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## Abstract

The main objective of this study is to examine the existing situation of results of the graduate students at Islamic University in Kushtia, Bangladesh as well as to identify the factors associated behind this issue. An analysis has been performed by using the primary data which collected from the graduate students of Islamic University under simple random sampling technique. Chi-square test for dependency checking has been performed as Bivariate analysis. After performing Bivariate analysis Multinomial logistic regression analysis has been performed. The result of the study has revealed that the factors like SSC and HSC results of the student, Parental academic qualification, Higher family income, residential in hall, student's class attendance, study time without class period have a positive impact and the factors like students' internet use for non-academic purpose, political status, mobile phone using for non academic purpose in the University have a negative impact of students academic results.

**Index terms**— academic results in cgpa, simple random sampling (without replacement) techniques, bivariate analysis, multinomial logistic regression model.

## 1 Introduction

Education is considered as a first step for every human activity in the present era. It plays a vital role in the development of human capital and is linked with an individual's well being and opportunities for better living [1]. To be developed a country well educated individuals are needed whose academic results and performances are good. Huge number of students in Bangladesh does not get chance for higher study. However most of the students who get scope for higher study cannot make good results.

In recent years, all the universities in Bangladesh use the CGPA system to evaluate the academic results of students. The CGPA shows the average of overall grades of the semesters or years of the period a student spends in the university. Most of the universities in the world are using the CGPA system for evaluating the academic result of the students. For instances, teachers evaluate the academic result of the students by using the CGPA system in Malaysia [2]. Also, in USA student's academic results is evaluated by making CGPA.

As academic result is considered as the measurement of qualification of the students, different studies have been performed to find the behind reason of the academic results. Many studies have shown that different factors have significant affect on academic results.

For example, Graetz [3] showed that one's educational success depends very strongly on socioeconomic status of the parents. Alnabhan [4] observed that the lack of family support for a student is the main factor behind a low level of student achievement cumulative GPA. Also, Woessmann [5] concludes that family background has strong and similar effects on both Europe and the USA. He also estimates the model using a QR (Quantify Rational) approach where he concludes that there is weak evidence of variation in the family background influence.

Not only the socio-economic status but also the educational level of the parents is an important factor for making the good results. In this purposes, Aghus and Makhbul [2] observed in their study that the mothers have more influence on their children academic achievements and performance. Students' performance in intermediate examination is positively associated with the mother education. Also there have different variables which have important effect on academic results. Among them, Al-Tamimi and Al-Shayeb [6] found that attendance, gender, and semester load are the most significant variables. They also found that significant gender differences exist, with

males outperforming females. Moreover, Applegate and Daly [7] used data collected from a survey of students at the University of Canberra, Australia and found that there is a positive correlation with the percentage of classes missed and a perception of a more negative effect of employment on grades.

Trained teachers are also an important fact in this case. Amitava Raychaudhuri, Manojit Debnath, Saswata Sen, and Braja Gopal Majumder [8] by applying regression analysis in their study found Mother's education & presence of trained teacher have a positive impact of students' academic performance.

In Bangladesh, the relationship between family background and student performance is not expected to be different from other countries. Since the country is researches were conducted, we need to estimate the relative importance of the factors. We hardly find any research on this issue in Bangladesh. However, depending on these theoretical and empirical findings, we set up our statistical model and estimate the various factors that affect the academic result of Islamic University students, Kushtia, Bangladesh.

As there are several factors that have significant affect on academic results in university level, the main objective of the present study is to determine the factors that affect results (CGPA) in which information is collected from Islamic University, Kushtia, Bangladesh. More specially, the objectives of the present study are ?

? To examine the factors that affects the academic results in university level.

? To provide better suggestion.

The remainder of this paper is organized as follows. Section 2 describes the data variables and methodology, Section 3 represents analysis and results. Finally, Section 4 summarizes the conclusions of the results and gives a short suggestion.

