

## INDICATORS OF STUDENTS' SUCCESS AT HIGHER EDUCATION INSTITUTIONS

Heba Khoshaim<sup>1\*</sup>, Tasneem Ali<sup>2</sup>

<sup>1</sup>Asst. Prof. Dr. Heba Khoshaim, Prince Sultan University, Kingdom of Saudi Arabia, hkhoshaim@pscw.psu.edu.sa

<sup>2</sup>Asst. Prof. Dr. Tasneem Ali, Prince Sultan University, Kingdom of Saudi Arabia, tali@pscw.psu.edu.sa

\*Corresponding author

### Abstract

Higher education institutions evaluate new applicants using pre-attained educational measurements, such as high school Grade Point Average (GPA) or scores of accredited standardized test. Based on such measurements, students will be accepted or denied acceptance to universities and colleges. Although there is no unified agreement among higher education institutions on what kind of measurements should be used in the admission processes, all aim to select those who are expected to succeed in their academic programs. In other words, admission criteria should be valid indicators of students' readiness or future performance. The reported study here looked at the validity of admission criteria of Prince Sultan University in Riyadh, Saudi Arabia. This study examined three explanatory variables as predictors of the Grade Point Average (GPA) of students at the end of their first year in the university. It was concluded that the regression model explained up to 34% of the variation in first year GPA. Moreover, each of the three variables is considered statistically significant, except that the influence of high school GPA is bigger than the influence of the national standardized test used in the Kingdom of Saudi Arabia. On the other hand, when the dummy variable—gender—is excluded from the model, only 27 % of the variation in first year GPA is explained.

**Keywords:** Higher education institutions; admission criteria; standardized tests; grade point average; preparatory year program

### 1 INTRODUCTION

Higher education institutions use admission criteria as indicators to select the most suitable students for their academic programs. Applicants who are interested to join higher education institutions should submit academic documentations as evidence of their academic status. This includes, but is not limited to, high school Grade Point Average (HS-GPA) and national and international standardized test scores. Researchers and educators around the world assess admission criteria to ensure that these are true indicators of students' readiness. In many cases, admission criteria have been shown to predict students' success in their first year at colleges; for example, the standardized test *Scholastic Assessment Test* (SAT) has been supported as a predictor of students' success in higher education institutions in the United States of America (Geiser & Studley, 2002; Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008; Patterson, Mattern, & Kobrin, 2009). Nevertheless, such criteria have suffered from educational criticisms (Maruyama, 2012) and more research is needed to support the selection process for higher education institutions.

Prince Sultan University (PSU) is a private institution located at the capital city of the Kingdom of Saudi Arabia. PSU inspires to "become the leading non-profit, private university in the Middle East, providing a quality education equal to other reputable universities in the world" (PSU Vision statement). As a process to reach its goal, PSU admits students based on three factors: High school *Grade Point Average* (HS-GPA), the national standardized *General Aptitude Test* (GAT) score, and PSU Admission test. By using such criteria, PSU aims to improve and support the process of selecting newly admitted students. Admission criteria intend to minimize the number of high school graduates who struggle in PSU classes and admit

those who will likely to succeed in completing PSU academic programs. In addition, all newly admitted students to PSU must complete the Preparatory Year Program (PYP). PYP is one year of preparatory courses that prepares students for their college level courses in the academic programs. This year provides students with knowledge and counseling to support their success in their new educational environment. The PYP specifically aims to strengthen students' proficiency in English and other basic subjects, such as mathematics and health education.

## 1.1 Research Problem

Admission criteria of any higher education institution aim to select appropriate students to its academic programs. For PSU, admission criteria have been mainly HS-GPA, GAT score, and PSU admission test. When looking at various Saudi public universities, student's HS-GPA and standardized test GAT have been shown to correlate with their first year GPA at the university they are joining (AlQataee & AlHarbi, 2012); Yet, many PSU students struggle in the Preparatory Year Program (PYP). Although around 50% of PSU newly admitted students score > 70/100 in GAT and more than 90/100 in HS-GPA (batch of 2010–2011; 2011–2012; 2012–2013), many of them fail to complete all its requirements within the specified time—one full academic year. It was noted specifically that PYP mathematics courses prevents students from being upgraded to Freshmen level. Several students succeed in completing all PYP requirements and fail to be upgraded to Freshmen level because of one of the mathematics courses. Statistical reports of previous years showed that the failing percentage of PYP mathematics courses reached 30%. On the other hand, a number of students fail to complete PYP in one year due to health education courses or deficiency in the English courses. In addition, AlQataee and AlHarbi study did not include PSU as part of its sample. Hence, it's crucial to understand if the results of their study hold when PSU students are the population of interest.

