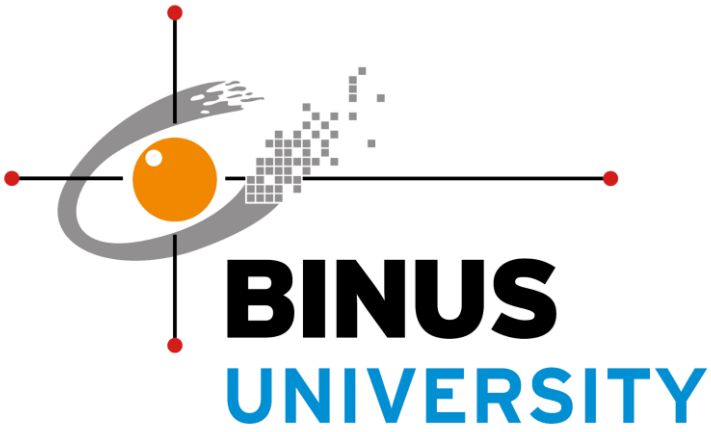
SSM Finals - Report_Kelompok 6

Mobility Students' Satisfaction Level on BINUS @ Anggrek Cafeteria Services, Cleanliness, and Products



Group 6:

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1. Introduction

1.1 Background

Campus dining services play a crucial role in university life, directly affecting how students feel, perform academically, and experience their time on campus. For mobility students who have moved from other BINUS campuses or participated in international exchange programs, the cafeteria that is in the campus becomes even more significant as they navigate their new environment while building habits and making friends. These students bring valuable perspectives shaped by what they've experienced before, creating particular expectations about what good food service should look like. Hence, today's university dining services need to meet diverse expectations that cover everything from food quality and quick service to cleanliness, easy payment options, varied menu choices, friendly staff, and comfortable dining spaces, also the facilities in the cafeteria.

The transition period for mobility students involves many adjustments that go far beyond just attending classes, having reliable but also worth it dining options becomes important to help them feel more at home in their new campus environment. Research in higher education consistently shows that when students are satisfied with campus food services, they're more likely to stay at the university, perform better academically, and feel positive about their overall college experience. For mobility students specifically, who may already be dealing with the stress of adapting to a new place, the quality of dining services can make a real difference in how well they settle in and succeed at their new university.

1.2 Problem

The core issue addressed in this study is the comprehensive evaluation of canteen service satisfaction among BINUSIAN mobility students at BINUS Anggrek. Given their unique position as students with comparative experience that can have differences, mobility students possess valuable perspectives on service quality standards that may differ from regular student populations. Are the current cafeteria services meeting their needs in all areas? Do mobility students encounter specific challenges related to food quality, service efficiency, or facility adequacy that impact their overall campus experience?

Furthermore, this study seeks to identify specific areas of strength and improvement within the cafeteria service system from the mobility student perspective. Understanding these satisfaction patterns is crucial for the university to enhance its food services, support successful student transitions, and maintain service standards that accommodate the diverse needs and different expectations of its mobility student community. This analysis will provide insights for improving services that directly impact student and campus satisfaction.

1.3 Measurements

To address the research problem, this study employs a comprehensive survey methodology using Likert scale measurements to evaluate multiple sections of cafeteria service satisfaction among mobility students. The structured approach ensures data collection that enables comparative assessment across service categories, focusing on the following key dimensions:

A. Cleanliness and Hygiene Standards
    a. Measuring satisfaction with dining area sanitation
    b. Measuring satisfaction of utensil cleanliness

    c. Measuring satisfaction for overall environmental cleanliness

B. Product Quality Evaluation
    a. Assessing food and beverage quality including taste
    b. Satisfaction of food's freshness
    c. Measures satisfaction of food's price
    d. Satisfaction for nutritional value

C. Payment Method Convenience
    a. Examining satisfaction with available payment systems
    b. Examining satisfaction on transaction efficiency

D. Menu Variation and Diversity
    a. Measuring satisfaction with food variety
    b. Measuring satisfaction for dietary accommodation

E. Staff Helpfulness and Professionalism
    a. Assessing staff's courtesy
    b. Assessing staff's responsiveness
    c. Assessing staff's knowledge