## 2 II.

### 3 Data and Methodology a) Data and Variables

There are total 37 numbers of public universities in Bangladesh that are being run under the University Grants Commission (UGC). Islamic University, Kushtia is one of the most renowned among them which includes 22 departments under 5 faculties and approximately 3500 graduate students are getting their education in different subjects. The data used in this study are collected primarily by the direct interview from the students. From each department, by drawing simple random sampling (without replacement) techniques a total 500 number of graduate students information have been collected.

As factors that influencing the academic performance would be determined, a large number of explanatory variables have been handled in this study. The variables are classified as-

### 4 b) Methodology

The main objective of this study is to determine the relationship between dependent variable and independent variables. To check the dependency among the variables bivariate analysis has been performed. Bivariate analysis involves the analysis of two variables for the purpose of determining the empirical relationship between them [9]. Cross tabulation was done to find any association between two variables and was tested by chi-square. This step of analysis provides us with the list of independent variables to be used in multinomial logistic regression.

The Multinomial Logistic regression Model is applied to determine the impact of different factors on the academic results. It is the linear regression analysis to conduct when the dependent variable is nominal with more than two levels. Thus it is an extension of logistic regression, which analyzes dichotomous (binary) dependents. Like all linear regressions, the multinomial regression is a predictive analysis. Multinomial regression is used to describe data and to explain the relationship between one dependent nominal variable and one or more continuous-level (interval or ratio scale) independent variables.

Standard linear regression requires the dependent variable to be of continuous-level (interval or ratio) scale. Logistic regression jumps the gap by assuming that the dependent variable is a stochastic event. And the dependent variable describes the outcome of this stochastic event with a density function (a function of cumulated probabilities ranging from 0 to 1). Statisticians then argue one event happens if the probability is less than 0.5 and the opposite event happens when probability is greater than 0.5.

In statistics, multinomial logistic regression is a classification method that generalizes logistic regression to multiclass problems, i.e. with more than two possible discrete outcome [10]. That is, it is a model that is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables (which may be real-valued, binary-valued, categorical-valued, etc.).

Multinomial logistic regression uses a linear predictor function  $(\beta_k)$  to predict the probability that observation  $i$  has outcome  $k$ , of the following form:  $0, 1, 2, 3, \dots, K-1$  where  $K$  is the number of possible outcomes. The probability of outcome  $k$  for observation  $i$  is given by:

Where  $\beta_k$  is the set of regression coefficients associated with outcome  $k$  and  $x_i$  (a row vector) is the set of explanatory variables associated with observation  $i$ .

III.

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## 5 Analysis and Results

Determined the factors that affect the academic result of students are the main theme of this study. Thus the association of dependent and independent variables has been found by bivariate analysis and then the impact of the factors by multinomial logistic regression model.

The frequencies and percentages of different explanatory variables and chi-square value and corresponding P-values are given in Table 1. From Table 1 it is concluded that Faculty name of the respondents, Birth place, SSC result of the respondents, HSC result of the respondents, Parents academic qualification, Family income, Residential status, Internet use for non-academic purposes, Political status, Study time (without class period), Type of study, Class attendance, Using mobile phone for nonacademic purpose have significant effect on Academic results at 1 percent and 5 percent level of significance. Also parent's occupations are significant at 10 percent level of significance.

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Finally to examine the effect of explanatory variables on academic result multivariate multinomial logistic regression models are fitted to the data considering all the explanatory variables found significant at 1 and 5 percent level of significance in bivariate analysis. The results are shown in the Table 2. The results of Table 2 give the estimates of the logistic regression coefficients corresponding to the explanatory variables and their relative odds ratio for each categories of the variable. In logistic regression the interpretation is done in terms of odds ratio. Odds ratios are used to compare the relative odds of two groups. In this study the categories of each variable compare with the reference category.

## 7 Family income

In Table 2 the Odds ratio under faculty indicates that in Science faculty the chance of poor result (less than 3) is 1.079 times more likely than the Business faculty compared to the good result (above 3.5). In Arts faculty the chance of poor result is 0.202 times than the Business faculty and the result is significant at 10 percent level of significance. Similarly, the chances of medium result (3-3.5) in Science and Arts faculties are 0.696 and 0.548 times respectively likely than the Business faculty and the results are not significant. Students born in urban have the chance of getting poor result 0.720 times than that of the rural but urban students have 1.196 times chances of getting medium result than the rural students. Thus the rural students make poor result more than the urban students. This may be due to the lack of facilities of education of rural students.