## 1.2 Objective and Significance of the Research

One of the goals of this research was to assess whether admission criteria at Prince Sultan University are good indicators of students' performance during the preparatory year program. This study informed and updated the knowledge about the effect of HS-GPA and GAT in predicting students' performance in PYP. Now that PSU passed its 10<sup>th</sup> anniversary, and is the first fully accredited private institution in the Kingdom of Saudi Arabia, the findings of such research are critical. The findings helped us understand the significance of PSU admission criteria and the extent of its success in selecting students who most likely will complete PYP courses. This study is significant especially because no previous research has looked at the prediction relationships among admission criteria and students' success in PSU. There is, however, some previous research that measured HS-GPA and GAT as predictors of first year at colleges using a sample of Saudi Universities (AlQataee & AlHarbi, 2012), not including PSU. Nevertheless, the number of studies that looked at the validity of admission criteria at higher education institutions in Saudi Arabia is limited, in which the finding of the current study will enrich the knowledge base on such issue.

This research used regression models to measure the correlations and prediction relationships between admission criteria and Grade Point Average of first year of PSU students. It is important to mention here that PSU admission test was not used in the regression model for two reasons: (1) starting the academic year 2011–2012, PSU started an intensive language program. The intensive program is one academic semester, additional to the PYP, given to those who score < 40 in the admission test. Hence, PSU admission test is being used as a placement test to the appropriate level of English Proficiency. (2) This study aims to add to the knowledge base of research that addressed such issue especially that the two focal admission criteria used in Saudi Universities are HS-GPA and GTA score

Some of the questions that this study addressed are:

- 1) To what extent high school Grade Point Average (HS-GPA) and the General Aptitude Test (GAT) are true predictors of students' success at PYP?
- 2) Is HS-GPA a statistically significant predictor of PYP-GPA when other explained variables are controlled?
- 3) Is GAT a statistically significant predictor of PYP-GPA when other explained variables are controlled?

## 2 LITRETURE REVIEW AND HISTORICAL BACKGROUND

Colleges and universities across the world strive to understand factors that could give an indication of students' success if they are accepted in their academic programs. Such indicators might help them better choose their newly admitted batch. Such indicators will be specifically important when higher education institutions face the problem of many students struggling to complete their academic programs (AlMoshari AlSaud, 2012). Therefore, higher education institutions use assessment tools to measure the academic competence of new applicants.

## 2.1 Academic Indicators of students' readiness

One of the academic indicators that have been investigated as a predictor of students' performance in colleges is High School Grade Point Average (HS-GPA) (Camara & Echternacht, 2000). In fact, the relationship between HS-GPA and students' success in higher education institutions is a well-known, highly researched topic (Zwick & Sklar, 2005). Some studies looked at special programs in high school, such as the *Advanced Placement* (AP) program (Shaw, Marini, & Mattern, 2012). The finding of many of these studies have suggested that students with high HS-GPA are more likely to succeed at the college level than students who have already struggled during high school. These results led to high school GPA to be among the factors that determine college admission in most higher education institutions around the world.

Standardized large-scale tests are other evidences of students' success and readiness in colleges. A widely used example is the *Scholastic Assessment Test* (SAT) and the *American College Test* (ACT) in the United States. Over many decades, thousand of studies have shown the validity of the SAT test to predict students' performance in colleges (Geiser & Studley, 2002; Kobrin et al., 2008; Patterson et al., 2009, Sackett, Kuncel, Arneson, Cooper, & Waters, 2009). For example, Sackett et al. reported .47 correlation between SAT and FY-GPA. In addition, there are similar tests in most countries in the world, such as the *National College Entrance Examination* in China, the *Baccalauréat* in France, the *General Certificate of Education Advanced Level (GCE-A Level)* in the United Kingdom, *The National Center test for University Admissions* in Japan, *Öğrenci Seçme Sınavı* in Turkey, and the *GAT* test in the Kingdom of Saudi Arabia. The expectation is that standardized tests will improve the process of selection and placement for higher education institutions and will predict students' performance when they move to higher education. The results of the tests will give data on students' readiness and hence minimize, or eliminate, students struggle in higher education institutions.

