Evaluation of the Undergraduate Student's Performance In a Private University: An Empirical Study of ASA University Bangladesh

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Abstract

Evaluation of student's performance is a continuous process. In general, students' performance depends on their study time, teacher-student relationship, group discussion about course related topics and the academic and administrative facilities. In this study, we use several types of indicators say, arithmetic mean, standard deviation, coefficient of variation to diagnose the current performance of the ASA University students and we found that the overall student's performance of ASAUB is gradually increasing. To compare the results between two conjugative semesters, generally paired-t can be used if data comes from normal distribution. But in this paper, the nonparametric or distribution-free test say, paired Wilcoxon Signed-Rank test is applied to compare the results between two semesters. At last, we propose an econometric model to measure the dependency of the quality of the students' performance. This paper suggests that major factors related to students' performance are study time, efficiency in English language, counseling time with course teachers, group discussions, achievement from the classes and expenditure for assignment purposes.

Keywords: Coefficient of Variation, Distribution-free test, Econometric model, Paired-t test, Student's performance, and Paired Wilcoxon Signed-Rank test.

1.1 Introduction

Education plays an inevitable role for promoting economic growth. Higher education may create greater tax revenue, increase savings and investment, and lead to a more entrepreneurial and civic society. It can also improve a nation's health, contribute to reduced population growth, improve technology, and strengthen governance (Mayston, 2003). To ensure the quality of higher education and increase the opportunity of higher education, fifty four private universities sprouted in Bangladesh after the Private University Act, 1992 was instituted. Therefore, now what matters in this connection is not the number but the quality.

ASAUB is an institution of higher education absolutely dedicated to quality education at affordable cost. ASAUB stands for academic and professional excellence. The mission of ASAUB is to offer programs of study appropriate to the needs of the 21st century which are related to progressive activities directly contributing to the socio-economic mobilization and

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empowerment of the people of the country, development of skilled manpower and increase of social and moral values among the youths of Bangladesh. Thus to play a role in poverty alleviation through education is one of the main concerns of ASAUB (http://asaub.edu.bd).Due to stiff competition in the education sector in Bangladesh. ASA University Bangladesh needs to prove their quality and should develop constructive and effective marketing programs and strategies for the purpose of survival as well as expansion.

Better student's performance is one of the major criteria to increase the reputation of a university. This paper gives a comparative overview to diagnose the present situation, and constructs a model to make policy for improving student's quality. The typical assumption in parametric test is that the data must be of at least interval scale and it must come from normal distribution. So, researchers need to check the normality assumption. To avoid the investigation of normality assumption, nonparametric test say paired Wilcoxon Signed-Rank test (Weiss, 2005) can be used. In regression analysis, a model related with student's performance is constructed and different model selection criteria R^2, Error Sum of Squares of Error (SSE), Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) (Gujarati, 2003) are used to find out the appropriate empirical model.

This paper is organized as follows: In section 1.2, more than one objective is considered. Section 1.3 discusses about sample technique. Sections 1.4 and 1.5 discuss graphical and numerical analysis and give some findings. Section 1.6 and 1.7 discuss theoretical background of the Paired Wilcoxon Signed-Rank test and introducing the hypothesis testing. Section 1.8 constructs the econometric model. At last section 1.9 gives some recommendations and conclusions of the study.

1.2 Objectives of the Study

The paper focuses on the evaluation procedures of student's performance in a private university. The major objectives of this study are as follows:
- To diagnose the undergraduate student's performance in Bachelor of Business Administration Program and compare it in different angle, batch to batch.
- To apply nonparametric paired Wilcoxon-Signed Rank test for comparing the student's performance about two conjugate semesters.
- To develop a significant econometric model for determining the dependency of student's performance with other factors.
- To take different policies for alleviating poverty and improving socio-economic condition of Bangladesh by offering higher education.

1.3 Sampling Technique

In October, 2009 total number of registered students in ASA University Bangladesh (ASAUB) was approximately 4076 in which 3388 were from the Faculty of Business and 688 were from Faculty of Arts, Social Science and Law. To evaluate the student's performance of ASAUB, the primary and secondary data were collected. This study actually considered undergraduate

students in B.B.A program as a target population. Thirty nine paired sample observations were selected from five batches out of eight batches (one through eight). Firstly, questionnaire was developed to compare the results of fall 2008 and spring 2009 and then required number of primary date (i.e. $n = 39 \times 5 = 195$) was collected on the basis of multi-stage cluster sampling (Mukhopadhyay, 2000).

