

Assessing The Effect Of Campus Support Facilities Sports Programs Experiences Provided And Environmental Factors On The Student's Satisfaction Level Using Ordinal Logistic Regression Model

Zahid Khan^{1*}, Sundus Hussain², Musarrat Ijaz³

¹Department of Statistics, University of Malakand, Chakdara, Dir (Lower), Pakistan.

^{2,3} Department of Statistics, Shaheed Benazir Bhutto Women University Peshawar

* Corresponding author Email: zahid.uom1@gmail.com

Abstract

The present study conducted to estimate under graduate students' satisfaction level and its associated factors in University of Malakand, Pakistan. A structure questionnaire was developed for collection of data. Cluster random sampling method was used to select students from various academic departments. Data were collected by questionnaire which were distributed among under graduate students consisting both gender, male and female. Subsequently, 110 students responded (62 male, 49 female), whose response were analyzed through descriptive statistics, and ordinal logistic regression model. The model indicated factors significantly associated to the student's satisfaction which were; campus support facilities, experiences provided by the institute to the students, environmental factors, and sports programs. In order to increase the satisfaction level these factors should be improve. The present research can provide a guideline for educational leaders in focusing their resources for the best satisfaction of their students.

Keywords; under graduate students, satisfaction level, associated factors, ordinal logistic regression model,

Introduction

Education is crucial for improvement of society and fundamental source for its development and stability. The quality of education is correlated to many factors, one of the prominent factors is student satisfaction. Students' satisfaction led to better learning outcomes and prepare them for practical application once they completed education (Rizwan, 2008). The student satisfaction level influences their success of learning, a satisfied student learns more than unsatisfied one. Some factors are associated with students' satisfaction level. Campus support facilities (transport, library, canteen etc.) is important factor affecting students' satisfaction

level. Another influential factor is campus environment which raise the level of student satisfaction. Increasing student's experience through field work, workshop etc. impact positively on the students' satisfaction. Students also become more satisfied from the institution when better sport facilities available to them. In the present study we assess the students' satisfaction level, and factors responsible for their satisfaction in University of Malakand Pakistan.

Rehman et al. (2020) found that recreation and sports facilities, transportation, accommodation facilities were the major factors associated with students' satisfaction and dissatisfaction. Alsulami (2022) found Instructor's Emotional

Intelligence most critical parameter for students' satisfaction. Alsulami et al. (2022) concluded that campus culture had positive impact on the satisfaction level of students. Saadaldin et al. (2022) studied the effect of team-based learning on students' satisfaction level in College of Dentistry, Princess Nourah bint Abdulrahman University, Saudi Arabia. Significant relationship found between team-based learning and students' satisfaction level. Kanwar and Sanjeeva (2022) conducted study with major goal to describe the development and implementation of a survey to assess undergraduate and postgraduate student satisfaction. Butt and Rehman (2010) investigated that teachers' expertise, courses offered, learning environment and classroom facilities were prominent factors correlated to students' satisfaction level.

Barutçu et al. (2015) indicated that students' general satisfaction level was high and they were most satisfied with "Sport facilities", "Cultural and art activities" and "Sport activities", respectively. Lindsey (2012) studied the benefits and satisfaction of participating in campus recreational sports facilities and programs among male and female African American students.

Methodology

The study is conducted in University of Malakand at Chakdara, Lower Dir, Khyber Pakhtunkhwa, Pakistan. This is one of the public sector universities with significant ranking in the world as well as in the country.

BS Students are selected through cluster random sampling technique. The education departments are considered as clusters. Thus, in first stages of survey education departments are selected and then students selected from the selected departments using simple random sampling method. A structure questionnaire designed, and distributed among selected students. In order to identify the significant factors contributing the

students' satisfaction level in the study area, ordinal logistic regression is applied. The dependent variable is students' satisfaction level which is ordinal in nature, therefore, the classical linear regression model is not suitable.