F. Facility Infrastructure Adequacy
    a. Evaluating satisfaction with seating arrangements
    b. Evaluating table and bench conditions
    c. Evaluating satisfaction on supporting amenities (e.g. sink, tissue) availability

Since, all questions will use the Likert scale measurement system this can result in standardized responses ranging from highly unsatisfactory to highly satisfactory, precise measurement of student view can be concluded for service improvements to accommodate mobility student needs. But, feedback from respondents is needed too, which is why feedback regarding cafeteria services in the form of an input text box is demanded too in our survey, and respondents can type their honest opinion and give us honest insights about the BINUS Anggrek's cafeteria.

2. Sampling Design

Stage I: Cluster Sampling

We grouped B27 mobility students into three clusters based on their home campuses: Bandung, Malang, and Semarang. All clusters were included, making it a single-stage cluster design. This approach was chosen for its practicality, enabling easier access through campus administrative networks and simplifying the sampling process.

Stage II: Simple Random Sampling

We applied a simple random sampling (SRS) technique by assigning each student a random number using Excel's RAND() function. The list was sorted, and the top *n* students were selected according to the required sample size. This method ensured equal selection probability for all students, with randomization performed after data cleaning.

2.1 Sample Size Calculation

1. Slovin's Formula for Total Sample Size in SRS

$$n = \frac{N}{1 + N \cdot d^2}$$

Given:

- $N = 101$ (total population)
- $d = 5\% = 0.05$

$$n = \frac{101}{1 + 101 \cdot 0.05^2} = \frac{101}{1 + 0.2525} = \frac{101}{1.2525} \approx 80.64$$

2. Sample Distribution by Cluster

Campus (Cluster)	Population (N)	Sample Size (n)	Sampling Fraction (f = n/N)
Binus@Bandung	36	33	0.917
Binus@Malang	19	18	0.947
Binus@Semarang	46	41	0.891
Total	**101**	**92**	**0.911**

2.2 Key Sampling Parameters

- Proportion (p): 0.5
  This is a conservative assumption used to calculate the maximum variance in the population proportion. We used 0.5 because it yields the largest possible sample size in the absence of prior data.
- Sampling Fraction (f): 0.91
  This means that around 91% of the total accessible population was sampled. A high sampling fraction increases the precision of the estimates and reduces the standard error.
- Average Standard Error per Variable **:**
  https://colab.research.google.com/drive/1mZ0bKJS-e-wt4e7rgoqL0jrQEZLGC0sv?usp=sharing

Services – SE = 0.0354
Indicates strong consistency in responses related to service aspects such as staff friendliness, responsiveness, and payment ease.

Cleanliness – SE = 0.0411
The highest SE among variables, suggesting more diverse views on canteen cleanliness and hygiene conditions.

Facilities – SE = 0.0385
Shows moderate variation, possibly due to differing experiences with seating and facility availability during busy hours.

Food Product – SE = 0.0366
Reflects high agreement among students regarding food variety, quality, and pricing.

2.3 Survey Life Cycle & Error Considerations

Phase	Potential Error	Example	Mitigation Strategy
Frame Building	Coverage Error	Student missing from database	Use verified admin list
Collection	Non-response Error	Students not responding	Replacement rules applied
Response	Measurement Bias	Students overrating service quality	Anonymous & neutrally-worded survey
Processing	Entry Error	Wrong input from Excel	Double-check by two team members

3. Questionnaire Design

This is a link to the questionnaire design, which contains questions and statements on a Likert scale.
https://binusianorg-my.sharepoint.com/personal/i_danuarta_binus_ac_id/_layouts/15/guestaccess.aspx?share=EaAuqU2PJWNBuu4qjpCpwaABLMxkl87HkPq7IGJcLZQqcg&e=hBFcCPe_Design Group 6.docx

4. Data Collection

4.1 Method

The method we used in conducting this research was a questionnaire or indirect data collection (secondary). We used the Microsoft Form platform, where the questionnaire was distributed directly to potential respondents via communication platforms such as WhatsApp or Line.