Most of the standardized tests used as an indicator of a student academic standard focus on accumulative knowledge in addition to students critical, analytical, and logical thinking (AlQataee & AlHarbi, 2012). Moreover, in most of these tests mathematical ability is one main specification that is measured (AlQataee & AlHarbi, 2012; NCAHE, n.d.; Gierl, Tan, & Wang, 2005). Generally, there are separate sections of mathematics, and reading and writing skills. SAT for example, consists of two parts, one of them evaluate students ability to reason, analyze and reflect in mathematical problems in all areas such as algebra, geometry, and statistics (SAT<sup>®</sup>, n.d.). Likewise, in a factor analysis study, Kojiro, Tatsuo, Shin-ichi, Masaaki, and Haruo (2007) concluded that the two factors structures in the National Center Test in Japan are Linguistics and Mathematics. Similarly, the GAT test measures these skills (AlQataee & AlHarbi, 2012).

An educational test is a mechanism that provides information about students' knowledge and aptitude. Standardized tests are educational assessment given under homogeneous conditions, and usually have a huge impact on students' academic future. Therefore, Wilson (2007) emphasized that the technical aspects of the tests need to be paid attention. Wilson defines validity of the test as "the degree to which the inferences made on the basis of the assessment are meaningful, useful, and appropriate" (p. 1103). Accordingly, scholars around the world are continuously measuring the validity of such tests (AlHarbi, 2012). Moreover, to support the validity of admission criteria, many higher education institutions around the world use both HS-GPA and standardized tests as indicators of college readiness. In fact, many studies have supported the validity of standardized tests in congruence with HS-GPA and showed their credibility in providing data about students level and abilities (Kobrin et al., 2008; Kobrin, Sinharay, Haberman, & Chajewski, 2011; Ewing, Huff, Andrews, & King, 2005). Kobrin et al. (2008) study is a wide study that used the data of 140,919 students from 109 four-year institutions in the United States of America. These institutions submitted the 1<sup>st</sup> year performance results of the 2006 batch. HS-GPA was self-reported, which has shown to be quite accurate (Baird, 1976; Kuncel, Credé, & Thomas, 2005). Kobrin et al. study examined the predictive validity of the SAT results score, and the HS-GPA to first year GPA (FY-GPA).

AlQataee and AlHarbi (2012) is a wide national study, similar to Kobrin et al. (2008) study, which examined GAT as a predictor of students' success in Saudi universities. The researchers used a random sample of 50,875 male students from nine Saudi universities. The researchers used multiple correlation, reporting both Pearson  $r$  and corrected Pearson  $r$ , to measure the prediction relationships among the predictors and the independent variable—first year GPA. It was noted that the corrected correlation between HS-GPA and FY-GPA (.59) is slightly higher than the corrected correlation between GAT and FY-GPA (.53). Some studies used the accumulative score of the standardized test (e.g. Kobrin et al., 2008), while others looked at the sub-score of the test as a separate indicator (e.g. Kobrin et al., 2011). Kobrin et al. (2011) looked at the math, writing, and critical reading as separate predictors in the regression model. Kobrin et al. (2011) reported .47 correlation between Math-SAT and FY-GPA and .54 between HS-GPA and FY-GPA. Some other researchers considered special programs, such as business students or science students (Rohr, 2013). Rohr examined if admission criteria, including SAT scores, predicted students' performance when

looking at students in certain programs, such as science, technology, engineering, mathematics, and business. Using 803 students and regression analysis, the author concluded that such criteria were predictive of students' performance and would support students to complete their academic programs.