The odds ratio under SSC result of the respondent shows that in medium result (less than 4) of SSC the chance of poor result is highly significant and 15.417 times more likely than the very good result (above 4.5) and in good result (4-4.5) the chance of poor result is 0.414 times than the very good result. That is, students who got medium result in SSC have the greater chance to get poor result in university level compared to the good and very good result in SSC. Similarly, in medium result (less than 4) the chance of medium result in university level is significant and 4.241 times more likely than the very good result (above 4.5) and in good result (4-4.5) the chance of getting medium result is 1.306 times than the very good result. The odds ratio under HSC result of the respondent shows that in medium result (less than 4) the chance of poor result in university level is highly significant and 7.090 times more likely than the very good result (above 4.5) and in good result (4-4.5) the chance of poor result is significantly 3.728 times than the very good result. That is, students who got medium result in HSC have the greater chance to get poor result in university level compared to the good and very good result in HSC. Similarly, in medium result (less than 4) the chance of medium result in university level is significant and 3.147 times more likely than the very good result (above 4.5) and in good result (4-4.5) the chance of getting medium result is 3.299 times than the very good result and the results are found significant. The odds ratio under the father's academic qualification reveals that in Primary education the chance of poor result is significant and 0.116 times likely than the higher education compared to the chance of good result. In no education and secondary education the chances of poor result are 0.590 and 0.802 times respectively. Similarly, in Primary education the chance of medium result is highly significant and 0.128 times likely than the higher education compared to the chance of good result. In no education and secondary education the chances of poor result are 2.077 and 2.563 times more likely than the higher education respectively. The odds ratio under the mother's academic qualification shows that in Primary and secondary education the chances of poor result are significant and 0.025 and 0.032 times more likely than the higher education compared to the chance of good result. In no education the chance of poor result is 0.241 times than the higher education. Similarly, in Primary and secondary education of mother the chances of poor result are highly significant and 0.068 and 0.023 times more likely than the higher education compared to the chance of good result.

The result under family income shows that in less than 10000 the chance of poor result is 2.248 times more likely than the above 20000 and in 10000-20000 the chance of poor result is significant and 7.982 times more likely than the above 20000. Moreover, in less than 10000 the chance of medium result is 0.541 times more likely than the above 20000 and in 10000-20000 the chance is 1.070 times more likely than the above 20000. The result under residential status shows that in hall the chance of poor result is 0.977 times than in mess. Also the students who stay in family have a highly significant effect on poor result and the chance is 21.100 times more likely than the students stay in mess. Similarly, the chance of medium result of students who stay in family is found highly

significant and 7.7040 times and the chance of medium result who stay in hall is 1.128 times more likely than that of the students stay in mess.

The odds ratio under Internet use for non-academic purposes indicates that the chance of poor result who use internet for non-academic purposes less than 10 (hrs/week) is found significant and 3.501 times more likely than more than 10 (hrs/week). But the chance of medium result is not significant at all. The odds ratio under political status shows that it has a negative and highly significant effect on results. The result shows that the chance of poor result in no politics is 0.016 times and in less than 10 (hrs/week) is 0.034 times likely the more than 10 (hrs/week). Also the Factors that Affect the Academic Results: A Case Study of Islamic University, Kushtia, Bangladesh chance of medium result in no politics is 0.048 and in less than 10 (hrs/week) is 0.101 times likely the more than 10 (hrs/week). The odds ratio under study time without class period reveals that the chances of poor results in less than 10 and 10-20(hrs/week) are found highly significant and 164.96 and 98.297 times more likely than more than 30 (hrs/week). That is, the students who study less time have the more chance to get the poor result. Similarly, the chance of medium result is significant in less than 10, 10-20 and 20-30 (hrs/week) and the results are 11.923, 43.318 and 8.047 times respectively more likely than the more than 30 (hrs/week). The students who read hand note only have more chance to get poor result than who read book and both hand note and book and the result is significant and it is 573.93 times more likely than who read both hand note and book. Similarly, the chance of getting medium result is significant and it is 5.977 times more likely than who read both hand note and book. Also the students who have less than 80 percent class attendance have more probability to get the poor result and it is 14.970 times more likely than the above 90 percent class attendance. Students who use mobile phone less than 5 (hrs/week) have a negative impact on poor and medium result than who use mobile phone more than 5 (hrs/week).