4.2 Process

Generally, it is somewhat challenging to contact respondents, particularly active students in the student mobility programme, as we require connections to reach the target audience. Therefore, the questionnaire was distributed through group chats owned by each group member with the assistance of text broadcasts to help potential respondents understand the purpose and objectives of our questionnaire. Among the respondents we collected, there were a few individuals we met in person to request their assessment of the quality of the Binus Anggrek canteen in our questionnaire form. Overall, we required approximately three weeks to collect 100 respondents from the target audience of active students in the student mobility programme, followed by the next week to clean and process the data for evaluation.

4.3 Effort to increase response rates and its effects

Based on the results of our survey distribution, there were some difficulties that we faced and required more effort in collecting responses. During the 3rd-week period of collecting respondent data, we were still far from the target quota of respondents in the 2nd week where this time was close to the target time we had set, our group tried to meet one by one friends who were known personally to ask for help filling out our questionnaire. In the middle of the

2nd week, we had reached around 96 respondents with a difference of 4 respondents remaining to meet the target, we again used the method of contacting our acquaintances one by one with broadcast text. The results we got were fruitful, where we got 112 respondents, with 4 of them being students who did not meet the qualifications of our respondent target. We have 8 response reserves ((112-4) - 100), where we only need 100 respondents to build a sample frame. We will use the response reserves to replace most of the respondents who did not respond.

5. Measurement Quality

To measure the quality of our questionnaire, we conducted validity and reliability tests on its main variables. The data we used to perform these tests were obtained from sampled data using simple random sampling (n = 81).

5.1 Validity Test

For the validity test, we calculate the Pearson correlation coefficient (rxy) for each question within the main variables. We then compare the results we got with the r-table to determine whether the question is considered valid or not. For the r-table, we use degree of freedom (df = N-2), with significance level α = 5%. Below is the link to our spreadsheet for validity test calculation.
https://docs.google.com/spreadsheets/d/1DAX44iZqH3unBAtyeL5lgi7pOYjAJ1DmBo7urdOlanY/edit?usp=sharing

Pearson Correlation:

$$r_{xy} = \frac{N\sum(x_i y_i) - (\sum x_i)(\sum y_i)}{\sqrt{[N\sum x_i^2 - (\sum x_i)^2][N\sum y_i^2 - (\sum y_i)^2]}}$$

r-table for df = 81 - 2 = 79 and α = 0.05 for two-tailed test is 0.2185.

Service:

Service (Pearson Correlation rxy)						
rQ1T	rQ2T	rQ3T	rQ4T	rQ5T	rQ6T	rQ7T
0.67778868	0.67746306	0.80314094	0.59658994	0.69157345	0.62519695	0.78980363

From the Pearson scores above, we can see that each question within the main variable "Service" is higher than the r-table score, meaning that every question of variable "Service" is considered valid.

Cleanliness:

Cleanliness (Pearson Correlation rxy)			
rQ1T	rQ2T	rQ3T	rQ4T
0.7148279202	0.863159935	0.7350508856	0.6415706145

From the Pearson scores above, we can see that each question within the main variable "Cleanliness" is higher than the r-table score, meaning that every question of variable "Cleanliness" is considered valid.

Facility:

Facility (Pearson Correlation rxy)		
rQ1T	rQ2T	rQ3T
0.8840529115	0.8358090041	0.9268195146

From the Pearson scores above, we can see that each question within the main variable "Facility" is higher than the r-table score, meaning that every question of variable "Facility" is considered valid.

Product:

Product (Pearson Correlation rxy)					
rQ1T	rQ2T	rQ3T	rQ4T	rQ5T	rQ6T
0.8428045466	0.7449221971	0.8339207733	0.8293426036	0.7007046264	0.8314228552

From the Pearson scores above, we can see that each question within the main variable "Product" is higher than the r-table score, meaning that every question of variable "Product" is considered valid.

