

Accounting Majors Finish First – Results of a Five-Year Study of Performance in Introductory Accounting

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Abstract

The current study identifies factors related to successful completion of the introductory accounting course. Delivery of a quality accounting course provides a solid foundation for business students. An empirical investigation was conducted on a sample of 398 students exposed to the same professor, text, teaching and examination format over five-years. Results suggest accounting major status was associated with earning higher grades in introductory accounting controlling for; grade point average, mathematics background and previous experience in the course. To improve performance in introductory accounting, schools of business should consider requiring a minimum grade point average and completion of the appropriate mathematics prerequisite.

Statement of Purpose

It is impossible to over-estimate the importance of the introductory accounting course to the education of the business student. Core courses in accounting and economics are as essential to business programs as organic chemistry is to pre-medicine (Jenkins & Rubin, 2011). A solid foundation in accounting is a tremendous benefit to all business students planning to work for any organization where decision makers use accounting information (AECC, 1992). There is a growing recognition of the importance of every business student having a firm understanding of accounting (Williams, 2011). The accounting knowledge learned in introductory accounting and how the information is delivered actually has significant impact on the nature of business conducted on an international basis (Wilkerson, 2011). Finally, the transformation of the first course in accounting was included as a key objective in a recommendation of a recent Pathways Commission on Accounting report (Behn et al., 2012).

The current study was designed to identify factors related to successful completion of introductory accounting and suggest opportunities to improve the often dismal grades earned. It is vitally important that schools of business identify criteria associated with success in introductory accounting to improve the quality of accounting education to effectively provide skills, knowledge and professional orientation (AECC, 1990). Resources are wasted as students retake the class or struggle in subsequent classes because they did not learn the appropriate information in the current format (Doran et al., 1991). Improvement of the preparedness of introductory accounting students may reduce failure rates and ultimately increase the quality of accounting graduates (Kealey et al., 2005). A study of the impact of a course redesign of introductory accounting to focus on core competencies, continual review techniques and technological improvements resulted in increased performance, enhanced retention and increased interest in majoring in accounting (Spiceland et al., 2015).

For accounting majors, the experience in introductory accounting is frequently a key factor in their decision to major in accounting (AECC, 1992). The course provides a first impression of the accounting profession, the skills

necessary to succeed and potential career opportunities. Introductory accounting includes both the preparation and analysis of accounting information (Jenkins & Rubin, 2011). While accounting majors must ultimately be skilled in both, they initially are more interested in the preparation aspect while their non-major counterparts prefer analysis. This describes the unique challenge introductory accounting professors' face in approaching this divided audience.

Accounting major status is of particular interest in relation to performance in introductory accounting as it has long been anecdotally observed and logically expected that accounting majors would earn higher grades: however, it has not been recently addressed in empirical studies. The phenomenon of superior performance is intuitively attributed to the increased motivation and focus of accounting majors as the introductory class forms the basis for future accounting classes.

To identify characteristics of students successful in the introductory accounting class, a detailed study of 398 introductory accounting students, exposed to the same professor, textbook, teaching and examinations throughout the duration of the study, was accomplished. The study includes 13 sections of introductory accounting over five-years from the fall of 2008 through the spring 2013. These results suggest opportunities for improvement in the introductory accounting class.

Literature Review

Results of previous studies suggest factors such as: arithmetical ability, critical thinking skills, cognitive style, grade point average (GPA), gender, high school accounting background, tolerance for ambiguity, internal locus of control, status as an accounting major and previous experience in the course were associated with performance in the introductory accounting class. Specific results of previous studies are discussed below.

A study examining accounting major status explaining student performance in a two-sequence introductory class suggested accounting major status, ACT scores, GPA and previous exposure to accounting through a high school bookkeeping class had a favorable impact (Doran et al., 1991). A 2010 study focused on an examination of performance in introductory accounting as related to the mathematical ability of students (Fedoryshyn et al., 2010). While arithmetical ability was significant, GPA was actually suggested to be the best predictor of success while gender and major were less effective predictors. Mathematical ability was measured by examining the relationship between results on an arithmetical skills exam of 247 students. The importance of emphasizing mathematics in an accounting curriculum was also extolled in a 1962 informational article (Brown, 1962). Results from a study focusing primarily on high school accounting background as associated with success in the introductory accounting class suggested students who had taken accounting in high school were more likely to do well in the course (Xiang & Gruber, 2012). Other factors suggested as significant by this study included student motivation and attitudes toward learning, measured by homework completion and class attendance.

