The Impact of Past Education Performance on Grade Point Average in the Faculty of Social Sciences, University of Kelaniya, Sri Lanka.

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Abstract

A sample of 274 units from the Faculty of Social Sciences was selected using the random sampling method and a well-structured questionnaire was used to collect data. The survey was carefully designed to gather accurate data in an efficient manner. The GPA was considered the determinant of student's performance in the study. A descriptive analysis was conducted to identify the patterns of the data and the association of variables with the GPA. Mann Whitney U test and Spearman rank correlation test were used in the analysis. The results revealed that except Grade 5 examination results, both the results of the GCE O/L and A/L have a positive relationship with students' performance at the university.

Key Words: students' performance, GPA, higher education, secondary education.

1. Introduction

Higher education vests a society with a strong economic capability by producing a powerful labour force. University graduates play a major role in government and private sector employments in Sri Lanka. Therefore, the students' academic performance can be considered a better indication of the future development of the country. The performance of university students can depend on several factors such as university facilities, family background, past education performance and social impact and it can change due to numerous factors in various stages of student life. Previous studies (McKenzie and Schweitzer, **2001)** show that the past school performance has been one of major determinants of university students' performance**.** After primary, secondary and tertiary levels in school, the performance of a student in Sri Lanka is evaluated on grade point average (GPA) value obtained during their university studies. Hence, **this study focused on** the relationship between the students' GPA and the**ir past school examination** results.

This study was conducted to measure the impact of past education performance on GPA in the University of Kelaniya. Since the students' academic performance would change periodically, it is important for policy makers and administrators to identify the impact of past education performance on a university student's GPA and it subsequently helps authorities to facilitate and plan effective improvement of school education. Accordingly, the objective of this study is to identify whether there is an impact of students' past performances (Grade **5** scholarship, GCE O/L, GCE A/L) on Grade Point Average during university education.

Literature review

Majority of education institutes consider their productivity by students that will contribute to society. Since the productivity of university students is based on their academic performance, most of the researchers have used the grade point average (GPA) of students for their research studies as an ascertaining factor (McKenzie & Schweitzer, 2001; Erdem, et al., 2007; Mushtaq & Khan, 2012).Since the number of graduates are increasing in the job market, it is very hard to get an appropriate job with only having the knowledge. Employers mostly prefer professionals with a higher cumulative grade point average (Erdem, et al., 2007). Ali et al. (2009) have highlighted that social and economic development of a country is directly linked with students' academic performance. It is obvious that a highly educated human resource of a country makes a better future.

The study of McKenzie and Schweitzer (2001) has revealed that previous academic performance influence students' academic performance. The study has been conducted to investigate the academic, psychosocial, cognitive, and demographic predictors of academic performance of first year university students. The findings of the study are based on a sample of 197 students studying in the faculties of Science and Information Technology from a large urban computer-based university. A descriptive analysis, standard regression models and analysis of variance tables (ANOVA) have been used to identify the significant effect of the factors. Erdem, et al. (2007) have considered cumulative grade point average as an indicator of students' performance of Gasiosmanpasa University in Turkey. This study has been done to determine the socio-economic and demographic factors which have an impact on academic performance. Although, the previous academic performance and the score obtained from nationwide university entrance exam (OSS) been considered in the study, they were not significant in the analysis. Martha (2009) has examined the factors affecting the academic performance of undergraduates at the Uganda Cristian University for her dissertation related to the degree of Master of Arts. This study has investigated a sample of 340 undergraduates of the Uganda Christian University to investigate factors related to academic performance. Advanced level and diploma admission points, parents' socio-economic status and former school background have been identified as significant factors related to academic performance.

Background of the Study

There are six faculties in the University of Kelaniya: Faculty of Social Sciences, Faculty of Humanities, Faculty of Commerce and Management, Faculty of Science, Faculty of Medicine and Faculty of Graduate Studies. Out of these faculties, the Faculty of Social Sciences has the largest student population in the University of Kelaniya. The university's nine departments of study, i.e. Department of Archeology, Economics, Geography, History, Library& Information Science, Mass Communication, Philosophy, Sociology and Sport and Recreation Management, offer two types of B.A. degree programs, Special and General, with eighteen types of course units (University of Kelaniya, 2014).