## 2.2 What is a better indicator for Success in Higher Education Institutions?

The demand and use of standardized tests increase everyday. Back in 1950s, only few students took the SAT; however, over 1,000,000 took the test around the world in 1997 (Madaus, Clarke, & O'Leary, 2003) and 1.66 million took it in 2012 (SAT, n.d.). Nowadays, most higher education institutions use standardized test score for admission selection (Patterson, Mattern, & Swerdzeskwi, 2012). Despite the results of many studies about the validity of standardized tests, using standardized tests as measurement for college admission has suffered considerable criticisms in Saudi Arabia and around the world (AlDakheel, 2012), and is continuously under recommendations for revision (Wiley, Shavelson, & Kurpius, 2014). One reason is the huge weight and impact such tests have on students future. When we test students, we are not literally interested in students' responses, but rather in what we can infer from these responses with regard to students' knowledge and understanding (Wiliam, 2010). In that, standardized tests that are used as admission criteria are influential and critical practice as they are used as assessor factors of what a student can achieve. Competitive students who are eager to be admitted in highly qualified institutions tend to take the standardized more than one, hoping of getting a better score (Patterson et al., 2012). That is why they are called *high-stakes* tests. To add more, high-stakes tests might also affect teachers' practice (Wilson, 2007). In many countries and in case there is only one standardized test that will be used for college admission, and when dealing with Grade 12 students, teachers basically teach for the test (Er, 2012). If this is not the case, then families will look for private tutoring, making such test a huge impact and burden on parents. In Turkey for example, an average of 15 % of a family income could be spent on private tutoring so that children who are ready to graduate from high school could get a chance in higher education institutions (Er, 2012).

In the United States, some critics claimed that standardized tests measure the socioeconomic status of students not their knowledge or readiness for college (Sackett et al., 2009). The National Association for the Advancement of Colored People (NAACP) has accused high-stakes and standardized aptitude tests to be unfair and called for not using such measurements to determine students' admission in higher education (Blair, 1999). This is because the findings of the standardized tests could be affected by other than academic factors (Zwick & Sklar, 2005), such as ethnicity. Other research supported that personality factor is even a greater influence than standardized test in predicting students success (Wolfe, 2005). On the other hand, other studies have compared high school GPA with other measurements, such as standardized tests (e.g. ACT, SAT), to conclude that HS-GPA was a better indicator (Camara & Echternacht, 2000; Noble, 2004). One of the good reason that support such claim is that test anxiety, stress, and motivation, especially with low performing students, might severely affect a student's performance during a test (Liu, Bribgeman, & Adler, 2012; Paris, Lavvton, Turner, & Roth, 1991; Ryan et al., 2007). This hence might lead to in-valid results.

Moreover, some researcher argue that even though high school assessments vary across schools, high school GPA is surely the most crucial indicator of college readiness; standardized test should be a supporter only (Atkinson & Geiser, 2009). Educational studies conducted for more than 50 years proved the validity of high school GPA over standardized test scores as the most important factor that should be considered for new applicants (Atkinson & Geiser, 2009; Zwick & Sklar, 2005). Main reason could be that standardized tests focus only on a student's performance on an exam for 3–4 hours, whereas high school GPA is a reflection of what student's know or understand over few years.

Nevertheless, to some universities, HS-GPA is also not a fair indicator. Because the GPA is school-restricted to a great extent and it depends on lots of factors—including instructors, recourses, and assessments tools used in each school—standardized test should be weighted more than high school GPA. In other words, standardized tests are trusted more to be an accurate indicator of a student level, and hence, cannot be ignored. Moreover, some researchers suggested that HS-GPA is a good predictor for first year GPA but standardized tests is a better predictor when it comes to evaluating students' readiness in certain subjects (Maruyama, 2012), such as mathematics. Others have argued that HS-GPA is a better indicator of graduation rate than standardized tests (Bowen, Chingos, & McPherson, 2009). However, high school GPA still is a major criterion for college acceptance. Hence, many institutions choose to use both standardized tests and HS-GPA to measure students' academic abilities.

## 2.3 Admission to Higher Education Institutions in KSA

In the Kingdom of Saudi Arabia, and for many years, educators and policy makers believed that high school