Factors of intellectualism as well as overall GPA were examined with mixed results on predicting performance across all levels of accounting students (Triki et al., 2012). The best and brightest students are usually identified by GPA while three factors of intellectualism -- the ability to think critically, tolerate contradictory situations and have an internal locus of control (i.e., believing that one's efforts can shape and change events) are the most desirable characteristics for successful accountants. Results suggest GPA is not *the only* means to differentiate between students. A relationship between GPA and intellectualism was suggested, however, students with higher GPA were found to be less tolerant of ambiguity and more likely to have an external locus of control.

Critical-thinking skills were found to be the most significant factor associated with variation in student performance in introductory accounting after controlling for academic aptitude (Kealey et al., 2005). In this study, critical-thinking skills were measured using a holistic scoring process to evaluate student essays. Results of a similar study suggested cognitive style, the approach an individual chooses to organize and represent information, was *not* found to impact performance in introductory accounting while controlling for student grade point average (GPA), a background of high school accounting and instructor effect (Jones & Wright, 2011). Cognitive style was suggested to influence the final but not the initial decision to major in accounting. A study examining the academic efficacy of first-year accounting students found that confidence in one's ability, a willingness to grasp material and meeting

deadlines were found to be related to successful grades (Byrne et al., 2014). Similar to previous research, gender differences were not found to be significant.

A ground breaking study analyzing student performance in Managerial Accounting found that personality type *and* gender together was a very strong predictor of performance (Fallon & Opstad 2014). These results were actually consistent with a similar gender study which suggested female students in accounting exert a greater amount of effort but do not outperform their male counterparts (Fogarty & Gouldwater 2010).

The “deep” approach to studying accounting, characterized by focusing on the underlying meaning of the subject with an intrinsic interest in the material, *was* found to be associated with successful performance (Elias, 2005). The “deep” approach is in contrast to the “surface” approach where students limit their studying to memorizing key concepts to meet minimum requirements and pass examinations. Both GPA and expected course grade were correlated with using the deep approach. Accounting and non-business majors were found more likely to use the deep approach as were women and more mature students.

A unique study compared traditional and non-traditional students using structural equations modeling (SEM) with many unique independent variables such as family and work activities, class room environment and some more traditional measures such as GPA (Wooten, 1998). The researcher discovered some interesting differences between the two groups (e.g., the effect of family responsibilities was significant for traditional but not for non-traditional students) and concluded they should not be treated as one homogenous group. Grade point average was found to be significant only for traditional students. A 1996 study focused only on minority student performance in accounting coursework (Gist et al., 1996). College GPA was the strongest predictor of performance in the introductory accounting class with SAT scores a close second. The third most important contributing factor to accounting course performance was achieving a “B” or better in calculus.

In relation to transfer students, a previous study found students transferring introductory accounting into a university had a failure rate triple that of non-transfer students in *Intermediate Accounting*- a subsequent class for accounting majors (Schmidt & Wartick, 2013). These students transferring in introductory accounting were also more likely to withdraw from the class than those taking introductory accounting at the same institution. A study analyzing academic policies across a sample of institutions found that the vast majority *do* allow students to transfer in the introductory course (Duchac & Amoruso, 2012)

An innovative variable, previous experience taking the introductory accounting class, emerged as significant in an international study (Du Plessis et.al., 2005). A profile developed to describe “at-risk” students included those required to repeat the course which was regarded as a demotivator. Results of a follow-up study introducing additional variables (i.e., the effect of language and matriculation certification) suggested repeating the first-year accounting class as still significant in profiling the at-risk student but to a lesser degree (Prinsloo et.al., 2010). This study went on to examine the effect of an intervention to mitigate the demotivating effect through the use of a risk assessment questionnaire, nicknamed “ToolKit for Success”. Results suggest identification and notification of risk to repeating students by completing the questionnaire had a positive impact on their second experience in introductory accounting through a comparison to a control group.