1.4 Graphical Analysis about the Student's performance for Summer 2009

For summer 2009, total 2061 students' secondary data are collected from the register's office where 145 students were in B.A. English (Hons), 215 students in L.L.B and 1701 students in B.B.A program.

If we want to draw attention to the frequency of each category, then we will most likely draw a bar chart. But, when we want to draw attention to the proportion of frequencies in each category, then a pie chart is a likely the choice.

Actually, the bar chart is a graphical device for depicting data that have been summarized in a frequency distribution, relative frequency distribution or percent frequency distribution (Levine, Krehbiel and Berenson, 2003).

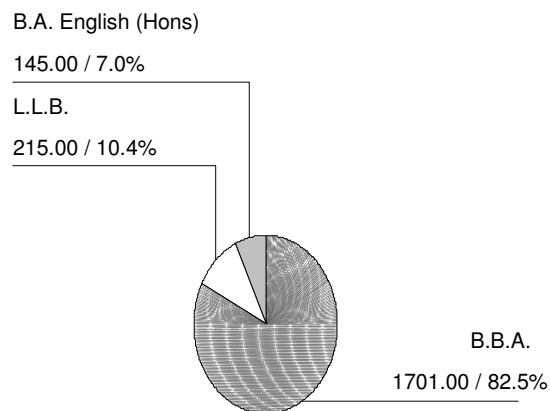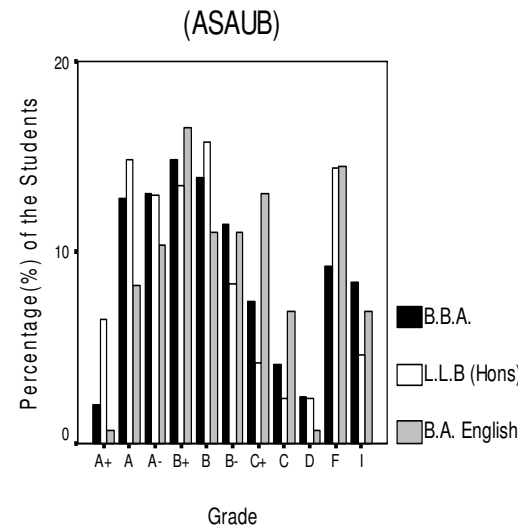Fig 1: Pie Chart for the Number of Student's in Different Programs

Fig 2: Bar Chart for the results of summer 2009

From fig (1), about 83 percent undergraduate students registered in ASA University Bangladesh are in Faculty of Business (summer 2009). So, on the basis of the quantity of the students, Department of Business Administration is the leading department in ASA University Bangladesh.

The Pareto diagram is a special type of vertical bar chart in which the categorized responses are plotted in the descending rank order of their frequencies and combined with a cumulative polygon on the same graph. The Pareto diagram is a very useful tool for presenting categorical data, particularly when the number of classifications or grouping increases (Levine, Krehbiel and Berenson, 2003).

Fig 3: Pareto Charts for the Evaluation of Student's Performance of ASAUB in Summer 2009

Program: B.B.A.

Program: L.L.B. (Hons)

