalls, and dining facilities within stadiums and event venues offer a wide range of food and beverage options to spectators. These sales can account for a considerable portion of the event's total revenue. For example, concessions are recognized as a main point of game day revenue, with many teams strategically setting ticket prices to encourage higher spending on food and drinks (Seaman, 2021). The influx of international visitors and the heightened demand for unique and local culinary experiences further amplify these revenues.

Culinary services at mega-sporting events provide a significant boost to local businesses, particularly those in the food and hospitality sectors. Local restaurants, food vendors, and suppliers experience increased demand, which can lead to higher sales and profitability. This economic stimulation extends beyond the duration of the event, as the enhanced visibility and reputation of local businesses can attract more customers in the long term (Knott et al., 2016).

The temporary nature of many event-related jobs can also serve as a stepping stone for individuals seeking to enter the workforce or gain experience in the hospitality industry. For instance, the London 2012 Olympics employed thousands of people in various capacities, including culinary services, thereby providing significant short-term employment benefits (Taks et al., 2015).

Infrastructural upgrades can include the development of new restaurants, food courts, and concession areas within and around event venues. These enhancements improve the overall visitor experience and contribute to the city's long-term economic development. For example, the 1992 Barcelona Olympics led to extensive urban regeneration, including the development of new dining and leisure facilities, which continue to benefit the city's economy (Ribeiro et al., 2020).

Economic Impacts of Culinary Activities

Mega-sporting events bring substantial direct economic benefits to host cities and communities, with culinary services playing a pivotal role in this economic boost. These benefits are primarily realized through increased revenue from food and beverage sales, job creation, and the stimulation of local businesses.

One of the most significant direct economic benefits of mega-sporting events is the revenue generated from food and beverage sales. Concession stands, food trucks, and dining facilities at and around event venues experience a surge in demand as thousands of spectators seek food and refreshments. This surge translates into substantial sales figures. For instance, at major sporting events like the Olympic Games and FIFA World Cup, the influx of international visitors and the heightened demand for local and international culinary options lead to considerable revenue for food vendors (Seaman, 2021).

Studies have shown that concession sales are a crucial revenue stream for event organizers and local businesses alike. Teams and event organizers strategically price tickets and promote food and beverage sales to maximize revenue (Seaman, 2021). The 2012 London Olympics, for example, saw a significant portion of its economic impact derived from food and beverage sales, contributing to the overall \$5.2 billion in additional economic activity generated by the event (Povilanskas & Kontautienė, 2017).

Mega-sporting events also create numerous job opportunities, both temporary and permanent, within the culinary sector. The need for a wide range of culinary services, including chefs, servers, food preparers, and supply chain workers, leads to a substantial increase in employment. These jobs provide valuable income

for local residents and contribute to reducing unemployment rates, particularly in the hospitality and food service industries (Taks et al., 2015).

The London 2012 Olympics, for instance, employed thousands of individuals in various capacities, including culinary services. This not only provided short-term employment but also offered opportunities for skills development and experience in the hospitality sector (Ribeiro et al., 2020). Such employment benefits can extend beyond the duration of the event, as businesses may retain skilled workers and continue to benefit from their enhanced capabilities.

The economic stimulation of local businesses is another direct benefit of culinary services at mega-sporting events. Local restaurants, food vendors, and suppliers experience increased demand, which leads to higher sales and profitability. This economic activity supports the growth of small and medium-sized enterprises (SMEs) and fosters a vibrant local economy (Knott et al., 2016).

During the 2008 Beijing Olympics, for example, many local eateries and food markets reported a surge in business, contributing to the overall economic uplift of the city (Fourie & Santana-Gallego, 2011). This increased patronage can have lasting effects, as the visibility and reputation gained during the event can attract more customers in the future, thereby sustaining economic benefits long after the event has concluded.

Indirect economic benefits of mega-sporting events, particularly through culinary services, extend well beyond immediate revenue and employment. These events boost tourism, leading to increased spending in various sectors such as hotels, retail, and transportation. The enhanced visibility of the host city fosters long-term tourism growth, with visitors returning to explore more extensively (Knott et al., 2016). Additionally, infrastructure developments, such as upgraded transportation and dining facilities, leave a lasting legacy that benefits the local economy (Fourie & Santana-Gallego, 2011). Moreover, the heightened profile of local culinary businesses can attract investment and encourage the growth of the hospitality sector, contributing to sustained economic development (Povilanskas & Kontautienė, 2017). Thus, mega-sporting events catalyze broader economic activities, creating a ripple effect that significantly boosts the host city's economy over time (Ribeiro et al., 2020; Taks et al., 2015).

