International Journal of Science, Strategic Management and Technology
Volume **02** Issue **05** May-**2026** | ISSN: **3108-1762 (Online)** | Impact Factor: 3.8
An International, Peer-Reviewed, Open Access Scholarly Journal Indexed in recognized academic databases

An Analysis of Student Food Preferences in Cyclic Lunch Menus within Institutional Catering Systems

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https://doi.org/10.55041/ijsmt.v2i5.016

Cite this Article: PS, M. (2026). An Analysis of Student Food Preferences in Cyclic Lunch Menus within Institutional Catering Systems. International Journal of Science, Strategic Management and Technology, *02*(05). https://doi.org/10.55041/ijsmt.v2i5.016

Abstract: Institutional catering systems in educational institutions rely heavily on cyclic menu planning to ensure efficiency and consistency. However, the success of such systems depends on student satisfaction, which is influenced by food preferences. This study analyzes student food preferences in cyclic lunch menus, with a specific focus on South Indian students, and evaluates their impact on satisfaction levels. A quantitative research design was adopted with a sample size of 150 students. Data were collected through structured questionnaires and analysed using descriptive statistics, Pearson correlation, and multiple regression analysis. The findings reveal that traditional meals and biryani are the most preferred lunch options. Pearson correlation analysis shows a strong positive relationship between biryani and satisfaction ($r = 0.612$). Regression analysis further confirms that biryani is the strongest predictor of satisfaction ($\beta = 0.421$, $p < 0.001$), followed by traditional meals and non-vegetarian dishes. The study concludes that while traditional meals form the backbone of cyclic menus, the inclusion of high-preference dishes such as biryani significantly enhances student satisfaction. The research recommends a balanced cyclic menu that integrates staple meals with occasional high-demand dishes to improve acceptance and reduce food waste.

Introduction. Institutional catering in educational settings is designed to serve large populations efficiently while maintaining nutritional standards and cost control. Cyclic menu planning is widely used due to its operational convenience and predictability. However, its effectiveness is increasingly challenged by changing student expectations, particularly regarding taste, variety, and cultural relevance. Students represent a diverse consumer group with evolving food preferences influenced by regional habits, exposure to global cuisines, and lifestyle factors. In South India, rice-based meals dominate daily consumption patterns, yet there is a growing demand for flavourful and diverse dishes such as biryani and Indo-Chinese cuisine. This dual preference creates a challenge for institutional caterers to balance routine meals with exciting menu options [1]. Food preference plays a critical role in determining satisfaction, consumption patterns, and food waste. Traditional menus that fail to adapt to student preferences often lead to dissatisfaction and reduced meal participation. Therefore, understanding the relationship between food choices and satisfaction is essential for designing effective cyclic menus. This study aims to analyse student food preferences, identify key drivers of satisfaction, and evaluate the impact of specific dishes particularly biryani on overall acceptance of cyclic lunch menus. Institutional catering systems are an integral component of educational establishments, providing large-scale food services to students, staff, and faculty. These systems must balance cost efficiency, nutritional adequacy, and consumer satisfaction. One of the most widely used approaches in institutional catering is cyclic menu planning, where a set of

menus is repeated over a specific period, such as weekly or monthly cycles [2]. This method simplifies procurement, ensures consistency, and facilitates efficient kitchen operations. Despite its advantages, cyclic menu planning often faces challenges related to monotony and reduced consumer satisfaction. Students, as primary consumers, exhibit diverse food preferences influenced by cultural background, taste preferences, dietary habits, and exposure to global cuisines [3]. In a dynamic food environment, students increasingly demand variety, quality, and personalisation in meals. Therefore, understanding their preferences becomes essential for designing effective cyclic menus. Food preference is a complex phenomenon shaped by sensory attributes such as taste, aroma, texture, and appearance, as well as psychological and social factors [4]. In educational institutions, these preferences directly influence food consumption patterns, plate waste, and overall satisfaction with catering services. Ignoring these factors can result in decreased meal participation and increased food wastage, ultimately affecting the efficiency of catering operations [5]. In recent years, there has been a growing emphasis on consumer-centred menu planning in institutional catering. This approach involves gathering feedback from diners and incorporating their preferences into menu design [6]. For educational institutions, this is particularly important as students represent a diverse population with varying expectations. Additionally, promoting healthy eating habits through appealing menu options is a key responsibility of institutional catering services. This study focuses on analysing student food preferences within cyclic lunch menus in educational institutions. It aims to identify key factors influencing food choices, assess satisfaction levels, and provide recommendations for improving menu planning practices [7]. By aligning cyclic menus with student preferences, institutions can enhance meal acceptance, improve nutritional intake, and optimise operational efficiency [8].

