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## THE IMPACT OF FOOD QUALITY ATTRIBUTES ON STUDENT SATISFACTION IN HIGHER EDUCATION: EVIDENCE FROM UITM TERENGGANU

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### Abstract:

This study examines the correlation between various food quality attributes, including taste, freshness, and temperature, and student satisfaction in an institutional dining setting, specifically identifying the attribute that most significantly impacts student satisfaction at Universiti Teknologi MARA (UiTM) Terengganu. Data were collected using a quantitative, cross-sectional survey design from a representative sample of 350 undergraduate and postgraduate students across three campus locations in Dungun, Bukit Besi, and Kuala Terengganu. Non-probability convenience sampling was utilised, and data were collected online and in person using a standardised five-point Likert-scale instrument. Statistical analyses, encompassing descriptive profiling, Pearson Correlation, and multiple linear regression modelling, were conducted utilising PSS Version 27.0. The empirical data demonstrate that all three independent food qualities show statistically significant, robust, and positive linear correlations with student satisfaction. The structural quality framework demonstrates substantial explanatory power, accounting for 53.4% of the total variance in overall student eating satisfaction. Standardised regression coefficients indicate that meal temperature is the primary predictor of satisfaction, followed in

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order by food taste and food freshness. The research shows that physical sensory characteristics are essential criteria for institutional consumers. Serving meals at inadequate holding temperatures leads to consumer dissatisfaction and prompts off-campus departure behaviours, resulting in a decline in institutional income. To enhance student well-being and loyalty, college administrators must implement cohesive operational changes, including investing in capital thermal equipment, evaluating recipes with fresh ingredients, and establishing digital feedback mechanisms. Future research should assess pricing fairness as a moderating variable and utilise longitudinal methodologies.

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Food Quality, Freshness, Serving Temperature, Student Satisfaction, Taste.



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## Introduction

Food quality is one of the critical parameters in achieving student satisfaction in the university food environment. As explained by Ramaprasad & Kashyap (2024) and Leal et al. (2022), food consumption not only fulfils a nourishing purpose but also has cultural, social, and economic influences. Food quality, particularly food taste, freshness and food serving temperature, plays a significant role in some personal perceptions such as feeding and well-being of university students in Universiti Teknologi MARA (UiTM) Terengganu. Research has also found that food quality, especially taste, influences the likelihood of students returning to on-campus dining facilities and their satisfaction (Ryu et al., 2012; Othman et al., 2024).

It is known that taste is a critical characteristic of food quality that significantly influences student preferences and willingness to pay for tasty, pleasant food (Wang et al., 2023). Alongside taste, the importance of freshness cannot be overlooked. The meals with fresh ingredients are naturally perceived as healthier and more nutritious, leading to an increase in perceived meal satisfaction (Choi et al., 2023; Smith et al., 2020). Food temperature is equally vital, serving as a connection between the sensory experience and the health of the food. Appropriate meal temperatures allow foods to taste better, be more pleasant to eat, and are essential for thorough food safety practices as they inhibit the proliferation of any pathogens (Bennett et al., 2022; Santos et al., 2020). While most studies to date have examined the value of food quality in the satisfaction of students towards campus dining services in public universities, many recent studies conducted in Malaysia have indirectly studied food quality in conjunction with other dimensions of campus dining services, including price, hygiene, food variety and staff service (Haque et al., 2024). Therefore, it is not possible to deduce which of the three factors of taste, freshness or serving temperature has the most significant relationship

with students' satisfaction. Additionally, most of the studies carried out in Malaysia were in universities in the Klang Valley or other parts of the country, with little research in universities on the East Coast of Peninsular Malaysia, especially UiTM Terengganu

Hence, this study is conducted in order to fill the above-mentioned gaps by investigating the effect of three important factors in determining food satisfaction in the context of UiTM Terengganu, which are taste, freshness and serving temperature. This study contributes to the literature on campus food service management by understanding campus food quality, identifying the most influential food quality attribute in an under-researched university setting, and offering context-specific evidence to help university administrators and food service providers improve dining quality and enhance students' overall campus experience.

## Literature Review

Food quality is the most important concept in consumer satisfaction in the commercial and institutional foodservice field. From consumers' point of view, quality is a multidimensional concept of food that encompasses taste, freshness, temperature, and other factors that influence consumers' preferences and the eating experience (Ramaprasad & Kashyap, 2024; Leal et al., 2022). All of these factors are even more determining in the field of university discipline, where students are more inclined to obtain their complete nutrition from the food services at the university. For example, Karwini and Handayani (2026) compared the contribution of the two factors (food quality and service quality) to customer outcomes and found that both factors contribute positively to customer experience, but food quality contributes significantly more to customer satisfaction than service quality. Their research shows that high-quality food, characterised by taste, freshness, presentation, and portion size, is a critical differentiator and directly contributes to customer satisfaction.