Despite the significant economic benefits of mega-sporting events, there are notable challenges and limitations associated with hosting them. The high costs of infrastructure development and event organization can strain local resources and result in financial burdens for host cities (Jones, 2001). Additionally, the short-term nature of many jobs created by these events raises concerns about their sustainability and long-term impact on employment (Ribeiro et al., 2020). There are also issues related to economic disparities, as the benefits may not be equitably distributed across different community segments, potentially exacerbating social inequalities (Rocha & Xiao, 2022).

Social Impacts of Culinary Activities

Mega-sporting events play a crucial role in enhancing community engagement by bringing together diverse groups of people and fostering a sense of unity and pride. These events provide numerous opportunities for local residents to participate, whether as volunteers, spectators, or service providers, thereby promoting social inclusion and community cohesion (Taks et al., 2015).

Culinary services at these events significantly contribute to this engagement. Local food festivals and culinary showcases during mega-sporting events highlight regional specialties and culinary traditions, allowing residents to share their cultural heritage with a global audience (Ribeiro et al., 2020). This not only boosts community morale but also strengthens local identity and pride.

Furthermore, volunteering programs associated with these events offer valuable opportunities for skills development and civic participation. For instance, the London 2012 Olympics engaged over 70,000 volunteers, many of whom were involved in culinary services, thereby fostering a culture of volunteerism and enhancing social capital (Taks et al., 2015).

Mega-sporting events significantly boost culinary tourism and facilitate cultural exchange by attracting international visitors eager to experience the host nation's food culture. These events provide a platform for showcasing local culinary traditions, thus promoting the host city as a gastronomic destination (Knott et al., 2016).

Moreover, culinary events and food festivals associated with mega-sporting events encourage interactions between locals and international visitors, facilitating a deeper understanding and appreciation of different cultures. This cultural exchange through food promotes mutual respect and strengthens global community ties (Ribeiro et al., 2020).

Case Studies of Culinary Impacts at Mega-Sporting Events

Examining specific mega-sporting events provides valuable insights into the culinary impacts on host cities. These case studies highlight how culinary services enhance economic benefits, promote cultural exchange, and address challenges related to food safety and public health.

The 2012 London Olympics are a prime example of the positive culinary impacts of mega-sporting events. The event significantly boosted local businesses, with food and beverage sales contributing to the overall economic impact of \$5.2 billion (Povilanskas & Kontautienė, 2017). The "Food Vision for the London 2012 Games" initiative emphasized sustainability and local sourcing, promoting healthy eating habits among visitors (Seaman, 2021). This initiative showcased British cuisine and supported local farmers and food producers, enhancing the economic benefits for the community.

The 2012 London Olympics

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The 2016 Rio Olympics

The 2016 Rio Olympics further illustrate the culinary impact of mega-sporting events. The "Taste of Rio" food festival highlighted Brazilian cuisine, promoting cultural exchange and enhancing the visitor experience (Seaman, 2021). This festival not only boosted local tourism but also provided international exposure to Brazilian culinary traditions, fostering mutual cultural appreciation (Knott et al., 2016). Despite the economic benefits, the event faced challenges related to food safety and the need for stringent health regulations to manage mass food production and prevent foodborne illnesses (Rocha & Xiao, 2022).

The 2008 Beijing Olympics

The 2008 Beijing Olympics demonstrated the potential for mega-sporting events to transform local culinary landscapes. Significant investments in dining facilities and infrastructure led to long-term benefits for Beijing's hospitality sector. The event also promoted Chinese culinary heritage on a global stage, attracting culinary tourists and boosting local businesses (Fourie & Santana-Gallego, 2011). The emphasis on traditional Chinese dishes during the Games helped foster a greater appreciation for the country's culinary diversity and contributed to increased international tourism in subsequent years.

The FIFA World Cup

The FIFA World Cup, held in various countries, consistently showcases the culinary diversity of host nations. For example, the 2010 FIFA World Cup in South Africa highlighted local dishes such as bobotie and boerewors, enhancing the cultural experience for visitors and promoting South African cuisine internationally (Ribeiro et al., 2020). The economic impact included increased revenue for local food

vendors and long-term tourism growth, as international visitors were drawn to the country's rich culinary offerings.

Strategies for Maximizing Positive Impacts

To maximize the positive impacts of culinary services at mega-sporting events, a multi-faceted approach is required. This involves strategic planning, sustainable practices, and innovative solutions that address economic, social, and environmental dimensions.

