# Using Multiple Linear Regression and Factor Analysis to Explore the Determinants of Students Success at the University

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**Abstract.**

This paper studies the determinants of university success using a data set collected from a random sample from a Palestinian university. We used multivariate inferential data analysis techniques like factor analysis and multiple linear regression to model the relationship between the variables and compare these models across faculty groups and student seniority at school. The results show that high school grades are strongly associated with university success. The results also show that the next important predictors of university success are "having scholarships", English language proficiency, and class attendance, whereas variables measuring psychological well-being, gender, type of residency, and smoking behavior have only a smaller impact. Moreover, the link between most of these predictor variables and university success is shown to vary substantially across faculties and across the student's seniority level. In some fields of study, some variables are significantly correlated with university success, while in other areas, these same variables are not.

Keywords: College education, Academic success, Predictors of University success, Regression analysis

**مستخلص**

تدرس هذه الورقة محددات النجاح الجامعي للطلبة باستخدام مجموعة بيانات تم جمعها من عينة عشوائية من جامعة فلسطينية. قمنا باستخدام أساليب التحليل الإحصائي الاستدلالي متعدد المتغيرات مثل التحليل العاملي وتحليل الانحدار المتعدد لنمذجة العلاقات بين المتغيرات ومقارنة تلك النماذج عبر الكليات المختلفة وعبر السنة الدراسية للطالب. تشير النتائج إلى أن علامات المرحلة الثانوية مرتبطة بقوة بنجاح الطالب في الجامعة. تظهر النتائج أيضًا أن المتنبئين المهمين التاليين للنجاح الجامعي هم الحصول على المنح الدراسية، وإتقان اللغة الإنجليزية، وحضور الفصول الدراسية، في حين أن المتغيرات التي تقيس الرفاهية النفسية والجنس ونوع الإقامة وسلوك التدخين لها تأثير أقل. علاوة على ذلك، يتبين أن الارتباط بين معظم متغيرات التنبؤ هذه ونجاح الطالب في الجامعة يختلف اختلافًا كبيرًا عبر الكليات وعبر مستوى أقدمية الطالب في الجامعة. في بعض مجالات الدراسة، ترتبط بعض المتغيرات بشكل كبير بنجاح الطالب في الجامعة، بينما في مجالات أخرى لا ترتبط هذه المتغيرات نفسها بنجاح الطالب في الجامعة.

الكلمات المفتاحية: التعليم الجامعي، النجاح الأكاديمي، تحليل الانحدار

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## Introduction

College education comes as a continuation to what a student started at school, and it is an essential concern to keep up with the requirements of this phase so one could successfully pass it. Performance in the college is just as crucial as the high school performance was, even if it is a little different in how it could be measured. A high-grade point average (GPA), fewer course-withdrawals, and graduating within the minimum period are the most common signs of success among university students. Now the success, as an accomplishment, definitely has some characteristics or certain behaviors which contributed to achieving it.

For many years now, the causes of academic achievement in college have been a deep concern for researchers and educators. How predictable is the academic success of university students was an essential question for the researchers? This interest comes as a result of trying to understand the factors related to success, developing remedial measures that lead to educational improvement, improve the college acceptance and placement of students, and intervene more effectively with high-risk students.

The previous researchers did not completely agree on the factors that affect academic achievement at the university, while one research indicates that the absence from lectures, for example, affects the academic achievement of the student, we find another research indicating the lack of influence. One of the expected reasons for this variation may be the different study populations. In this research, we will compare the effect of the factors affecting academic achievement, according to the field of study and the level of the student's academic year.

There is plenty of studies on educational achievements factors (review Danilowicz-Gösele, Meya, Schwager & Suntheim, 2014; Birch & Miller, 2005; Hoffmann, Anna-Lena, Lerche & Katharina, 2016; Lopesa & Carreiraa, 2018; Belfield & Crosta, 2012; Burton & Ramist, 2001; Richardson, Abraham & Bond, 2012; Petrie, Zanden, Denessen, Cillessen & Paulien, 2018; Dika & Sylejmani, 2012; Van Overwalle, 1989; Cyrenne & Chan, 2012; McKenzie & Schweitzer, 2001; Alves, 2014; Win & Miller, 2005, and more).

