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Factors Affecting Academic Achievement of B.Sc. Students of Tribhuvan University Constituent Campuses in Province - 1, Nepal.

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Abstract

An attempt has been made to assess the factors affecting academic achievements of bachelor's level students under Institute Science and Technology of Tribhuvan University in Province No. 1, Nepal. The academic achievement has been considered as a dependent variable and the gender, caste/ethnicity, socio-economic status and learning facilities as independent variables. A cross-sectional research design was used. The sample size of this research was 130 and the sample was drawn using simple random sampling technique. A well-designed questionnaire was used to collect the data. The Binary logistic regression model was used to find the association of various factors with the academic achievement of the students and the goodness of fit test of the model was assessed through Hosmer and Lemeshow test. The study concluded that the internet facility at libraries, as a learning facility, contributed significantly to the students' academic achievement whereas the remaining variables had no significant effect on the academic achievement of students' Moreover, this research also discusses the implications for improving academic achievement.

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1. Introduction

Education plays a great role in utilizing resources for the development of human capital and improvement in quality of life. Quality improvement of human resources is closely related to the quality of education. In the context of Tribhuvan University (TU), educational quality is being measured through the achievement of the examination. TU is one of the oldest and largest universities which provides higher education in Nepal. Under the umbrella of TU, the Institute of Science and Technology (IOST) is one of the oldest and largest technical institutes which constitute 13 central departments, one school, 24 constituent campuses and 89 affiliated campuses (retrieved from About us http://www.tuiost.edu.np). Nepal has a history of nine decades of science teaching and learning at the higher education level. Several schemes, plans, policies and implementation strategies have been experimented in science education. This institute has come to the present form after facing many challenges.

According to Steinmayr et al.,(2017), "Academic achievement represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university". The academic success is necessary as it is highly linked to positive outcomes. Some researchers used test results or previous years' results to study performance in the specific subject or year (Hijazi and Naqvi, 2006).

Mushtaq and Khan (2012) used CGPA to measure academic achievement of the students in their study conducted at private colleges in Pakistan, and they claim that communication, learning facilities, proper guidance and family stress affects performance of students. Similarly, Tesfaw and Derebew (2014) claimed that study hours, mother's educational level, teacher's commitment, standard of lectures and presentations, assessment and marking criteria, and course interest have positive effects on the achievement of students at the University.

Umar et al., (2015) argued that there is no significant difference between gender and academic performance in Colleges. Whereas, Pangeni(2014) in his study mentioned that gender was significantly related to mathematics achievement. The performance of boys was better than girls, and he also claimed that the differences in academic achievements were related to students' ethnicity. The high caste group performed better than the middle and low caste group. Also, the socio cultural factors (gender and caste/ethnic identity) and the English test score of students in rural Nepal was strongly associated (Neupane et al.,2018).

Similarly, Chandra and Azimuddin(2013) claimed that academic achievement and socioeconomic status were positively correlated. Also, Das and Sinha (2017) found significant relationship between the components of socioeconomic status such as father's income, occupation, monthly family income and students' performance.

Likewise, Singh et al., (2016) argued that students' performance depends on learning facilities, teaching methods, student to teacher ratio, student to class ratio, availability of teaching learning resources at school. Whereas availability of books at home was not significant (Sebro and Goshu, 2017).

Adopting the theoretical framework, the present study attempts to assess how gender, caste/ethnicity, socioeconomic status and learning facilities affect academic achievement of bachelor's level students of IOST, Tribhuvan University, Province 1 in Nepal.

Caste has been the central feature in Nepal to describe poverty level, education level and health status of the people. In Nepal there are 125 caste/ethnic groups (CBS, 2011). Since, it is difficult to take all 125 caste/ethnicity separately, in this study only four caste/ethnicities were taken. Because majority of students were from Brahmin, Chhetri and Janajati caste and least number of students were from other castes which include Madhesi and Dalit.

The socio-economic status of a child is most commonly determined by combining parent's educational level, occupational status and income level (Jeynes, 2002). In this study socio economic status comprises father's education, mother's education, main earner of family, occupation of main earner, family income, pocket money and side job of respondents. Here a side job is also taken since the participants were adult.

The academic achievement of students is not satisfactory as observed in various constituent campuses. Most of the students are not passing their exam regularly. Academic achievement is one of the major determinants in assessing the quality of education. With extensive literature review, most of the studies on this topic were carried out in addressing the factors affecting academic achievement of students up to school leaving certificate only in the context of Nepal. Those factors which were identified as a positive predictor of achievement in early grade levels may not necessarily have the same effect for adult learners. So, this study was conducted to address the factors affecting academic achievement of adult learners.

Previous researches were found to be done using other statistical tool like correlation and regression analyses but this study has been conducted using binary logistic regression. The binary logistic regression has been used in this study since the outcome variable categorized just into two categories (i.e. pass and fail).

This study may be helpful for the related stakeholders, to give attention in promoting the low achievers by providing required facilities. This study attempts to determine the significant factors among different factors that affect academic achievement of bachelor's level students.

2. Materials and Method

2.1 Data and study area

Province number 1 is located in the easternmost part of Nepal covering an area of 25,905km^2.andBiratnagar as its headquarter. The province is bordered by the Tibet Autonomous Region of China to the North, the Indian states of Sikkim and West Bengal to the east, and Bihar to the south, and Bagmati Pradesh and Madhesh Pradesh to the west. It comprises fourteen districts. In this region there are four constituent campuses of TU, having bachelor's degree program related to institute of Science and Technology.

Mechi Multiple Campus, Jhapa.

Dhankuta Multiple Campus, Dhankuta.

Central Campus of Technology, Dharan.

Mahendra Morang Aadarsa Multiple Campus, Biratnagar.

Population of the study includes all B.Sc 4th year students of constituent campuses of TU, IOST in Province No.1. According to the examination sections of the respective campuses, total number of students enrolled in B.Sc. fourth year in the academic year 2019 were 255.The study was focused on the academic performance of B.Sc. third year students who were enrolled in B.Sc. 4th year.

The sample size 130 out of total 255 students was finalized through the sample size calculation formula (Cochran, 1977) using the estimated proportion of an attribute that is present in the population (p) =0.5 and taking 95% confidence level with ±7% precision. Sample was selected using simple random sampling technique. Number of samples depends on total number of students at each campus. Campus possessing larger number of students has large sample size compared to campus having less number of students. The numbers of students selected for this study were 31 from Central Campus of Technology, Dharan;6 from Dhankuta Multiple Campus, Dhankuta; 58from Mahendra Morang Adarsha Campus, Biratnagar and 35 from Mechi Multiple Campus using proportional allocation method. Samples from each campus were drawn using simple random sampling technique. Data was collected from 26thFebruary to 4th March 2019. The Questionnaire was used to collect information from the respondents by visiting them directly at their respective campuses.

2.2 Study variables

The dependent variable of this study was academic achievement. In TU, academic achievement of students is being measured by their annual or semester exam results. The independent variables considered were: Gender, Caste/ Ethnicity, Socio economic status and Learning facilities. Socio-economic status include fathers education, mothers education, main earner of family, occupation of main earner, family income, pocket money and side job. Learning facilities include overcrowding problem at class, overcrowding problem at library & laboratory, sufficient books at library, sufficient books at home, internet facilities in library,computer facilities with internet for study purpose at home and lecturer style of teaching.

2.3 ***Data and study area***

The data gathered were presented through frequency table and cross tabulations. The Chi square test was used to determine the association of each independent variable with the dependent variable, from which the principle variables for the Binary logistic regression model was identified. If a p value< 0.05 at 5% level of significance, results were considered statistically significant. Data were analyzed using IBM SPSS version 20.

2.4 Statistical model

Binary logistic regression model was used, since the dependent variable of the study is dichotomous. The dependent variable is defined as academic achievement= {0 for fail and 1 for pass}.Candidate variables identified from bivariate analysis were used to determine the most significant factors associated with the outcome.

2.5 Goodness of fit test of the model

To test the goodness of fit of the fitted binary logistic regression model, Hosmer and Lemeshow test (Hosmer&Lemeshow, 1980) which measure the correspondence between the actual and predicted values of the dependent variable, was used. The model fit is indicated by a large p-value (higher than 0.05 for 5% level of significance).

3. Results

The study consists of 130 students where 43.1 %(56) were female students and 56.9 % (74) were

male students. One of the respondents declined to provide information about his/her result. 69.6 % (39) of female students and 47.9 %(35) of male students had passed exam. Female students have a higher pass percentage than male students.

Out of 130 respondents, 30% (39) were Brahmin, 20.8% (27) were Chhetri, 26.9%(35) were Janajati and 22.3 %(29) were from other caste/ethnicity (Dalit and Madhesi). Of total students (130), 66.7% (26) of Brahmin students, 59.3% (16) of Chettri students, 58.8% (20) of Janajati students and 41.4 % (12) of students from other caste/ethnicity have passed the exam.