Strategic Planning and Collaboration

Effective strategic planning is crucial for ensuring that culinary services at mega-sporting events contribute positively to the host community. This includes careful coordination with local businesses, food vendors, and stakeholders to optimize the benefits of increased tourism and economic activity. Organizers should collaborate with local food producers to ensure that the event showcases regional specialties and supports local agriculture. For instance, the London 2012 Olympics' "Food Vision" emphasized local sourcing and sustainability, benefiting local farmers and promoting British cuisine (Seaman, 2021).

Sustainable Practices

Sustainability is a key consideration for maximizing the positive impacts of culinary services. Event organizers should implement practices that minimize environmental footprints, such as reducing food waste, using eco-friendly packaging, and promoting plant-based menu options. The 2012 London Olympics set a precedent with its commitment to sustainability, including initiatives to reduce food miles and encourage recycling (Povilanskas & Kontautienė, 2017). These practices not only enhance the event's environmental credentials but also resonate with increasingly eco-conscious consumers.

Innovation and Technology

Incorporating innovative solutions and leveraging technology can enhance the efficiency and impact of culinary services at mega-sporting events. Mobile apps for pre-ordering food, cashless payment systems, and real-time inventory management can streamline operations and improve the spectator experience. Additionally, technological advancements in food preparation and delivery can help meet the high demand while maintaining quality and safety standards (Widjanarko, 2024).

Community Engagement and Cultural Promotion

Engaging the local community and promoting cultural exchange through food are essential strategies. Events should include cultural programs and food festivals that highlight local culinary traditions, fostering a sense of pride and unity among residents. The "Taste of Rio" food festival during the 2016 Rio Olympics is an excellent example of how culinary events can promote cultural heritage and enhance the visitor experience (Seaman, 2021). Encouraging community participation through volunteer programs and local vendor involvement also strengthens social cohesion and ensures that economic benefits are widely distributed (Taks et al., 2015).

Public Health and Safety

Ensuring food safety and promoting public health are critical for the success of culinary services at mega-sporting events. Organizers should work closely with health authorities to establish stringent food safety protocols and provide training for food handlers. Public health campaigns that promote nutritious food choices can enhance the overall health impact of the event (Rocha & Xiao, 2022). The emphasis on healthy and safe food options can also mitigate potential health risks associated with mass gatherings (Domper, 2024).

CONCLUSION

Mega-sporting events hold substantial potential for economic and social transformation, particularly through their culinary impacts. The diverse range of food and beverage services at these events generates significant direct and indirect economic benefits, including increased revenue, job creation, and the stimulation of local businesses (Seaman, 2021; Povilanskas & Kontautienė, 2017). Additionally, these events foster community engagement, cultural exchange, and public health promotion, highlighting the integral role of culinary services in enhancing the overall event experience (Knott et al., 2016; Ribeiro et al., 2020).

However, to maximize these positive impacts, it is crucial to address the associated challenges and limitations. Issues such as high infrastructure costs, economic disparities, and environmental sustainability need careful consideration and strategic planning (Jones, 2001; Rocha & Xiao, 2022). Implementing sustainable practices, leveraging technological innovations, and engaging local communities are essential strategies for ensuring that the benefits of mega-sporting events are equitably distributed and long-lasting (Widjanarko, 2024; Taks et al., 2015).

Public health and food safety are also critical aspects that require meticulous management to prevent potential risks and promote healthy dietary habits (Domper, 2024; Gaffar et al., 2022). The emphasis on nutritious and safe food options, coupled with effective public health campaigns, can enhance the positive health impacts of these events (Rocha & Xiao, 2022).

Case studies of past mega-sporting events, such as the Olympics and FIFA World Cup, provide valuable insights into the successful integration of culinary services and the lessons learned from these experiences. For instance, the London 2012 and Rio 2016 Olympics highlighted the importance of local sourcing and cultural representation in maximizing economic and social benefits (Seaman, 2021; Knott et al., 2016).

In conclusion, the culinary aspects of mega-sporting events significantly contribute to their economic, social, and cultural impacts. By adopting comprehensive strategies that address sustainability, community engagement, innovation, and public health, event organizers can ensure that these impacts are positive and enduring. The insights gained from this review can guide future events in harnessing the full potential of culinary services to create enriching and sustainable experiences for all stakeholders (Seaman, 2021; Povilanskas & Kontautienė, 2017; Knott et al., 2016; Ribeiro et al., 2020; Rocha & Xiao, 2022).