Multiple Regression Model vs Logistic Regression Model

The objective of logistic regression is the same as ordinary least square (OLS) regression, that is, dependent variable is model in terms of one or more independent variables. The OLS method is effective in modeling continuous dependent variable with one or more independent variables. Logistic regression, the goal is the same as (OLS) regression: we wish to model a dependent variable in terms of one or more independent variables; while logistic regression is applied for categorical dependent variable. The dependent variable can be categories into two categories (e.g male/female) or more than two categories (agree, moderate agree, disagree). Moreover, the dependent variable may be ordered or unordered.

Ordinal logistic regression

Ordinal logistic regression is the generalized form of standard logistic regression to deal with response variable consisted of three or more categories and every category has important sequence (Liu and Koirala, 2013). For example, religious intensity of an individual is (0 = no religion, 1= somewhat strong, 2 = not very strong, and 3 = strong). In this situation, as with many latent variables, there may be an underlying continuous variable but the metric, that is, the distance between adjacent levels, is unknown (Tarling, 2008). To model such categorical variable, three commonly known models are used; continuation ratio (CR) model, proportional odds (PO) model and the adjacent category (AC) logistic. Proportional odds (PO) are the most popular model than the other two models. Most

of the software packages use the PO model as the default for ordinal regression (Liu and Koirala, 2013). The PO model is also called cumulative logit model, because it estimates cumulative odd of exactly or below a specific level of dependent variable, that is, PO model characterizes the ordinal response in k categories in term of k-1 cumulative categories comparisons, specifically, k-1 cumulative logits of the ordinal responses (David and Mitchel, 1994). More specifically, in case of four level of ordinal outcome i.e 0, 1,2,3 three logit will be modeled, one for each of the cut points; 0 vs. 1, 2, 3; 0, 1 vs. 2, 3; and 0, 1, 2 vs. 3 (Hosmer and Lemeshow, 2000).

To illustrate the ordinal logistic model (proportional odds model), suppose the dependent variable Y has t ordered categories. The t categories can be represented as t – 1 binary comparison. The cumulative odd of the ith category as

$$\text{odd}(Y \leq j) = \frac{p(Y \leq i)}{p(Y > i)}$$

$$= \frac{p_1 + p_2 + p_3 \dots \dots \dots p_j}{p_{i+1} + p_{i+2} + p_{i+3} \dots \dots \dots p_t}$$

The proportional odd model for the single predictor variable is then

$$\log\left(\frac{p(Y \leq i)}{p(Y > i)}\right) = \alpha_i - \beta x,$$

So that

$$p(Y \leq i) = \frac{e^{\alpha_i - \beta x}}{1 + e^{\alpha_i - \beta x}} \quad i = 1, 2, 3 \dots \dots \dots t - 1$$

Result and Discussion

Total of 110 under graduate students are selected consisting 62 male students and 49 female students from 11 selected education departments from University of Malakand. The satisfaction level of the students is presented in Table 1 which shows 8% highly satisfied, 45% satisfied, 29% moderate satisfied, 15% unsatisfied, 8% highly unsatisfied. Overall, 79% students are satisfied and 21% students are unsatisfied.

Table 1; Satisfaction level of Students of University of Malakand

Satisfaction Level	No. of Students	Percentage of Students	Cumulative Percentage
Highly Satisfied	09	08	08
Satisfied	49	45	53
Moderate Satisfied	29	26	79
Unsatisfied	15	14	93
Highly unsatisfied	08	07	100

Table 2 presents the satisfaction level with support facilities, environment, experience provided by the university. The table shows that 82% (28+41+15) satisfied from support facilities, 73% satisfied from environment, 74% satisfied from experience provided from the university,

and 62% satisfied from sports programs. While, 18%, 27%, 26% and 38% are unsatisfied from support facilities, environment, experience provided by university, and sports programs respectively. The overall result shows that majority of the students are satisfied.