The undergraduates are enrolled for Bachelor of Arts (General) degree in their first year and they are selected for a four-year Special Degree program in their second year, based on their Grade Point Average (GPA) achievement and the rest are selected for three year duration B.A. (General) Degree programs. The students who follow the General degree program can complete the program based on two or three major subjects.

Determining the University Students' Performance on Grade Point Average

Grade Point Average is calculated from dividing the total credits that are weighted on grade point values by the total number of credits. The students' academic performances are determined on their calculated GPA based on end semester examination results. The GPA is calculated by the university according to the obtained Grades and relevant Point Values as shown in the following table.

Table 1: Grade and point values for students' marks

Range of marks	Grade	Point Value
85 – 100	A+	4.0
70 – 84	A	4.0
65 – 69	A-	3.7
60 – 64	B+	3.3
55 – 59	B	3.0
50- 54	B-	2.7
45 - 49	C+	2.3
40 – 44	C	2.0
35-39	C-	1.7
30 – 34	D+	1.3
25 – 29	D	1.0
00 – 24	E	0.0

Source: Faculty of Humanities & Social Sciences, 2014

Most of the universities in the world use the GPA as a measurement of their students' performance. Nevertheless, GPA calculation methods vary by institutes, country or persons mainly based on the form of the weighting method.

By the universities, students are categorized or selected for the special academic programs such as special degree programs and awarding of classes is determined with all other graduation requirements based on their GPA value. As a performing indicator, GPA pays a key role in the university system in Sri Lanka. Similarly, the Faculty of Social Sciences, University of Kelaniya, uses the GPA value to select undergraduates for the special degree program and in the final year, the students who are following both general and special are awarded classes for their performance based on the GPA score and other requirements.

The total credit-weighted score will be divided by the total number of credits earned by the students to calculate the GPA. (Faculty of Humanities & Social Sciences, 2014)

$$\text{Grade Point Average (GPA)} = \frac{\text{Total credit-weighted Score}}{\text{Total no. of credits}}$$

Sampling and Data Collection

Simple random sampling method (SRS) was used to select the sample units because of it is thesuitable probabilistic sampling technique which applies when there is a homogeneous and has a list of all elements called sampling frame.

The following formula was used to determine the sample size considering the minimization of sampling error of simple random sampling method. (Thompson, 2002)

$$n = \frac{Z^2_{\alpha/2}\, pq}{e^2}$$

n = sample size

$Z^2_{\alpha/2}$ = the table value of Normal distribution at desired confidence level.

P = the population proportion of 3rd year students of Faculty of Social Sciences, University of Kelaniya,

q = 1– p

e = the desired level of precision.

The required data about the number of students in the faculty was obtained from the Dean's office of Faculty of Social Sciences, University of Kelaniya. According to that data, there were 611 number of 3rd year students in the faculty of social sciences while total number of students in the faculty was 2780.

Here, $Z_{\alpha/2}$ = 1.96 and e = 0.05 at 95 % confidence level. p = 611/ 2780 = 0.2198.

Then, the sample size was $n = \frac{1.96^2(0.2198)(1-0.2198)}{0.05^2} = \frac{0.6588}{(0.05)^2} = 263.51$

Therefore 264 students were selected into the study sample from 3rd year students using simple random sampling method.

Data were entered into the SPSS package with the help of a pre-prepared code book in order to enter the data. The data set had three continuous variables; O/L grade score, A/L GPA value and Z-score of students and one numerical discrete variable; A/L General Knowledge marks. Therefore, the total number of scale type variables was four. The rest of the variables were string type.

Test of the Assumption of Normality for Students' GPA Distribution

The test of Kolmogorov-Smirnov and Shapiro-Wilk were used to conduct a test of normality in SPSS software. The following hypotheses were tested in both normality tests.

H_o: The data come from a normally distributed population.

H_1: The data come from a population that is not normally distributed.

The both tests are sensitive to the size of the sample. Therefore, both the tests should always be used with the visual inspection of histograms and Skewness and Kurtosis measures. If the test is significant ($p < 0.05$) rejecting the assumption of normality for the distribution (Spinks & Canhoto, 2015).

According to Normal Q-Q plot, Detrended Normal Q-Q plot and the significant p-value of the test of normality, the null hypothesis was rejected under 1% level of significance.