The taste indicator of food satisfaction has been the most used, thus the first hypothesis is constructed based on taste. Taste perception is the sense of flavour, aroma, and texture that is vital in comfort and satisfaction while eating food (Ryu et al., 2012; Wang et al., 2023). The cross-contextual study by Aboueldahab et al. (2026), which involved an examination of the underlying decision-making processes of university students, showed that out of all major food categories, one factor stands out as the most significant determinant of individual dietary choices, namely taste. On-campus dining becomes more frequent, demonstrating a higher degree of patronage, if meals are tasty, fresh and highly palatable (Yusof et al., 2016). This ensures that the sensory aspects of meals are a crucial precursor that influences overall psychological satisfaction, as well as students' revisits (Mijares et al., 2024).

H1: There is a positive relationship between food taste and student satisfaction.

Food freshness is another important factor in quality, which is directly connected to the second hypothesis. The use of fresh ingredients correlates with nutritional value and healthiness, which, in turn, increases students' satisfaction with the food (Choi et al., 2023; Smith et al., 2020). When the options are perceived as overly processed or lacking freshness, there is a clear disconnect between this and the students' health-related goals, which negatively affects their satisfaction with institutional dining (Arslan et al., 2026). Akbara et al. (2021) evaluated and analysed the findings of a university student population corresponding to the evaluation of campus meals with Importance-Performance Analysis (IPA). They discovered that the freshness of ingredients is a high-priority factor that falls into the keep up the good work

quadrant for student satisfaction. This indicates that fresh foods play an important role in meeting students' basic expectations and are a key reason for meal satisfaction in higher education dining.

H2: There is a positive relationship between food freshness and student satisfaction.

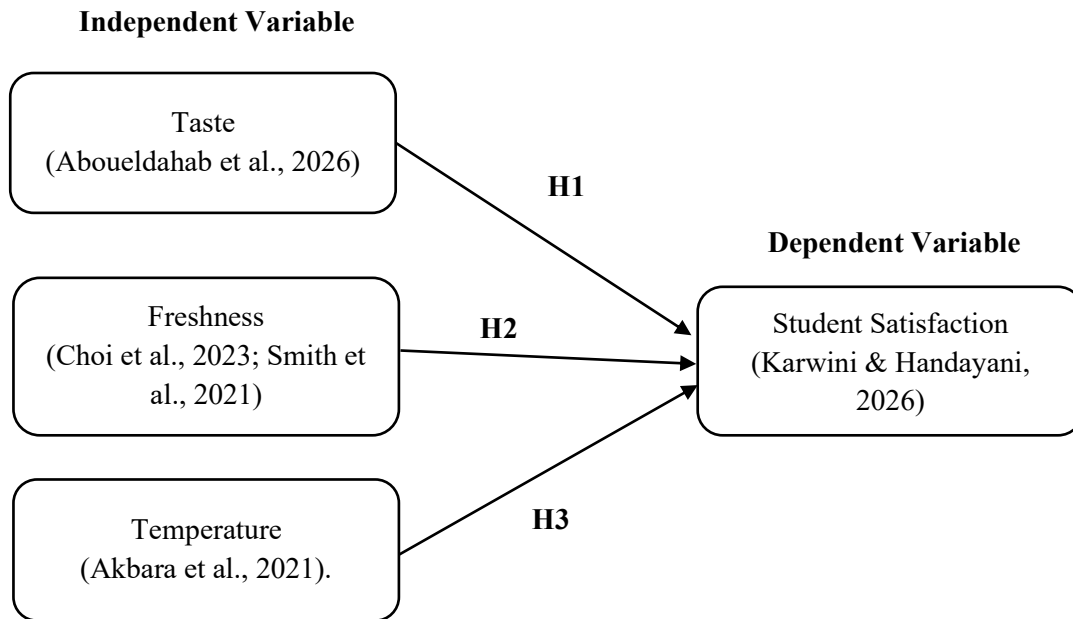
Temperature is a third characteristic of food that is required for both the sensory pleasure of food and its safety and is supported by the third hypothesis. Correct temperatures will help keep food tasting good, smelling good and maintain its texture and reduce the risk of food poisoning (Smith et al., 2020; Bennett et al., 2022). The correct temperature can help to amplify the flavours and general enjoyment, while the wrong temperature can ruin the dining experience and even pose a health risk (Choi et al., 2023; Santos et al., 2020). In institutional and higher education environments, maintaining the appropriate thermal state of meals is a sensory determinant and a baseline safety requirement, as a failure to deliver food at the expected temperature directly triggers cognitive dissonance and severely undermines satisfaction, thereby reducing students' intention to return (Akbara et al., 2021). This is especially difficult in universities because there are a lot of services to be fulfilled; however, it is essential to satisfy students.