Clearly, there are myriad studies in this area each examining an array of diverse factors associated with successful completion of the introductory accounting course. However, accounting major status, GPA, mathematical ability, transfer status and repeating introductory accounting consistently emerged as relevant. These variables are also easily measureable and extremely noteworthy in current Schools of Business.

Research Design

The current study was designed to investigate the impact of status as an accounting major on the successful completion of the introductory accounting course. Status as an accounting major was chosen as a focus of this study

as it has long been anecdotally observed and logically expected to be associated with improved performance in introductory accounting. However, accounting major status has not been recently addressed as a focal point in empirical studies. The phenomenon of superior performance is intuitively attributed to the increased motivation and focus of accounting majors as the introductory class forms the basis for future accounting classes.

However, it was necessary to control for many of the other variables found to be significant in previous research. To isolate the association between the grade in introductory accounting and accounting major status, four independent variables were chosen as control variables because they emerged as significant in previous studies, they are measurable, interesting and relevant. These include: overall grade point average, a mathematical score, transfer student status and repeating the introductory accounting course.

Independent and control variables (shown in Table 1) were developed to capture the key characteristics of successful performance in the introductory accounting course.

As mentioned previously, some empirical support, suggested accounting majors outperform non-majors in the introductory course. This has long been a widely held anecdotal tenet as well. Accounting major status was designated from a review of student transcript for declared major. A dichotomous variable was used and “1” was assigned to designate status as an accounting major. The following hypothesis, stated in the alternative, was developed:

H1: Accounting majors earn higher grades in introductory accounting than non-majors.

Additional variables have been suggested as potentially significant in the explanation of successful grade performance in the introductory accounting class. In order to isolate the effect of accounting major status, these variables have been included in the study as control variables.

The first two control variables, measured as of the end of the semester before the accounting class is taken, are overall grade point average (GPA) and Mathematics proficiency (MATH). It is important to consider any relationship between these variables and performance in introductory accounting in isolating the association of grade and accounting majors. A direct and significant relationship could result in the establishment of a valid prerequisite to restrict the class to those students with the requisite background which would result in improved performance in introductory accounting.

Evidence exists in the current literature that both overall GPA and a proven proficiency in studying mathematics have a positive impact on grades in introductory accounting. Mathematics proficiency is measured using a mathematics score calculated by the level of class taken and the grade received – see specific description of the estimation in the methodology section.

The following hypotheses, stated in the alternative, were developed:

H2: Students with higher overall GPAs earn higher grades in introductory accounting.

H3: Students with proven proficiency in studying mathematics earn higher grades in introductory accounting.

The next control variable included in the study was transfer student status (TRANS). This variable was included in consideration of the fact that 40% of the student body of this institution is transfer students. While there are articulation agreements between various schools to identify the equivalency on a course-for-course basis and each university establishes an acceptable minimum grade, there is no standardization or guarantee of overall quality. There is some empirical evidence of a higher failure and withdrawal rate in the subsequent class of Intermediate accounting where introductory classes are transferred in (Schmidt & Wartick, 2013). Considering the prospect of a weaker academic background, the question of whether transfer students would perform as well as non-transfer students in introductory accounting is largely unknown.

Transfer status was measured using two different variables. First, the total number of credits transferred into the university was used to represent transfer status. However, because of the vast disparity of the number of credits student transfer in, transfer status was also measured using a dichotomous variable, “1” to designate transfer student and “0” for non-transfer. It is important for future academic policy decisions to consider any relationship between transfer status and performance in class in isolating the association of grade and accounting majors. The following hypothesis, stated in the alternative, will explore if transfer status is associated with performance in introductory accounting:

H4: Transfer students earn lower grades in introductory accounting than non-transfer students.

The final control variable chosen in the study was whether or not the student had previously taken introductory accounting course at our university or (PREV). This variable was suggested to have a deleterious effect on the performance of introductory accounting students in previous studies because repeating a class is a demotivating experience. Through anecdotal observation from experience as a professor of introductory accounting for over twenty-four years, I have discovered a consistent characteristic of a struggling student in introductory accounting is an unsuccessful previous attempt.

Students may have withdrawn from the course in a previous semester before they actually failed while others may have attended only a limited number of classes. Whatever the circumstances, the anxiety over previous attempts always seems to more than outweigh *any* information that might have been learned the first time through. Considering this situation, the next control variable chosen for the study was previous experience in introductory accounting (PREV). A continuous variable ranging from -1.0 to 2.0 was developed to represent whether the previous experience was favorable or unfavorable – specific details of the variable specification are included in the methodology section.