However, Danilowicz-Gösele et al. (2014), Burton & Ramist (2001), Cyrenne & Chan (2012), Alves (2014), Dooley et al. (2012), Aiana (2011), Win & Miller (2005) and more all confirmed the explanatory power of the high school grade point average which significantly dominates that of other variables such as university program, gender, and neighborhood. On the other hand, Dooley et al. (2012) showed that the type of university program, gender, neighborhood, and high school characteristics have weak links with university outcomes. Aiana (2011) talked about whether individual characteristics, academic performance, geographical mobility, and family size may affect the completion of a degree course or not.

Pritchard and Wilson (2003) revealed that emotional and social factors (e.g., stress, frequency of alcohol consumption) are related to GPA. Morlaix and Suchaut (2014) found that social characteristics (scholarship or no scholarship), and cognitive ability (working memory, speed of information processing) play a limited role in explaining differences of success. Whereas Hoffmann et al. (2016), Saloua & Bani (2015) and Dika & Sylejmani (2012) all had different results about the effect of attending classes on the performance, some mentioned that attending has no significant impact on student performance in most specifications, while the others showed that student motivation and commitment to their studies lead to academic success.

Dayioglu and Turut-Asik (2004) studied gender differences in academic performance. Finally, Feast (2002) showed that a significant and positive relationship was found between English language proficiency measured by IELTS test scores and performance at University, as measured by the GPA.

All the studies mentioned above enlightened our way of doing this research. However, generalizing their results on the students at Birzeit University won't be significant because of the differences between students in these studies and the students at Birzeit University. Therefore, these differences, such as intelligence levels, behaviors, lifestyles, study skills, and habits, preferred learning methods, experiences, backgrounds, and demographics, all with interactions between these factors make it challenging to predict students' success at Birzeit University without conducting this research.

This study at Birzeit University simulates all previous studies done in other universities, except for some different results concluded. These results are considered to be very important to all university parties: administrators, teachers, and students. Whereas students can focus on the characteristics that influence their academic success, teachers and administrators can use measures to increase the likelihood of students' success.

The purpose of this study is to detect the determinants of students' academic success at Birzeit University and to see if these determinants vary by major and seniority of students..

**Literature Review**

The academic attainment factors that are examined in this article were compiled from the existing literature on relationships between student/environmental characteristics and educational achievement. The following section gives a brief outline of the factors that have been identified in the literature to influence school academic achievement.

In a recent view, Danilowicz-Gösele et al. (2014) showed that there is a firm relation between high school grades and both graduation probabilities and final grades based on a set of data of a German university. On the other hand, variables based on social status or income have little influence. That agrees with some findings we had in 2001 by Burton and Ramist, who concluded that the combination of high school records and SAT scores are consistently the best predictor of a college students' academic performance and non-academic accomplishments (such as leadership in college, and post-college income). And then, in 2012, Cyrenne and Chan estimated the likelihood of success of subsequent students based on their characteristics as well as their high school grades, and they hoped that it would help in deciding to admit students.

Another study was made in 2014 by Alves, who also showed that internal high school grade is a better predictor of achievement than the score of national mathematics exam and that attending a private high school or following the economics track at high schools is irrelevant for predicting educational outcomes.

Dooley et al. (2012) examined the correlates of four measures of persistence and academic success in university. They had two empirical findings: First, the high school grade point average is strongly linked to all of the university outcomes in the sense of both the magnitude and the precision of the estimated regression coefficients. Second, all of the other variables such as university program, gender, the neighborhood, and high school characteristics used in this study—such as average neighborhood income and the average Grade 9 Math Assessment scores of a high school—have weak links with university outcomes.

Aiana (2011) studied the success by taking several outcomes into account, namely the probability of withdrawal for voluntary or involuntary reasons, graduating within the minimum period, and graduating with top marks. The study explored whether individual characteristics, academic performance, geographical mobility, and family size may affect the completion of a degree course or not. The main results indicated that poor high school performance, in particular, increases the chances of non-completion and graduation after the legal length of the course. In contrast, higher final high school marks, a more academic-oriented diploma, living in a small family, and being commuters result in a higher probability of gaining a degree with top marks and within the minimum period. Win and Miller (2005) had a similar finding that high schools have an impact on the academic performance of students at university beyond students' background characteristics.