grade point average (HS-GPA) was *the only* fair measurement for selection in university admission. At that time, and unlike the United States and other countries, all Grade 12 students took the large-scale standardized high school graduation exams that covered all subjects taught in Grade 12. Such exams were based on unified national curricula for all K-12. KSA educators, like other international researchers (e.g. Linn, 2009), believed that if students are studying the same curricula, then it is eligible to give them all a unified measurement in a form of a national test that will be linked directly to college admission. However, for more than a decade now, researchers had suggested that the level of high school graduates is weak to succeed in higher education, especially that most students are used to memorizing formula and are not trained to solve problems that require high cognitive skills (AlSaeed, 2012). AlHarbi (2012) concluded that specifically in mathematical topics, high school graduates are found deficient when it comes to high cognitive skills or abstract thinking. In 2000, a large-scale standardized test, given by an independent organization, was established as an approach to develop a selection process. The National Center for Assessment in Higher Education (NCAHE) is a national center that aims to improve education by establishing an effective assessment process (NCAHE, n.d.). NCAHE designs tests that could be used for better selection for college admission. It aims "to detect the student's potential abilities and academic skills in the fields of Language, Mathematics, Science, and some creativity aspects" (NCAHE, n.d.). NCAHE provides several kinds of tests to measure language proficiency (Arabic and English), academic skills, and eligibility for teaching license. The two tests that are used for higher education admission are mainly: the General Aptitude test (GAT), which focuses on students' ability to critique, analyze, and interpret information, and measures cognitive skills and logical thinking; and the Standard Achievement Admission Test (SAAT), which measures students' knowledge (or educational attainment) on different subjects (NCAHE, n.d.). Admission to most higher education institutions in the Kingdom now depends not only on high school GPA, but also on the result of the tests provided by NCAHE.

### 2.3.1 The context in PSU

PSU also uses HS-GPA and GAT results as criteria for admission, in addition to PSU admission test. It is important to mention here, though, students' results in HS-GPA does not always match the results in the GAT test. For example, among the 2012–2013 male batch admitted to PSU, 64% had 90 and above in HS-GPA, whereas, only 8% had 90 and above in the GAT test and 61% had 70 and above in the GAT test. Similarly, among the 2012–2013 female batch admitted to PSU, 69% had 90 and above in HS-GPA, whereas, only 2% had 90 and above and 61% had 70 and above in the GAT test (PSU statistical reports). This could be a result of high school education focuses on memorizing formula and facts and not given attention to problem solving or critical thinking (AlSaeed, 2012), which are major character of the GAT. Moreover, starting 2012, PSU admission test is being used as a placement test to the appropriate level of English courses; a student's score is used for the placement in the appropriate level rather than a criterion for admission to PSU. Meaning, students with very low score in the admission test could be given conditional admission providing the completion of an Intensive English program for one full academic semester. Recently, in 2012–2013 school year, PSU raises its admission requirements with regard to the College for Women; admission was restricted to those who have achieved at least 90% in HS-GPA and at least 70% in GAT.

## 3. METHODOLOGY

This study focused on the effect of admission criteria at Prince Sultan University on the overall academic performance of PYP students using two explanatory variables: HS-GPA and GTA. The researchers used regression models to measure the correlations and prediction relationships between admission criteria and Grade Point Average of PYP students. The targeted population of this research is PSU students and the data were obtained from the Deanship of Admission and Registration. The initial sample consisted of 1426 newly admitted PSU male students and 1253 newly admitted PSU female students for the academic years 2010–2011, 2011–2012, and 2012–2013. The sample has been divided in two strata: male and female students for better representation of the two groups. Hence, stratified random sampling method was used. Screening of the data was performed to exclude all none applicable cases. For example, students admitted in the *Law, Applied Linguistic, or Translation* programs were excluded because the PYP for such programs is different from the PYP for all other programs focussing on special courses given only to those applying for Law (or applied linguistic or translation) respectively. Moreover, withdraw students or those who did not complete the PYP by the time the data was obtained were also excluded from the sample. In addition, international high schools graduates who did not submit the GAT score were not considered. After screening of the data, the analyses were performed on a sample of 749 female students and 455 male students.

The statistical assumptions were tested to fit the model of regression. Graphical and numerical measures descriptive statistics were used to best represent the sample data. Mean, standard deviation, range and other suitable measures were computed for all the variables of PSU students both female and male students.

#### 4. RESULTS

This section reports on some primarily results of a study that looked at the admission criteria that could be predictors of students' success of the *Preparatory Year Program* (PYP) at Prince Sultan University. Using Excel STAT PLUS and XLSTAT, correlation and regression analyses were done on the sample of size 1204 data values considering PYP-GPA as dependent/explained variable and HS-GPA, GAT and Gender as Independent/explanatory variables. Gender was used as a Binary variable having

$$\begin{cases} X_3 = 1 \text{ if female} \\ X_3 = 0 \text{ if male} \end{cases}$$

Table 1 below shows the correlation coefficient matrix between any two possible variables. Since the correlation  $r$  between PYP-GPA and HS-GPA is the same as  $r$  between HS-GPA and PYP-GPA, only the bottom triangular portion of the matrix is given. It is clear from the table that there are moderate to weak upward positive correlation between all two possible combination of variables, which means that as one variable increases, others also tend to increase. For example, the correlation between PYP-GPA and HS-GPA shows a value of  $r = 0.4916$  having a moderate positive relationship between these variables. Similarly, the correlation  $r = 0.3756$  between PYP-GPA and GAT exhibits a positive weak relationship between these two variables. Gender and GAT, however, show negative correlation, which means that for female students GAT tends to decrease as compare to male students GAT.