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ABSTRACT

This study investigates the food service management at Ihsanul Fikri Boarding School (IFBS) Magelang, focusing on menu planning, budgeting, procurement, storage, preparation, distribution, and hygiene and sanitation practices. Using a descriptive qualitative approach, data were collected through observations, interviews, and documentation from August to December 2022. The findings reveal that menu planning at IFBS follows a 7-day cycle but lacks variety, leading to student dissatisfaction and potential nutritional inadequacies. The study highlights the necessity of comprehensive menu planning and nutritional counseling to ensure balanced and sufficient nutrition for students. Comparisons with literature emphasize the need for diverse meal plans and the integration of agricultural resources to enhance food service quality. This research underscores the importance of effective food service management in supporting the health and academic performance of boarding school students and suggests practical strategies for improvement. Future studies should focus on the implementation and impact of these strategies to further optimize food service in educational institutions.

Keywords: Food service management, menu planning, nutritional adequacy, boarding school, qualitative research, Ihsanul Fikri Boarding School, student health, educational outcomes, nutritional counseling, agricultural integration.

INTRODUCTION

Islamic boarding schools, known as "pondok pesantren," represent a significant educational institution in Indonesia, providing both academic and religious education. The curriculum mandates that students, known as "santri," reside within the school premises, thereby requiring the institution to cater to their nutritional needs. This setting imposes a critical responsibility on the boarding school to ensure that the dietary requirements of the students are adequately met to support their learning and overall well-being (Khan, 2021).

Given that many students are in their growth phase, balanced nutrition is vital for their development. Effective management of meal provision in such institutions is crucial to ensure that the nutritional needs of the students are met, which in turn supports their educational performance. Previous studies have highlighted the importance of providing nutritionally adequate and well-managed meals to promote the health and academic achievements of students in boarding schools (Hatijah, 2021).

Despite the recognized importance of nutritional management in boarding schools, many institutions struggle with implementing an effective meal management system. This includes challenges in menu planning, budgeting, food procurement, preparation, and distribution, as well as maintaining hygiene and sanitation standards. These issues can significantly affect the nutritional status and health of the students, thereby impacting their academic performance and overall well-being (Ain & Prameswari, 2020).

To address these challenges, a comprehensive approach to meal management is required. This involves structured planning and implementation of various components such as menu planning, budgeting, procurement, food preparation, and distribution, all while ensuring strict adherence to hygiene and sanitation standards. Effective management practices can help ensure that the food provided is nutritious, safe, and meets the dietary needs of the students, thus supporting their growth and academic success (Pekaramba, 2019).

Studies have shown that a well-organized food service system in educational institutions can significantly enhance the nutritional status of students. For instance, implementing systematic menu planning and budgeting can help ensure that the meals provided are balanced and within budgetary constraints. This involves careful selection of food items to meet the dietary needs of the students while also considering cost-effectiveness (Oostindjer et al., 2017).

Furthermore, research highlights the importance of proper food procurement, storage, and preparation processes. Efficient procurement practices ensure the availability of high-quality food items, while proper storage methods help maintain their nutritional value and safety. Additionally, standardized food preparation techniques ensure that the meals are not only nutritious but also safe for consumption, reducing the risk of foodborne illnesses (Gumilang, 2023).

Education on healthy and balanced diets is another critical aspect. Studies have emphasized the need for educational programs within boarding schools to promote healthy eating habits among students. This can be achieved through various initiatives such as nutrition education sessions, interactive activities, and incorporating nutritional topics into the school curriculum. Such educational efforts can foster a better understanding of healthy eating practices and encourage students to make healthier food choices (Yahya et al., 2021).

In-depth analysis of existing literature reveals several gaps in the management of food services in boarding schools. Although there is substantial research on the importance of balanced nutrition, there is limited information on the practical implementation of comprehensive meal management systems in these institutions. For example, while studies acknowledge the need for proper menu planning and budgeting, they often lack detailed strategies on how to effectively implement these practices in a boarding school setting (Amalia et al., 2023).

Additionally, research on food procurement and preparation in boarding schools tends to focus more on theoretical aspects rather than practical applications. There is a need for more empirical studies that provide actionable insights into the processes and best practices for managing food services, including procurement, storage, and preparation techniques. Moreover, the impact of these practices on the nutritional status and health of the students is not thoroughly explored (Gumilang, 2023).

Hygiene and sanitation practices are also crucial areas that require further investigation. While the importance of maintaining high hygiene and sanitation standards is well-documented, there is a lack of specific guidelines and assessment tools for boarding schools. More research is needed to develop and validate effective hygiene and sanitation protocols that can be easily implemented in these institutions to ensure food safety and prevent foodborne illnesses (Appietu & Amuquandoh, 2020).

The objective of this study is to examine the management of food services at Ihsanul Fikri Boarding School (IFBS) Magelang, covering various aspects such as menu and budget planning, procurement, reception and storage of food ingredients, preparation and processing of food, food distribution, and food hygiene and sanitation practices at IFBS Mungkid Magelang.