5.2 **Reliability Test**

For the reliability test, we use the Cronbach Alpha formula to calculate the reliability score of each main variable and check the range of reliability through the interpretation. Below is the link to our spreadsheet for reliability test calculation.

https://docs.google.com/spreadsheets/d/1QRjhVRyrdjhEpp1rWCuIS1CpdNHC2Z2cp4zUqevLlGY/edit?usp=sharing

Cronbach Alpha:

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum s_i^2}{s_t^2}\right)$$

Service:

$\sum s_i^2 = 3.499074074$

$s_t^2 = 11.8095679$

k = 7

$$\alpha = \left(\frac{7}{7-1}\right)\left(1 - \frac{3.499074074}{11.8095679}\right) = 0.8209933008$$

From the calculations above, we got a reliability score of ~0.821 for the variable "Service". $\alpha >$ 0.8 means a high reliability where each question within the variable "Service" has consistent reliability.

Cleanliness:

$\sum s_i^2 = 2.166975309$

$s_t^2 = 4.639197531$

k = 4

$$\alpha = \left(\frac{4}{4-1}\right)\left(1 - \frac{2.166975309}{4.639197531}\right) = 0.7105315681$$

From the calculations above, we got a reliability score of ~0.711 for the variable "Cleanliness". α > 0.7 means a reliability that is moderately good enough for each question within the variable "Cleanliness".

Facility:

$\sum s_i^2 = 1.738580247$

$s_t^2 = 3.894444444$

k = 3

$$\alpha = \left(\frac{3}{3-1}\right)\left(1 - \frac{1.738580247}{3.894444444}\right) = 0.8303613885$$

From the calculations above, we got a reliability score of ~0.830 for the variable "Facility". α > 0.8 means a high reliability where each question within the variable "Facility" has consistent reliability.

Product:

$\sum s_i^2 = 2.696296296$

$s_t^2 = 9.858641975$

k = 6

$$\alpha = \left(\frac{6}{6-1}\right)\left(1 - \frac{2.696296296}{9.858641975}\right) = 0.8718051468$$

From the calculations above, we got a reliability score of ~0.872 for the variable "Product". α > 0.8 means a high reliability where each question within the variable "Product" has consistent reliability.

6. Preliminary Analysis

6.1 Descriptive Analysis

We identify **missing values** from our data for all variables. The result is there is one variable that contains missing value, the variable is Home Campus.

Summary statistic/ visual representation for our data:

a) **Faculty Distribution**
We can see that most of the respondent is from SoCS (School of Computer Science) faculty (90 respondent), followed by School of Information System, Faculty of Digital, Business School, and School of Design

b) **Canteen Visit Frequency**
We can see that most of the mobility students visit BINUS Anggrek canteen 1-2 times.

c) **Distribution of Service Satisfaction in the Canteen**
The boxplot shows the distribution of the mean service satisfaction scores. The median is around 4 (agree), with the first quartile slightly below 4 and the third quartile close to 4.5. This shows that most students are satisfied (high score) with the cafeteria food

products. The outliers around 2 show some low scores, but most of the data is clustered above the mean.

d) Distribution of Satisfaction with Canteen Cleanliness
This boxplot shows the distribution of mean satisfaction scores for the cleanliness of the canteen. The median is at 4 (agree), with the first quartile around 3.5 and the third quartile at 4. This shows that most students feel quite good (slightly above neutral) about the canteen's food products. The outliers below 3 and above 4.5 show some low and some high scores for the cleanliness of the canteen, but most of the data are clustered around 4.

e) Distribution of Canteen Product Satisfaction
This boxplot shows the distribution of mean product satisfaction scores. The median is around 4 (agree), with the first quartile ~4 and the third quartile slightly above 4. This shows that most students are satisfied (high score) with the cafeteria food products. The outliers below 3 show some low scores, but the majority of the data is clustered above the mean.

f) Distribution of Cleanliness Values to Service Values
The scatter plot above shows a positive trend between service satisfaction and cleanliness. Respondents who gave high scores on service tend to also give high scores on cleanliness (the further to the right the higher it goes). This may indicate that improvements in canteen service are often accompanied by improvements in cleanliness (or vice versa).