Table 1. Correlation Matrix

	PYP-GPA	HS-GPA	GAT	Gender
PYP-GPA	1			
HS-GPA	0.49161	1		
GAT	0.3756	0.4461	1	
Gender	0.2529	0.0529	-0.1554	1

In addition, Table 2 and Table 3 below show the results when testing the overall usefulness of the model at 5% level of significance. Table 2 shows the regression statistics of the model. The "*Adjusted R Square*" tells that nearly 34% of the variation in PYP-GPA are explained by HS-GPA, GAT and Gender. In fact, the three explanatory variables are 34% responsible for the variation in PYP-GPA.

Table 2. Regression Statistics of the Model

Regression Statistics	
R	0.5863
R Square	0.3438
Adjusted R Square	0.3421
Standard Error	0.6247
Total Number Of Cases	1204

Moreover, Table 3 indicates that the p-level is less than the level of significance, so the null hypothesis is rejected and it is concluded that the model is overall useful in explaining the variation in PYP-GPA.

Table 3. Regression Model Analyses

ANOVA					
	d.f.	SS	MS	F	p-level
Regression	3	245.3312	81.7771	209.5506	<.05
Residual	1,200	468.2999	0.3903		
Total	1,203	713.6311			

Using Table 4, from first column, the two estimated regression models with same slopes, but different intercepts, can be written depending  $x_3 = 0$  (when a student is male):

Table 4. Individual Test of Usefulness of Explanatory Variables Using t Statistics

	Coefficients	Standard Error	LCL	UCL	t Stat	p-level	H0 (5%) rejected?
Intercept	-2.765	0.2472	-3.3409	-2.1891	-11.1835	<.05	Yes
HS-GPA	0.0404	0.0029	0.0336	0.0473	13.7536	<.05	Yes
GAT	0.0200	0.0021	0.0152	0.0249	9.6059	<.05	Yes
Gender	0.4343	0.038	0.3459	0.5227	11.4441	<.05	Yes

$$\text{PYP-GPA} = - 2.7650 + 0.0404 * \text{HS-GPA} + 0.0200 * \text{GAT} + 0.4343 * (0)$$

Hence,

$$\text{PYP-GPA} = - 2.7650 + 0.0404 * \text{HS-GPA} + 0.0200 * \text{GAT}$$

However, when  $x_3=1$  (the student is female)

$$\text{PYP-GPA} = - 2.7650 + 0.0404 * \text{HS-GPA} + 0.0200 * \text{GAT} + 0.4343 * (1)$$

Hence,

$$\text{PYP-GPA} = - 2.3307 + 0.0404 * \text{HS-GPA} + 0.0200 * \text{GAT}$$

As it can be seen, incorporating the dummy variable affects the regression intercept only.

The table indicates that individually all three explanatory variables are useful in explaining the variation in PYP-GPA.

Interpreting the co-efficient of HS-GPA, GAT, and Gender from the estimated model we can see that for every one unit increase in HS-GPA there is an increase in PYP-GPA by 0.04 score holding other two variables constant. Moreover, for every one unit increase of score in GAT there is an increase in PYP-GPA by 0.02 units of GPA, holding other variables constant. In addition, female students score an average of 0.43 GPA higher than their male students, holding other variables constant.

On the other hand, when the regression model considered only the two admission criteria HS-GPA and GAT ignoring Gender, we found that the “Adjusted R Square,” tells that nearly 27% of the variation in PYP-GPA can be explained by HS-GPA and GAT. The standard error = 0.66 is slightly higher than the standard error = 0.63 for the regression model with three explanatory variable including Gender, which shows that Gender is a variable appropriate for the model.