H3: There is a positive relationship between food temperature and student satisfaction.

Numerous studies indicate that these food quality determinants are associated with the customer satisfaction level among students. When campus dining services fall short of baseline food quality measures, including taste, freshness, and optimal temperature, students migrate to external food ecosystems. According to a study conducted on a university campus on the mapping of students' satisfaction with the dining experience by Mohd Fauzi & Rusali (2024), the study revealed that when it comes to dining, students' over-dependence is initially seen on dining facilities provided inside the campus, but when the quality of food service is lowered, it triggers the need for off-campus dining alternatives. This consumer shift pulls restaurant revenue away from campus and into off-campus competitors, creates economic losses for the university and exposes students to unsupervised nutrition outside campus, which could impact a student's health negatively. Conversely, good food, or better, their improved food enjoyment will make students more likely to buy food on campus, and this will generate a kind of community in food sales and lead to improved students' food consumption and their performance in study and health (Khan & Sadiq, 2023). Interaction among these factors implies that enhancement of any one of these factors can enhance satisfaction in general. Through these major areas, universities can improve their dining experience, help students live healthily, grow, and foster a more caring and dynamic campus environment (Nik Mohd Samirah et al., 2024).

### ***Conceptual Framework***

Figure 1 shows the conceptual framework of the study. Three independent variables, namely taste, freshness, and temperature, are involved in student satisfaction, while student satisfaction preferences serve as the dependent variable.



**Figure 1: Conceptual Framework**

## Methodology

This study is an empirical study that adopts a quantitative, cross-sectional survey design to investigate the effect of certain food quality dimensions, namely taste, freshness and temperature, on students' satisfaction at Universiti Teknologi MARA (UiTM) Terengganu. The target population comprised 8,320 students enrolled during the 2025 academic semester. With a 95% confidence level and a 5% margin of error, the sample size was determined to be a representative sample of 350 students using the Raosoft sample size calculator. Because of institutional accessibility and time constraints, non-probability (convenience) sampling was used. This type of sampling may lead to selection bias and thus restrict the generalisability of the results, but due consideration was paid to minimising this sampling bias by obtaining participants from several faculties, academic levels and residential statuses. Furthermore, both face-to-face and online survey delivery strategies were employed to ensure that students with various backgrounds and schedules would be encouraged to participate and, therefore, contribute to the diversity of the sample.

Data collection took place within a structured five-week period by applying the dual channel distribution method, which combines face-to-face data collection administration, as well as employing the online data collection approach through email, WhatsApp and Telegram to optimise response rates. Five weeks were chosen for the data collection period to allow sufficient participation and to take into account the students' dining experiences within a typical academic semester. Data were collected outside of large examination periods and semester breaks to try to avoid any atypical eating habits or patterns and attendance rates on campus affecting students' responses. However, since the study was conducted on a cross-sectional design, one should consider that the academic calendar or time elapsed effects might have influenced students' perceptions when studied together with the results.

The main research tool is a structured self-administered questionnaire comprising a demographic profile and the main construct measured on a standard five-point Likert scale. The scale items were selected from the literature, which had already validated the use of these items in a food service setting, and then pilot tested with 30 students to improve the clarity and readability of the scale items for the purpose of construct validity and improving scale metrics. In addition, Cronbach's alpha coefficients were computed to assess the internal consistency of the multi-item subscales, where an alpha coefficient of  $\geq 0.60$  was considered an acceptable threshold. Table 1 presents the structure, operationalisation of items, and the sources of the questionnaire used.