In 2002, a significant and positive relationship was found between English language proficiency, as measured by IELTS test scores and performance at university, as measured by the GPA (Feast, 2002). Similar findings were achieved by Woodrow (2006) as the results indicated further evidence for the predictive validity of IELTS as weak; however, significant correlations were obtained between overall IELTS bands and GPA, and closer scrutiny revealed significant correlations between writing, speaking, listening subtests, and GPA.

Birch et al. (2005) found that students' university entrance scores largely influence university grades. Schools also appear to play an essential role in influencing students' university outcomes. In contrast, Belfield and Crosta (2012) found that placement tests do not yield reliable predictions of how students perform in college, while high school GPAs are useful for predicting many aspects of their performance. As a conclusion, using high school GPA instead of placement tests reduces the severe error rates by half across both English and math.

Hoffmann et al. (2016) suggest that, in the given framework, attending class and studying on one's own may be substituted while Saloua and Bani (2015) showed that student motivation and commitment to their studies lead to academic success. Moreover, Dika and Sylejmani (2012) showed that the impact of student presence in lectures and practical work in the laboratory is evident. So they suggested that professors should ensure regular attendance of students in lectures and exercises in labs.

Other results show that student-workers who finish their degrees behave similarly to the non-worker students in their academic performance, parents' education hurts final grades whereas higher previous qualifications, peer effects, better integration, and higher average grades within degree increase academic performance (Lopesa and Carreiraa, 2018). And this agrees with Triventi (2014), who showed a presence of penalty in academic progression only for high-intensity workers, but once accounted for unobserved heterogeneity also the low-intensity work experience negatively affects academic progression.

In 2018, The results of a study indicated some predictors contributed to multiple domains of success, namely, students' previous academic performance, study skills, motivation, social relationships, and participation in first-year programs (Petrie et al., 2018). Besides, McKenzie and Schweitzer (2001) showed that previous academic performance was identified as the most significant predictor of university performance. Integration into university, self-efficacy, and employment responsibilities were also predictive of university grades. A high correlation was observed for performance by self-efficacy, which was the strongest correlate (of 50 measures) followed by high school GPA, ACT, and grade goal (Richardson et al., 2012).

As for gender differences in academic performance, Dayioglu and Turut-Asik (2007) found out that a smaller number of female students manage to enter the university, and when they do so, they enter with lower scores; once they are admitted to the university, they excel in their studies and outperform their male counterparts (these results hold after controlling for the field of study and individual attributes). On the other hand, Chyung (2007) revealed that female students improved their self-efficiency more and scored significantly higher on the final exam than male students, whereas younger male students' exam scores and younger female students' exam scores were significantly different from each other.

In contrast with most previous studies, Dickson et al. (2000) found a significant relationship between previous study at TAFE (college study at a Technical and Further Education Institute) and failure in an academic unit, perhaps due to the timing of this unit in the students' overall program. Van Overwalle (1989) had findings that revealed that midterm performance was most strongly related to final examination grades; next in order were academic self-esteem, expectancies, and efficiency of study strategies.

Finally, a study by Pritchard and Wilson in 2003 revealed that emotional and social factors (e.g., stress, frequency of alcohol consumption) are correlated with GPA, and emotional factors (e.g., self-esteem, fatigue) are related to attrition.

**Method**

This research is based on a sample survey of students at Birzeit university, and the statistical analysis used are both factor analysis and multiple linear regression.

**Target Population**

The survey targeted students at Birzeit University enrolled in Spring 2018. Students from all the university faculties, both genders, and on different academic years (save for the newcomers who enrolled in Spring 2018) were asked to fill a self-administered questionnaire.

Birzeit University is the oldest University and one of the largest universities in terms of student enrollment in Palestine. Its students come from all over Palestine, with different backgrounds, ways of living, thoughts, behaviors, study skills, and intelligence levels; with this unique student combination, we believe we are going to have exciting conclusions. By Spring 2018, Birzeit had 12,297 undergraduate students enrolled: 37.6% of the total students are males, and 62.4% are females. These students are studying in seven faculties: Faculty of Science, Engineering and IT, Business and Economics, Arts, Law and Public Administration, Education, and Medical Sciences. Table 1 shows the distribution of these students by faculties.