Most of the students' i.e. 32.3 % (42) fathers had received school level certificate. Thirty percent of participants' fathers had received basic level certificate and 25.4% (33) of participants' fathers had received graduate and above education. Most of the student's i.e.72.7 % (24) whose father had a graduate & above level education had passed the exam.

Most of the students' mothers 36.2 %(47) had received basic level education. Thirty point eight percent of students' mothers had received a school level education and above 33% of participants' mothers were illiterate. Many students' i.e. 70% (28) whose mothers had a school level education and above had passed the exam. Main earners of the respondents' family were mostly father (88.5%). Only 6.2% of the total students' mothers were the main earner and the remaining 5.3% were other members as the main earner in the students 'family.

As stated in the fifth household budget survey, the average monthly income of Nepali people was Rs 30,121. Among all, 30.8% (40) students had monthly family income greater than NRs 30,121 and 69.2% (90) students had monthly family income of less than NRs 30,121. Also, 58.9 % (33) of students from income group of less than or equal to NRs 30,121 passed the exam and 53.8% (21) of students from income group of greater than NRs30, 121 had passed the exam.

A Large number of respondents [(36.2% (47)]main earners' occupation was agriculture while only 9.2% (12) of the respondents' main earners were involved in foreign employment. Small scale business included both seasonal employment and daily wages. Of total, 22.3% (29) of respondents main earner's occupation was small scale business. Sixty three percent of participants whose main earners' occupation was agriculture had passed the exam, whereas 57.1% (24) of participants whose main earners occupation was service passed the exam.

Eighty percent of the respondents were receiving pocket money up to NRs5, 000 monthly from their families and 31. 5% of respondents had side job.

Only 10.8% (14) students reported overcrowding problem at class and 20.8 %(27) of students reported overcrowding problem at library and laboratory. Most of the students [84.6 %(110)] did not have sufficient books at the library and 67.7 %(88) did not have sufficient books at their home. Fifty percent students had internet facility in library. Most of the students, i.e. 73.8% (48), having internet facilities at library had passed the exam, whereas, only 40.6% (26) of the students not having internet facility at library had passed result.

3.1 Bivariate analysis

Table 1: Bivariate analysis of variables

Variables	Result%(n)		Pearson chi-square	d.f	Sig.
	Fail	Pass			
Gender					
Female	30.40%(17)	69. 60%(39)			

Male	52.10%(38)	47.90%(35)	6.100	1	0.014*
Caste/Ethnicity					
Brahmin	33.3% (13)	66.7% (26)			
Chettri	40.7% (11)	59.3% (16)	4.479	3	0.214
Janajati	41.2%(14)	58.8%(20)			
Others	58. 6%(17)	41.4%(12)			
Father's education					
Illiterate	56.2%(9)	43.8% (7)			
Basic level	59%(23)	41% (16)	9.862	3	0.020*
School level	34.1%(14)	65.9%(27)			
Graduate &above	27.3% (9)	72.7% (24)			
Mother's education					
Illiterate	55.8%(24)	44.2%(19)			
Basic level	41.3%(19)	58.7%(27)	5.698	2	0.058
School level & above	30%(12)	70%(28)			
Main earner					
Father	41.3%(47)	58.7%(67)			
Mother	37.5%(3)	62.5%(5)	2.551	2	0.279
Others	71.4% (5)	28.6% (2)			
Income					
≤ 30,121	41.1%(37)	58.9%(53)	0.283	1	0.595

> 30,121	46.2%(18)	53.8%(21)			
Occupation			1.251	3	0.741
Small scale	48.3%(14)	51.7(15)%			
Foreign employ	50%(6)	50%(6)			
Agriculture	37%(17)	63%(29)			
Service	42.9%(18)	57.1%(24)			
Pocket money			0.883	2	0.643
No money	45.5%(5)	54.5%(6)			
Up to 5,000/-	40.8%(22)	59.2%(61)			
Above 5,000/-	53.3%(8)	46.7%(7)			
Side job			0.337	1	0.561
Yes	46.3%(19)	53.7%(22)			
No	40.9%(36)	59.1%(52)			
Overcrowding problem at class			5.554	2	0.62
Yes	71.4%(10)	28.6%(4)			
No	40.5%(34)	59.5%(50)			
Satisfactory	35.5%(11)	64.5%(20)			
Overcrowding problem at library & laboratory			1.784	2	0.410
Yes	48.1%(13)	51.9%(14)			
No	45.2%(33)	54.8%(40)			
Satisfactory	32.1%(9)	67.9%(19)			
Sufficient books at library			1.545	1	0.214
Yes	30%(6)	70%(14)			
No	45%(49)	55%(60)			