**Table 1: Research Questionnaire Matrix and Source of Measurement Items**

| Variables                                 | Items                                                                                                                                                                                                                                                                                                                                                                                       | Sources                                                                            |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Section A<br>Demographic<br>Information   | 1. Gender<br>2. Age<br>3. Ethnicity<br>4. Current Academic Level<br>5. Current Semester of Study<br>6. Campus Location<br>7. Residential Status<br>8. Are you receiving any financial scholarship?                                                                                                                                                                                          |                                                                                    |
| Section B<br>Food Quality:<br>Taste       | 1. The taste of the food provided is satisfying.<br>2. The taste of the food meets my expectations.<br>3. The food has a pleasant flavor.<br>4. I agree that there is a good variety of tastes offered.<br>5. The texture of the food enhances its taste.                                                                                                                                   | Aboueldahab et al. (2026);<br>Namkung & Jang (2007);<br>Serhan & Serhan (2019)     |
| Section C<br>Food Quality:<br>Freshness   | 1. I believe the food served is fresh.<br>2. The food appears fresh.<br>3. The ingredients used in the food seem fresh.<br>4. The food has a fresh aroma.<br>5. Freshness of the food is important to me.<br>6. The food's freshness enhances its nutritional value.<br>7. I am satisfied with the quality of fresh food served.                                                            | Choi et al. (2023);<br>Namkung & Jang (2007);<br>Sari et al. (2026).               |
| Section D<br>Food Quality:<br>Temperature | 1. I am satisfied with the temperature of the food served.<br>2. The food is served at the correct temperature.<br>3. I believe hot food should be served hot.<br>4. I believe cold food should be served cold.<br>5. The temperature of the food affects my enjoyment of the meal.<br>6. The food temperature enhances the overall taste.                                                  | Akbara et al. (2021);<br>Namkung & Jang (2007);<br>Serhan & Serhan (2019)          |
| Section E<br>Student<br>Satisfaction      | 1. I am satisfied with the food served.<br>2. Overall, I am happy with the food services.<br>3. The food quality meets my expectations.<br>4. I would recommend the food services provided by the on-campus cafeteria to a friend.<br>5. The value for money of the food is good.<br>6. The variety of food options is satisfying.<br>7. I am satisfied with the overall dining experience. | Karwini & Handayani (2026);<br>Andaleeb & Caskey (2007);<br>Serhan & Serhan (2019) |

The survey responses were numerically coded and analysed using the Statistical Package for the Social Sciences (SPSS) Version 27.0. The data analysis was done in two stages: descriptive and inferential analyses. Descriptive data such as frequencies, percentages, mean and standard deviations were used to summarise respondents' descriptive features and describe the study variables. Second, inferential statistical analyses were conducted to test the proposed hypotheses. Pearson correlation was employed to examine the strength and direction of the linear correlation among each of the students' food quality parameters (taste, freshness, serving temperature) and their satisfaction. Then, multiple linear regression analysis was performed to identify the influence level of three food quality variables (taste, freshness and serving temperature) on student satisfaction and to find which factor had the most significant effect among the various factors. For all analyses, statistical significance was evaluated at  $p < 0.05$ .

## Result & Discussion

### *Reliability Analysis*

The internal consistency of each section of the questionnaire was examined with that of 30 selected respondents through a pilot test, and the reliability of the instrument was determined using Cronbach's alpha. The investigation demonstrated differing levels of internal consistency among the quality dimensions. In section B (taste), the Cronbach's Alpha was 0.782, which was measured as satisfactory internal consistency. The constructs in Section C (freshness) and Section D (temperature) demonstrated reliability, with alpha coefficients of 0.772 and 0.734, validating that the items accurately assess their intended constructs. Results indicated that Section E (students' satisfaction) had a strong internal consistency with Cronbach's alpha value of 0.882. The pilot test results showed that all subscales of the study instrument, as reported by the pilot test metric, achieved an internal consistency reliability of more than 0.70, which means that the instrument has a high level of internal consistency and reliability for the evaluation of the meal attributes and student satisfaction. The results of the pilot test reliability analysis and Cronbach's Alpha can be examined in Table 2.

**Table 2: Reliability Analysis and Cronbach's Alpha Results for the Pilot Test**

| <i>Section</i> | <i>Classification</i>     | <i>No. of Item</i> | <i>Cronbach's Alpha</i> |
|----------------|---------------------------|--------------------|-------------------------|
| <i>B</i>       | Food Quality: Taste       | 5                  | 0.782                   |
| <i>C</i>       | Food Quality: Freshness   | 7                  | 0.772                   |
| <i>D</i>       | Food Quality: temperature | 6                  | 0.734                   |
| <i>E</i>       | Student Satisfaction      | 7                  | 0.882                   |

