

Satisfaction Index and Prioritizing the Factor of Students' Satisfaction Towards UTHM Hostel in Pagoh

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Abstract

Hostel experience plays an important role to improve student's academic performance and increase university's popularity. This study aims to determine whether the UTHM students are satisfied with the hostel UTHM in Pagoh or not and also identify the main model factors that will influence the student's satisfaction towards the hostel. Through American Customer Satisfaction Index (ACSI), the average for all items in each satisfaction factors are calculated to measure the satisfaction index on the satisfaction level of students towards the hostel UTHM in Pagoh. In order to prioritise the factors that influence the students' satisfaction towards the hostel, the variables with factor loadings above 0.5 are selected. In the principal component analysis (PCA), the result shows it has 2 group of factors: the availability of hostel facilities, the quality of hostel facilities and services, that will influence students' satisfaction towards the hostel while in the factor analysis (FA), the result shows that there are 8 main factors extracted which are the accessibility of hostel, room comforts and facilities, hostel service and environment quality, additional facilities and services, study environment and student service, furniture quality, sports facilities quality and availability and the student health service. By comparing the FA and the PCA results, the factor analysis results were prioritized because they explain more variance and provide a more comprehensive satisfaction model. The ACSI score of 46.61 indicates that students are not satisfied with the UTHM hostel in Pagoh. These findings can help the university to determine students' satisfaction levels more accurately and also prioritize the main factors influencing their satisfaction with the hostel, which can help prevent unnecessary costs. Additionally, this method can be applied in future research to assess students' satisfaction with other aspects of the university, such as the campus facilities.

1. Introduction

University experience is the most exciting part for students to explore different aspects of life, especially hostel experience [1]. The hostel university plays an important role in improving students' academic performance and increasing the university's popularity [2]. Students with positive hostel experience will easily perform well in their studies. However, parties like families, schools, organizations, and local governments are rarely interested in improving the quality of student life, rather than learning [3].

Some previous studies have used descriptive analysis of Likert scales, regression analysis, and cross-sectional analysis to determine students' satisfaction levels towards the university campus [4],[5],[6]. However,

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most of these studies focus on the campus or university services rather than the university hostel. This creates a gap in the literature, as there is a lack of research prioritizing students' satisfaction with the university hostel. This study aims to address this gap by determining the satisfaction level of students towards the hostel at Universiti Tun Hussein Onn Malaysia (UTHM) in Pagoh by using the American Customer Satisfaction Index (ACSI) method. Additionally, this study aims to prioritize the factors influencing students' satisfaction with the hostel by using factor analysis. Some previous studies have used the maximum likelihood method to identify factors that predict students' satisfaction with university hostels [7].

The study is conducted through a survey. It takes place in the UTHM hostel in Pagoh. The students who study in the UTHM campus in Pagoh are involved in the survey. Our questionnaire consists of 3 parts. First is the demographic information. Second, the satisfaction level towards the satisfaction factors of the hostel by the Likert scale. The third is the open-ended question for extra information. There are five satisfaction factors: room facilities, hostel facilities, additional facilities, location, and the quality of hostel service. By using the Krejcie and Morgan Table, there are 355 respondents from 4646 population to be collected in the questionnaire [8].

1.1 Problem Statements

This study aims to determine the satisfaction level of students towards the UTHM hostel in Pagoh and prioritize the model factors that mainly influence the students' satisfaction towards the hostel. There are three objectives in the study. First, to identify the main model of satisfaction factors influencing students' satisfaction with the hostel UTHM Pagoh through factor analysis. This objective is used to answer the question of how to prioritize the factor that has the most influence on satisfaction levels towards the hostel UTHM Pagoh. By answering the question: How to calculate the satisfaction level towards the hostel UTHM Pagoh among students? The second objective is to calculate the average of each satisfaction factor for the satisfaction index of students towards the hostel UTHM, Pagoh. The third objective is to determine the satisfaction index on the satisfaction level of students towards hostel UTHM, Pagoh by using the American Customer Satisfaction Index (ACSI). Correspondingly, the research question asks: How to determine the satisfaction level of students towards the hostel UTHM at branch Pagoh?

2. Materials and Methods

This section is known as methodology. All the necessary information that is required to obtain the results of the study is discussed.

2.1 Materials

The questionnaire is conducted, which has the demographic part, satisfaction level towards UTHM hostel in Pagoh by using Likert Scale, and the open-ended questions. In the Likert Scale, 5- very satisfied, 4- satisfied, 3- neutral, 2- unsatisfied, and 1- very unsatisfied. There are 355 respondents collected in the survey.

2.2 Methods

Procedures can be described using flowcharts, in which case the chart will be considered as Fig. 1.

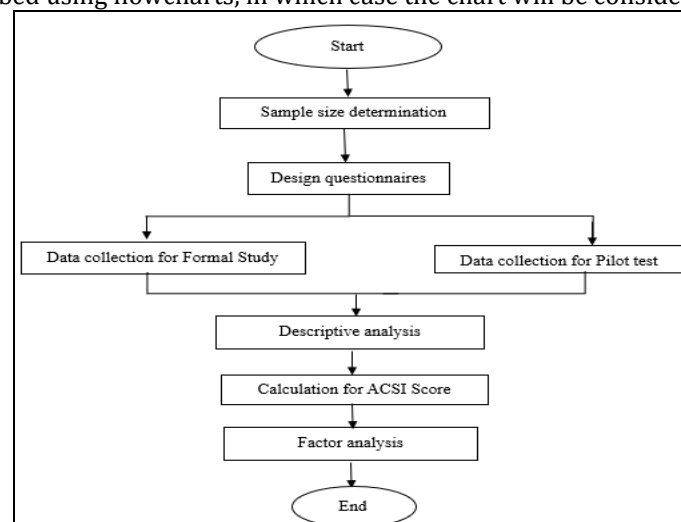


Fig. 1 Flowchart of research

2.3 Data Collection

Before the formal study is conducted, a pilot study is conducted to ensure the reliability of the questionnaire. According to [9], 30 respondents are sufficient to do the pilot test. In our study, there are 31 respondents are collected. If the value of Cronbach's alpha exceeds 0.8, it indicates that the response value for each respondent across a set of questions is consistent. The questionnaire can proceed. The formula of Cronbach's alpha is in equation 1:

$$\alpha = \frac{N_s^2 \times M(COV)}{SUM\left(\frac{VAR}{COV}\right)} \quad (1)$$

where,

N_s = Number of items in scale

$M(COV)$ = Average of inter item covariance

$SUM\left(\frac{VAR}{COV}\right)$ = Sum of statements in matrix of variance over covariance

2.4 Factor Analysis

This method is used to prioritize the factors that have a major effect on the subject by reducing the unrelated factors. All factors' satisfaction has several items, these response items will identify the factor whether it have effect on the satisfaction toward hostel UTHM, branch Pagoh in our study. According to [10], factor analysis is the reduction of the myriad number of variables measuring an idea or concept down to a smaller number of factors that represent the essence or nature of the original set of variables. These factors will be identified and categorized based on their covariance. By using Appendix A, the identified factors are named by referring the item questionnaire which is highly correlated with the factors. In order to obtain the more accurate result, the principal component analysis (PCA) is also used to compare the result with the factor analysis (FA). In order to identify the factor model, Varimax rotation is also needed in both PCA and FA to simplify the interpretation of factors by maximizing the variance of squared loadings on each factor, while minimizing the variance of squared loadings across other factors. The formula of the factor model is shown in equation 2:

$$X = \mu_i + \ell_i F_j + \varepsilon_i \quad (2)$$

where,

μ_i = mean of variable i

ε_i = ith specific factor

F_j = jth common factor

ℓ_i = loading of the ith variable on the jth factor

2.5 American Customer Satisfaction Index (ACSI)

The ACSI is used to investigate more accurately whether the students are satisfied or unsatisfied with the UTHM hostel in Pagoh. Each factor's satisfaction acts as the variable in the calculation of the ACSI score. Before the calculation, the weightage of each variable was identified first through some discussion with the Deputy Principal 2 at Pagoh Campus Residential College, Encik Muhammad Qusyairi bin Abdul Rahman, College fellow, Ts. Dr. Suhadir Bin Shamsuddin and Encik Mahathir bin Mohamed. The total weightage is 1. A variable with a higher weightage means that the expert considers it to have a greater influence on students' satisfaction towards the UTHM hostel. The weightage of each variable is shown in Table 1.

Table 1 Weightage of each variable

Variable	Weightage
Room facilities, X_1	0.20
Hostel facilities, X_2	0.15
Additional facilities, X_3	0.20
Location, X_4	0.15
Quality Hostel service, X_5	0.30

According to [11], the ACSI score will be calculated according to the formula shown in equation 3:

$$ASCI = \frac{(X_1-1)*W_1+(X_2-1)*W_2+(X_3-1)*W_3+(X_4-1)*W_4+(X_5-1)*W_5}{5*100} \quad (3)$$

where,

X_i = General average for each variable

W_i = Weightage for each variable

5 = the number of variables (5 satisfaction factors)

$X_i - 1$ is used to adjust the scale so that the lowest possible rating in the Likert Scale (usually 1) becomes zero, allowing the calculation to start from zero rather than one. This ensures the satisfaction score accurately reflects the distance from the minimum satisfaction level.

Equation 4 represents the formula of the average for each statement of variable:

$$Average = \frac{\sum_{i=1}^n (x_i \times f_i)}{N} \quad (4)$$

where,

x_i = Numeric value assigned to the Likert scale point, 1 to 5 (very unsatisfied to very satisfied)

f_i = Count or frequency of responses for the i^{th} Likert point

N = The total number of responses ($N=355$)

n = Number of Likert scale point which is $n=5$

Therefore, if the factor satisfaction has 10 statements or items in it, then the general average for the variable (factor satisfaction) is calculated by using the sum of the averages for each statement of variable divided by 10 ($\div 10$).

3. Results

This section presents the analysis and discussion of our results based on the research objectives.

3.1 Pilot study

There are 31 respondents collected to do the pilot test in this study.

Reliability Statistics	
Cronbach's Alpha	N of Items
.952	42

Fig. 2 Cronbach's Alpha value

Fig.2 shows that the value of Cronbach's Alpha is 0.952, which is higher than 0.8. It means that the instruments used are highly reliable and the response values for each participant across a set of questions are consistent. The questionnaire can be continued to proceed with collecting the respondents for the formal study analysis.

3.2 Demographic analysis

In this study, there are 3 demographic results: gender, race, and faculty.

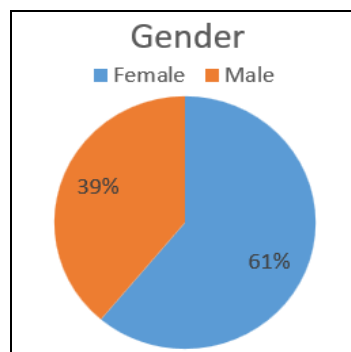


Fig. 3 Distribution of gender

Fig. 3 shows that there are 61% is female, while male only have 39%, which means that more than half of the respondents are female.

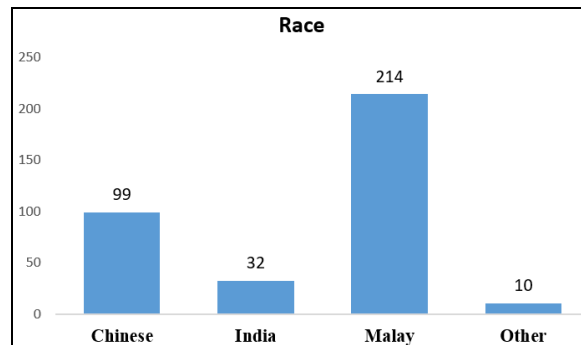


Fig. 4 Distribution of race

Fig. 4 shows that more than half of the respondents are Malay, with 214 respondents (60.28%), followed by Chinese respondents with 27.89%, then Indian and the other races which are 32 respondents (9.01%) and 10 respondents (2.81%).

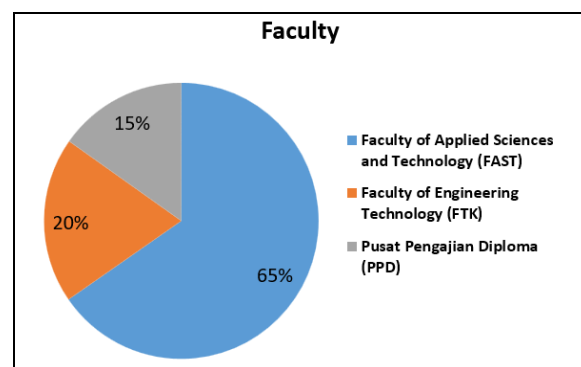


Fig. 5 Distribution of Faculty

Fig. 5 shows that there is the highest number of respondents from FAST which is 232 respondents (65%). And another 20% and 15% are FTK and PPD which are 69 respondents and 54 respondents respectively.

3.3 Prioritising the satisfaction factors

The Principal Component Analysis (PCA) and the Factor Analysis (FA) are used in prioritizing the satisfaction factors.

3.4 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test

Before starting the FA and PCA, the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity are needed to check whether the sample size data is suitable for both analyses.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.947
Bartlett's Test of Sphericity	Approx. Chi-Square	8410.293
	df	861
	Sig.	.000

Fig. 6 KMO and Bartlett's Test of Sphericity

Fig. 6 shows that the KMO value is $0.947 > 0.5$ which indicates the data are correlated to form meaningful factors. The Bartlett's test of sphericity shows the significant p-value is $0.000 < 0.05$, it means that the data is significant and the variables are correlated. Therefore, the data is suitable for factor analysis and principal component analysis. The extracting factors for our data are appropriate to proceed.

3.5 Scree plot

The Scree plot is used to determine the number of components to retain in the PCA.

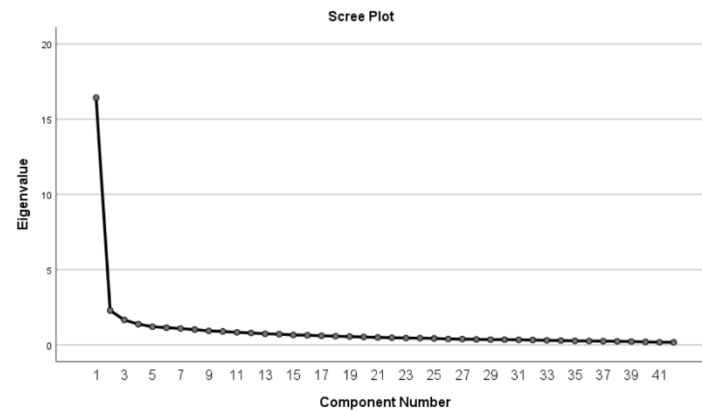


Fig. 7 Scree plot

Fig. 7 shows that the first component has a very high eigenvalue, which indicates the largest variance explained. There is a large decline after the first component, followed by a clear elbow after the second component. Therefore, there are 2 components that are retained for principal component analysis. Components beyond the second have relatively low eigenvalues and contribute minimally to explaining variance

3.6 Principal Component Analysis

Total Variance Explained						
Component	Total	Initial Eigenvalues		Rotation Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.425	39.108	39.108	9.798	23.328	23.328
2	2.288	5.449	44.557	8.916	21.229	44.557
3	1.662	3.957	48.515			
4	1.381	3.288	51.802			
5	1.210	2.881	54.683			

Fig. 8 Total Variance explained

Fig. 8 shows that Component 1 has an eigenvalue of 16.425, explaining 39.108% of the total variance. Component 2 has an eigenvalue of 2.288, explaining 5.449% of the total variance. Both components explain 44.557% of the total variance.

Rotated Component Matrix^a

	Component	
	1	2
4a	.683	.111
4b	.690	.151
4c	.641	.207
4d	.625	.119
4e	.579	.308
4f	.573	.264
4g	.163	.600
4h	.063	.671
4i	.182	.556
4j	.314	.438
5a	.621	.246
5b	.548	.364
5c	.649	.251
5d	.083	.651
5e	.270	.604

Fig. 9 Rotated Component Matrix

Fig.9 shows the loadings of each item on the two components. Loadings above 0.5 are selected which is considered strong and meaningful [12].

Table 2 Item selection for each component

Component	Item with factor loading >0.5
Component 1, the availability of the hostel facilities	4a, 4b, 4c, 4d, 4e, 4f, 5a, 5b, 5c, 6a, 6h, 6i, 7b, 7c, 7d, 7e, 7f, 8g
Component 2, the quality of the hostel facilities and services	4g, 4h, 4i, 5d, 5e, 5f, 5g, 6b, 6d, 6e, 7g, 8a, 8b, 8c, 8d, 8f, 8h

In the principal component analysis, these 2 components with their items of statement in questionnaires are the main model factors that will influence the satisfaction of student towards the UTHM hostel Pagoh.