**Table 1: Number of students enrolled in Birzeit University by faculty - Spring 2018**

| Faculty | Number of students | percent |
|---|---|---|
| Arts | 2,830 | 23% |
| Business and Economics | 3,063 | 24.9% |
| Education | 248 | 2% |
| Engineering and IT | 2,972 | 24.2% |
| Law and Public Administration | 1,731 | 14.1% |
| Medical Sciences | 804 | 6.5% |
| Science | 649 | 5.3% |
| **Total** | **12,297** | **100%** |

**Sample**

A stratified random sample of 450 undergraduate students was drawn. Stratification was done according to faculty and gender, and the sample included students from different academic years. Out of the 450 students in the sample, only 426 questionnaires were found to be suitable for conducting regression analysis.

**Data**

**Dependent Variable**

The unique dependent variable in this study is the GPA(grade point average), which is used as a measure of the student's academic success.

**Explanatory Variables**

The choice of the explanatory variables is informed by the received literature and a previous unpublished similar study. We may summarize these variables as follows:

- High School Diploma Score (Tawjihi Score) out of 100%
- Gender: dummy variable takes the value one for male students and zero for females.
- Likes his/her major: dummy variable takes one/ zero as values when the student likes/does not like his/her major.
- Chose his/her major: dummy variable takes one as a value when the student himself has chosen to study the major he/she is studying and zero when he/she has not (e.g., his parents forced him to choose the major).
- Missing classes: dummy variable takes the value one when the student misses his classes always or sometimes, zero when the student does not miss or rarely misses his classes.
- Family vs. student residency: dummy variable takes the value one for students who live with the family and zero for students who stay in a students' residence.
- Smoke: dummy variable takes the value one for students who smoke and zero for students who don't.
- Had a scholarship during University: dummy variable takes the value one for students who have ever taken a scholarship that requires them to keep their GPA within a specific range and zero for students who have never taken such a scholarship.
- Has difficulty in studying in English: dummy variable takes the value one for students who face difficulties in studying courses taught in English and zero for students who are good with that.
- Psychological Well-being: variable obtained by factor analysis of five questions that determine how often the student felt sad, lonely, stressed, pessimistic, and needed to cry.
- Daily-hours of internet use: average number of hours per day the student spends on using the internet for purposes related to their studies or not.

The following table gives descriptive statistics for the variables used in this study.

**Table 2: Descriptive Statistics for Selected Variables in the Sample**

| Continuous Variables | | | |
|---|---|---|---|
| | | Mean | Std. Dev. |
| GPA | | 74.727 | 6.207 |
| High School Diploma Score (Tawjihi Score) | | 86.704 | 7.766 |
| Daily-hours of internet non-study use | | 6.178 | 3.134 |
| **Binary Variables** | | | |
| | | Count | Percent |
| Gender | Male | 167 | 39.2 |
| | Female | 259 | 60.8 |
| Likes his/her major | Yes | 318 | 74.6 |
| | No | 108 | 25.4 |
| Missing classes | Yes | 245 | 57.5 |
| | No | 181 | 42.5 |
| Family vs. students residency | Family | 385 | 90.4 |
| | Students' | 41 | 9.6 |
| Smoke | Yes | 96 | 22.5 |
| | No | 330 | 77.5 |
| Had a scholarship during University | Yes | 92 | 21.6 |
| | No | 334 | 78.4 |
| Has difficulty in studying in English | Yes | 158 | 37.1 |
| | No | 268 | 62.9 |
| Note: n = 426. | | | |