### *Demographic Profile*

There are more females (54.8%) than males among the respondents of this study, and the majority were aged between 21 and 23 years (31.8%). All respondents identified as Malay (100%), reflecting the sample's ethnic composition. The majority of students are in Diploma (38%) and bachelor's degree (37.7%) programs, and proportionately fewer fill pre-diploma (10%) and master's degree (14.2%) programs. This is spread evenly throughout the semesters, with the highest numbers in Semester 4 (18.3%) and Semester 6 (16%) and the lowest in Semester 8 (2.3%) and Semester 1 (7.5%). The majority of the students are at Dungun campus (56%), and more than half live in college accommodation (56%). The rest remain in other places (44%). Furthermore, over half (51.5%) of the participants receive financial support. This

demographic profile describes a predominantly young and Malay student group with equal proportions of on- and off-campus students, providing an accurate basis on which student satisfaction with campus food services can be examined.

**Table 3: Demographic Profile**

| Classification                               |                     | Frequency | Percentage (%) |
|----------------------------------------------|---------------------|-----------|----------------|
| Gender                                       | Male                | 158       | 45.3%          |
|                                              | Female              | 192       | 54.8%          |
| Age                                          | 18 – 20 years old   | 61        | 17.5%          |
|                                              | 21 – 23 years old   | 111       | 31.8%          |
|                                              | 24 - 26 years old   | 88        | 25%            |
|                                              | 27 – 29 years old   | 62        | 17.8%          |
|                                              | 30 and above        | 28        | 8%             |
| Ethnicity                                    | Malay               | 350       | 100%           |
|                                              | Chinese             | 0         | 0%             |
|                                              | Indian              | 0         | 0%             |
| Current Academic Level                       | Pra-Diploma         | 35        | 10%            |
|                                              | Diploma             | 133       | 38%            |
|                                              | Bachelors of Degree | 132       | 37.7%          |
|                                              | Masters of Degree   | 50        | 14.2%          |
| Current Semester of Study                    | Semester 1          | 26        | 7.5%           |
|                                              | Semester 2          | 46        | 13%            |
|                                              | Semester 3          | 54        | 15.5%          |
|                                              | Semester 4          | 64        | 18.3%          |
|                                              | Semester 5          | 48        | 13.7%          |
|                                              | Semester 6          | 56        | 16%            |
|                                              | Semester 7          | 36        | 10.3%          |
|                                              | Semester 8          | 20        | 23%            |
| Campus Location                              | Dungun              | 196       | 56%            |
|                                              | Bukit Besi          | 63        | 18%            |
|                                              | Kuala Terengganu    | 91        | 26%            |
| Residential Status                           | Staying-in college  | 196       | 56%            |
|                                              | Staying-off campus  | 154       | 44%            |
| Are you receiving any financial scholarship? | Yes                 | 180       | 51.5%          |
|                                              | No                  | 170       | 48.5%          |

N=350

### ***Student Satisfaction with the Food Quality of Taste***

The five measurement items to assess students' perceptions of the taste of the campus food in terms of mean and standard deviation are shown in Table 4 (N =350). Descriptive statistics reveal that the mean scores of all the items are between 3.47 and 3.57, which represent a moderate to high level. The mean score for item 5 was the highest ( $M = 3.57$ ,  $SD = 1.073$ ), indicating that mouthfeel and food structure play a prominent role in students' flavour perception. On the other hand, items 1 and 2 had identical lowest scores ( $M = 3.47$ ). The standard deviations for each item are rather small, all from 1.050 to 1.127. This suggests that, although there is a generally positive taste attitude amongst most of the student population, a

notable segment holds differing opinions, highlighting opportunities for enhancing institutional dining.

**Table 4: Mean and Standard Deviation scores for Food Taste Attributes**

| No. | Statement                                              | Mean | Std. deviation |
|-----|--------------------------------------------------------|------|----------------|
| 1.  | The taste of the food provided is satisfying.          | 3.47 | 1.127          |
| 2.  | The taste of the food meets my expectations.           | 3.47 | 1.050          |
| 3.  | The food has a pleasant flavor                         | 3.52 | 1.051          |
| 4.  | I agree that there is a good variety of tastes offered | 3.52 | 1.074          |
| 5.  | The texture of the food enhances its taste             | 3.57 | 1.073          |

N=350

In the higher education context, Serhan & Serhan (2019) also showed that food taste is a key institutional variable that directly affects student happiness. The food provided in the campus's dining rooms offers a delightful and good variety of flavours that meet the needs of the students who use the university's facilities each day for their meals, both physical and hedonic (Andaleeb & Caskey, 2007). Ongoing recipe modifications and seasoning management are therefore essential for the school to play a part in protecting the school's supplementary income and improving student retention on campus.