IV.

## 8 Conclusion

The study examines the factors of results of the graduate students by using the primary data which is collected from the graduate students of Islamic University, Kushtia, Bangladesh under simple random sampling technique. Both bivariate and Multinomial Logistic regression analyses have been performed to identify the important factors that affect the academic results. The results show that there are many factors that affect the academic result.

In Multinomial logistic regression analysis it is found that the factors such as Arts faculty, Medium result in SSC, Medium and Good result in HSC, Father education of Primary level, Mother education of Primary and Secondary level, Family income of between 10000 to 20000, Residential status at Family, Political status of No politics and Less than 10 (hrs/wk), Type of study of Handnote, Class attendance of Less than 80 percent, Mobile phone using status of Less than 5 (hrs/wk) have significant effect on getting Poor result. Also Medium result in SSC, Medium and Good result in HSC, Father education of Primary level, Mother education of Primary and Secondary level, Residential status at Family, Political status of No politics and Less than 10 (hrs/wk), Type of study of Handnote, Mobile phone using status of Less than 5 (hrs/wk) have significant effect on getting medium result.

It is revealed that the students who do not involve in politics they can show good performance on the academic results than who spend more time for political purpose. Furthermore, the students who do not spend more time in mobile phone and internet for non academic purpose they can also show good performance than who spend more time for these non academic purposes and the students who have above 90 percent class attendance and study above 30 hours per week their academic result performance is better than the other categories of these factors. Also the factors such as father's occupation, staying in hall, and SSC & HSC results of the students, education level of their parents, higher family income have positive impact on the academic results of the students in Islamic University, Kushtia.

Finally it can be declared that if we maximize the quality and facilities of the factors that have positive impact on academic results and minimize the negative factors that are main constraints then the academic performance of the students in Islamic University should be good. <sup>1</sup>

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Figure 1: ?

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Factors	CGPA			?	2	P-value
Independent variables	Poor ( < 3)	Medium (3-3.5)	Good ( > 3.5)			
Faculty Name of the respondent						
Science	29(41.4%)	114(38.1%)	69(52.7%)	10.831	0.029	
Arts	23(32.9%)	124(41.5%)	45(34.4%)			
Business	18(25.7%)	61(20.4%)	17(13.0%)			
Gender				0.667	0.716	
Male	36(51.4%)	169(56.5%)	71(54.2%)			
Female	34(48.6%)	130(43.5%)	60(45.8%)			
Religion				5.444	0.245	
Muslim	49(70.0%)	235(78.6%)	109(83.2%)			
Hindu	21(30.0%)	63(21.1%)	22(16.8%)			
Others	0(0.0%)	1(0.3%)	0(0.0%)			
Birth place				10.923	0.004	
Urban	17(24.3%)	110(36.8%)	29(22.1%)			
Rural	53(75.7%)	189(63.2%)	102(77.9%)			
SSC result of the respondents				29.109	0.000	
Medium(Less than 4)	26(37.1%)	57(19.1%)	12(9.2%)			
Good (4-4.5)	11(15.7%)	66(22.1%)	46(35.1%)			
Very Good (above 4.5)	33(47.1%)	176(58.9%)	73(55.7%)			
HSC result of the respondents				17.555	0.002	
Medium(Less than 4)	23(32.9%)	57(19.1%)	29(22.1%)			
Good (4-4.5)	20(28.6%)	88(29.4%)	20(15.3%)			
Very Good (above 4.5)	27(38.6%)	154(51.5%)	82(62.6%)			
Father's academic qualification				17.478	0.008	
No education	5(7.1%)	29(9.7%)	4(3.1%)			
Primary	31(44.3%)	76(25.4%)	50(38.2%)			
Secondary	14(20.0%)	67(22.4%)	26(19.8%)			
Higher	20(28.6%)	127(42.5%)	51(38.9%)			
Father's occupation				9.380	0.052	
Job	22(31.4%)	104(34.8%)	53(40.5%)			
Business	22(31.4%)	78(26.1%)	19(14.5%)			
Farmer	26(37.1%)	117(39.1%)	59(45.0%)			
Mother's academic qualification				29.881	0.000	
No education	32(45.7%)	108(36.1%)	36(27.5%)			
Primary	16(22.9%)	73(24.4%)	54(41.2%)			
Secondary	20(28.6%)	82(27.4%)	39(29.8%)			
Higher	2(2.9%)	36(12.0)	2(1.5%)			
Mother's occupation				5.084	0.079	
House wife	64(91.4%)	268(89.6%)	126(96.2%)			
Job	6(8.6%)	31(10.4%)	5(3.8%)			