**Table 3: Descriptive Statistics for Selected Variables by Field of Study**

| **Descriptive statistics by Field of study** | | | | |
|---|---|---|---|---|
| **Continuous Variables** | | **Mean** | | |
| | | Science, Eng., IT, Medical | Art, Law, Education | Business |
| GPA | | 76.2 | 73.4 | 74.8 |
| High School Diploma Score (Tawjihi Score) | | 89.1 | 83.5 | 88.7 |
| Daily-hours of internet non-study use | | 5.2 | 6.3 | 7.4 |
| | | **$n_1$ = 153** | **$n_2$ =173** | **$n_3$ =100** |
| **Binary Variables** | | **Percentage (%)** | | |
| | | Science, Eng., IT, Medical | Art, Law, Education | Business |
| Gender | Male | 39.9 | 38.2 | 40.0 |
| Likes his/her major | Yes | 24.8 | 22.5 | 31.0 |
| Missing classes | Yes | 46.4 | 42.2 | 37.0 |
| Family vs. students residency | Family | 83.7 | 92.5 | 97.0 |
| Smoke | Yes | 19.6 | 27.2 | 19.0 |
| Had a scholarship during University | Yes | 27.5 | 17.9 | 19.0 |
| Has difficulty in studying in English | Yes | 28.1 | 44.5 | 38.0 |
| **Number of observatios: Total - n = 426.** | | **$n_1$ = 153** | **$n_2$ =173** | **$n_3$ =100** |

**Table 4: Descriptive Statistics for Selected Variables by Year in School**

| **Continuous Variables** | | **School Year** | | | |
|---|---|---|---|---|---|
| | | First | Second | Third | Fourth |
| GPA | | 74.5 | 75.3 | 75.1 | 74.3 |
| High School Diploma Score (Tawjihi Score) | | 86.0 | 86.3 | 86.9 | 87.4 |
| Daily-hours of internet non-study use | | 6.9 | 6.4 | 6.5 | 5.2 |
| **Number of observations: Total - n = 426.** | | **n1 = 111** | **n2 = 87** | **n3 = 102** | **n4 = 126** |
| **Binary Variables** | | **School Year** | | | |
| | | First | Second | Third | Fourth |
| Gender | Male | 43.2 | 35.6 | 36.3 | 40.5 |
| Likes his/her major | Yes | 77.5 | 74.7 | 76.5 | 70.6 |
| Missing classes | Yes | 55.9 | 59.8 | 58.8 | 56.3 |
| Family vs. students residency | Family | 85.6 | 88.5 | 93.1 | 93.7 |
| Smoke | Yes | 19.8 | 20.7 | 21.6 | 27.0 |
| Had a scholarship during University | Yes | 15.3 | 18.4 | 23.5 | 27.8 |
| Has difficulty in studying in English | Yes | 39.6 | 42.5 | 37.3 | 31 |
| **Number of observations: n = 426.** | | **n1 = 111** | **n2 = 87** | **n3 = 102** | **n4 = 126** |

**Statistical Analysis Method**

Previous studies of factors affecting university success have used several methods of statistical analysis to explore the relationships between university success (typically measured by the GPA) and intellectual and non-intellectual predictor variables. In studies investigating the determinants of overall university academic success, the analysis methods include simple correlation analysis, ANOVA, OLS regression, and logistic regression.

We used two methods of statistical analysis; first, we used factor analysis to derive the latent variable, Psychological Well-being, using five questions that determine how often the student felt sad, lonely, stressed, pessimistic, and needed to cry. To measure the reliability of this construct, Cronbach Alpha was used. Then we checked the validation of OLS regression and developed a model that follows the multiple linear regression technique with no interactions. The determinants of academic success for undergraduate students are tested using the following final model:

$$\begin{aligned} GPA = {} & \beta_0 + \beta_1(\text{High School Diploma Score}) + \beta_2(\text{Gender}) + \beta_3(\text{Likes the major}) \\ & + \beta_4(\text{Miss classes}) + \beta_5(\text{Residency Type}) + \beta_6(\text{Smoke}) \\ & + \beta_7(\text{Had a scholarship}) + \beta_8(\text{English language professiency}) \\ & + \beta_9(\text{Psychological well being}) \\ & + \beta_{10}(\text{Daily hours of internet non} - \text{study use}) \end{aligned}$$

The model was applied to all data, data classified by faculties, and data classified according to academic years.

