Pre-University Exams Effect on Students GPA: A case Study in IT Department

Sarah Mohamed Hassan[a,*], Muna S. Al-Razgan[b]

[a]IWAN Research Group, King Saud University, Riyadh, Saudi Arabia
[b]College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia

Abstract

In the kingdom of Saudi Arabic (KSA) education community, especially in the secondary and tertiary, there are many arguments about the university admission criteria. Specifically the pre-university exams where in KSA they are GAT and AT. Many students have a very high score in the high school, but they did not enter the college they want because of the GAT and AT scores. In this paper, we applied regression techniques on datasets of graduate and undergraduate students to find if the pre-university exams have a real effect on the students' college GPA. We found that high school GPA effects the college GPA more than pre-university exams, and that the enrolled year has an unexpected effect on the college GPA. We also found that the mean of students' college GPA is decreasing by time.

1. Introduction

As the number of students graduated from secondary education has increased, the number of applicants at tertiary level increased. So, universities cancelled free entry policy and tried to find new ways to accept students. They tried to design admission rules that help in achieving education policy goals. Universities aimed to make acceptance fair, legitimate and stable, e.g. some countries combines SAT scores with student's scores at school and make an interview with the applicant. Other countries design the admission rules only on the student's performance in school or even make lotteries between the applicants[11].

In KSA, Pre-University exams include two tests: General Aptitude Test (GAT) and Achievement Test (AT). The first measures the general Mathematical and English skills of a student, checks the knowledge gained throughout her/his academic years and hence cannot be studied for over a short period of time nor practiced shortly beforehand. The Maths section includes trigonometry and basic calculations whereas the English one is basically comprehension and analogies (relationships). The second test targets a students understanding of the three sciences (Biology,

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* Corresponding author. Tel.: +966-54-094-0075 ; fax: +966-54-094-0075.
E-mail address: sarahmohamed91@gmail.com

Chemistry, and Physics) and Mathematics taken in the senior levels, which is generally, is taught in the governmental schools curriculum.

To understand the factors that lead to success or failure of secondary students, researchers had made many studies to determine the variables that are related to academic achievement[5]. For example: Early In 1975, Leanning has shown that ACT and SAT scores provide a good predictive validity of freshman GPA[6]. A research has been done to develop predictive equations for 18 college courses with ACT data from 1980 to 1984[7].

In 1991, another research has shown that models that uses either ACT or high-school grades alone do not predict as well as models that include both[8]. While in 1992, another research has found that SAT scores are related to college class rank and that high-school performance was not a significant predictor of college achievement[9]. Betts and Morrell have found that both SAT scores and high-school GPA are significant predictors of college GPA[10].

Finally, In University of Winnipeg, they found that there is a relation between student's high school scores and his university GPA and there are other factors play a significant rule in predicting the performance of the students in the university[2].

In this paper, we studied the admission criteria of King Saud University (KSU), College of Computer and Information Science at the Information Technology department (IT). Our goal is to find how much the pre-university exams affect the student GPA after graduation. The admission criteria for the IT department are combined as follow: 30% of the High School GPA (HS_GPA), 30% of the GAT score, and 40% of the AT score.

The rest of the paper is organized as follow: In section two, literature review for similar works is presented. In section three, we explain our methodology. Then, statistics and regression results are discussed in section four. Finally, a summary and conclusion are summed in section five.

2. Literature Review

In Damam University, a study have been applied using regression to explore if the entrance tests like General Aptitude Test (GAT), Achievement Test (AT) and high school GPA are correlated to the university GPA. They have found that the high school GPA and the entrance test were a significant predictors of cumulative GPA. However, the entrance test were more predictive in Medical Science College than the Humanities College[3].

Moreover in Turkey, students have to take a centralized and standardized placement test before entering the secondary education institution. Scores of this tests are combined with other factors to determine the final placement scores of the Secondary Education Transition System SETS. Researchers have used different data mining methods to determine important factors that affects in their final score. They have found that the students who are successful in taking centralized test previously are more likely to be successful in scoring high for the SETS[5].

In university of South Carolina, The relation between college GPA and high-school rank, High School GPA, and SAT scores have been studied. Also, they have investigated the relation between more attributes like gender, color and rank to the college GPA. From regression model, they have found many conclusions regarding the parameters, but in general they found that including SAT in admission criteria predicts a higher college GPA[4].

3. Methodology

3.1. Gathering and Pre-processing the dataset

Gathering and collecting the desired dataset for further analysis is an essential task for any data mining analysis. The following steps were used to pre-process our dataset:

- Request the dataset from the administration.
- Clean the dataset by identify the attributes needed for regression models such as (University GPA, High school GPA, GAT, AT, Graduation year, registration year and enrolled class) and omit the anomalies from the data like missing, incorrect or odd values.
- Represent the data in the format of the tool we will use 'Weka'.