## 5. CONCLUSION

Most higher education institutions use some kind of measurements to decide whether applicants are suitable for their institutions; nevertheless, there is no unified approach or general agreement on criteria that are used as evidence of students’ readiness (Maruyama, 2012). The agreement though, is that criteria used for admission should be valid indicators. The reported study here looked at admission criteria of Prince Sultan University in Riyadh, Saudi Arabia. This study examined three explanatory variables of the Grade Point Average of students at the end of their first year in the university. It was concluded that the regression model explained up to 34% of the variation in PYP-GPA. Moreover, each of the three variables is considered statistically significant, except that the effect of HS-GPA has a bigger influence than GAT. On the other hand, when only HS-GPA and GAT are used as predictors, the regression model explained only up to 27% of the variance in PYP-GPA.

It is interesting to note that although the model was seen to be significant in predicting PYP-GPA, it was less effective than what AlQataee and AlHarbi (2012) reported. AlQataee and AlHarbi (2012) reported up to

59% explained variation by HS-GPA and GAT, whereas HS-GPA alone explained 53% and GAT explained 49% of the variance. It is also noteworthy to mention here that this study reported moderate to weak correlation ( $r=.45$ ) between the two explanatory variables, which is so close to the .41 correlation reported by AlQataee and AlHarbi.

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## REFERENCE LIST

### Arabic References:

- AlDakheel Allah, D. A. (2012). Analyzing the content of a sample from articles addressed the National Center for Assessment in Higher Education in Saudi newspapers. *National Center for Assessment in Higher Education (technical Reports)*.
- AlHarbi, K. A. (2012). High school graduates performance in aptitude and basic knowledge in the Kingdom of Saudi Arabia. *National Center for Assessment in Higher Education (technical Reports)*.
- AlQataee, A. A., & AlHarbi, K. A. (2012). Ability of higher education admission criteria to predict first year grade point average in some Saudi universities. *National Center for Assessment in Higher Education (technical Reports)*.
- AlMoshari Alsaud, F. A. (2012). A vision in the reality of high school education and its developments. *National Center for Assessment in Higher Education (technical Reports)*.

### English References:

- Alsaeed, M. (2012). *Teacher Knowledge That Supports Student Processes in Learning Mathematics: A Study at All-Female Middle Schools in Saudi Arabia* (Unpublished Doctoral Dissertation). Ohio University, Ohio.
- Atkinson, R. C., & Geiser, S. (2009). Reflections on a century of college admissions tests. *Educational Researcher*, 38, 665–676. Doi: 10.3102/0013189X09351981.
- Baird, L. L. (1976). *Using self-reports to predict student performance* (Research Monograph No. 7). New York: The College Board.
- Blair, J. (1999). NAACP criticizes colleges' use of SAT, ACT. *Education Week*, 19 (14), 10–10. [NAACP: National Association for the Advancement of Colored People]
- Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities*. Princeton, NJ: Princeton University Press.
- Camara, W. J., & Echternacht, G. (2000). *The SAT I and high school grades: Utility in predicting success in college*. (College Board Research Report No. 2000–10).
- Er, N. S. (2012). *Perceptions of Turkish High School Mathematics Teachers Regarding the 2005 Curricular Changes and Their Effects on Mathematical Proficiency and University Entrance Exam Preparation* (Unpublished Doctoral Dissertation). Ohio University, Athens, Ohio.
- Ewing, M., Huff, K., Andrews, M., & King, K. (2005). *Assessing the reliability of skills measuring by the SAT* (College Board Research Report No. 2005–24). New York: College Board.
- Geiser, S., & Studley, R. (2002). UC and the SAT: Predictive validity and differential impact of the SAT I and SAT II at the University of California. *Educational Assessment*, 8, 1–26.
- Gierl, M., Tan, X., & Wang, C. (2005). *Identifying content and cognitive dimensions on the SAT*. (College Board Research Report No. 2005–11). New York: College Board.
- Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for predicting first- year college grade point average* (College Board Research Report No. 2008–5). New York: The College Board.
- Kobrin, J. L., Sinharay, S., Haberman, S. J. & Chajewski, M. (2011). *An investigation of the fit of linear regression models to data from an SAT validity study* (College Board Report No. 2011–3). New York: The College Board.
- Kojiro, S., Tatsuo, O., Shin-ichi, M., Masaaki, T., & Haruo, Y. (2007). Factor structure of the National Center Test 2005 by the full-information Pseudo-ML method. *Behaviormetrika*, 34 (2), 131–156. DOI: 10.2333/bhmk.34.131.
- Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point average, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research*, 75, 63–82.