Review of Literature

Previous studies have highlighted the importance of understanding consumer preferences in institutional catering. Research indicates that taste is the most significant determinant of food choice, followed by variety and presentation. Students tend to prefer meals that are flavourful, visually appealing, and culturally familiar. Studies on cyclic menu planning emphasise its operational benefits, including cost control, ease of procurement, and reduced complexity in kitchen management. However, researchers have also noted that repetitive menus can lead to decreased satisfaction and increased plate waste [9]. Incorporating variety within the cyclic framework is therefore essential. Nutritional considerations also play a vital role in menu planning. Institutional catering must ensure that meals meet dietary requirements while remaining appealing to consumers. Studies suggest that students are more likely to consume healthy foods when they are presented in an attractive and palatable manner [10]. Cultural diversity is another important factor influencing food preferences. Educational institutions often host students from different regions, each with unique dietary habits. Research shows that including regional and traditional dishes in menus enhances acceptance and satisfaction. Recent literature also emphasizes the role of feedback mechanisms in improving catering services. Surveys, suggestion boxes, and digital feedback systems allow institutions to gather insights into student preferences and adjust menus accordingly [11]. This participatory approach leads to higher satisfaction levels and better alignment with consumer expectations. The literature suggests that successful cyclic menu planning requires a balance between operational efficiency and consumer satisfaction. Understanding student preferences is key to achieving this balance [12]. Previous studies emphasise that taste and variety are the primary determinants of food preference in institutional catering. Traditional meals provide familiarity and comfort, while variety prevents monotony. Research also indicates that high-preference dishes, often rich in flavour and spices, significantly enhance satisfaction. Cyclic menus are recognised for their efficiency but criticised for repetition. Scholars suggest incorporating feedback mechanisms and periodic menu revisions to improve acceptance [13]. Studies on student populations highlight the importance of cultural relevance, particularly in regions like South India, where food habits are deeply rooted [14]. Recent research also points out that while students are aware of nutrition, it does not strongly influence their food choices unless combined with taste and presentation. This aligns with findings that indulgent foods often have a stronger impact on satisfaction than purely healthy options [15].

Materials and Methods

This study adopted a quantitative research approach to examine student food preferences in cyclic lunch menus within an institutional catering system. The research was conducted in an educational institution providing industrial catering

services, with a sample size of 150 South Indian students selected using a simple random sampling technique to ensure representativeness. Primary data were collected through a structured questionnaire comprising Likert-scale and multiple-choice questions focusing on lunch preferences, frequency of dish selection, and satisfaction levels. The questionnaire was pre-tested for clarity and reliability before administration. Variables considered in the study included traditional meals, variety rice, biryani, non-vegetarian meals, healthy meals, and overall student satisfaction. Data collection was carried out over a defined period during regular lunch service to capture realistic responses. The collected data were coded and analyzed using statistical tools, including descriptive statistics, Pearson correlation analysis, and multiple regression analysis, to identify relationships between food preferences and satisfaction. The results were presented in the form of tables and graphs for better interpretation. Limitations of the study include its restriction to a single institution and reliance on self-reported data, which may be subject to response bias.

Results and Discussion

The present study examined student food preferences in cyclic lunch menus within an institutional catering system and analyzed their influence on overall satisfaction. The results are discussed based on descriptive analysis, correlation findings, and regression outcomes. The analysis of food choice preferences indicates that traditional South Indian meals are the most frequently consumed lunch option, confirming their role as staple foods that ensure consistency and daily acceptance among students. However, biryani emerges as a highly preferred dish, accounting for a significant proportion of student choices, reflecting a strong inclination toward flavorful and indulgent meals. Variety rice and non-vegetarian dishes also contribute to menu diversity and acceptance, though to a lesser extent.

Correlation

Variables	**Traditional Meals**	**Variety Rice**	**Biryani**	**Non-Veg Meals**	**Healthy Meals**	**Satisfaction**
Traditional Meals	1.000	0.412**	-0.285*	0.265*	0.198	0.436**
Variety Rice	0.412**	1.000	0.305*	0.214	0.176	0.382**
Biryani	-0.285*	0.305*	1.000	0.521**	-0.248*	**0.612** **
Non-Veg Meals	0.265*	0.214	0.521**	1.000	-0.190	0.458**
Healthy Meals	0.198	0.176	-0.248*	-0.190	1.000	0.205
Satisfaction	0.436**	0.382**	**0.612** **	0.458**	0.205	1.000

The Pearson correlation analysis provides valuable insights into the relationship between different lunch preferences and student satisfaction within cyclic menu systems in institutional catering. The results indicate that biryani has the strongest positive correlation with satisfaction ($r = 0.612$, $p < 0.01$), making it the most influential factor among all variables. This suggests that students derive a higher level of satisfaction from flavorful and premium dishes, highlighting the importance of incorporating such items into cyclic menus. Biryani also shows a strong positive relationship with non-vegetarian meals ($r = 0.521$, $p < 0.01$), indicating overlapping consumer preferences for rich and protein-based dishes. Traditional meals demonstrate a moderate positive correlation with satisfaction ($r = 0.436$, $p < 0.01$), confirming their role as staple foods that ensure consistency and daily acceptance. Similarly, non-vegetarian meals ($r = 0.458$, $p < 0.01$) contribute significantly to satisfaction, reinforcing the preference for taste-driven food choices among students. Variety rice shows a moderate positive relationship with satisfaction ($r = 0.382$, $p < 0.01$), indicating that diversity in menu options helps improve overall acceptance, though it is less impactful than high-preference dishes like biryani. The positive correlation between traditional meals and variety rice ($r = 0.412$, $p < 0.01$) suggests that both contribute collectively to menu balance. In contrast, healthy meals exhibit a weak positive correlation with satisfaction ($r = 0.205$), implying that nutritional considerations alone are not strong determinants of student satisfaction. Furthermore, the

negative correlation between healthy meals and biryani ($r = -0.248$, $p < 0.05$) highlights a trade-off between health-oriented and indulgent food choices. The negative relationship between traditional meals and biryani ($r = -0.285$, $p < 0.05$) indicates that these categories serve different functional roles within cyclic menus. Traditional meals cater to routine consumption, while biryani represents a special or high-value item that enhances excitement and satisfaction. Overall, the findings suggest that student satisfaction in institutional catering is primarily influenced by taste, richness, and variety rather than health considerations. Therefore, an effective cyclic menu should balance staple traditional meals with occasional high-preference dishes like biryani to maximize acceptance and reduce menu fatigue.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.742	0.551	0.536	0.412

The model summary statistics indicate a strong and meaningful relationship between the independent variables (traditional meals, variety rice, biryani, non-vegetarian meals, and healthy meals) and the dependent variable (student satisfaction). The correlation coefficient ($R = 0.742$) suggests a strong positive association between the set of predictors and satisfaction levels. This implies that the selected food preference variables collectively have a substantial influence on how students perceive and evaluate cyclic lunch menus in institutional catering. The coefficient of determination (R Square = 0.551) reveals that 55.1% of the variation in student satisfaction is explained by the independent variables included in the model. This is a relatively high explanatory power for behavioral and food preference studies, indicating that menu composition plays a critical role in determining satisfaction levels. The adjusted R Square (0.536) is slightly lower than the R Square value, which is expected as it accounts for the number of predictors in the model. The small difference between R Square and adjusted R Square suggests that the model is well-fitted and does not suffer from overfitting, confirming the reliability of the selected variables in explaining satisfaction. The standard error of estimate (0.412) indicates the average deviation of observed values from the predicted values. A lower value reflects better prediction accuracy, suggesting that the model provides reasonably precise estimates of student satisfaction. Overall, the model demonstrates a good fit and strong predictive capability, confirming that food preferences particularly high-demand items such as biryani and traditional meals—are significant determinants of satisfaction in cyclic menu systems. However, since approximately 44.9% of the variation remains unexplained, other factors such as service quality, food presentation, dining environment, and pricing may also influence student satisfaction and should be considered in future research.

Anova

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	28.642	5	5.728	33.74	0.000
Residual	23.358	144	0.162		
Total	52.000	149			

The ANOVA results assess the overall significance of the regression model in explaining student satisfaction based on lunch preferences in cyclic menus. The regression sum of squares (28.642) represents the variation in student satisfaction explained by the independent variables (traditional meals, variety rice, biryani, non-vegetarian meals, and healthy meals). In comparison, the residual sum of squares (23.358) indicates the unexplained variation, suggesting that a substantial portion of satisfaction is accounted for by the model. The degrees of freedom (df = 5 for regression and 144 for residual) correspond to the number of predictors and sample size, respectively. The mean square for regression (5.728) is significantly higher than the mean square for residual (0.162), indicating that the model explains considerably

more variance than random error. The F-value (33.74) is relatively high, which demonstrates that the model provides a much better fit than a model with no predictors. Most importantly, the significance value ($p = 0.000$) is less than 0.001, confirming that the regression model is statistically highly significant. This means that the independent variables, when considered together, have a significant effect on student satisfaction. In other words, food preferences in cyclic menus are not random but play a crucial role in determining satisfaction levels among students. Overall, the ANOVA results validate the reliability of the regression model and confirm that menu components particularly high-preference items like biryani and traditional meals collectively influence satisfaction in institutional catering systems.

Regression

Variables	B (Unstandardized)	Std. Error	Beta (Standardized)	t-value	Sig.
(Constant)	1.215	0.284	—	4.28	0.000
Traditional Meals	0.248	0.072	0.261	3.44	0.001
Variety Rice	0.186	0.065	0.198	2.86	0.005
Biryani	**0.392**	0.068	**0.421**	**5.76**	**0.000**
Non-Veg Meals	0.214	0.071	0.233	3.01	0.003
Healthy Meals	0.082	0.059	0.091	1.39	0.167

The coefficients table provides detailed insights into the individual contribution of each independent variable to student satisfaction in cyclic lunch menus. The constant value ($B = 1.215$, $p < 0.001$) represents the baseline level of satisfaction when all predictors are held constant. Its significance indicates that there are inherent factors influencing satisfaction beyond the variables included in the model. Among the predictors, biryani emerges as the most influential factor ($\beta = 0.421$, $t = 5.76$, $p < 0.001$). This strong positive and statistically significant relationship confirms that biryani has the highest impact on student satisfaction. It highlights the role of highly preferred, flavorful dishes in enhancing the overall dining experience within institutional catering. Traditional meals ($\beta = 0.261$, $p = 0.001$) also show a significant positive effect on satisfaction. This indicates that staple South Indian meals remain essential for maintaining consistency and meeting daily dietary expectations of students. Non-vegetarian meals ($\beta = 0.233$, $p = 0.003$) significantly contribute to satisfaction, suggesting that protein-rich and taste-oriented dishes are important components of cyclic menus. Similarly, variety rice ($\beta = 0.198$, $p = 0.005$) has a moderate but significant impact, emphasizing the importance of diversity in menu planning. In contrast, healthy meals ($\beta = 0.091$, $p = 0.167$) are not statistically significant, as the p-value exceeds 0.05. This indicates that although students may be aware of nutritional aspects, these do not strongly influence their satisfaction levels when compared to taste-driven options. Overall, the regression coefficients clearly demonstrate that student satisfaction is primarily driven by taste, richness, and variety, with biryani acting as the strongest predictor. Traditional and non-vegetarian meals provide foundational support, while healthy options have minimal direct impact. These findings reinforce the need for a balanced cyclic menu strategy that prioritizes high-preference dishes alongside staple meals to maximize satisfaction.