It is important to consider any relationship between students having previously taken the class and their current performance in isolating the association between grades and accounting majors. The conjecture that students doing poorly in the past would be likely to repeat the experience resulted in the development of the following hypothesis, stated in the alternative:

H5: Students re-taking introductory accounting because of a previously unfavorable experience earn lower grades than those taking it for the first time.

Methodology

Definition of Independent and Control Variables

The development of the independent variable, MAJOR and the control variables of GPA, MATH, TRANS and PREV are identified and explained in Table 1. Additional details on the specification of two of these variables, MATH and PREV, are discussed below to provide additional detail.

Mathematics score (MATH)-The control variable to represent the mathematical preparation of students was a mathematics score considering both the level of class taken previously as well as the grade received. The score was calculated by assigning a factor to represent the level of the most recent mathematics class taken from 0.50 to 2.0 and then multiplying this by the quality points received as a grade in the class. The grade range was a 4.3 for an A+ through a 0 for an F. As a result, the maximum “MATH” variable would be 8.6, and the minimum would be 0.

Previous experience in introductory accounting (PREV)-A continuous control variable was developed to measure the result of a previous attempt ranging from -1.0 to 2.0. Students taking the class for the first time were assigned a neutral variable of “0” while those transferring the class from another university were assigned “2.0” or the most favorable positive rating – transfer credits are accepted only where the student had passed the first time

through. Students earning a “D” the first time through, were assigned a “1.0” assuming that they earned *some* information on a first attempt.

Since the two possible scenarios in previous attempts, withdrawal or failure, were considered unfavorable, both were represented by variables with negative signs. Students withdrawing from the class were assigned a “-0.50” to represent an unfavorable experience to a lesser degree than actually failing. While students withdrawing from a class must provide documentation of an extenuating circumstance – few students performing well in a class request late withdrawals. Students receiving an “F” were assigned a “-1.0” as this is a clear indicator that performance was unfavorable the first time the class was taken. So a positive sign or a direct relationship was expected between GRADE and PREV as the less favorable the previous experience, the lower the current expected grade.

Sample

The sample for the current study included all students registered in my introductory accounting classes beginning with the fall semester of 2008 and continuing through the spring semester of 2013; thirteen classes were included. Note that in both 2008 and 2009, two sections of the same class were offered. The time frame of the data was chosen in a somewhat arbitrary manner as there was a conscious attempt to strike a balance between gathering an adequate sample to analyze and a desire to include the most current information possible.

Further standardization of the sample rested in the fact that it was not necessary to control for differences across delivery methods as the same professor, textbook, teaching and examination format was used for the duration of the study. The consistent application of teaching style and enforcement of course policies inherent on a sample with one professor was considered an advantage in research design (Wooten, 1998) (Mattar & El Houry, 2013).

Data Collection

All data were collected from student transcripts. To analyze the data, the first step was to calculate the descriptive statistics for the dependent variable GRADE and each of the independent and control variables, see results of the descriptive statistics in Table 2.

Next bivariate correlations were calculated between all variables, dependent, independent and control for which results are shown in Table 3. Relationships significant at the 1% and 5% levels are designated with ** and *, respectively. Results suggest four variables (i.e., GPA, MATH, MAJOR and PREV) have a 1% relationship to GRADE the dependent variable. These variables were used to model GRADE in a multivariate regression equation.

Summary of Results and Opportunities for Future Research

The results of the multivariate model to explain GRADE are shown in Table 4. The model estimating the dependent variable of GRADE using the independent variable MAJOR controlling for other variables found significant in bivariate testing indicates an adjusted r^2 of 35% with all variables remaining significant in the final equation.

While Table 3 reveals several significant bivariate relationships emerged in the analysis between pairs of independent variables -- MATH and GPA, MATH and MAJOR, MAJOR and GPA and MAJOR and PREV, the multivariate model remained stable despite the inclusion of these variables. As a result, it does not appear that multicollinearity impaired the stability of the model.

From the results of the multivariate model, four of the five null hypotheses were rejected. Each is discussed in detail below.