Table 2 Satisfaction level with different variables (characteristics)

Satisfaction Level	Support Facilities	%	Environment	%	Experience	%	Sports	%
Highly Satisfied	28	25	16	15	10	09	08	07
Satisfied	45	41	36	33	51	46	46	42
Moderate Satisfied	17	15	27	25	21	19	14	13
Unsatisfied	14	13	20	18	24	22	31	28
Highly unsatisfied	06	05	12	11	04	04	11	10

In order to investigate the significant factors affecting the student's satisfaction ordinal logistic regression model is applied. The results are shown in Table 3. Using the forward selection criteria for specification of the model finally four factors found significant. Campus support facilities, overall environment, sport program,

experience provided by university significantly affected the students' satisfaction level. They all are positively related to the dependent variable, that is, as these factors provided by the university the students' satisfaction level increases vice versa.

Table 3; Result of the Ordinal Logistic Regression Model

Coefficient	Estimates	SE coefficient	P-value	Odd Ratio
Constant (1)	2.9654	2.9623	0.000	
Constant (2)	6.9282	6.9212	0.000	
Constant (3)	9.0452	9.0432	0.000	
Constant (4)	10.8866	10.8880	0.000	
Campus Support Facilities	0.4520	0.1836	0.015	1.571452
Overall Environment	0.9343	0.1990	0.000	2.545431
Sport Program	0.4573	0.1837	0.001	1.579803
Experience provided	0.7302	0.2221	0.015	2.075496

Conclusion

This study consists of many factors which effect the students' satisfaction. But we found only four significant, its mean that all other factors are satisfactory. The four factors which found significant by ordinal logistic regression model are; campus support facilities, overall

environment, sport program, experience provided by university.

References

1. Rehman, S.M. M., Mia, S., Ahmad, F., Thongarak, S. and Kiatpathomchai, S.

- (2020) *Journal of Asian Finance, Economics and Business*, 7 (8), (2020) 323–332.
2. Butt, B. Z. and Rehman K. U. (2010). A study examining the student's satisfaction in higher education. *Procedia Social and Behavioral Sciences*, 2, 5446–5450.
 3. Tarling, R. (2008). *Statistical modelling for social researchers: Principles and practice*. Routledge.
 4. Liu, X., & Koirala, H. (2013). Fitting Proportional Odds Models to Educational Data with Complex Sampling Designs in Ordinal Logistic Regression. *Journal of Modern Applied Statistical Methods*. 12(1), 235-248.
 5. David, K., & Mitchel, K. (1994). *Logistic regression: A self-learning text*.
 6. Hosmer, D. W., & Lemeshow, S. (2000). *Applied Logistic Regression*. John Wiley & Sons, Inc. New York.
 7. Rizwan, A., Alvi, M. S. and Hammouda, M. M. (2008). Analysis of factors affecting the satisfaction levels of engineering students, *International Journal of Engineering Education*, 24(4), 811–816.
 8. Alsulami, H. (2022). Assessing the Effect of Instructor's Emotional Intelligence (EI) on the Students' Satisfaction Index (SSI): Meta-Analysis of University Students. *Mathematical Problems in Engineering*,
 9. Alsulami, H., Abualsauod, E. H., Alomar, M. A., Serbaya, S. H., Othman, A. M., & Rizwan, A. (2022). The Impact of Campus Culture on the Satisfaction Level of Engineering Students: A Metaheuristics Approach. *Mathematical Problems in Engineering*,
 10. Saadaldin, S. A., Eldwakhly, E., Alaziz, S. N., Aldegheishem, A., Fahmy, M. M., Alsamady, S. M. & Soliman, M. (2022). Team-Based Learning in Prosthodontics Courses: Students' Satisfaction. *International journal of dentistry*,
 11. Kanwar, A., & Sanjeeva, M. (2022). Student satisfaction survey: A key for quality improvement in the higher education institution. *Journal of Innovation and Entrepreneurship*, 11(1), 1-10.
 12. Barutçu Yıldırım, F., Yerin Güneri, O., & Çapa Aydın, Y. (2015). University Students' Satisfaction Level and Related Variables. *Eğitimde Kuram ve Uygulama*, 11(2), 521-533.
 13. Lindsey, R. R. (2012). The benefits and satisfaction of participating in campus recreational sports facilities and programs among male and female African American students: A pilot study. *Recreational Sports Journal*, 36(1), 13-24.