- Linn, R. L. (2009) Comments on Atkinson and Geiser: Considerations for college admissions testing. *Educational Researcher*, 38, 677–679. Doi: 10.3102/0013189X09351982.
- Liu, O. L., Bribgeman, B., & Adler, R. M. (2012). Measuring learning outcomes in higher education: Motivation matters. *Educational Researcher*, 41, 352–362. Doi: 10.3102/0013189X12459679.
- Madaus, G., Clarke, M., & O'Leary, M. (2003). A century of standardized mathematics testing. In G. M. A. Stanic & J. Kilpatrick (Eds.), *A History of School Mathematics* (Vol. 2, pp. 1311–1433). Reston, VA: National Council of Teachers of Mathematics.
- Maruyama, G. (2012). Assessing college readiness: Should we be satisfied with ACT or other threshold scores? *Educational Researcher*, 41, 252–261. DOI: 10.3102/0013189X12455095.
- National Center for Assessment in Higher Education (NCAHE) (n.d.). Retrieved from <http://www.qiyas.sa/Sites/English/Tests/Pages/GiftednessAndCreativity.aspx>
- Noble, J. P. (2004). Is high school GPA better than admission test scores for predicting academic success in college? *College and University*, 79, 17–22.
- Patterson, B. F., Mattern, K. D., & Kobrin, J. L. (2009). *Validity of the SAT for predicting FYGPA: 2007 SAT validity sample*. (College Board Report No. 2009–1). New York: The College Board.
- Patterson, B. F., Mattern, K. D., & Swerzewski, P. (2012). Are the best scores the best scores for predicting college success? *Journal of College Admission*, 217, 35–45.
- Paris, S. G., Lavvton, T. A., Turner, J. C., & Roth, J. L. (1991). A developmental perspective on standardized achievement testing. *Education Researcher*, 20, 12–20. Doi: 10.3102/0013189X020005012
- Rohr, S. L. (2013). How well does the SAT and GPA predict the retention of science, technology, engineering, mathematics, and business Students. *Journal of College Student Retention: Research, Theory & Practice*, 14, 195–195.
- Ryan, K. E. et al. (2007). Motivation for Standardized Math Exams. *Educational Researchers*, 36, 5–13. Doi: 10.3102/0013189X06298001.
- Sackett, P. R., Kuncel, N. R., Arneson, J. J., Cooper, S. R., & Waters, S. D. (2009). *Socioeconomic status and the relationship between the SAT and freshman GPA: An analysis of the data from 41 colleges and universities*. (College Board Research Report No. 2009–1). New York: The College Board.
- SAT<sup>®</sup>, College Board (n.d.). Retrieved from <https://sat.collegeboard.org/about-tests/sat>
- Shaw, E. J., Marini, J. P., Mattern, K. D. (2012). Exploring the utility of advanced placement participation and performance in college admission decisions, *Educational and Psychological Measurement*, 73 (2), 229–253. Doi: 10.1177/0013164412454291.
- Wiley, E. W., Shavelson, R. J., & Kurpius, A. A. (2014). On the factorial structure of the SAT and implications for next-generation college readiness assessments. *Educational and Psychological Measurement*, 74 (5), 859–874. Doi: 10.1177/0013164414528332.
- William, D., (2010). What counts as evidence of educational achievement? The role of constructs in the pursuit of equity in assessment. *Review of Research in Education*, 34, 254–284. Doi: 10.3102/0091732X09351544
- Wilson, L. D. (2007). High-stakes testing in mathematics. In F. K. Lester, Jr. (Ed.). *Second handbook of research on mathematics teaching and learning: A project of the National Council of Teachers of Mathematics* (Vol. 2, pp. 1099–1110). Charlotte, NC: Information Age.
- Wolfe, R. N. (2005). Personality as a predictor of college performance. *Educational and Psychological Measurement*, 55, (2), 177–185. Doi: 10.1177/0013164495055002002.
- Zwick, R., Sklar, J. C. (2005). Predicting college grades and degree completion using high school grades and SAT scores: The role of student ethnicity and first language. *American Educational Research Journal*, 42, (3), 439–464. Doi: 10.3102/00028312042003439.