#### ***Student Satisfaction with the Food Quality of Freshness***

Table 5 presents descriptive statistics, including mean scores and standard deviations, for the seven items assessing university students' perceptions of campus food freshness. The average scores on each of the seven items range from 3.47 to 3.73. Item 5 had the highest mean score ( $M = 3.73$ ,  $SD = 1.116$ ), demonstrating excellent food integrity awareness among students. In item 6 ( $M = 3.66$ ,  $SD = 1.161$ ), health benefits are well known. Item 2 had the lowest mean score ( $M = 3.47$ ,  $SD = 1.157$ ). Standard deviations for all items were between 1.065 and 1.161, with most scores indicating positive attitudes towards food freshness on campus, although a considerable part of the student population is experiencing suboptimal food freshness.

**Table 5: Mean and Standard Deviation Scores for Food Freshness Attributes**

| No. | Statement                                            | Mean | Std. deviation |
|-----|------------------------------------------------------|------|----------------|
| 1.  | I believe the food served is fresh.                  | 3.60 | 1.084          |
| 2.  | The food appears fresh.                              | 3.47 | 1.157          |
| 3.  | The ingredients used in the food seem fresh.         | 3.51 | 1.065          |
| 4.  | The food has a fresh aroma.                          | 3.51 | 1.075          |
| 5.  | Freshness of the food is important to me.            | 3.73 | 1.116          |
| 6.  | The food's freshness enhances its nutritional value. | 3.66 | 1.161          |
| 7.  | I am satisfied with the quality of fresh food served | 3.53 | 1.124          |

N=350

This is in line with the Importance-Performance Analysis (IPA) model developed by Akbara et al. (2021), where the freshness of food ingredients was also identified as a high-priority operational attribute needed to ensure students remained satisfied, falling into the keep up the good work quadrant. In addition, current research indicates that students' lack of perceived freshness, in terms of their satisfaction with the food offered, causes issues with health and

safety concerns, and encourages them to pursue other dining options (off campus) at the expense of institutional auxiliary revenues.

### ***Student Satisfaction with the Food Quality of Temperature***

The descriptive statistics for the six items measuring university students' perceptions of campus food temperature are shown in Table 6. The results show that mean scores for all six items range from 3.55 to 3.71, placing them in the high range on a 5-point Likert scale. Notably, Item 6 had the highest mean score ( $M = 3.71$ ,  $SD = 1.119$ ), indicating that students understand how food temperature affects its taste. Item 5 ( $M = 3.65$ ,  $SD = 1.155$ ) supports this well. The slightly lower mean score for Item 2 ( $M = 3.55$ ,  $SD = 1.116$ ) indicates that the food might not be held at the correct temperature consistently in campus operations. All items have a value for the standard deviation ranging from 1.093 to 1.155. This suggests that student opinions vary, with many finding serving temperatures generally satisfactory, while a distinct segment frequently experiences temperature consistency issues.

**Table 6: Mean and Standard Deviation Scores for Food Temperature Attributes**

| No. | Statement                                                     | Mean | Std. deviation |
|-----|---------------------------------------------------------------|------|----------------|
| 1.  | I am satisfied with the temperature of the food served.       | 3.60 | 1.138          |
| 2.  | The food is served at the correct temperature.                | 3.55 | 1.116          |
| 3.  | I believe hot food should be served hot.                      | 3.64 | 1.093          |
| 4.  | I believe cold food should be served cold.                    | 3.62 | 1.141          |
| 5.  | The temperature of the food affects my enjoyment of the meal. | 3.65 | 1.155          |
| 6.  | The food temperature enhances the overall taste.              | 3.71 | 1.119          |

N=350

The findings are consistent with ongoing studies by Sari et al. (2026), which indicate that various aspects of food, such as holding and serving temperatures, directly influence student satisfaction during meals. The immediate enjoyment of food is ruined when hot meals are served at room temperature or cold items have lost their chill. This results in dissatisfaction. In addition, sensory research demonstrates that youngsters may have safety concerns due to poor food-storage conditions and exhibit exit behaviours, defecting to outside competitors. This financial and wellness risk supports the findings of Serhan and Serhan (2019), who identified serving temperature as a critical physical dining variable that cannot be compromised. To keep students around and make them utilise the cafeteria, institutional operators must implement stringent quality controls, including heated buffets, cold wells, and rigorous temperature monitoring.