The scope of this research is descriptive, involving 12 subjects at IFBS. Through this study, we aim to contribute to the existing body of knowledge on food service management in educational institutions and provide practical solutions that can be implemented to enhance the nutritional status and health of students in boarding schools.

PURPOSE OF THE STUDY

This study aims to fill the gaps identified in the literature by providing a detailed analysis of the practical implementation of food service management in a boarding school setting. The novelty of this research lies in its comprehensive approach to examining all aspects of food service management, from planning and procurement to preparation, distribution, and sanitation. By focusing on the practical applications of these processes, this study seeks to provide actionable insights and recommendations for improving food service management in boarding schools.

METHOD

This study utilized a descriptive qualitative research design, aiming to explain realities through detailed, in-depth, and comprehensible narratives (Pujileksono, 2015). The research was conducted at Ihsanul Fikri Boarding School, located at Jalan Pabelan 1, Desa Pabelan, Kecamatan Mungkid, Kabupaten Magelang, from August to December 2022. The research subjects were selected using purposive sampling, focusing on individuals capable of providing detailed information on various aspects of food service management, including menu planning, budgeting, procurement, storage, preparation, equipment, and distribution of food (Sugiyono, 2014). The subjects included 12 individuals comprising the head of the kitchen, cooks, teachers, and students.

Participants

In this study, data collection involved observation, interviews, and documentation. Observations were conducted to gather initial data on the kitchen conditions, food service processes, challenges, infrastructure, hygiene, sanitation, the number of food handlers, and the number of students and teachers. Interviews were conducted with the selected subjects to obtain detailed information on the food service management at IFBS. Documentation included collecting documents, images, and reports related to the food service practices at Ihsanul Fikri Boarding School Magelang. To ensure the validity of the collected data, triangulation of data collection techniques was employed, comparing interview data with observations and documentation to confirm accuracy and reliability (Pujileksono, 2015).

Data Collection and Analysis

The experimental setup in this study focused on the interactive and continuous data analysis process until data saturation was achieved. This involved three main activities: data reduction, data display, and conclusion drawing and verification (Miles & Huberman in Sugiyono, 2014). The observations provided comprehensive data on the kitchen's operational and physical conditions. The interviews offered insights into the perspectives and experiences of the kitchen staff, teachers, and students regarding the food service management practices. The documentation process collected supporting evidence to reinforce the findings from observations and interviews.

The primary parameters measured in this study included the efficiency and effectiveness of menu planning, budgeting processes, food procurement and storage methods, food preparation and distribution practices, and the hygiene and sanitation standards maintained in the food service at IFBS. Data were collected through multiple methods to ensure comprehensive coverage and to cross-verify findings. Observations provided real-time data on operational practices, interviews gathered subjective insights from key stakeholders, and documentation offered historical and supportive data (Sugiyono, 2014). This multi-faceted approach ensured that all critical aspects of food service management were thoroughly examined.

The data analysis in this study followed an interactive model, which involved continuous and iterative processes of data reduction, data display, and conclusion drawing and verification. Data reduction involved summarizing and focusing on essential information gathered during observations, interviews, and documentation. Data display referred to organizing and assembling the data in a manner that allowed for systematic examination and interpretation. Conclusion drawing and verification involved synthesizing the findings to develop coherent conclusions, ensuring the validity and reliability of the results through triangulation and cross-verification methods (Miles & Huberman in Sugiyono, 2014). This rigorous analytical process aimed to provide an accurate and comprehensive understanding of the food service management practices at IFBS.

FINDINGS

Ihsanul Fikri Boarding School Magelang provides meals for 1,218 students and 155 teachers daily, with a frequency of three meals a day. The series of food management activities carried out in the kitchen of Ihsanul Fikri Boarding School are as follows:

Menu Planning

Based on interviews and menu documents, menu planning at IFBS is conducted on a 7-day cycle and planned by the head of the kitchen. The menu serves as a guide for the cooks in preparing meals. Interviews with the students revealed complaints about boredom and monotony with the menu. This is due to a lack of variety, as the weekly menu repeats in subsequent weeks.

"The menu is not varied, Kak. We want more complex dishes, as we have a lot of activities including memorizing, so we need more nutrition." - FRA (16)

Students also require more nutrition to support their daily activities, especially for memorizing the Quran. Although IFBS Magelang has calculated the nutritional needs of the students, distribution is uneven due to limited human resources. To address this, carbohydrate provision is tailored to each student's needs.