Sufficient books at home			0.337	1	0.561
Yes	46.3%(19)	53.7%(22)			
No	40.9%(36)	59.1%(52)			
Internet facility at library			14.552	1	0.000*
Yes	26.2%(17)	73.8%(48)			
No	59.4%(38)	40.6%(26)			
Internet facility at home for study purpose			7.247	1	0.007*
Yes	37.6%(41)	62.4%(68)			
No	70%(14)	30%(6)			
Lecturer style			13.055	2	0.001*
Board marker, multimedia & lab based	20%(5)	80%(20)			
Board marker only	52.1%(49)	47.9%(45)			
Multimedia	10%(1)	90%(9)			

*Significance at 5% level of significance

The independent variables such as gender of respondents, father's education level (p-value=0.020), internet facilities at respondent's library (p-value=0.000), internet facilities for study purpose at home using desktop/laptop (p-value=0.007)and lecturer style of teaching(p-value=0.001) was significantly associated with academic achievement in bivariate analysis(Table 3.1.1). But the remaining variables like caste/ethnicity were not significantly associated with academic achievement in bivariate analysis. Similarly, mother's education of respondent, main earners of the family, occupation of main earners, monthly income of respondent's family, pocket money and side job of the respondents were not significantly associated with academic. Also, overcrowding problem at class, overcrowding problem at library and laboratory, sufficient books at home was significantly associated with academic achievement of students.

3.2 Multivariate Analysis

Table 2. Results of binary logistic regression model

	B	S.E.	Wald	df	P-Value	O.R.	95% C.I for O.R.	
							Lower	Upper
Gender	-.584	.423	1.901	1	.168	.558	.243	1.279
Fathers education(reff-illiterate)			3.328	3	.344	1		
Basic level certificate	-.533	.667	.639	1	.424	.587	.159	2.169
School level certificate	.227	.672	.114	1	.736	1.254	.336	4.684
Graduate and above	.473	.715	.439	1	.508	1.605	.396	6.515
Internet facility at library	1.059	.457	5.377	1	.020*****	2.883	1.178	7.055
Internet facility at home	.722	.602	1.439	1	.230	2.059	.633	6.704
Lecturer style of teaching(reff-Multimedia,lab based & board marker)			2.692	2	.260	1		
Board marker	-.579	.620	.871	1	.351	.561	.166	1.891
Multimedia	1.060	1.200	.780	1	.377	2.886	.275	30.328
Constant	-.122	1.086	.011	1	.918	.894		

From Table 3.2.1, It was found that there was no significant relationship between gender and academic achievement (P>0.05) instead, the regression coefficient of -0.584 indicated that the female students perform better than male students.

The study showed no significant relationship between father's education level and academic achievements. But the regression coefficient of -0.533 indicated that the students having illiterate fathers performed better than those whose fathers had basic level education. A regression coefficient of 0.227 indicated that the students whose fathers possessed school leaving education had better achievement than the students having illiterate father.

Similarly, the regression coefficient of0.473 indicated that the students whose fathers pursued graduate and above education performed better than the students having illiterate father. Also, the odds ratio of 1.605 indicated that those students whose fathers pursued graduate and above education were 1.605 times more likely to perform better in academic achievement compared to the students having illiterate father controlling for other variables in the model.

Likewise, the regression coefficient of 1.059 indicated that students having internet facilities at their library had better result than those without internet facilities. The estimated odds ratio of 2.883 indicated that students having internet facilities at the library were 2.883 times more likely to perform better than those not having internet facilities controlling for other variables in the model.

An internet facility at a library is significant (P-value<0.05) in the fitted binary logistic regression for the dependent variable academic achievement but an internet facility at home for study purpose was insignificant (P>0.05).

The regression coefficient of -0.579 indicated that students who were taught by using multimedia, board marker and laboratories performed better than those taught by using board marker only and the regression coefficient 1.060 indicated that students taught by using multimedia only performed better than the students those taught by using multimedia, board marker and laboratories at a time in the classroom. Also, the odds ratio of 2.886 indicated that students who were taught by using multimedia only were 2.886 times more likely to perform better in academic achievement as compared to those taught by using multimedia, board marker and laboratories at a time in the classroom controlling for other variables in the model. Lecturer style of teaching was not significant (P>0.05) in the binary logistic regression model for the dependent variable academic achievement.