Link full explanation with graph and summary statistic : https://docs.google.com/document/d/11SbGtekHxfyo9s5J2S-edbWGKlt49BrDfC5piGihArA/edit?usp=drivesdk

6.2 Preprocessing

The preprocessing methods we used are:

a) **Drop null/ missing value column**, drop the missing value or empty value in home campus column
b) **Drop duplicated** NIM in NIM Binusian, by checking and sorting the start and completion time. We keep the last submission from filling our questionnaire.
c) **Fixing data inconsistencies**, by changing the question in the questionnaire into new columns, and then check the inconsistencies in those columns and make them into consistent answers.
d) **Fixing data errors**, we make the questionnaire for mobility student, so if there are any students from BINUS Greater Jakarta, we assume that they are from BINUS Bandung.
e) **Encoding,** converting ordinal and nominal data into numeric data so that it can be analyzed more easily.

After that, we create a clean copy of the original dataframe (df) and save it with the name df_clean so that the original data is not changed. We also created variable exclude_cols to filter non-likert questions. Lastly, we created variable likert_cols to filter likert questions and encode them accordingly.

Changing all column answers into lowercase to maintain consistency and converting ordinal data answers to numbers based on likert_map mapping.

Changing all column answers with column name ‘How often do you visit Binus Anggrek canteen in a week?’ to lowercase to maintain consistency and convert ordinal data answers to numbers based on freq_map mapping.

Changing all column answers with column name ‘Are you an active student in the Binus Mobility program?’ to lowercase to maintain consistency and convert ‘yes’ answers to 1 and ‘no’ answers to 0.

Link full explanation with image/ picture :
https://docs.google.com/document/d/125OmFgEkBDt5JFLKSRDtcftm6LlSkAhis_Pu-Fte0Qc/edit?usp=drivesdk

7. Conclusion

7.1 Overall

This comprehensive study successfully evaluated cafeteria service satisfaction among mobility students at BINUS Anggrek across four key dimensions, that concludes service quality, cleanliness standards, facility infrastructure, and product quality. The research employed a robust methodology combining cluster sampling and simple random sampling, achieving a high sampling fraction of 92 out of 101 total mobility students.

7.2 What can be improved

When assessed the service efficiency, product quality, facility adequacy and staff performance scores are generally positive. However, even if the scores are high in cleanliness satisfaction observed in the study, implementing more cleanliness protocols and regular monitoring could enhance student’s experiences. Also, facility satisfaction scores suggest there might be potential crowding issues during busy periods, indicating that adding seating arrangements and well management on the peak hour could improve overall cafeteria experience. Last, to keep the current positive satisfaction levels while still listening to concerns that might emerge, establishing regular satisfaction surveys and feedback surveys would be good for service enhancement.

7.3 Impact

This study provides BINUS Anggrek administration with evidence-based insights for enhancing cafeteria services specifically tailored to mobility students' needs. The high overall satisfaction levels indicate successful service delivery, while the identified areas for improvement offer clear directions for future enhancements. The research methodology and findings can serve as a framework for similar studies across other BINUS campuses, contributing to the broader goal of improving student life quality and supporting successful academic transitions for mobility students

8. Attachment

Here is our collected data based on our Sampling Frame:

https://docs.google.com/spreadsheets/d/1xuHut6udRR8bFPedXM9PMdrjc_jJfHarZf7MVxduhug/edit?usp=sharing

Link for Questionnaire Attachment:

https://forms.office.com/pages/responsepage.aspx?id=Y7mFNLqCb0qBD7XMIm_4mNIOCgA7cUtLk9a6jNP5X3pUQlpLQ0g2M1daNFoxQkREVk9YNEpKVlhSSS4u&route=shorturl

Link for Cleaned Dataset and Sampling Calculation:

https://1drv.ms/x/c/8dff73d79707108e/EfwebnTDekZLh57C0et3es8B7Sw2iV7VroEbIsQE6uQyWg?e=hQeyFw

Link for Google Colab Code:

https://colab.research.google.com/drive/1yAUCwiH2l-Fd1EAS1Q3PWWQwROYdQgMG?usp=sharing

Link for Canva PPT:

https://www.canva.com/design/DAGmxefJblQ/BfPt1Lhizj9DLeU8v2swug/edit?utm_content=DAGmxefJblQ&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton