

## Multivariate analysis of a study of student satisfaction levels Higher Education Centres and its associated factors

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### Introduction:

Satisfaction is a state felt by a person who has experienced a performance or an outcome that fulfilled his or her expectations. Student satisfaction an acute attitude, resulting from an assessment of a student's educational experiences. (1,2) Over the years, educational Institutions, have become more than just degree providers. They play a major role in shaping the career and hence the future of their students. The economic development of the nation depends on the quality of Higher education is perceived as one of the most important instruments in assessment. (3) Every successful university in the world has always stressed the importance of student feedback for them to improve and develop in the future. The basic purpose of all the higher education centres is of imparting knowledge and its effective use for development through innovation, and creativity and to meet the expectations and needs of the student community without compromising on quality education. (4,5) At present globalization of higher education has led to increased competition among higher education centres and made them adopt corporate strategies to be unique from their competitors to gain the attention of the student's community and provide satisfaction by meeting their needs and expectations. (6) The present study was undertaken to assess the student's satisfaction levels and identify various factors influencing the satisfaction levels, also to measure student perceptions of the campus experience to identify those areas where the institution is performing well and to target areas where there is scope for improvement. The aim was to fulfil the dreams of young aspirants by providing quality education, and better prospects for their future.

### Objectives:

To assess the contentment level of students regarding infrastructures, teaching-learning, and evaluation aspects of the university

To assess the factors contributing to the satisfaction levels

### Materials and methods

The population for our study is final year students of Sri Devaraj Urs Academy of Higher Education and Research from all branches. Final year students are chosen based on probability proportional to size from each branch as they have more experience to make a better judgement on what satisfies them about the university and its facilities. Data on infrastructure, administration, Library facilities, Hostel and mess, and teaching facilities was collected using a pretested questionnaire to carry out the study. The data were collected using a questionnaire, made through a pretested questionnaire. A Simple of 451student from

various branches were randomly selected depending on the probability proportional to size sampling. Ethical clearance was obtained from the Institutional Ethical Committee.

The questionnaire consists of seven multiple choice questions and six rating questions where students were asked to fill their satisfaction level (from 0-10, where 0 is very poor and 10 is excellent) with the respective service or facility. Thus, the scale variables in our study are the satisfaction levels while the main categorical variables are gender, age group and branch study in the university. Students were free to express as there were personal identities and confidentiality was ensured.

**Statistical Analysis**

Collected data will be entered into an excel spreadsheet basic data will be presented by frequency tables, quantitative data by mean and SD, and Qualitative data by percentages. MANOVA (multivariate analysis of variance) was used to examine whether there is any difference between independent groups on two or more dependent variables. Each dependent variable must represent a single set of scores from the one-time point. The scores across each dependent variable are explored across the groups of each of the independent variables. For each MANOVA, the multivariate effect was explored (how the independent variables have an impact upon the combination of dependent variables) and univariate effects (how the mean scores for each dependent variable differ across the independent variable groups and proportional variation) were tested using t-test and chi-square test.

**Results:**

The data were tested for normality, sphere city, multivariate outliers, linear dependency, homogeneity of variance, co-variance, and for multi collinearity before going for MANOVA.

The variables used in the instrument were tested for inter-item reliability and consistency of the questionnaire using Cronbach alpha which was 0.733. The overall significance of the correlation matrix was significant with a p-value of < 0.001, and a Bartlett Test of Spheri city value of 478.34, which indicated that the data matrix had sufficient correlation. Moreover, the overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy had a highly acceptable value of 0.773.

Mahala Nobis distance was calculated for all 5 variables used to measure the satisfaction level then the values were sorted in descending order. Then the p-values were computed through chi-square distribution and 3 multivariate outliers were identified. The level of significance was P<0.001. Since the p-value for each observation is greater than 0.001, it was concluded that there are no multivariate outliers.

**Table 1 Branch and Gender wise -wise distribution of students**

S.No	Name of the Branch	Male	Female	Total
1	AHS Courses	10(18.9)	43(81.1)	53
2	Clinical Nutrition& Dietetics	6(18.8)	26(81.2)	32
3	Medicine	133(53.8)	114(46.2)	247
4	Nursing	13(12.3)	93(87.7)	106
5	Physiotherapy	3(23.1)	10(76.9)	13
	Total	165(36.6)	286(63.4)	451

55% of the students were from the Medicine faculty and others from branches like Nursing, and AHS. CND and Physiotherapy. The age of students ranged from 20-30 years with the mean age being 22 years.

**Table 2: Association between demographic variables and overall**

Variables		Satisfaction Level			P Value
		Below Average	Good	Very Good	
Branch	AHS	3	34	16	<0.001
	CND	3	13	16	
	Medicine	81	136	30	
	Nursing Science	22	64	20	
	Physiotherapy	0	11	2	
Gender	Female	40	97	28	0.780
	Male	69	161	56	
Age Group	20-23 Years	102	247	77	0.330
	24-27 Years	6	11	7	
	More than 27 Years	1	0	0	

The satisfaction levels significantly varied with the branches (P<0.001)(Table 2)

**Table 3.Descriptive statistics of satisfaction rating scores**

Dependent Variables	Branch	Mean	Std. Deviation
Infrastructure Rating	AHS	7.38	1.060
	CND	6.91	1.907
	Medicine	5.58	2.153
	Nursing Science	6.35	1.821
	Physiotherapy	7.46	1.050
	Total	6.12	2.042
Hostel provided food	AHS	4.94	2.575
	CND	6.13	2.485
	Medicine	3.04	2.374
	Nursing Science	4.76	2.176
	Physiotherapy	3.77	2.048
	Total	3.91	2.560
Library rating	AHS	7.21	2.178
	CND	8.19	.859
	Medicine	6.80	2.083
	Nursing Science	6.27	2.215
	Physiotherapy	7.77	.725
	Total	6.85	2.092
Rate Teaching facility	AHS	7.57	1.152
	CND	7.41	1.012
	Medicine	7.31	1.721
	Nursing Science	7.28	1.999
	Physiotherapy	7.85	.987
	Total	7.36	1.678
Evaluation process rating	AHS	6.40	1.801
	CND	6.94	1.480
	Medicine	6.11	1.902
	Nursing Science	6.00	1.947
	Physiotherapy	5.85	1.772
	Total	6.17	1.879

The Mean satisfaction scores between males and females was not statistically significant across all the criteria. Since the number of observations in each sub-category was unequal, Scheffe's test for the post-hoc analysis was used. The test result suggests that the Medicine branch has shown significant variation in satisfaction levels compared to CND, Nursing and AHS branches in hostel food.

Medicine had significant mean different satisfaction levels compared to AHS, CND, Physiotherapy and Nursing branches concerning infrastructure. Even the AHS branch compared to nursing and CND had a significant difference. Even students in Physiotherapy had better satisfaction scores compared to medical students about infrastructure.

Library services are concerned the mean satisfaction scores for all branches varied from (6.8-8.19). CND had higher average satisfaction levels when compared with the Medical and nursing students' stream.

As for as the rating of teaching facilities and evaluation process are concerned the variations observed in satisfaction levels of student between branches does not show any statistically significant variation. For all the branches combined the mean satisfaction levels scores regarding the evaluation process ranged from 6-7 which was very good. (Table 3)

Multiple linear Regression analysis shows that the predictor's infrastructure provided, Library rating, Hostel food, evaluation process and Teaching facility provided are significantly associated with satisfaction levels. Reported an R2 value of 0.962 indicating the model was a good fit. The 96 % of satisfaction level of students was predicted by 5 predictors

**Table 4: Multivariate analysis of satisfaction levels with dependent variables**

Effect		Value	F	Hypothesis df	Error df	P value	Partial Eta Squared
Intercept	Pillai's Trace	.909	1107.955	4	443.00	.000	.909
	Wilks' Lambda	.091	1107.955	4	443.00	.000	.909
	Hotelling's Trace	10.004	1107.955	4	443.00	.000	.909
	Roy's Largest Root	10.004	1107.955	4	443.00	.000	.909
Branch	Pillai's Trace	.286	8.575	16	1784.00	.000	.071
	Wilks' Lambda	.735	8.992	16	1354.02	.000	.074
	Hotelling's Trace	.334	9.229	16	1766.00	.000	.077
	Roy's Largest Root	.232	25.858 <sup>c</sup>	4	446.00	.000	.188

The Wilk's Lambda test since it is the most robust test, the P value was < 0.001 which was significant. Thus, the vector of average combined satisfaction levels for infrastructure, Hostel food, Library, teaching facility, and evaluation process, was not the same across all the branches. The observed power for our study was found to be 100%. (Table4)

**Table 5: Univariate tests**

Dependent Variable		Sum of Squares	Mean Square	F	P Value	Observed Power
Infrastructure Rating	Contrast	203.757	50.939	13.583	< 0.000	1.000
	Error	1672.536	3.750			
Hostel food provided	Contrast	479.675	119.919	21.650	< 0.000	1.000
	Error	2470.414	5.539			
Library rating	Contrast	110.801	27.700	6.648	<0.000	.992
	Error	1858.245	4.166			
Rate Teaching facility	Contrast	6.590	1.648	.583	0.675	.193
	Error	1260.935	2.827			
Evaluation process rating	Contrast	26.898	6.724	1.920	0.106	.579
	Error	1562.295	3.503			

The univariate analysis brings out the fact that only Hostel food, infrastructure, and library average satisfaction scores are significantly associated with overall satisfaction levels compared between

branches with almost power of 100%. Whereas the average scores for teaching facility and evaluation process do not show any difference between branches. (Table 4)

### Discussion:

The infrastructure provided to the student was one of the components for assessing their satisfaction levels. In the present study for all the branches, the satisfaction levels concerning infrastructure as observed was Poor in 24.2% of students, it was moderate as expressed by 57.2% and only 18.6% expressed the infrastructure was good or excellent. A similar kind of study by Wilkins et.al observed that the quality of imparting education through quality lectures, and well-equipped classrooms with advanced technologies are the determinant factors of student satisfaction. (7) Mai in his study on students' satisfaction levels in higher educational institutions observed that institutional reputation, quality and type of education provided, teachers' expertise and prospects were identified as the most influential predictors of student satisfaction. (8) In the present study, 53% of the students from all the branches were satisfied with the administration process. Tandilashvili, in his study, considered that the administrative factors were very sensitive in determining students' satisfaction. Even the programme offered in higher education has a positive relationship with students' satisfaction levels. (9) In the present study Multiple linear regression revealed that all criteria to assess the satisfaction levels were significantly associated with overall satisfaction levels. The model also reported an R<sup>2</sup> value of 0.962 which indicated the model was a good fit and 96% of the variation in satisfaction levels was explained by infrastructure, hostel food and library facility. Whereas MANOVA also supports that all dependent factors Infrastructure, food, library facilities, teaching facilities and evaluation process mean satisfaction scores were different across branches of study. A study by Luo Siming et.al observed that the factors like student-teacher relationship, teacher preparedness, campus services and facilities considered to assess students' satisfaction when modelled had an R<sup>2</sup> value of 0.466 by which the parameters of our study to assess satisfaction levels explain the satisfaction levels better. (10) Billups et.al in qualitatively analysing data obtained through focused group discussion mentions that the quality of student-teacher interaction rather than the amount of interaction was a key factor in improving student satisfaction. (11)

The multivariate analysis performed showed that the student's satisfaction levels are significantly associated with age groups but gender does not show any association with satisfaction levels concerning infrastructure, hostel food, library facilities, teaching facility and evaluation process. In a study by Memon M et.al to assess the relationship between hostel facilities and students' satisfaction level result indicated that there was a strong significant relationship between the parameters of Food Quality, Cleanliness, and Water supply with satisfaction levels. (12) In a study conducted in Sri Lankan Universities by Mansoor UL et.al observed that several significant factors contribute to students' satisfaction with the hostel facilities. Facilities like accommodation, medical facilities, hostel facilities, food facilities, and library facilities were significantly related to their satisfaction and academic performance. (13)

In the present study teaching facilities do not show any significant association with their satisfaction levels. The teaching infrastructure with advanced technologies, enhancing advanced teaching methods, student's teacher relationships, and transparency in assessment could be a reason for this.

The quality and experience the teacher poses were observed to be one of the most influential factors on students' satisfaction and the study also recommends the attention of the policymakers and institutes in this direction. (14)

Arambewela R et.al survey conducted in 2002 among international postgraduate students using MANOVA also made a similar observation that students' satisfaction levels were not significantly associated with neither age nor gender. (15)

The evaluation process in the university had an average rating score of 6.17 which is good, but much literature also observed that introspection of evaluation methods appropriateness, fairness and whether it is giving confidence and giving feedback on what they have learnt. Many researchers have found that transparency and fair evaluating practices impact students' satisfaction. (8,14)

### **Conclusion:**

Students' satisfaction is one of the aspects of prime importance in higher education centres which impacts the prospects not only in education but of the students. Many parameters like quality, variety of programmes offered, the course content, the teaching quality of teachers and teaching material, the facilities in the form of Hostel accommodation, food, Library facilities, laboratory facilities the administrative process, and fee structure takes importance. Many studies highlighted that the major university activities, like research and teaching facilities, have greater impacts on overall students' and staff satisfaction than supportive facilities. There is a felt need that universities should create a comfortable learning environment on campus. There is a need to improve students teacher relationships also student support facilities are another important measure of satisfaction level. There was a gap observed in students' satisfaction among public level higher educational centres compare to private higher education centres, in the form of facilities and environment available. Many studies have highlighted those facilities like auditoriums, recreational facilities, cultural events, sports and libraries are the physical factors that most strongly influence students' satisfaction.

Student satisfaction is also measured by the good and bad experiences extended towards them by the institute, teachers and friends, campus services and student support facilities are another important measure of satisfaction level.

A proper periodical feedback system will help the higher education centres to assess the needs of the students and helps in meeting the contemporary challenges and needs of the stakeholders plays a major role in delivering quality in higher education institutions

Higher education institutes should resist the urge to high grades simply to improve their marks as doing so will result in an erosion of the perceived quality, and therefore negatively impact the image of the institution. The relationship between the evaluation process and student satisfaction important factor to consider in higher education centres. Transparent and fair grading practices are likely to lead to higher student satisfaction.

### **Abbreviations:**

CND: Clinical Nutrition and Dietetics

AHS: Allied Health Sciences

MANOVA: Multivariate Analysis of Variance

**Acknowledgement:** Thank the University for providing the opportunity

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