

Assessing Foodservice Quality in University Cafeterias for Health Promotion: An Importance–Performance Analysis Approach

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ABSTRACT

Background: Campus dining services significantly influence students' dietary choices, nutritional status, and overall health. Early detection of gaps in foodservice quality allows universities to implement preventive measures that promote healthy eating behaviours and prevent nutrition-related issues. This study aimed to evaluate the importance and satisfaction of foodservice attributes at university cafeterias using the Importance–Performance Analysis (IPA) method, with a focus on identifying priority areas for preventive intervention. **Methods:** A cross-sectional survey involving 231 students was conducted across three main campus cafeterias. Data was collected using a validated questionnaire consisting of 25 attributes across food quality, food selection, food price, interactional quality, and atmospheric quality using a 7-point Likert scale. Mean scores were calculated and analyzed using the Statistical Package for the Social Sciences (IBM SPSS Statistics) Version 29. The IPA grid was used to identify priority improvement areas. **Results:** While students generally considered food and service aspects to be highly important, the findings revealed that several areas did not meet their expectations. These included food hygiene, staff friendliness, speed of service, and cleanliness of dining spaces. In contrast, food freshness, nutritional value, reasonable pricing, and staff knowledge were viewed more positively. Aspects such as entertainment and dining ambiance were less emphasised for improvement. **Conclusion:** Overall, the results indicate a gap between student expectations and the current performance of foodservice operations in key operational areas. This study highlights the need for targeted enhancements, particularly in hygiene standards. Recommended actions include comprehensive staff training, regular cleanliness inspections, and the adoption of responsive customer service protocols.

Keywords:

Campus dining services; foodservice quality; Importance–Performance Analysis; student satisfaction; hygiene standards

INTRODUCTION

University food services play a pivotal role in shaping students' dietary intake and contributing to their overall campus experience. The demand for nutritious and high-quality food options is increasingly pronounced within higher education institutions, as younger generations demonstrate heightened awareness of their dietary choices and actively seek healthier alternatives (Ulita et al., 2024). In response to the evolving landscape of the food industry, suppliers face mounting pressure to accommodate health-conscious consumers by offering products that balance nutritional value with taste, convenience, and variety. To effectively meet these dynamic expectations, institutions must adopt strategic approaches that prioritize customer satisfaction and align foodservice offerings with students' changing preferences.

Food service quality is critically important for university students, influencing not only their satisfaction and well-being but also their academic engagement and campus experience. Food service quality, encompassing taste, hygiene, ambiance, and presentation, has a direct impact on students' satisfaction with campus life (Hashim et al., 2024). Besides, high-quality food services ensure that students have access to nutritious meals, which are essential for maintaining energy levels, concentration, and overall health. Dissatisfaction with cafeteria services often leads students to avoid on-campus meals, potentially compromising their dietary intake (Misiran et al., 2021). Past studies found that several factors, including food quality, variety, pricing, service interactions, and the dining environment, align with student expectations, play an important role in supporting healthy eating habits and academic performance. Tan et al. (2014) in their study found that the students' satisfaction depends on the students' background, personal view, and the year of

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study. Besides, factors such as age, gender, habits, and personal preferences can affect how satisfied the students are with campus food service (Shin & Yu, 2020; Tuncer et al., 2021).

According to Serhan and Serhan (2019), service quality in foodservice encompasses multiple dimensions such as food quality, food selection, pricing fairness, interactional quality, and atmospheric conditions. Each dimension contributes differently to overall satisfaction and behavioural intentions such as loyalty and repeat patronage (Andaleeb & Caskey, 2007; Tuncer et al., 2021). Therefore, students who are happy with their meals are more likely to return and tell others about the cafeteria service on campus (Pradnyadewi & Giantari, 2022).