PCA 1 = $0.683 \times 4a + 0.690 \times 4b + 0.641 \times 4c + 0.625 \times 4d + 0.579 \times 4e + 0.573 \times 4f + 0.621 \times 5a + 0.548 \times 5b + 0.649 \times 5c + 0.642 \times 6a + 0.639 \times 6h + 0.554 \times 6i + 0.594 \times 7b + 0.530 \times 7c + 0.736 \times 7d + 0.590 \times 7e + 0.600 \times 7f + 0.543 \times 8g$
 PCA 2 = $0.600 \times 4g + 0.671 \times 4h + 0.556 \times 4i + 0.651 \times 5d + 0.604 \times 5e + 0.542 \times 5f + 0.561 \times 5g + 0.530 \times 6b + 0.516 \times 6d + 0.513 \times 6e + 0.519 \times 7g + 0.613 \times 8a + 0.628 \times 8b + 0.701 \times 8c + 0.550 \times 8d + 0.639 \times 8f + 0.570 \times 8h$

The first component labelled as the availability of the hostel facilities while the second component labelled as the quality of the hostel facilities and services.

3.7 Factor Analysis

Total Variance Explained						
Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.425	39.108	39.108	4.978	11.852	11.852
2	2.288	5.449	44.557	4.255	10.132	21.983
3	1.662	3.957	48.515	4.113	9.792	31.776
4	1.381	3.288	51.802	3.092	7.362	39.138
5	1.210	2.881	54.683	2.852	6.790	45.928
6	1.147	2.732	57.415	2.762	6.576	52.504
7	1.089	2.593	60.008	2.246	5.348	57.853
8	1.020	2.429	62.437	1.926	4.585	62.437
9	.938	2.234	64.671			

Fig. 10 Total Variance Explained of factor analysis

Fig.10 shows that there are 8 factors that are retained where their eigenvalues are more than 1 and the total variance explained is 62.437. Another 37.563% will be explained by other factors.

3.8 Varimax Rotation

In the Varimax rotation, it simplifies factor structure by maximizing high loadings and minimizing low ones. The items with factors loading more than 0.5 will be selected for each of the 8 extracted factors. Then, the 8 extracted factors will be named and identified.

Table 3 Item selection for each extracting factor

Extracting factor	Item with factor loading >0.5
Factor 1, Accessibility of hostel	7c, 7b, 7f, 7d, 7a, 7e, 6h
Factor 2, Room comforts and facilities	4c, 4a, 4b, 4d, 4e, 4f
Factor 3, Hostel service and environment quality	8a, 8f, 8d, 8b, 8c, 8h
Factor 4, Additional facilities and service	6e, 6g, 6i
Factor 5, Study environment and student services	5g, 5f, 5h
Factor 6, Furniture quality	4h, 4i, 4j, 4g
Factor 7, Sports facilities and availability	5a, 5b
Factor 8, Student health services	6b, 5d

In the factor analysis, these 8 factors with their items of statement in questionnaires are the main model factors that will influence the satisfaction of student towards the UTHM hostel Pagoh.

3.9 Average for Each Satisfaction Factors

The general average is calculated after obtaining the sum of averages for every statement in each variable, and then divide with the number of statements.

Table 4 General average for each variable

Variable	General average
Room facilities, X_1	$31.616/10 = 3.1616$
Hostel facilities, X_2	$26.895/8 = 3.3619$
Additional facilities, X_3	$29.921/9 = 3.3246$
Location, X_4	$22.61/7 = 3.23$
Quality Hostel service, X_5	$27.853/8 = 3.4816$

3.10 American Customer Satisfaction Index

Table 5 ACSI Calculation

Variable	General average, X	$X - 1$	Weightage, W	$(X - 1) * W$
Room facilities, X_1	3.1616	2.1616	0.20	0.4323
Hostel facilities, X_2	3.3619	2.3619	0.15	0.3543
Additional facilities, X_3	3.3246	2.3246	0.20	0.4649
Location, X_4	3.23	2.23	0.15	0.3345
Quality Hostel service, X_5	3.4816	2.4816	0.30	0.7445
Total				2.3305
$ACSI = \frac{2.3305 * 100}{5} = 46.61$				

Table 5 shows that the ACSI score is 46.61. According to [13], when the ACSI value is not exceeded 55, it is considered as low value. Therefore, the result of the ACSI score of 46.61 is low, it means that the students are not satisfied with the UTHM hostel in Pagoh.