Findings

The study reveals that traditional South Indian meals continue to be the most commonly consumed lunch option among students, highlighting their importance as staple foods that ensure consistency and daily acceptance in institutional catering systems. At the same time, biryani emerges as the most preferred high-value dish and a major driver of student satisfaction. Pearson correlation analysis indicates that biryani has the strongest positive relationship with satisfaction ($r = 0.612$), followed by non-vegetarian meals and traditional meals. This is further supported by regression analysis, where biryani is identified as the most influential predictor of satisfaction ($\beta = 0.421$, $p < 0.001$), while traditional meals ($\beta =$

0.261) and non-vegetarian meals (β = 0.233) also show significant contributions. Variety rice demonstrates a moderate impact on satisfaction (β = 0.198), suggesting that diversity in menu options enhances acceptance. In contrast, healthy meals do not exhibit a statistically significant influence ($p > 0.05$), indicating that students prioritize taste and preference over nutritional considerations. The regression model explains 55.1% of the variation in satisfaction ($R^2 = 0.551$), and the ANOVA results confirm the model's statistical significance ($F = 33.74$, $p < 0.001$), validating the overall influence of food preference variables. Additionally, the negative relationship between traditional meals and biryani suggests that they serve different roles within cyclic menus—traditional meals support routine consumption, while biryani enhances excitement and satisfaction. Overall, the findings emphasize that student satisfaction in institutional catering is primarily driven by taste, flavor, and variety rather than health factors, underscoring the need for a balanced cyclic menu that combines staple meals with high-preference dishes.

Conclusion

This study examined student food preferences in cyclic lunch menus within institutional catering systems, with a particular focus on South Indian students, and evaluated their influence on overall satisfaction. The findings clearly demonstrate that while cyclic menu planning is effective for operational efficiency, its success largely depends on how well it aligns with student preferences and expectations. The results indicate that traditional South Indian meals continue to form the foundation of lunch menus, ensuring consistency, familiarity, and daily acceptance among students. These meals play a crucial role in maintaining routine consumption patterns and meeting basic dietary expectations. However, the study also highlights the growing importance of high-preference dishes, particularly biryani, in enhancing student satisfaction. Statistical analysis confirms that biryani is the strongest predictor of satisfaction, reflecting students' strong inclination toward flavorful, rich, and indulgent foods. The correlation and regression analyses further reinforce that taste-driven factors such as flavor, variety, and sensory appeal significantly influence satisfaction levels, whereas nutritional considerations alone do not have a substantial impact. Although healthy meal options are recognized, they are not primary determinants of food choice or satisfaction among students. This suggests that institutional catering systems must go beyond nutritional adequacy and focus on delivering meals that are both appealing and enjoyable. Another important insight from the study is the complementary role of different food categories within cyclic menus. Traditional meals serve as the core component for daily consumption, while dishes like biryani function as high-value additions that increase excitement and reduce menu fatigue. This balance is essential for maintaining long-term acceptance of cyclic menus. The study concludes that a successful cyclic menu in institutional catering should adopt a student-centered approach by integrating staple meals with strategically planned high-preference dishes. Including items like biryani on a periodic basis can significantly enhance satisfaction without compromising operational efficiency. Additionally, incorporating variety and occasional innovation in menu planning can further improve the dining experience. The effectiveness of cyclic menu systems depends not only on cost and operational factors but also on their ability to meet consumer expectations. By aligning menu design with student preferences, institutions can improve satisfaction, increase meal participation, and reduce food waste. Future research may explore additional factors such as service quality, presentation, and environmental influences to develop a more comprehensive understanding of student satisfaction in institutional catering.

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