**Results**

**First, Factor Analysis:**

We used factor analysis to create a construct that will be used to measure student's psychological well-being. An important assumption of factor analysis is the existence of non-zero correlations between the variables; this assumption is examined by producing the correlation matrix as shown in table 5 below. Table 5 shows that all the pairwise correlations are significant at the 0.01 or better level. Then an overall significance of the correlation matrix is checked using Bartlett's test. The test shows that the correlations, when taken overall, are significant at the 0.001 level (see figure1 below)

**Table 5: Pairwise Correlations between the Items included in the Factor Analysis.**

| | Felt Sad | Felt Lonely | Felt Stressed | Felt Pessimistic | Felt Need to Cry |
|---|---|---|---|---|---|
| Felt Sad | 1 | .561** | .541** | .520** | .475** |
| Felt Lonely | .561** | 1 | .430** | .469** | .387** |
| Felt Stressed | .541** | .430** | 1 | .590** | .455** |
| Felt Pessimistic | .520** | .469** | .590** | 1 | .492** |
| Felt Need to Cry | .475** | .387** | .455** | .492** | 1 |

**. Correlation is significant at the 0.01 level (2-tailed).

Also, we examined the factorability of the data set using Measure of Sampling Adequacy (MSA), which is found to be 0.836, and that is a good indication of sample adequacy since it falls in the acceptable range of over 0.5 (Hair et al. 1998).

**Figure 1: KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .836 | |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 723.751 |
| | df | 10 |
| | Sig. | .000 |

Therefore, we applied factor analysis using PCA with Varimax rotation and the analysis produced only one factor which explained around 60 % of the total variance in the variables. To measure the reliability of the construct produced by factor analysis, C*ronbach Alpha* was used and found to be 0.827 which is higher than the agreed upon lower limit of 0.70 (Hair et al. 1998) indicating a high reliability of the construct.

**Second, Regression Analysis**:

Tables 6 and 7 show the regression results for the whole sample, the sample classified by faculty and student's academic year.

Table 6 shows that the model for all students explains 34.8% of the variation in the GPA, while this percentage varies across faculty group and has its highest value 46.6% in the Faculty of Business and Economics. Most of the variables used in the regression model for all students are significant. As for the explanations of the regression coefficients, in each explanation, we assume all other variables fixed. For each extra mark on high school diploma score, the average value of GPA is expected to increase by 0.31 marks, and females are expected to have an average GPA exceeds that of males by 1.11 marks. Students who like their major, do not miss classes, and do not smoke have higher GPAs. "Having difficulties in studying courses in English" causes a decrease in the expected average GPA by around 1.52 marks. On average, students who have ever had a scholarship during university period are seemed to have a higher GPA by 2.33 marks. When looking at the regression results across faculty groups, the high school diploma score is a significant predictor in all of the groups; however, gender differences appear only in the faculty of Business and Economics. Missing classes, and Smoking are significant predictors of university success in faculties of Law, Education, and Arts. Psychological well-being is only significant in the faculties of Business. While having a scholarship has its significant effects on students' success in the faculties of Science, Engineering, IT, Medical Sciences, and Business.

In table 7, the model for first-year students has the highest explanatory power by explaining 49.7% of the variability in GPA. The effect of high school performance is significant in all years. Gender differences are significant in only the first year, whereas "having difficulties in studying courses in English" is found significant just in the first year. Type of residency is found insignificant in all years. Having a scholarship is only significant for students in their 4th year, and the missing classes affect the average value of GPA for 3rd, and fourth-year students.

**Table 6: Regression coefficients for effects of socio-demographic and background variables on academic performance classified by faculty group**

| Variable | Science, Eng., IT, Medical | Art, Law, Education | Business | All students |
|---|---|---|---|---|
| Constant | 31.384(***) | 62.288(***) | 44.297(***) | 49.165(***) |
| High School Diploma Score (Tawjihi Score) | .472(***) | .182(***) | .446(***) | .311(***) |
| Gender | .818 | -1.549 | -5.099(***) | -1.107 |
| Likes his/her major | 1.506 | 1.079 | 2.187 | 1.547(**) |
| Missing classes | -1.047 | -1.580(*) | -1.850 | -1.467(**) |
| Family vs. students residency | 1.261 | -3.354(*) | -6.476(*) | -1.195 |
| Smoke | -1.965 | -2.092(*) | -.060 | -1.515(*) |
| Had a scholarship during University | 1.665 | 1.957(*) | 3.246(*) | 2.331(***) |
| Has difficulty in studying in English | -1.224 | -.418 | -1.693 | -1.524(**) |
| Psychological Well-being | .189 | .717 | 1.263(*) | .498 |
| Daily-hours of Internet use | .208 | -.006 | -.142 | .034 |
| Sample size | 153 | 173 | 100 | 426 |
| Adjusted R square | 0.339 | 0.310 | 0.466 | 0.348 |
| Standard error of estimates | 4.80 | 4.75 | 5.10 | 5.01 |

(*) Significant at $\alpha = 0.05$.(**) Significant at $\alpha = 0.01$. (***) Significant at $\alpha = 0.001$.