The health team at the boarding school is expected to provide nutritional counseling to both cooks and students. Observations found that the menu is well-structured to meet the nutritional adequacy levels. The kitchen management has assessed the nutritional needs of consumers and strives to create a balanced menu according to the established nutritional standards at IFBS. However, discrepancies in the provided

menu still exist. The menu is planned using a Master Menu system, adjusted to the budget and the type of dishes to be served. Table 1 shows the standard nutritional requirements.

Table 1. Comparison of Standard Nutritional Requirements and Actual Intake

Food Item	Male (2,475 kcal)	Female (2,125 kcal)	Actual Intake by Students
Rice	6 ½ portions	4 ½ portions	3 portions
Vegetables	3 portions	3 portions	3 portions
Fruit	4 portions	4 portions	1 portion
Tempeh	3 portions	3 portions	1 portion
Meat	3 portions	3 portions	1 portion
Milk	1 portion	1 portion	1 portion
Oil	6 portions	5 portions	1 portion
Sugar	2 portions	2 portions	1 portion

Budget Planning

Interviews revealed that budget planning is conducted once a year based on suggestions from the head of the kitchen. The funding comes from the students' tuition fees.

"Most of it comes from students' tuition fees." - KE (37)

According to the head of the kitchen, the budget planning (Table 2) is adjusted according to the number of consumers and is linked to the fluctuation of staple food prices. The goal of budget planning is to provide estimates for necessary ingredients and minimize budget overruns. A market survey is conducted before finalizing the budget to account for price fluctuations.

Table 2. Budget Planning Observation Results

No.	Indicator	Percentage	Remarks
1	Budget planning according to set budget	75%	Well implemented
2	Budget planning cycle	100%	Very well implemented

Food Procurement

Food procurement at IFBS Magelang is done by purchasing directly from first-hand suppliers. Items such as rice, chicken, fruit, and coconut are procured through tenders. Informants added that IFBS Magelang's location near the mountains provides ample vegetable and food supply land, making food items more affordable, easier to procure, and ensuring quality. Key considerations before procurement include checking availability, as outlined in Table 3.

Food procurement is carried out by designated cooks who shop and hand over the list of needed ingredients. This is done to ensure efficiency. Purchase records should match the required weight and specifications. The kitchen management lacks sufficient human resources to precisely calculate the needed ingredients. Accurate weight and specifications can minimize shortages and excesses of food ingredients.

Table 3. Food Procurement Observation Results

No.	Indicator	Percentage	Remarks
1	Recording of food purchases	100%	Very well implemented
2	Availability of food supplies	100%	Very well implemented

Designated cooks handle food procurement and provide the required list of ingredients. This process aims to be effective and efficient. Purchase records should align with the needed weight and specifications to minimize shortages and excesses, given the limited human resources in the kitchen management for precise calculations.

Food Acceptance

The food management at IFBS Magelang has not met the criteria for food acceptance because there is no inspection of the quality and quantity of food ingredients. See Table 4.

Table 4. Food Acceptance Observation Results

No	Indicator	Percentage	Remarks
1	Inspection of food quality	50%	Moderately implemented
2	Reporting of food acceptance	100%	Very well implemented

The kitchen staff only record the incoming food items and match them with the request notes without checking the quality and condition of the food ingredients.

The reporting of food acceptance is carried out well as it is closely related to the production process and the procurement of food ingredients. Therefore, the food acceptance reporting at IFBS Magelang is well-implemented.

Food Storage

IFBS Magelang has designated storage areas for perishable food items, such as frozen foods and poultry. However, the kitchen staff does not have a place to store fresh food, as it is used immediately. Storing fresh food on the kitchen floor can reduce its quality. The storage facilities do not meet the requirements, as the storage racks can allow dust and dirt to enter. It is recommended to procure insect-proof equipment to prevent contamination. The IFBS kitchen has a dry food storage facility that meets the requirements of being non-humid, insect-free, and easy to clean. However, the placement of dry food items is disorganized, leaving gaps that are difficult to clean. Table 5 shows the observation results of food storage.

Table 5. Food Storage Observation Results

No	Indicator	Percentage	Remarks
1	Storage and arrangement of food items	25%	Poorly implemented
2	Maintenance of food safety	75%	Well implemented
3	Condition of storage rooms	75%	Well implemented

Food Preparation

Food preparation at IFBS Magelang includes the preparation of basic and additional spices (see Table 6). The basic spices prepared include garlic, shallots, candlenuts, coriander, sugar, and salt in equal amounts for the day's menu. Additional spices are prepared if the menu requires them, such as tamarind for tamarind soup, lemongrass, galangal, and turmeric.