Food hygiene and safety practices are especially critical in campus settings because of the potential for rapid transmission of foodborne illnesses in a dense population. Previous studies in university contexts have demonstrated that food quality, cleanliness, and service speed often emerge as top priorities for improvement, while factors like ambiance and seating may already meet expectations (Imran, 2018; Serhan & Serhan, 2019). However, findings vary depending on cultural, economic, and institutional factors. In Malaysia, research on campus foodservice quality revealed that food quality and service quality have significant influences on the students' satisfaction with campus foodservice (Mohd Fauzi & Rusali, 2024; Mat Nor et al., 2025). On the other hand, food price was found to be the most satisfactory attribute among international students in Malaysian research universities (Akbara et al., 2021). Food quality is widely acknowledged as a complex, relative, and multidimensional construct that encompasses nutritional, sensory, cultural, sanitary, and safety aspects, all of which contribute to consumer perceptions and expectations. Failures in areas such as hygiene, safety, or nutritional adequacy can negatively influence these perceptions and, in turn, shape the definition of quality food (Gomes et al., 2024). Thus, the Importance–Performance Analysis (IPA) method introduced by Martilla and James (1977) was used in this study to identify areas where timely action can reduce dissatisfaction and address potential food safety risk. This study addresses that gap by examining the importance and satisfaction of foodservice attributes at IIUM Kuantan and identifying key areas for improvement using the Importance–Performance Analysis (IPA) tool.

MATERIALS AND METHODS

Study Design and Data Collection

This study employed a quantitative cross-sectional design to evaluate students' satisfaction with campus foodservice and to compare perceived importance with satisfaction across service attributes. The study was conducted at the International Islamic University Malaysia (IIUM) Kuantan Campus, focusing on three main mahallah dining facilities, namely Cafeterias A, B, and C, located near student residences. Participants were recruited using convenience sampling. Inclusion criteria were local or international students (foundation, undergraduate, or postgraduate) from the IIUM Kuantan campus who purchased and consumed food at the selected cafeteria. Staff, visitors, and non-student customers were excluded. Ethical approval was obtained before data collection. Students were invited to participate either through Google Forms or paper-based questionnaires administered at the cafeterias. Informed consent was obtained from all participants.

Sample Size

The study population consists of 3,664 students across six Kulliyah, such as Medicine, Pharmacy, Dentistry, Allied Health Sciences, Science, and Nursing. The sample size was calculated using Yamane's (1967) formula for finite populations with a 7% margin of error, as recommended for resource-constrained surveys. The minimum required sample was 193, to which an additional 20% was added to account for non-response, yielding a final target of 231 respondents.

Survey Instrument

Data were collected using a structured questionnaire adapted from Akbara et al. (2021). The instrument consisted of three sections: (a) socio-demographic information; (b) importance ratings of 25 foodservice attributes; and (c) satisfaction ratings of the same attributes. Responses were recorded on a 7-point Likert scale (1 = very unimportant/very dissatisfied to 7 = very important/very satisfied). The estimated completion time was 10–15 minutes.

Validity and Reliability of the Survey Instrument

The questionnaire was adapted and pretested to ensure content validity. The irrelevant items in the questionnaire were excluded prior to the survey. Internal consistency was assessed using Cronbach's alpha, which demonstrated excellent reliability ($\alpha = 0.93$), confirming that the

instrument was appropriate for measuring importance and satisfaction with cafeteria services.

Validity and Reliability of the Survey Instrument

The questionnaire was adapted and pretested to ensure content validity. Items that were unsuitable were removed prior to the survey. Internal consistency was assessed using Cronbach’s alpha, which demonstrated excellent reliability ($\alpha = 0.93$), confirming that the instrument was appropriate for measuring importance and satisfaction with cafeteria services.

Data Analysis

Data were analysed using IBM SPSS Statistics Version 29. Descriptive statistics were applied to summarise students’ demographic characteristics as well as the mean ratings of importance and satisfaction for each foodservice attribute. Internal consistency of the instrument was reconfirmed using Cronbach’s alpha.

The Importance–Performance Analysis (IPA) matrix was generated by combining the mean importance and satisfaction values for each cafeteria service attribute. These values were then plotted in the IPA grid to visualise priority areas for intervention (Martilla & James, 1977). The four-quadrant matrix provided an overview of attributes that required urgent improvement, those that should be maintained, areas of lesser concern, and those where resources could potentially be reallocated. Figure 1 illustrates the IPA grid and its corresponding quadrant indications.