**Table 7: Regression coefficients for effects of socio-demographic and background variables on academic performance classified by academic year**

| Variable | 1st year | 2nd year | 3rd year | 4th year &higher | All students |
|---|---|---|---|---|---|
| Constant | 48.840(***) | 54.374(***) | 43.552(***) | 55.062(***) | 49.165(***) |
| High School Diploma Score (Tawjihi Score) | .386(***) | .234(**) | .376(***) | .194(***) | .311(***) |
| Gender | -5.019(***) | .185 | 1.005 | .145 | -1.107 |
| Likes his/her major | -1.074 | 2.524 | 2.429(*) | 1.382 | 1.547(**) |
| Missing classes | -1.040 | -.100 | -1.984(*) | -2.289(**) | -1.467(**) |
| Family vs. students residency | -2.515 | -2.201 | -1.778 | 2.921 | -1.195 |
| Smoke | -2.467 | -2.515 | -1.094 | -1.018 | -1.515(*) |
| Had a scholarship during University | 2.297 | 1.365 | 1.089 | 3.149(*** | 2.331(***) |
| Has difficulty in studying in English | -2.744(*) | -.329 | -1.721 | -1.562 | -1.524(**) |
| Psychological Well-being | .635 | .313 | .685 | .251 | .498 |
| Daily-hours of Internet use | -.096 | .173 | .024 | -.060 | .034 |
| Sample size | 111 | 87 | 102 | 126 | 426 |
| Adjusted R square | 0.497 | 0.213 | 0.329 | 0.342 | 0.348 |
| Standard error of estimates | 5.84 | 4.66 | 4.70 | 4.05 | 5.01 |

(*) Significant at $\alpha = 0.05$.(**) Significant at $\alpha = 0.01$. (***) Significant at $\alpha = 0.001$.

## Conclusion

The analysis presented in this study provides useful insight into the factors that affect the university success of undergraduate students at University. Previous researches on academic success suggest that precollege performance variables may serve as useful predictors of university success (Danilowicz-Gösele et al. (2014), Burton & Ramist (2001), Cyrenne & Chan (2012), Alves (2014), Dooley et al. (2012), Aiana (2011), Win & Miller (2005)). This study contributes to that line of research and coincides with most of their results.

Previous researches (Dooley et al. (2012)) showed that demographic variables have weak links with university outcomes. This study confirmed that and added that the effect of demographic variables vary across fields of study and across seniority of the student. Researchers had different results about the effect of classes attendance on the academic performance (Hoffmann et al. (2016), Saloua & Bani (2015) and Dika & Sylejmani (2012)). This research showed that the effect of classes attendance on academic performance vary across fields of study and across seniority of the student and that might explain part of the disagreement between researchers.

Previous research, also showed that behavioral variables like attitudes (smoking) and personality variables like psychological well-being are significant predictors of university success. Again our research showed that, although these variables are significant on the aggregate level, the effect varies across fields of study and across seniority of the student.

By treating student performance in high school as an early warning sign, administrators might be able to identify students who are more likely to be successful when moved to the university. Teachers should ensure regular attendance of students to increase the probability of their academic success. Commitment to classes, improving English language skills, choosing a major they like, and maintaining good psychological health all together could help students become more successful at university.

## Limitation and Future Research

Although the sample size was large enough to give reliable results on the university level, it was not large enough when disaggregating the results on the Faculty or year in school levels. Future research should address students in the first year of school with a large enough sample size since this group of students is in the transition period and need more attention. As the results showed that there are variations in the results across faculties, one might focus the research in specific faculties, which would make the study group more homogenous and the results more informative.

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