Table 6. Food Preparation Observation Results

No	Indicator	Percentage	Remarks
1	Preparation of food items and tools	100%	Very well implemented
2	Use of food items according to recipes	50%	Moderately implemented

The preparation of food items and tools has been very well implemented, but the use of food items according to recipes is only moderately implemented, as it relies on the cooks' experience. Preparation involves getting spices ready according to the planned menu and ensuring the necessary tools are available to adhere to the meal schedule.

Food Processing

In the food processing at IFBS, tasks are divided as follows: five people cook breakfast from 3 am to 6 am, four people cook lunch from 8 am to 12 pm, and four people cook dinner from 1 pm to 5 pm. The remaining cooks help in 8-hour shifts daily. See Table 7.

Table 7. Food Processing Observation Results

No	Indicator	Percentage	Remarks
1	Use of proper cooking methods	50%	Moderately implemented
2	Food is fresh	100%	Very well implemented
3	Food is not spoiled	100%	Very well implemented
4	Food is not wilted	100%	Very well implemented

Observations revealed that food processing at IFBS Magelang does not follow standardized times and techniques for each type of food, relying instead on the cooks' experience. This leads to risks of food being overcooked, undercooked, or unevenly cooked. Food processing should aim to preserve nutritional value, enhance digestibility, add aroma, kill harmful germs, and eliminate toxins to ensure the food is safe for consumption. Observations showed that the ingredients used are in very good condition, being fresh, not spoiled, and not wilted.

Food Distribution

Ihsanul Fikri Boarding School Mungkid Magelang uses a decentralized method of food distribution, where food is placed in large containers and served at a serving table. Students take food according to their portions. The downside of this method is that students can take excessive portions, leading to insufficient food for those eating later. To address this, the kitchen management provides additional dishes to compensate. See Table 8 to know the observation results of food distribution.

Table 8. Food Distribution Observation Results

No	Indicator	Percentage	Remarks
1	Distribution according to predetermined portions	75%	Well implemented

The food distribution and serving areas for male and female students are separated. The male students' dining area is located in the easternmost part of the kitchen, while the female students' dining area is close to the girls' dormitory.

Food Handlers' Hygiene

Observations of food handlers' hygiene at IFBS Magelang based on Table 9 are as follows:

a. Cleanliness of Cooks' Clothing and Bodies: Cooks at IFBS Magelang wear clean clothing, and their bodies are ensured to be clean upon entering the kitchen area, where they clean themselves and their clothes beforehand. Thus, the cleanliness of cooks' clothing and bodies is very well implemented.

b. Cleanliness of Cooks' Hands and Nails: Observations indicate that the cleanliness of cooks' hands and nails is very well implemented.

c. Neatness of Cooks' Hair and Head Covers: Observations show that 10 out of 16 food handlers are female and are required to wear head covers (jilbabs) while working in the kitchen. However, 6 male food

handlers do not wear head covers. While hair in food is not a primary cause of bacterial contamination, its presence can be unpleasant for consumers.

d. Use of Aprons by Cooks: All food handlers at IFBS Magelang wear aprons while preparing food. The use of aprons is consistent with each employee's work shift, except during prayer and meal breaks.

e. Use of Auxiliary Tools: Cooks use auxiliary tools such as rice ladles, spatulas, and knives during food preparation. However, they do not use gloves, which are important to prevent contamination from the hands.

Table 9. Food Handlers' Hygiene Observation Results

No	Indicator	Percentage	Remarks
1	Cleanliness of cooks' clothing and bodies	100%	Very well implemented
2	Cleanliness of cooks' hands and nails	100%	Very well implemented
3	Neatness of cooks' hair and head covers	100%	Very well implemented
4	Use of aprons by cooks	100%	Very well implemented
5	Use of auxiliary tools	75%	Well implemented

Sanitation of Facilities and Production Environment

Observations on the sanitation of facilities and the production environment at IFBS Magelang indicate that the available garbage bins in the kitchen are insufficient. See Table 10. The food management at IFBS is located far from pollution sources such as toilets, garbage disposal, and chemical factories. The walls and floors are made of waterproof, smooth, brightly colored materials, making it easy to clean. The roof and ceiling are made of concrete, ensuring they are clean and gap-free. Ventilation meets the requirement of being 1/10 of the floor area. The shelves are 15 cm away from the walls and 60 cm from the ceiling, although they are too close to the walls. The temperature of dry food storage should be 19-20 degrees Celsius, and the observed average temperature is 19-22 degrees Celsius. The production equipment is made of stainless steel.

Table 10. Facilities and Production Environment Sanitation Observation Results

No	Indicator	Percentage	Remarks
1	Production location far from pollution sources	100%	Very well implemented
2	Clean and garbage-free production area	75%	Well implemented
3	Non-humid, easy-to-clean, insect-free production area	100%	Very well implemented
4	Clean, waterproof, smooth, brightly colored walls	100%	Very well implemented
5	Clean, waterproof, smooth, strong, non-slip floors	100%	Very well implemented
6	Clean, gap-free roofs and ceilings	100%	Very well implemented

Based on Table 11, the water used at IFBS Magelang comes from a clean source, directly from mountain springs, ensuring the water is clear, tasteless, colorless, and odorless. The water used for washing food and equipment is running water.

Table 11. Facilities and Production Environment Sanitation Observation Results

No	Indicator	Percentage	Remarks
1	Water source from a clean place	100%	Very well implemented
2	Clear, tasteless, colorless, odorless water	100%	Very well implemented
3	Running water for washing food and equipment	100%	Very well implemented

DISCUSSION

At Ihsanul Fikri Boarding School (IFBS) Magelang, menu planning is conducted on a 7-day cycle and is overseen by the head of the kitchen. This menu serves as a guideline for the cooks in meal preparation. Interviews with students revealed a common complaint of boredom due to the lack of variety in the menu, as the same menu repeats weekly. One student expressed a desire for more complex dishes to support their intensive activities, including Quran memorization, indicating a need for higher nutritional intake (FRA, 16). Observations and menu documents confirmed that while the menu is designed to meet nutritional adequacy standards, there is still a gap in variety and nutritional distribution. The health team at IFBS is expected to provide nutritional counseling to both the cooks and the students to address these issues (Amalia et al., 2023).

The findings at IFBS align with the broader literature on nutritional management in educational institutions. For instance, Gumilang (2023) emphasizes the importance of improving nutritional management and providing healthy menus in boarding schools. Despite efforts to meet nutritional standards, IFBS faces challenges similar to those identified by Appietu and Amuquandoh (2020), who noted that ensuring food safety and maintaining microbiological quality in school meals are crucial yet challenging tasks. The repetition in the menu at IFBS reflects a common issue in many educational institutions where limited resources and personnel affect the variety and quality of meals provided (Yahya et al., 2021).

Additionally, the lack of menu variety at IFBS contrasts with the successful implementation of diverse and nutritious meal plans in other boarding schools that integrate agricultural management into their food service systems. Alhifni and Ahwarumi (2018) highlighted how the management of agriculture and plantation within the school supports self-sufficiency and enhances food variety. IFBS could benefit from adopting similar strategies to diversify their menu and ensure consistent nutritional quality.

The findings from IFBS underscore the critical role of effective menu planning in meeting the nutritional needs of students, which is essential for their academic and physical development. The reported monotony and insufficient nutritional variety in the menu highlight the need for a more dynamic and responsive approach to meal planning. This is particularly important in a boarding school setting where students rely entirely on the institution for their daily nutritional intake. The implementation of a more varied and balanced menu could significantly enhance students' health and academic performance, as suggested by Gajdoš et al. (2004).

Moreover, the practical implications of these findings suggest that IFBS should consider incorporating nutritional education and counseling into their routine practices. Providing training for cooks and students on the importance of a balanced diet and how to achieve it can foster better nutritional habits and improve the overall food service system. Additionally, leveraging local agricultural resources, as recommended by Alhifni and Ahwarumi (2018), could not only diversify the menu but also promote sustainability and reduce costs.

In conclusion, the study highlights the need for comprehensive improvements in menu planning and nutritional management at IFBS. By addressing these issues, the school can enhance the health and well-

being of its students, thereby supporting their educational outcomes and overall development (Yahya et al., 2021).

CONCLUSION

This study comprehensively examined the food service management at Ihsanul Fikri Boarding School (IFBS) Magelang, focusing on various aspects such as menu planning, budgeting, procurement, storage, preparation, distribution, and hygiene and sanitation practices. The findings reveal that while the menu planning at IFBS meets nutritional adequacy standards, there is a significant lack of variety, leading to student dissatisfaction and potential nutritional gaps. This issue is compounded by uneven distribution of nutritional intake due to limited human resources. Comparisons with existing literature highlight the importance of diverse and balanced meal plans and underscore the need for nutritional education and agricultural integration to enhance food service quality.

The study's implications are twofold: First, there is a critical need for improved menu planning that incorporates variety and meets the dynamic nutritional needs of students. Second, providing nutritional counseling and leveraging local agricultural resources can significantly enhance the food service system's effectiveness. By addressing these aspects, IFBS can better support the health, well-being, and academic performance of its students, contributing to their overall development. Future research should explore practical implementation strategies for these improvements and assess their impact on student health and educational outcomes.

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