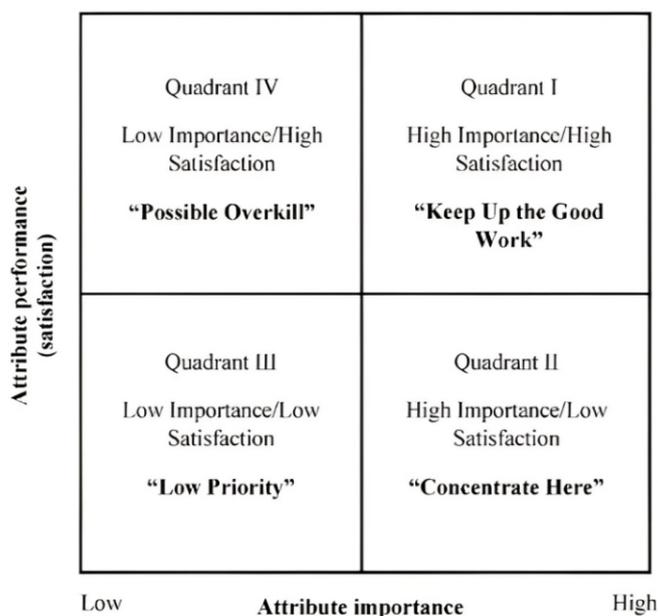


Figure 1: IPA grid for Importance- Satisfaction Analysis

RESULTS

Socio-demographic characteristics

Table 1 shows that out of 231 respondents, 227 (98.3%) were females and 4 (1.7%) were males. The majority were aged between 21–23 years. In terms of financial support, 120 (51.9%) relied on parents and 104 (45.0%) on scholarships or loans. Most respondents were from the Kulliyyah of Allied Health Sciences, with a large proportion being in their first year of study. Regarding cafeteria usage, 162 (70.1%) reported using the cafeteria daily, 53 (22.9%) used it 3–5 times per week, and 16 (6.9%) used it 1–2 times per week.

Table 1: Socio-demographic characteristics of the respondents (N=231)

| Characteristics | n (%) |
|-------------------------------------|-------|
| Age Range | |
| 18–20 | 92 |
| 21–23 | 127 |
| 24 and above | 12 |
| Gender | |
| Male | 227 |
| Female | 4 |
| Sources of Expenses | |
| Parental support | 120 |
| Scholarship/Loan | 104 |
| Personal savings | 2 |
| Part time job income | 5 |
| Kulliyyah | |
| Medicine | 17 |
| Pharmacy | 64 |
| Dentistry | 14 |
| Allied Health Sciences | 66 |
| Science | 23 |
| Nursing | 47 |
| Year of Study | |
| 1st year | 96 |
| 2nd year | 63 |
| 3rd year | 56 |
| 4th year | 15 |
| 5th and above | 1 |
| Frequency of Cafeteria Usage | |
| Daily | 162 |
| 3–5 times per week | 53 |
| 1–2 times per week | 16 |

IPA on perceived importance and satisfaction with foodservice attributes

The IPA on the perceived importance and satisfaction with foodservice attributes is summarized in Table 2. IPA results across service quality dimensions (Interactional Quality,

Food Quality, Atmospheric Quality, Food Price, and Food Selection), showing the positioning of attributes within Quadrants I–IV, where Quadrant I indicates high importance–low performance (improve), Quadrant II indicates high importance–high performance (maintain), Quadrant III indicates low importance–low performance (possible overinvestment), and Quadrant IV indicates low importance–high performance (improve).

Table 2: Importance-Performance Analysis for 25 Items (N=231)

| Attributes | Label | Item Description | Importance | Satisfaction | Quadrant |
|-----------------------------------|-------|---|------------|--------------|----------|
| Interactional Quality (IQ) | IQ1 | Respectfulness of the foodservice outlet staff | 5.64 | 5.34 | IV |
| | IQ2 | Staff knowledge of the food items sold in foodservice outlet | 6.10 | 5.42 | I |
| | IQ3 | Speed of service in foodservice outlet | 6.10 | 5.15 | II |
| | IQ4 | Cleanliness and neatness of staff appearance | 6.32 | 5.05 | II |
| | IQ5 | Easiness talking to staff (able to answer my questions) | 6.18 | 5.47 | I |
| | IQ6 | Friendliness of the foodservice outlet staff | 6.13 | 5.27 | II |
| Food Quality (FQ) | FQ1 | Freshness of food ingredients | 6.21 | 4.95 | I |
| | FQ2 | Appropriateness of food flavor | 6.15 | 5.11 | I |
| | FQ3 | Nutritional benefits of food items | 6.10 | 5.03 | I |
| | FQ4 | Food hygiene and safety | 6.26 | 4.81 | II |
| | FQ5 | Appropriateness of food temperature | 5.79 | 4.78 | III |
| | FQ6 | Attractiveness of food items displayed | 5.77 | 4.87 | III |
| Atmospheric Quality (AQ) | AQ1 | Seat availability | 5.94 | 6.23 | I |
| | AQ2 | Convenience of service hours | 6.13 | 5.44 | I |
| | AQ3 | Cleanliness of the foodservice outlet | 6.35 | 4.97 | II |
| | AQ4 | Decoration of the foodservice outlet | 5.18 | 4.58 | III |
| | AQ5 | Noise level | 5.28 | 4.90 | III |
| | AQ6 | Foodservice outlet entertainment, such as music | 4.51 | 4.32 | III |
| Food Price (FP) | FP1 | The announcement of food price changes | 5.94 | 4.81 | I |
| | FP2 | Reasonableness of the quality of food items for the price paid | 6.14 | 5.07 | I |
| | FP3 | The attractiveness of the quantity of food items for the price paid | 6.18 | 5.07 | III |
| Food Selection (FS) | FS1 | Variety of food served | 6.08 | 5.13 | I |
| | FS2 | Food choices to meet nutrition needs | 5.96 | 4.99 | I |
| | FS3 | Food choices to meet cultural preferences | 5.47 | 5.03 | IV |
| | FS4 | Food selection to make me feel at home | 5.24 | 4.62 | III |

Interactional Quality (IQ)

Within the domain of Interactional Quality (IQ), staff knowledge (IQ2) and ease of communication with staff (IQ5) were in Quadrant I (Figure 2). This indicates that customers consider these factors highly important and are satisfied with their performance, suggesting that existing standards in these areas should be maintained. Conversely, staff speed of service (IQ3), cleanliness and

neatness of appearance (IQ4), and friendliness (IQ6) were positioned in Quadrant II. Since these attributes are important to customers but currently underperforming, they represent critical areas that require immediate improvement. Notably, staff friendliness (IQ6) being in Quadrant II contrasts with the ease of communication with staff (IQ5) in Quadrant I. This could imply that staff are respectful but not necessarily friendly, or that the results may reflect respondent bias. Interestingly, respectfulness

of staff (IQ1) was placed in Quadrant IV, meaning customers are satisfied with it, but do not perceive it as particularly important; thus, it requires minimal managerial attention.

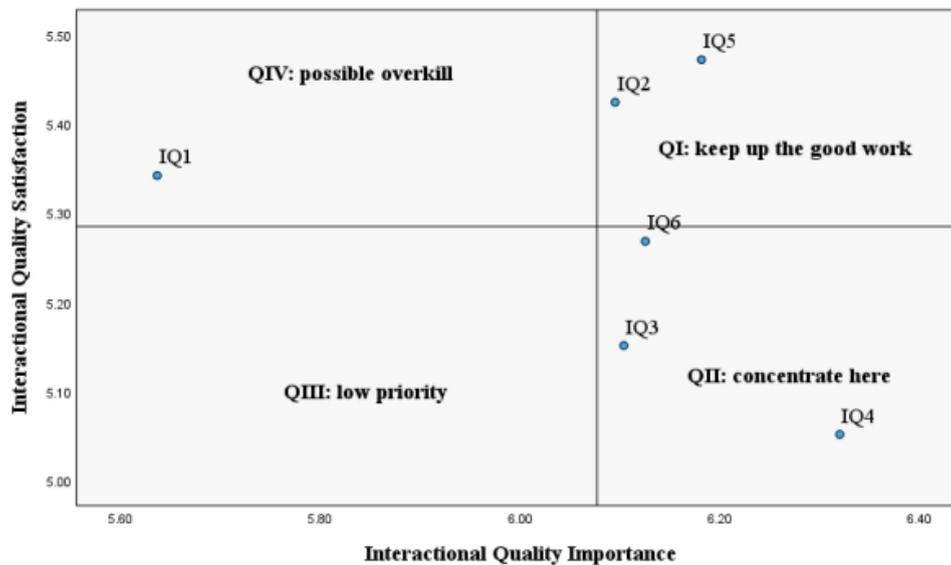


Figure 2 IPA grid for International Quality (IQ) dimensions

Food Quality (FQ)

As shown in Figure 3, the Food Quality (FQ) dimension displayed the freshness of ingredients (FQ1), suitability of food flavour (FQ2), and nutritional value of food items (FQ3) fell into Quadrant I. These are both highly important and well-performing attributes that should be sustained. In contrast, food hygiene and safety (FQ4) was mapped to Quadrant II, showing that while customers value this

aspect, its current performance is unsatisfactory and demands urgent attention. Other factors, such as food temperature (FQ5) and attractiveness of food presentation (FQ6), were placed in Quadrant III, meaning they are less important and perform at lower levels, making them low-priority areas. However, considering the overall analysis, food quality as a whole was positioned in Quadrant II, implying it is a high-importance but low-satisfaction attribute and therefore warrants significant attention.

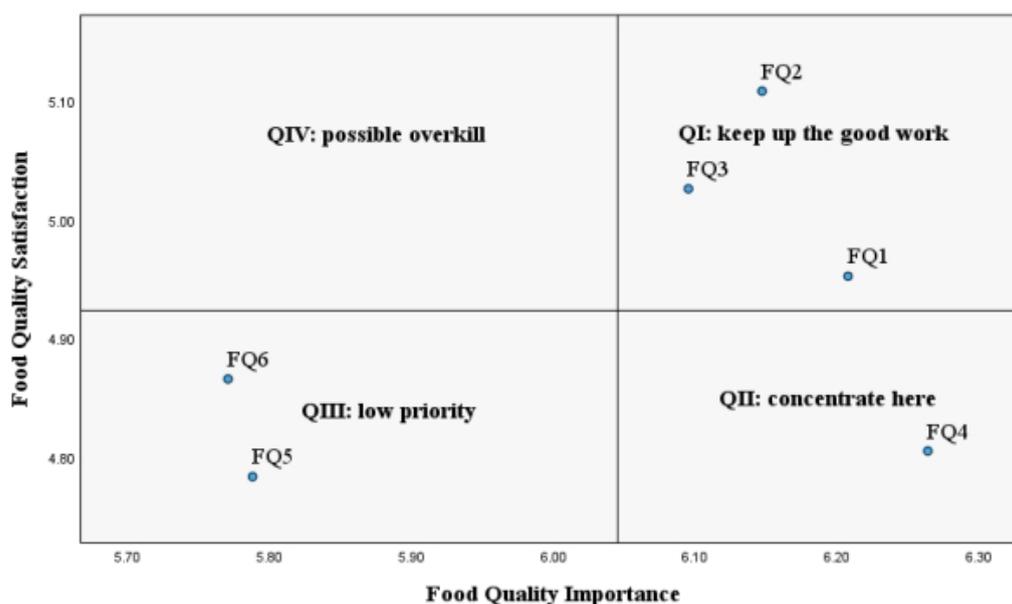


Figure 3 IPA grid for Food Quality dimensions

Atmospheric Quality

Regarding Atmospheric Quality (AQ), the overall dimension was situated in Quadrant IV, suggesting it

requires the least managerial focus (Figure 4). Nonetheless, within this category, seat availability (AQ1) and convenience of service hours (AQ2) were found in Quadrant I, indicating high importance and high satisfaction, and should therefore be preserved. On the other hand, outlet cleanliness (AQ3) was in Quadrant II, highlighting the need for urgent improvement in this essential aspect. The remaining atmospheric elements—outlet decoration (AQ4), noise level (AQ5), and entertainment features such as music (AQ6)—were positioned in Quadrant III, indicating low importance and low performance, and thus can be deprioritized.

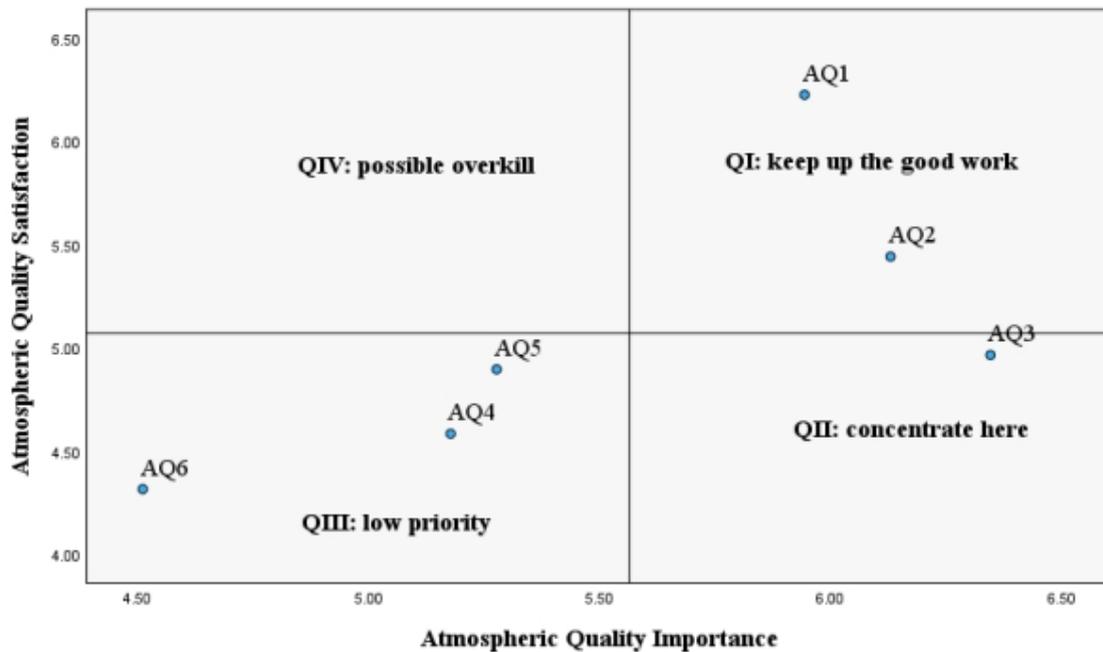


Figure 4 IPA grid for Atmospheric Quality dimensions

Food Price (FP)

With respect to Food Price (FP) as displayed in Figure 5, both fairness of food prices (FP2) and value of food quantity relative to price paid (FP3) were identified in Quadrant I, demonstrating strong performance in areas that customers deem important. In contrast, the announcement of food price changes (FP1) was classified into Quadrant III, suggesting it is of relatively low importance and does not require immediate action.

Food Selection (FS)

Finally, under Food Selection (FS), as illustrated in Figure 6, the variety of food offered (FS1) and food options meeting nutritional needs (FS2) were mapped to Quadrant I, indicating that both are important and well-delivered aspects that should be maintained. Meanwhile, food’s ability to create a sense of comfort or “feeling at home” (FS4) was placed in Quadrant III, pointing to a low-priority area. Additionally, food choices accommodating cultural preferences (FS3) were found in Quadrant IV, reflecting high satisfaction for an attribute considered of low importance, suggesting little to no action is necessary at present.

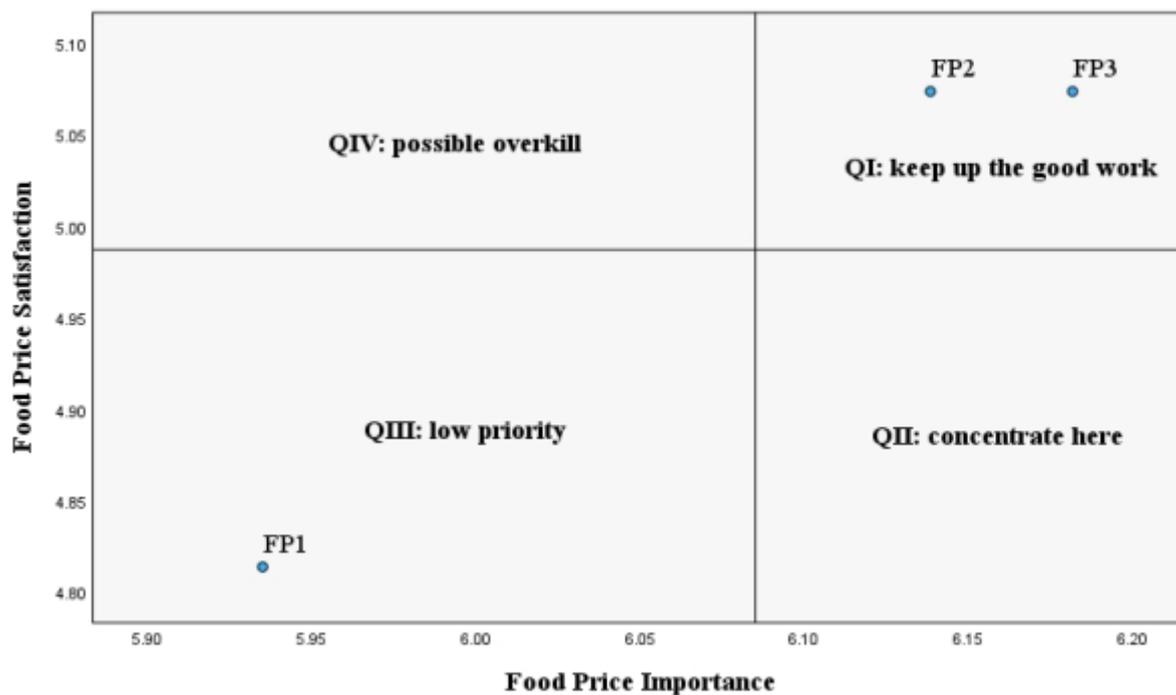


Figure 5 IPA grid for Food Price dimensions

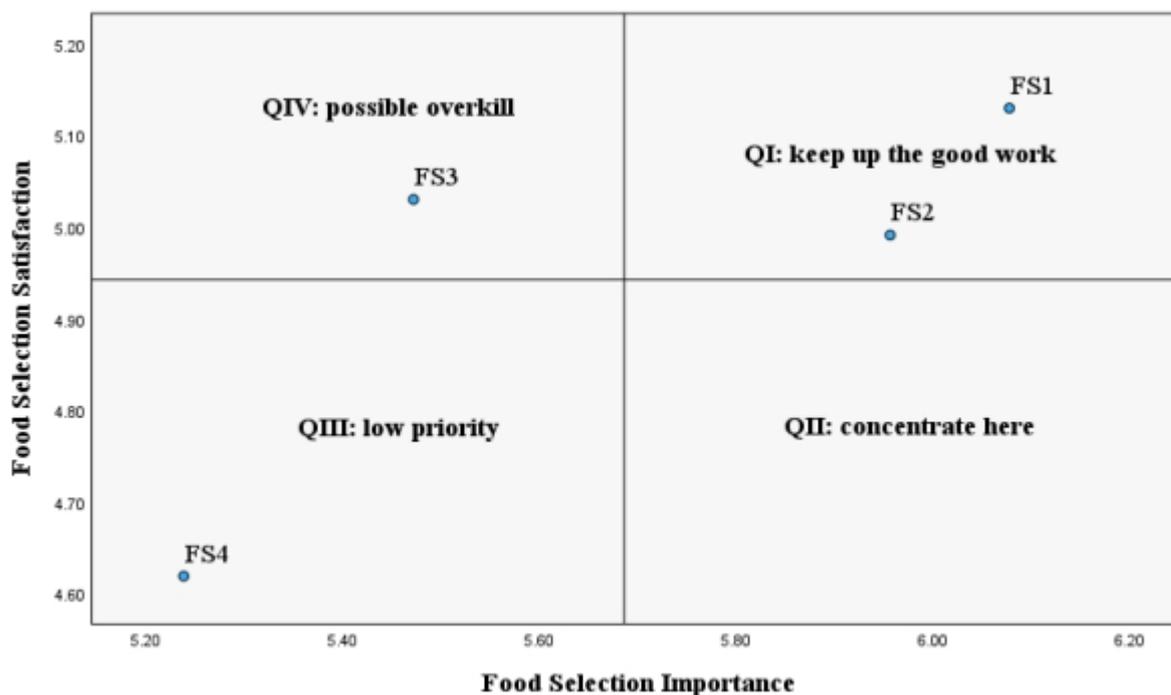


Figure 6 IPA grid for Food Selection dimensions

DISCUSSION

This study employed the Importance–Performance Analysis (IPA) to identify priority areas for enhancing foodservice quality in university cafeterias. IPA is widely used in hospitality research to compare the importance customers assign to service attributes with their satisfaction toward performance. Within the university