Hosmer and Lemeshow Test is presented in table 4

Table 3. Goodness of fit test

Chi- square	Df	P-value
2.308	7	0.941

From table 3 it was observed that, P-value 0.941 which is greater than the level of significance at 5%. It can be concluded that the data fits the model well. There is no significance difference between the observed and estimated values since p-value is > 0.05 at 5% level of significance indicating that the goodness of fit of the model has not been violated.

4. Discussion

The aim of the study was to assess factors affecting academic achievement of bachelor's level students. The variables under consideration were the academic achievement as a dependent variable and the gender, caste/ethnicity, socio-economic status and learning facilities as independent variables. Cross-sectional research study was conducted at four constituent campuses of IOST; TU in province number 1, Nepal. Out of 255 students, 130 (±7% desired error) students were selected by using simple random sampling technique.

The data obtained as quantitative and qualitative form were described, summarized and distributed in different ways. Frequency table and cross tabulations were used to present the data. The chi-square test was performed to identify the association between dependent and independent variables. Stated hypotheses were tested by employing binary logistic regression analysis. Since, the dependent variable has a dichotomous outcome i.e pass and fail binary logistic regression analysis was used.

Bivariate analysis was performed using Chi square test to identify the association between variables. It was observed that gender of respondents, fathers education level, internet facilities at respondents library, computer facilities with internet for study purpose at home and lecturer style of teaching were significantly associated with academic achievement of students in the study area at 5% level of significance.

Caste/Ethnicity was not significantly associated with academic achievement of students in the study area at 5% level of significance. This finding corroborated with Yadav and Chahal (2016).

Mother's education of respondent, main earner of family, occupation of main earner, monthly income of respondent's family, pocket money and side job of the respondents were not significantly associated with students' academic achievement in the study area at 5% level of significance. These variables belong to socio-economic status.

Overcrowding problem at classes, overcrowding problem at library and laboratory, sufficient books at home were not significantly associated with academic achievement of students at 5% level of significance. These variables belong to learning facilities.

For multivariate analysis, binary logistic regression analysis was performed. All possible factors whose probability of significant less than 5% were taken.

It was found that there was no significant relationship between gender and academic achievement (P>0.05). This finding was inconsistent with the findings of Sebro and Goshu (2017), Sodipo et al., (2015) and Joseph & John (2015). In bivariate analysis gender was found to be significantly associated with academic achievement. The factor gender after keeping all possible factors in the

multivariate analysis did not show the significant difference. The bivariate association of gender with academic achievement might be due to confounding effects.

The study found no significant relationship between father's education level which belongs to Socio-economic status and academic achievements. The factor father education of respondents after keeping all possible factors in the multivariate analysis did not show the significant difference. The bivariate association of father's education with academic achievement may be due to confounding effects.

Most of the variables belonging to socio economic status were not significantly associated with academic achievement of students; only father's education level was significantly associated with academic achievement while performing bivariate analysis. After performing multivariate analysis it was also found that father's education level was not significantly related with academic achievement of students.

Overall, it was found that socio economic status was not significantly related with academic achievement of students. This was not supported fully by the previous studies. It may be due to government policy because the government sets different quotas and scholarship schemes to the students of lower economic background, which may encourage them to perform better.

The study found that there was no significant relationship between lecturer style of teaching and academic achievement (P>0.05). In bivariate analysis lecturer style of teaching was found to be significantly associated with academic achievement. However, the factor lecturer style of teaching after adjusting all possible factors in the multivariate analysis did not show the significant difference.

It was found that there was a significant relationship between internet facilities at libraries and academic achievement. Internet facilities at the library belong to learning facilities. This finding was inconsistent with Musthaq and Nawaz Khan (2012), Suleiman et al., (2018) and Ilomo and Mlavi (2016).

5. Conclusion and Recommendation

The study found that there was a significant relationship between internet facilities at libraries. As internet facilities at library belongs to learning facilities, it can be concluded that learning facilities especially internet facilities at library influenced academic achievement of the students. The students' academic achievement could be improved if the government makes policy to access e-library at each campus.

There may be various factors influencing academic achievement besides the factors considered in this study like communication, class size, study habit, proper guidance, absenteeism that can influence academic achievement. The study was limited only to identifying the relationship between academic achievement and factors such as gender, caste/ethnicity, socio-economic status and learning facilities. Hence, further study in elaborated form is recommended.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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