Table 2: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Students' Grade Points Average	.169	264	.000	.828	264	.000

a. Lilliefors Significance Correction

Therefore, it could be concluded that the distribution of students' GPA is not normal. Considering this mater, as done in the descriptive analysis, the categorized students' GPA has been used as the response variable for the onward data analysis of univariate analysis and advanced analysis. Since the population did not have a certain distribution as normal distribution, then non parametric tests were used to analyze the data.

Since the study has focused on the university students' academic performance, it has considered the (categories of students' grade point average values) students' class division as the dependent variable for further studies. Therefore, a suitable non parametric test called distribution free test i.e. Spearman rank correlation test, Kendall's tau-c Rank correlation, Mann-Whitney U test, Kruskal –Wallis test, has been considered for the study.

Data Analysis

In this study data were collected from 264 students out of which 226 (85.61 %) were females and 38 (14.39%) were males. It was clear that in the Faculty of Social Sciences there are more female students than male students. The descriptive statistical analysis has been discussed under two sub- sections such as sample characteristics and the factors associated with students' grade point average (GPA).

Sample Characteristics

The total percentage of special degree students in the sample was 75.76%, while 24.24% were general degree students. It was clear that the percentage of special female students is higher in the sample. The number of the special students in the group of male students was also higher than the number of the general students.

Most of the students in the sample were Sinhalese and as a percentage, it was 96.97%. Nevertheless, among Sinhalese students, the percentage of female students in the sample was 83.71%while13.26% were male students. Also, there were 3.03% students from other ethnicity groups in the sample.

The highest percentage value 30.3% was in the Western Province while the lowest value 3.03% was shown in North Central Province. The inclusion of sample units from North western and Sabaragamuwa was higher than the other provinces. Except North and Eastern provinces, all other provinces had been represented by the sample.

Table 3: The distribution of students among the degree courses

Subjet	Frequency	persenta
Geography	40	11.49
Development Studies	31	8.91
Economics	30	8.62
Sociology	30	8.62
International Studies	27	7.76
Political Science	27	7.76
Mass Comunication	24	6.90
Sport and Recreation Management	23	6.61
Archaeology	19	5.46
History	19	5.46
Psychology	17	4.89
Library Science	14	4.02
Philosophy	13	3.74
Peace and Conflict Resolution	12	3.45
Social Statistics	11	3.16
Tourism and Cultural Resource Management	8	2.30
Computer Science and Statistics	3	0.86
Anthropology	0	0.00

Among the eighteen degree courses offered by the Faculty of Social Sciences, the highest number of students in the sample belonged to the Geography degree program. The students who were following Computer Science and Statistics were less while there were no Anthropology students in the sample. The distributions of the sample units among the degree courses were very similar to the target population.

Distribution of Students' GPA Value

Table 4: Statistics of the Students' GPA Value

Statistic		Value
Mean		3.372416
Range		1.6410
Std. Deviation		.4429722
Skewness		-1.236
Kurtosis		.419
95% Confidence Interval for Mean		
	Lower Bound	3.318734
	Upper Bound	3.426097
Quartiles	Q1	3.24
	(Median) Q2	3.54
	Q3	3.70
Minimum		2.24
Maximum		3.38

Since, the mean and standard deviation of students' GPA value were respectively 3.37 and 0.44, it was clear that the students' GPA values were high and they varied within a short interval. It was also proved by the negative Skewness value. Nevertheless, since the Kurtosis value was very small, it could be determined that the data have a flat distribution. There was a 95% confidence for the population GPA to be between the values of 3.31 and 3.42.

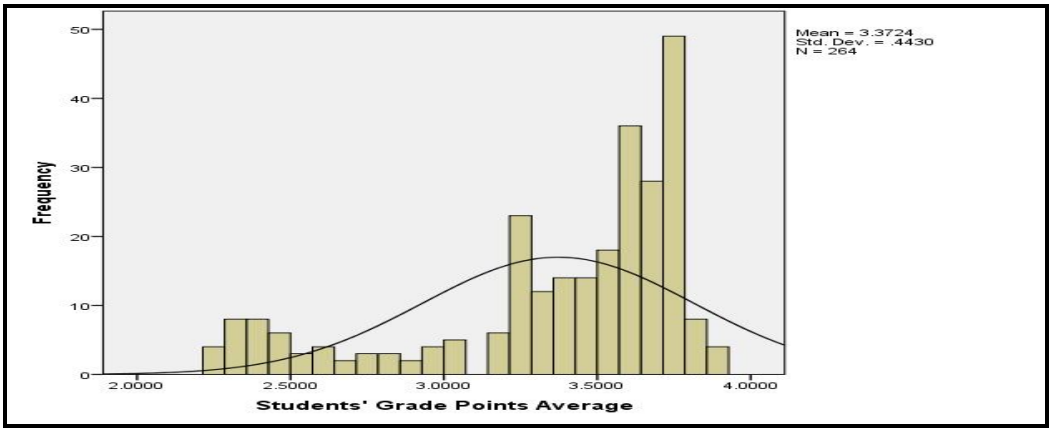

Figure 1: Distribution of Students' GPA value

According to the above figure, it was clear that the distribution of GPA is negative skewed and has a flat curve. Most of the students showed a tendency to have high GPA values. The classes have been created using the results available at this point of third year students. The distribution of the categorized GPA values under standard criterions; First class (GPA > 3.7), Second upper class (3.3<GPA>3.7), Second lower class (3.0<GPA<3.3) and General pass (GPA<3.0) are represented in the following figure.

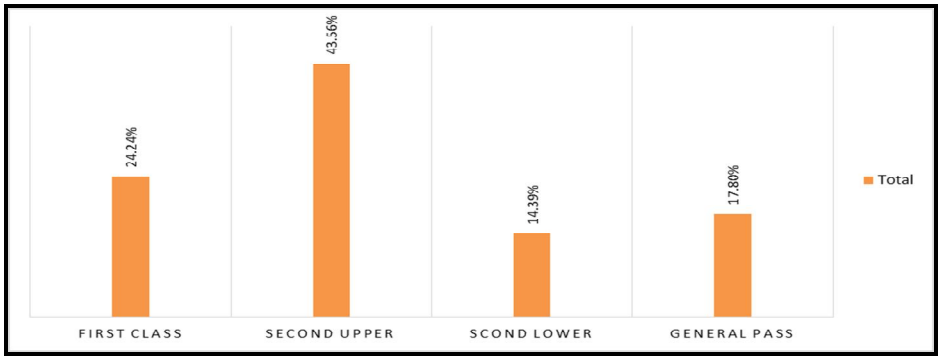

Figure 2: the distribution of categorized students' GPA

The figure shows that 24.24% students among the sample units have obtained first classes. The highest numbers of students have obtained second upper class division based on their grade point achievements. It was obvious that 67.8% students (179 number of students out of 264) in the sample have achieved (equal or greater than to 3.3 grade point value) first classes or second upper classes. The percentage of students having at least any class was 82.15%.

Tests of Normality of the GPA earned for GCE Ordinary Level (O/L) Examination (OGS), General Knowledge and Attitude Test Marks (GKM) and AL-ZScore

Table 5: Tests of Normality of OGS, GKM and AL_Zscore

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
The score earned for GCE Ordinary Level (O/L) examination (OGS)	.095	264	.000	.936	264	.000
General knowledge and attitude test marks (GKM)	.086	264	.000	.964	264	.000
AL-ZScore	.052	264	.077	.985	264	.008

It is important to identify whether the distributions of the OGS, General knowledge and attitude test marks have normally distributed or not. According to the statistical tests of Kolmogorov-Smirnov and Shapiro-Wilk, the OGS and General Knowledge and Attitude Test marks have rejected the hypothesis that the data come from a normally distributed population.

However, according to the test results of the above table, it was evident that the Z-score has normally distributed since the significant value of the test of Kolmogorov-Smirnov is greater than 0.05.

Association between GPA and Grade 5 Examination Results

The distribution of students in the fail category was narrower than pass category and it had a higher median in the distributions. Although the number of first class students was higher in the category of students who have passed grade 5 examinations, the total percentage of students in both the first and second upper classes was higher in the fail category.

Relationship between GPA and the score earned for GCE ordinary level examination

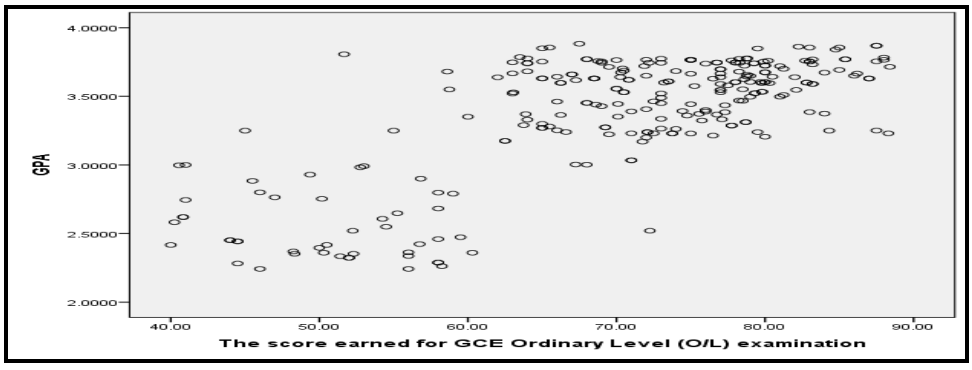

Figure 3: the relationship between the OGS and GPA

According to the above scatter diagram, there was a positive relationship between GPA and the score earned for GCE ordinary examination (OGS).

Relationship between GPA and the Z-score for GCE Advanced Level Examination

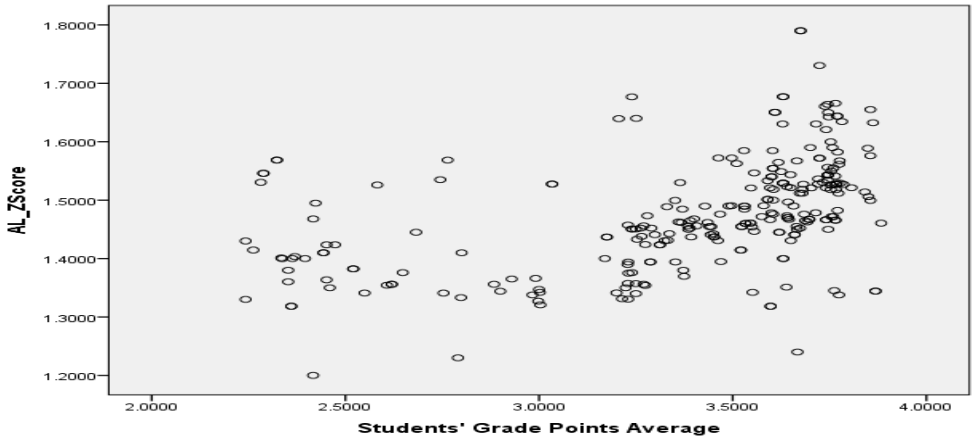

Figure 4: the relationship between the A/L Z-score and GPA

As illustrated by the scatter diagram above there was a positive relationship between students' GPA and the Z-score.

Relationship between GPA and the General Knowledge and Attitude Test Marks for GCE A/L Examination

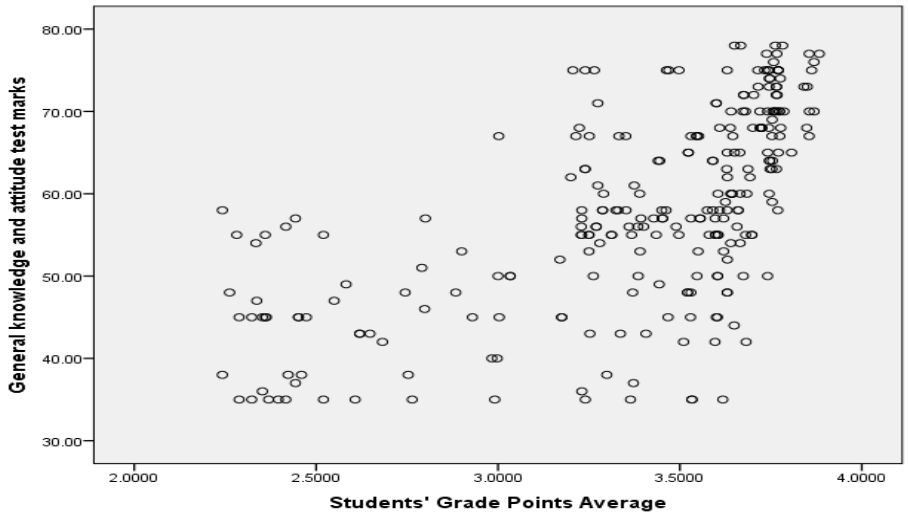

Figure 5: the relationship between the GKM and GPA

According to the above scatter diagram there was a positive relationship between students' GPA and general knowledge and attitude test marks.

Association between GPA and Office Bearers in School Society or Association

There was no significant difference of the GPA distributions between students who were office bearers and those who were not office bearers in the school. Nevertheless, the percentage of first classes was higher in the yes category while there were 42.8% of students of second upper class division in the no category. When considering the total percentage of first classes and second upper classes, there was no significant difference between the two categories.

Statistical Test Results

Mann-Whitney U test

The variables which have two populations were tested using Mann-Whitney test.

Hypothesis tested;

H_o: There is no association between students' class division and the predictor variable
H_1: There is an association between students' class division and the predictor variable

Table 6: Significance values under Mann-Whitney U test

Grade 5 examination result	0.4490

According to the results of this test there were no predictor variables significant at the 5% level of significance. It was clear that the predictor variable, Grade 5 examination result has no significant association with students' class division.

Spearman Rank Correlation Test

In this test, the association between students' class division and scale type of predictor variables was considered.

Table 7: Significance values under Spearman rank correlation test

The score earned for GCE Ordinary Level (O/L) Examination	.000
General Knowledge and Attitude Test Marks	.000
A/L Z-Score	.000

According to the above results table, it was obvious that "The score earned for GCE Ordinary Level (O/L) Examination", "General Knowledge and Attitude Test marks (GKM)" and "A/L Z-Score" are highly significant at the 5% level of significant. The score earned for GCE Ordinary Level (O/L) Examination (OGS) was a new variable instead of ordinary level examination results.

According to the test results, it could be identified that only four variables have been significant at the 5% level of significance among all variables.

The significant variables from the univariate tests under categories of factors were score earned for GCE Ordinary Level (O/L) Examination, General Knowledge and Attitude Test marks, A/L Z-Score.

Discussion and Conclusion

The objective of this study was to identify whether there is an impact of students' past performances on the GPA. These past performances were considered on the basis of their performance at the Grade 5 Examination, GCE O/L and GCE A/L. Grade 5 examination was assumed to be important to investigate in this study because it is the first competitive examination faced by the students at school level. However, when considering the results of the study, it was identified that the Grade 5 examination was not significant in relation to the students' performance at the university. In fact, the findings pointed out that although the percentage of first class students is higher in the category of students who have passed grade 5 examinations, in relation to the overall sample, the percentage of first class and second upper students is higher in the category of students who have failed the Grade 5 examination.

When considering the secondary education system, GCE O/L and A/L are very important examinations faced by the students and because of this importance; they too were examined in this study. The score earned for GCE O/L (OGS) examination and general knowledge and attitude test marks for GCE A/L examination (GKM) were not normally distributed according to the descriptive test results in the study. The students who obtained high level of Z-score for the GCE A/L are selected for the university entrance. Therefore, it could be identified that the Z-score for GCE A/L examination has distributed normally but within the maximum value 1.2 and minimum 1.79. Similarly, it was clear that they performed well in GCE (O/L) Examination, because visual inspection of histograms revealed that the distributions of OGS and GKM are negatively skewed.

According to the results of the study, there was a positive relationship between GPA and the score earned for GCE Ordinary Level Examination. Similarly, in relation to GCE A/L, there is a positive relationship between GKM and Z-score and the students' GPA. Since these tests at the A/L examination are the last performance indicators at school level before the university entrance, the fact that there is a positive relationship between them and the students' GPA is a significant finding in the study.

According to the analysis of the study, except Grade 5 examination results, the results of both the GCE O/L and A/L have a positive relationship with students' performance at the university which means the students overall past performances are important factors in their academic performance in the university.

For further investigation, it is important to conduct a future study to identify the impact variation of factors in critical stages in the primary, secondary and the university education on students' performance at the university.

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