4. Conclusion

In conclusion, the main model of satisfaction factors influencing students' satisfaction with the hostel UTHM Pagoh is identified. In the Principal Component Analysis, there are 2 factors: the availability of hostel facilities, the quality of the hostel facilities and services. In the factor analysis, there are 8 factors mainly influence the satisfaction level of students towards UTHM Pagoh: the accessibility of the hostel, room comforts and facilities, hostel service and environment quality, additional facilities and service, study environment and student service, furniture quality, sports facilities quality and availability and the factor student health service. By comparing these PCA and the FA result, the factor analysis results were prioritized because they explain more variance and provide a more comprehensive satisfaction model []. The ACSI score with 46.61, indicates that the students are not satisfied with the hostel UTHM in Pagoh. This means that there are a lot of space for improvement the hostel UTHM in Pagoh.

The contribution of the study is there is hardly any application of the ACSI method to determine the satisfaction level of students towards the hostel university. This method can help others to determine the satisfaction level but not only to calculate the frequency for the Likert scale of the variables. This method also can contribute to the other university, industry or even to the public. For example, Industry owner can determine whether their workers are satisfied with the hostel provided or not. This study also help the university to prioritize the area of improvement of the hostel university by saving more cost and time.

The limitation of the study is the questions inside the questionnaire is limited, in fact there are many other kinds of questions can be asked to determine more accurately whether the students are satisfied with the hostel UTHM in Pagoh or not. Besides, the time is limited to collect data, the population size is only focus on students in

Pagoh, but it can also be done among the student UTHM in Parit Raja to get more comprehensive and accurate result on the hostel UTHM.

In the future study, since the factor analysis has been done, the main model that has influenced the student satisfaction towards UTHM Pagoh already identified, therefore, more factors can be added in the questionnaire part. It means that the researchers can add more detailed questions. Besides, the researchers can use the identified factors with their statement to do again the questionnaire because the statement already classified, the result will be more specific to identify which part the students are more satisfied and which parts the students are not satisfied. It can help the university to know clearly which parts they have to improve and save more time and cost. Other than that, the researchers also can enlarge the population size that include the College Fellows or lecturers who stay in the hostel to obtain more accurate result which about the satisfaction level towards the hostel UTHM in Pagoh.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution:

The authors confirm contribution to the paper as follows: **study conception and design:** Woon Yee Ying; **data collection:** Woon Yee Ying, Suliadi Firdaus Sufahani; **analysis and interpretation of results:** Woon Yee Ying; **draft manuscript preparation:** Woon Yee Ying, Suliadi Firdaus Sufahani. All authors reviewed the results and approved the final version of the manuscript.

Appendix A: Statement of questionnaire item for each factor satisfaction

No	Question (ROOM FACILITIES)	Statement
1	The room without a door	4a
2	Each room in the house has sufficient space for 3 persons	4b
3	The washroom in the house is sufficient for 12 persons	4c
4	The number of fans in each room	4d
5	Good sound insulation between the rooms	4e
6	The number of drying clothes in each house	4f
7	The quality of bed	4g
8	The quality of the table	4h
9	The quality of the chair	4i
10	The quality of the cupboard	4j
Question (Hostel facilities)		
1	Sport facilities are equipped well	5a
2	The number of sport facilities is sufficient in the hostel	5b
3	Printing service for students are provided	5c
4	Health service for students	5d
5	Maintenance service is rapid	5e
6	The study rooms are sufficient	5f
7	The quality of the study room	5g
8	The hair cut service for students	5h
Question (Additional facilities)		
1	Stationery shop for student service are provided	6a
2	Clinic for student service are provided	6b
3	Restaurant for student service are provided	6c

4	Transportation for student service are provided	6d
5	Bus service provides backing home packages for students	6e
6	Bus service for students to go Muar	6f
7	Sport facilities are provided	6g
8	The mart and shopping centre outside the hostel	6h
9	The car repairing shop outside the hostel	6i
Question (Location)		
1	The hostel easily accessible in terms of its location	7a
2	The hostel is located near a convenient shop	7b
3	The hostel is conveniently located near dining places	7c
4	The hostel is conveniently located near shopping centers	7d
5	The hostel is conveniently located near healthcare services	7e
6	The hostel is conveniently located near other essential amenities	7f
7	The hostel is safely located for students to exercising	7g
Question (Quality of hostel service)		
1	The responsibility of the security guard	8a
2	The quality of the water supply in the house	8b
3	The quality of the healthcare service	8c
4	The speed of internet in the hostel is rapid	8d
5	The quality of the sports facilities	8e
6	The quality of cleanliness in the hostel	8f
7	The quality of food in the hostel	8g
8	The sound environment for studying	8h

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