context, this approach provides valuable managerial insight by highlighting which attributes require immediate improvement (Joung et al., 2014). The present study found that several attributes related to food quality, interactional quality, and atmospheric quality fell into the “concentrate here” quadrant, indicating that these areas were highly important to students but underperformed in practice. Interactional quality emerged as a critical determinant of

satisfaction. Attributes such as speed of service, cleanliness, and neatness of staff appearance, and ease of communication were rated as very important but scored lower in satisfaction. This result is consistent with previous studies conducted in Malaysian universities, where cleanliness, staff appearance, and efficiency were highly valued yet performed below expectations (Akbara et al., 2021). Similarly, El-Said and Fathy (2015) reported that the promptness, friendliness, and professionalism of service staff significantly influenced students' overall satisfaction in campus dining settings. These findings highlight that service interactions shape students' dining experiences and perceptions of foodservice credibility. Enhancing staff efficiency, interpersonal communication, and professionalism through systematic training and supervision is therefore essential for improving service quality in university cafeterias.

Food hygiene and safety were also identified as key determinants of satisfaction. Although students in this study viewed hygiene and safety as highly important, their satisfaction scores for these attributes were lower. This finding aligns with prior research indicating that hygiene and safety practices are central to customers' trust and satisfaction with university food services. Akbara et al. (2021) found that students expressed lower satisfaction with hygiene, nutritional value, and food quality, while El-Said and Fathy (2015) emphasized sanitation as a strong predictor of satisfaction among university diners. Similarly, Siow and Sani (2011) demonstrated that food handlers' hygiene knowledge and practices directly influence food safety outcomes in Malaysian universities. These studies collectively emphasize that ensuring strict hygiene standards, providing continuous training for food handlers, and conducting regular hygiene audits are vital to maintaining consumer confidence and safeguarding public health.

Cleanliness of foodservice outlets was another prominent attribute influencing satisfaction. A clean dining environment not only assures customers of food safety but also enhances their comfort and trust (Namkung & Jang, 2007). Conversely, poor cleanliness can result in negative perceptions and decreased patronage, even when food quality or prices are acceptable (Ha & Jang, 2010). The present study found that students rated cleanliness as one of the most important attributes, yet satisfaction remained below expectations. This is consistent with findings by Afroza and Haque (2022) and Ibrahim et al. (2018), who reported that environmental hygiene significantly affects students' evaluation of foodservice quality in Malaysian universities. Therefore, maintaining high standards of cleanliness through regular monitoring, transparent cleaning practices, and responsive maintenance should be

prioritized as part of ongoing quality improvement.

Despite providing useful insights, this study has several limitations. Conducted at a single university, its findings may not be generalizable to institutions with different foodservice systems, management practices, or cultural contexts. The use of convenience sampling may have limited representativeness by excluding commuting students, staff, and cafeteria workers whose views might differ. Self-reported data could also be influenced by social desirability bias. Moreover, reliance on quantitative data restricted deeper exploration of students' experiences, while the absence of objective evaluations—such as food quality testing, pricing analysis, or hygiene audits—limited the comprehensiveness of the findings.

Future research should include a more diverse participant group encompassing commuting students, academic and administrative staff, to capture broader perspectives on campus dining experiences. Incorporating objective assessments such as food quality evaluations, price comparisons, and hygiene inspections would also enhance data validity. Longitudinal or periodic studies using consistent methodologies are recommended to track changes over time and evaluate the effectiveness of service improvements.

Overall, the IPA approach proved effective in identifying key strengths and weaknesses of university foodservice operations. The results underscore the importance of improving interactional quality, hygiene, and cleanliness to meet students' expectations. By addressing these priority areas and maintaining a culture of continuous quality improvement, universities can enhance student satisfaction, promote safer and healthier dining environments, and strengthen institutional competitiveness.

CONCLUSION

This study applied the Importance–Performance Analysis (IPA) to evaluate student satisfaction with university foodservice across five dimensions: Interactional Quality, Food Quality, Atmospheric Quality, Food Price, and Food Selection. The results showed strengths in staff knowledge, food freshness, and seating availability, but highlighted weaknesses in cleanliness, service speed, and staff friendliness. Hygiene and staff interaction require greater managerial attention, while pricing and food selection met expectations but could be more diverse and value-driven. Overall, the IPA approach effectively identified key areas for improvement to enhance student satisfaction, foodservice quality, and the university's overall competitiveness.

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