Program: B.A. (Hons) in English
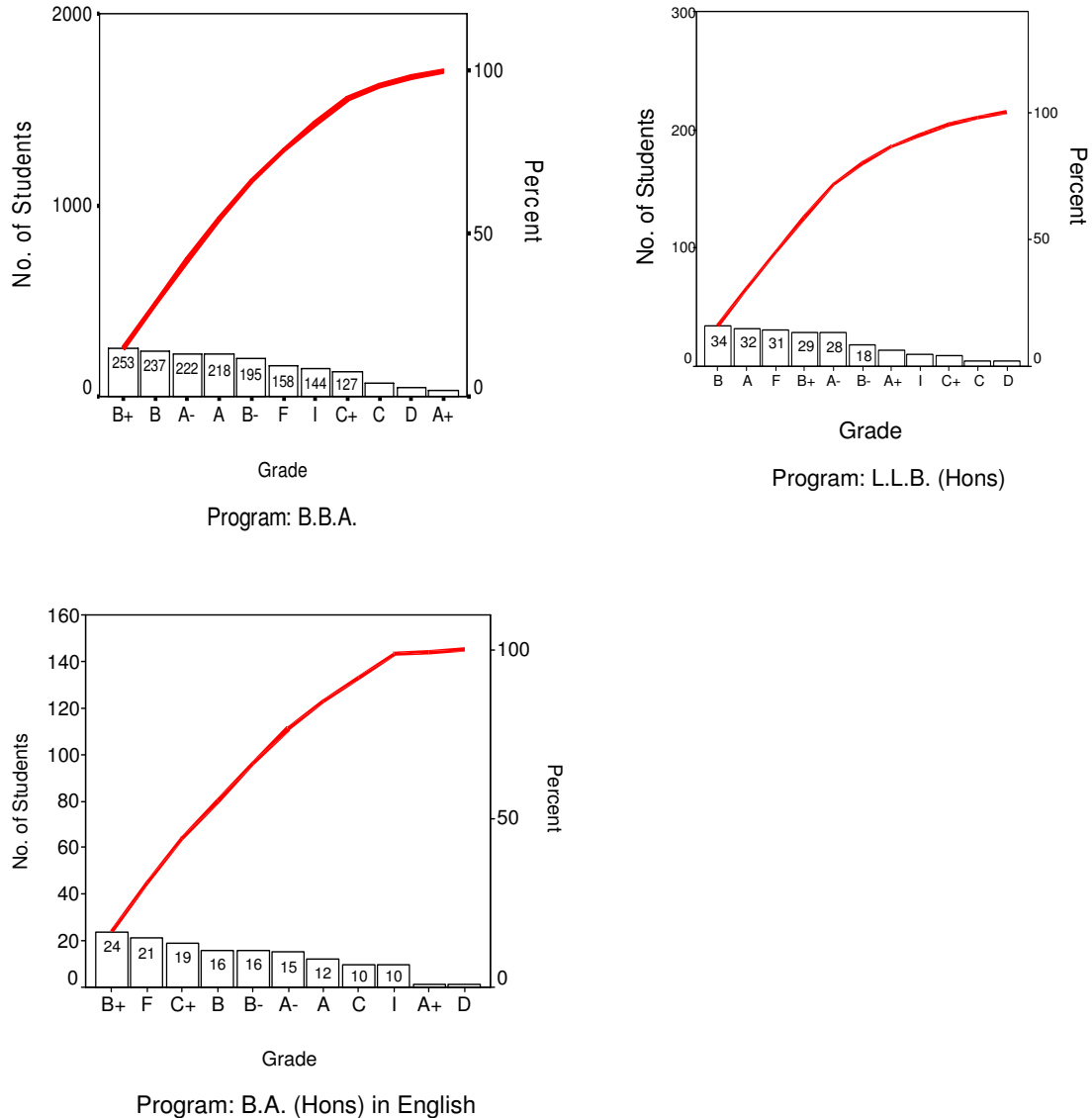
In fig (2) and (3), the last semester (summer 2009) results show that in the relative percentage of getting A+ L.L.B. students is slightly higher than others and in the relative percentage of the

failed or lower level students of L.L.B. and B.A. (Hons.) in English are similar and larger than B.B.A department. So, the average result of last semester in B.B.A. department is well.

1.5 Numerical Analysis about the Student's Performance in ASA University Bangladesh

The coefficient of variation is a relative measure of variability; it measures the standard deviation relative to the mean, expressed as a percent, it is especially useful for comparing the relative dispersion in two or more sets of data where (1) they are in different units or (2) one mean is much larger than the other mean (Levine, Krehbiel and Berenson, 2003). The coefficient of variation is computed as follows:

$$CV = \frac{S}{\bar{X}} \times 100$$

Table (1.1): Compare the performance of B.B.A. Students between Fall 2008 and Spring 2009

Characteristics	Spring-2009					Fall-2008				
	Batch					Batch				
	1	2	3	4	5	1	2	3	4	5
Average Grade Point, $\bar{X}$	3.41	3.50	3.54	3.21	3.38	3.42	3.52	3.57	3.35	3.43
Standard Deviation, S	0.40	0.36	0.29	0.61	0.52	0.40	0.29	0.30	0.30	0.34
Coefficent of Variation, CV (in %)	11.85	10.38	8.20	19.07	15.40	11.68	8.32	8.36	9.01	9.99

So, we can conclude that the 2nd Batch's overall result on fall 2008 was the best result among the five batches of ASAUB because they had the lowest coefficient of variation. But in, spring 2009, the overall result of the 3rd Batch was the best result among the five batches of ASAUB because they had the lowest Coefficient of Variation.