### ***Correlation Analysis***

Pearson correlation analysis was used to examine the strength and direction of linear correlation between the independent variables (food quality parameters, taste, freshness, and temperature) and the dependent variable (student satisfaction). All statistical results are shown in Table 7. Each food quality attribute has a strong positive relationship with the dependent variable, student satisfaction. Food temperature exhibits the strongest linear correlation with pleasure ( $r = 0.667$ ,  $p < 0.001$ ), followed by food freshness ( $r = 0.641$ ,  $p < 0.001$ ) and food taste ( $r = 0.637$ ,  $p < 0.001$ ). All significance levels are well below the criterion ( $p = 0.000$ ), supporting the

research hypotheses that multidimensional food quality variables significantly enhance student satisfaction.

**Table 7: Pearson Correlation Coefficients Matrix among Study Variables**

**Correlations**

|                      |                     | Taste  | Freshness | Temperature | Student satisfaction |
|----------------------|---------------------|--------|-----------|-------------|----------------------|
| Taste                | Pearson Correlation | 1      | .666**    | .661**      | .637**               |
|                      | Sig. (2-tailed)     |        | .000      | .000        | .000                 |
|                      | N                   | 350    | 350       | 350         | 350                  |
| Freshness            | Pearson Correlation | .666** | 1         | .725**      | .641**               |
|                      | Sig. (2-tailed)     | .000   |           | .000        | .000                 |
|                      | N                   | 350    | 350       | 350         | 350                  |
| Temperature          | Pearson Correlation | .661** | .725**    | 1           | .667**               |
|                      | Sig. (2-tailed)     | .000   | .000      |             | .000                 |
|                      | N                   | 350    | 350       | 350         | 350                  |
| Student satisfaction | Pearson Correlation | .637** | .641**    | .667**      | 1                    |
|                      | Sig. (2-tailed)     | .000   | .000      | .000        |                      |
|                      | N                   | 350    | 350       | 350         | 350                  |

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

**Multiple Regression Analysis**

Multiple linear regression analysis was conducted to assess the ability of all independent food quality parameters to predict the dependent variable. Model Summary and Analysis of Variance (ANOVA) metrics are shown in Tables 8 and 9, respectively.

**Table 8: Regression Model Summary for Food Quality Predictors**

| <b>Model Summary<sup>b</sup></b> |                   |          |                   |                            |
|----------------------------------|-------------------|----------|-------------------|----------------------------|
| Model                            | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1                                | .731 <sup>a</sup> | .534     | .530              | .51473                     |

a. Predictors: (Constant), Taste, Freshness, Temperature

b. Dependent Variable: Student Satisfaction

The multiple correlation coefficient ( $R = 0.731$ ) in Table 8 indicates a strong overall positive linear relationship between food quality attributes and student satisfaction. The  $R^2$  of this model is 0.534, indicating that it accounts for 53.4% of the total variance in overall student satisfaction explained by the three predictors.

The next table, Table 9, gives the ANOVA results for the regression model. F-value = 132.064 and significance level = 0.000, which shows that the model is significant. This means that at least one independent variable, whether taste, freshness, or temperature, significantly influences student satisfaction. That is, taste, freshness, and temperature are three factors that

together form a set of predictors that can accurately predict students' meal satisfaction, and the results are not much different from what can be obtained by chance. This highlights the importance of food-quality attributes in measuring students' satisfaction with on-campus dining.

**Table 9: Analysis of Variance (ANOVA) for the Regression Model**

| ANOVA <sup>a</sup> |            |                |     |             |         |                   |
|--------------------|------------|----------------|-----|-------------|---------|-------------------|
| Model              |            | Sum of Squares | df  | Mean Square | F       | Sig.              |
| 1                  | Regression | 104.970        | 3   | 34.990      | 132.064 | .000 <sup>b</sup> |
|                    | Residual   | 91.672         | 346 | .265        |         |                   |
|                    | Total      | 196.643        | 349 |             |         |                   |

a. Dependent Variable: Student Satisfaction

b. Predictors: (Constant), Taste, Freshness, Temperature

Table 10 shows that the individual food quality parameters, such as taste, freshness and temperature, had an impact on the satisfaction of the students. Coefficients for three variables are positive, and all are statistically significant ( $p < 0.05$ ), which means all three of the variables make significant positive contributions to students' satisfaction. Interestingly, the results indicate that the food temperature (Beta = 0.416) influences the students' satisfaction more than taste (Beta = 0.273). This statement clearly shows that thermal management is or should be an initial quality sensing parameter for those attending dining halls on campus, based on the basic requirement in cooking that hot food should be served hot and cold food served cold. This is a significant effect because the subject matter of the geographic location of UiTM Terengganu, the high temperature and humidity of the area, increases the need for food to maintain the proper temperature. Thus, in the eyes of their students, the key is to get freshly cooked food, steaming and hot or properly chilled drinks, to conform to the requirement of the immediate environment.