[Note: s-Year 2016]

Figure 2: Table 1 :

Factors	Poor result (Less than 3)		Medium result (3-3.5)		
	Coefficient	Odds Ratio	Coefficient	Odds Ratio	
Faculty Name of the respondent					
Science	0.076	1.079	-0.362	0.696	
Arts	-1.600	0.202*	-0.601	0.548	
Business					
Birth place					
Urban	-0.329	0.720	0.179	1.196	
Rural					
SSC result of the respondents					
Medium (Less than 4)	2.736	15.417***	1.486	4.421**	
Good (4-4.5) Very Good (above 4.5)	-0.883	0.414	0.267	1.306	Year
HSC result of the respondents Medium	1.959	7.090***	1.147	3.147**	2016
(3.5-3.99) Good (4-4.5)	1.316	3.728**	1.194	3.299***	
Very Good (above 4.5)					
Father's academic qualification					11
No education	-0.528	0.590	0.731	2.077	
Primary Secondary Higher Mother's	-2.157	0.116**	-2.053	0.128***	Volume
academic qualification No education	-0.221	0.802	0.941	2.563	XVI
Primary Secondary Higher Family in-	-1.422	0.241	-1.709	0.181	Is-
come Less than 10000 10000-20000	-3.703	0.025**	-2.682	0.068***	sue
Above 20000 Residential status Hall	-3.429	0.032***	-3.760	0.023***	I
	0.810	2.248	-0.614	0.541	Ver-
	2.077	7.982**	0.068	1.070	sion
	-0.023	0.977	0.121	1.128	I
Family Mess	3.049	21.100***	2.042	7.7040***	( G
					)
Internet use for non-academy	-1.530	0.217	-0.890	0.411	Global
(hrs/week) Not use Less than	1.253	3.501*	0.561	1.752	Jour-
10 Greater than 10 Political	-4.128	0.016***	-3.038	0.048***	nal
status(hrs/week) No politics Less	-3.373	0.034***	-2.292	0.101**	of
than 10 Greater than 10 Study	5.106	164.96***	2.478	11.923***	Hu-
without class period (hrs/week) Less	4.588	98.297***	3.769	43.318***	man
than 10 Between 10 to 20 Between 20	0.887	2.428	2.085	8.047***	So-
to 30 Greater than 30 Type of study	6.353	573.93***	1.788	5.977***	cial
Hand note Book Book & hand notes	1.814	6.134	-0.384	0.681	Sci-
Class attendance (%) Less than 80	2.706	14.970**	0.770	2.159	ence
					-
Between 80 to 90	1.183	3.263	1.228	3.413	
Above 90					
Mobile phone using status (hrs/week)					
Less than 5	-2.914	0.054**	-2.378	0.093**	
Between(5-14)	-0.815	0.443	-0.607	0.545	

[Note: Factors that Affect the Academic Results: A Case Study of Islamic University, Kushtia, Bangladesh above 14 ? \*\*\*/\*\*/\* indicates significant at 1%/ 5%/ 10% respectively ? Last category in each variables indicates the reference category ? Among the results good result is the reference category.]

Figure 3: Table 2 :





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