Table (1.2): Percentage (%) of number of students getting different grade point in different batch (Summer 2009)

Different Batches in B.B.A Program	Percentage (%) of number of students getting different grade point in different batch (Summer 2009) where total number of students is 1701.										
	A+	A	A-	B+	B	B-	C+	C	D	F	I
1	3.58	23.69	17.08	15.15	13.77	11.29	4.68	3.58	1.38	1.38	4.41
2	0	8.9	13.01	12.33	15.07	11.64	8.22	4.11	1.37	4.79	20.55
3	1.72	9.2	8.05	13.79	13.51	11.49	8.33	6.03	4.02	9.2	14.66
4	3.52	14.06	15.23	16.41	10.94	10.94	7.81	1.56	1.17	14.06	4.3
5	0.66	7.95	16.56	15.89	11.26	9.93	7.95	4.64	1.32	8.61	15.23
6	0.62	9.63	11.18	15.22	15.22	12.11	9.01	4.97	3.42	15.53	3.11
7	2.61	6.96	11.3	14.78	20.87	13.04	6.96	3.48	4.35	13.04	2.61

In this study, the typical findings are the performance of 1st batch is better than that of others in last semester and the performance of the 4th batch is gradually increasing (summer 2009).

1.6 Algorithm of Paired Wilcoxon Signed-Rank test

Suppose that a hypothesis test based on a paired sample is to be performed to compare the means of two populations. When deciding between the paired t-test and the paired Wilcoxon signed-rank test, the researcher should follow these guidelines:

- If the researchers are reasonably sure that the paired-difference variable is normally distributed, they should use the paired t-test.
- If the researchers are not reasonably sure that the paired-difference variable is normally distributed but are reasonably sure that it has a symmetric distribution, then paired Wilcoxon signed-rank test (Weiss, 2005) is used.

The algorithm for comparing two populations means, μ_1 and μ_2 is as follows:

- The null hypothesis is $H_0 : \mu_1 = \mu_2$ and the alternative hypothesis is -

$$H_1 : \mu_1 < \mu_2 \qquad\qquad\qquad H_1 : \mu_1 > \mu_2$$

   (left-tailed)   or   (right-tailed)

- Decide the significance level, α

- Calculate the paired differences of the sample pairs.

- Discard all paired difference that equal zero and reduce the sample size accordingly.
- Construct a work table to obtain the signed ranks of the paired differences.
- Compute the value of the test statistics, W= sum of the positive ranks and denoted the value W_0
- The critical value(s) are,

$$W_{1-\alpha} \qquad\qquad\qquad W_{\alpha}$$

   (left-tailed)   or   (right-tailed)

- If the value of the test statistics falls in the rejection region, reject Ho, otherwise, do not reject Ho.
- Interpret the results of the hypothesis test.

1.7 Hypothesis Testing

Let, μ_f indicates the average results of the undergraduate Students of ASAUB in B.B.A. Program on fall-2008 and μ_s indicates the average results of the undergraduate students of ASAUB in B.B.A Program on spring-2009. So, the hypothesis is-

$$H_0: \mu_f = \mu_s$$
$$H_1: \mu_f > \mu_s$$

Here, the distribution of the data is unknown and the data is collected by using random sampling. To compare the results between two semesters, we need to use Paired Wilcoxon Signed-Rank test.