**Table 10: Regression Coefficients Matrix for Food Quality Predictors**

| Coefficients <sup>a</sup> |             |                             |            |                           |       |      |
|---------------------------|-------------|-----------------------------|------------|---------------------------|-------|------|
| Model                     |             | Unstandardized Coefficients |            | Standardized Coefficients |       | Sig. |
|                           |             | B                           | Std. Error | Beta                      | t     |      |
| 1                         | (Constant)  | .392                        | .164       |                           | 2.383 | .018 |
|                           | Taste       | .316                        | .061       | .273                      | 5.200 | .000 |
|                           | Freshness   | .240                        | .061       | .223                      | 3.903 | .000 |
|                           | Temperature | .337                        | .059       | .325                      | 5.722 | .000 |

a. Dependent Variable: Student Satisfaction

A summary evaluation of the structural relationships hypothesised at the beginning of this study was done for each relation individually, based on the joint results of the Pearson correlation and multiple linear regression analyses. Table 11 summarises the hypothesis-testing outcomes. The results of the statistical analysis indicate that all three hypotheses have a significant positive relationship with students' satisfaction at UiTM Terengganu, namely food taste, food freshness and serving temperature. Among these parameters, food temperature was considered the most important factor affecting student satisfaction, followed by taste and freshness.

**Table 11: Summary of Hypotheses Testing Results**

| Hypothesis | Structural Path                               | Correlation (r) | Standardized Beta ( $\beta$ ) | Sig. (p) | Outcome  |
|------------|-----------------------------------------------|-----------------|-------------------------------|----------|----------|
| H1         | Food taste towards student satisfaction       | 0.637           | 0.273                         | < 0.001  | Accepted |
| H2         | Food freshness towards student satisfaction   | 0.641           | 0.223                         | < 0.001  | Accepted |
| H3         | Food temperature towards student satisfaction | 0.667           | 0.325                         | < 0.001  | Accepted |

The results of the regression analysis strongly corroborate the recent empirical study by Karwini & Handayani (2026), which showed that service settings address transactional expectations, while the characteristics of food quality have a far more powerful direct effect on consumer satisfaction. In a college environment where students depend significantly on institutional meals for their daily nourishment, the physical characteristics of food, specifically temperature, taste, and freshness, become essential requirements.

## Conclusion

This study confirmed that taste, freshness, and serving temperature all have statistically significant, positive, and strong linear correlations with student satisfaction at UiTM Terengganu. The standardised model coefficients indicated that food temperature was the most important variable influencing students' eating satisfaction. This can be followed by food taste and food freshness, which indicates the sensory attribute is important to the student consumers, whose daily health and nutrition depend on the institutional infrastructure.

During the busiest service times, food temperature is an important factor in consumer rejection, with hot food becoming warm and cold food becoming even colder. If these are not delivered on a regular basis at campus dining facilities, exit behaviours transfer to off-campus competitors, putting student well-being and university revenue at risk. Foodservice administration in UiTM Terengganu requires adopting a comprehensive solution for its operations and moving beyond the fragmented implementation of quality management to minimise these risks and enhance campus life. This involves spending money upfront on equipment that holds temperature, such as heated buffet lines and cooling wells, rigorously training staff on thermal logs, constantly tweaking menu flavour and incorporating new recipe ideas that feature fresh ingredients, and implementing a digital, structured student feedback loop to dynamically track and adjust to changing student preferences.

From these findings, there are two areas where future researchers can build on the existing research. First, future research might employ external service features, such as price fairness or perceived value for money, as moderators to assess how financial constraints affect students' tolerance for minor sensory changes.

One of the major drawbacks of this study is that the respondents were all Malay students, and there was no ethnic diversity. While this may be a result of the institutional context of UiTM, it may limit the findings' applicability and generalisability to multi-ethnic university settings. Past studies have suggested that cultural background may affect people's beliefs and feelings

about foods, their taste and liking for foods and satisfaction with foodservice characteristics. Therefore, the results of this research should be used with caution when generalising to more diverse student populations.

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