Table 1.3: The Findings of Paired Wilcoxon-Signed Rank test

Batch	Result (W=Sum of the Positive Ranks)	Comments
1st	140.50	W(140.50) < $W_{\alpha=0.05}$ (150), Null Rejected, Fall-2008's result was **better** then Spring-2009
2nd	64	W(64) < $W_{\alpha=0.05}$ (79), Null Rejected, Fall-2008's result was **better** then Spring-2009
3rd	105	W(105) < $W_{\alpha=0.05}$ (150), Null Rejected, Fall-2008's result was **better** then Spring-2009
4th	131	W(131) < $W_{\alpha=0.05}$ (150), Null Rejected, Fall-2008's result was **better** then Spring-2009
5th	92	W(92) < $W_{\alpha=0.05}$ (150), Null Rejected, Fall-2008's result was **better** then Spring-2009

At 5% level of significance, there are enough evidence to conclude that the results of fall-2008 was better than the result's of spring-2009 for 1st, 2nd, 3rd, 4th and 5th batch.

1.8 Regression Analysis of the Student's Performance of ASAUB

The reputation of the university depends on their student's performance, intellectual resources (say, devoted academicians, talented researchers and scientists) and the student's administrative and academic facilities. In this study, a multiple regression model is proposed for student's performance (SP) with other factors. Generally, the quality of the students depends on several factors just like their family background, study time, group discussion, teacher-student relationship, language proficiency especially in English, lab and library facilities and so on.

The model related with student's performance is-
$$SP = f(SE, CT, GC, ASIC, AC)$$

Where, SP refers to the dependent variable student's performance and $SE, CT, GC, ASIC, AC$ refer independent variables skills in understanding English, counseling time with teacher, group discussions, achievement from the class and expenditure for assignment purpose respectively.

Table 1.4: Multiple Regression Analysis of the Students Performance of ASAUB

Dependent Variable: SP
Method: Least Squares
Included observations: $n = 195$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SE	0.019799	0.027382	0.723037	0.4706
CT	0.173426	0.060911	2.847232	0.0049
GS	0.117149	0.022346	5.242443	0.0000
ASIC	0.420738	0.071240	5.905948	0.0000
AC	0.000301	9.49E-05	3.177662	0.0017
C	2.604739	0.062176	41.89301	0.0000

R-squared	0.501779	Mean dependent var	3.374667
Adjusted R-squared	0.488598	S.D. dependent var	0.461282
S.E. of regression	0.329873	Akaike info criterion	0.650070
Sum squared resid	20.56631	Schwarz criterion	0.750778
Log likelihood	-57.38186	F-statistic	38.06987
Durbin-Watson stat	1.426822	Prob(F-statistic)	0.000000

On the basis of Table 1.4, the multiple regression equation for the student performance of ASA University Bangladesh is-

$$SP = 2.604739 + 0.019799 SE + 0.173426 CT + 0.117149 GS + 0.420738 ASIC + 0.000301 AC$$

Here, coefficient of multiple determination $R^2 = 0.501$ means that 50.1% of the total variation in student performance can be explained by the regression model. In further study, another significant variable need to be searched. The global test (F-statistic) suggests that all of the predictors in the model have significant effect on the response variable and find out that on an average students' performance may be increased on the basis of one unit increase of explanatory variable when other variables still hold as a constant.

1.9 Conclusion and Recommendations

Although the history of ASA University is not so long, it is improving gradually for its qualified helpful teachers, good management and well ambitious and industrious students. In this study, Paired Wilcoxon Signed rank test is used to compare the two semester results and find that in undergraduate level (Bachelor of Business Administration program) the average results of last semester is changed. This study also suggests that major factors related to student's performance are English proficiency, counseling time with teacher, group study, achievement from the class

and family background. To enhance the skill of English Language, University should take different steps such as making the debating club more active, encouraging students to communicate in English, and recommending teachers to deliver their lectures in English as far as possible.

To ensure the quality of the student, as a private organization, ASA University Bangladesh needs to consider the following recommendations:

- Growing awareness about the proper use of students' time in class room, home, lab and library;
- Establishing and maintaining a friendly student relationship among different departments;
- Attracting students to cultural sites and ethical background;
- Ensuring effective counseling in both academic and personal arena;
- Increasing necessary books in the library;
- Emphasizing more on the development of sound computer, social sciences programs and courses to improve the quality and standard of education;
- Developing a creative group discussion; and
- Emphasizing on the regular course work and expanding special courses and seminars on leadership.

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