H1: MAJOR – Alternative hypothesis accepted, null rejected

Accounting majors were suggested to earn higher grades in introductory accounting than their non-major counterparts which are consistent with results of previous studies (Doran et al., 1991) (Fedoryshyn et al., 2010). This is an important result as the superior performance in introductory accounting by accounting majors has long been observed anecdotally; it has not been the focus of significant previous empirical research in the past.

H2: GPA – Alternative hypothesis accepted, null rejected.

The control variable of GPA was a significant predictor of the final grade in introductory accounting. This confirms results from several previous research studies (Gist et al., 1996); (Elias, 2005); (Fedoryshyn et al., 2010); (Doran et al., 1991); (Wooten, 1998);(Triki et al., 2012). These results are also consistent with expectations from previous teaching experience.

H3: MATH – Alternative hypothesis accepted, null rejected.

The control variable of MATH (i.e., students with a higher mathematics score considering both the level of and grade earned in mathematics) was also a significant predictor of the final grade in introductory accounting. Results are consistent with previous studies (Gist et al., 1996); (Fedoryshyn et al., 2010) (Brown, 1992). As with GPA, results are also consistent with expectations from previous teaching experience.

H4: TRANS - Failed to reject null hypothesis.

Transfer student status, measured by number of credits transferred into the university *and* a dichotomous variable, was not suggested to be related to lower grades in introductory accounting. This is inconsistent with results of a study on the impact of transferring introductory accounting on Intermediate Accounting grades (Schmidt & Wartick, 2013). These results are also inconsistent with expectations from previous teaching experience. The results however, are noteworthy because a significant number of institutions do accept introductory accounting as a transfer course from other universities (Duchac & Amoruso, 2012).

H5: PREV – Alternative hypothesis accepted, null rejected

Students re-taking introductory accounting because of a previously unfavorable experience *were* suggested to earn lower grades than those taking the class for the first time which *was* consistent with previous research results (Prinsloo et. al., 2010) (Du Plessis et. al., 2005) and observations in practical teaching. Many students may have withdrawn from the course in a previous semester before they actually failed while others may have attended only a limited number of classes. This result was expected because the anxiety over previous attempts always seems to more than outweigh *any* information that might have been learned the first time through

By and large, the results of this study offer information to consider in discussion of how to improve results in the introductory accounting course. Accounting Major status was found to be a significant predictor of the ultimate grade students earn in the introductory accounting course while controlling for GPA, MATH and PREV. Together these variables effectively explained 35% of the factors that would influence a students' grades in introductory accounting.

This knowledge can be used to improve the delivery of introductory accounting. Since introductory accounting is traditionally one of the first courses in business that business majors are exposed to, it is of necessity a combined group of both accounting majors and students majoring in other business disciplines. The accounting majors generally compose a minority of a more interested, focused and motivated group of students within this course.

While segregating students already deciding to major in accounting would allow more in-depth study and the possibility of covering additional accounting topics, this idea is generally abandoned for a variety of reasons. These include what to do with students taking the non-majors class who switch into accounting. Another argument against segregating majors at the introductory accounting level is that the non-major class would be desimated by "cherry-picking" the most motivated students and funneling them into classes restricted to accounting majors. Previous research found support for the concept of an honors program in accounting by students, faculty and potential employers. (Leong & Wagner, 1990).

Attracting students to the accounting profession is, however, the most important argument to combine accounting and non-accounting majors in the same class. The introductory accounting class should be a beacon that engages students in the discipline of accounting rather than an impossible experience focused on weeding them out (Jenkins

& Rubin, 2011). Panels of accounting professionals should be invited to the course to introduce students of all business disciplines to the variety of accounting-related careers.

In regards to the significance of GPA and MATH to GRADE, results support the establishment of minimum standards of performance and admission into the school of business. Such initiatives are in accordance with The Association to Advance Collegiate Schools of Business (AACSB) (AACSB, 2012). One of the major influences on accounting education over the past 30 years has been AACSB accreditation (Black 2012). Accreditation initiatives frequently establish a minimum overall GPA for acceptance into and graduation from Schools of Business. Students apply for admission after earning a prescribed number of total credits at the university. In addition, minimum grades are customarily required in all business core courses and higher minimum grades are stipulated for all courses within a students' specialization. These results support the institution of GPA minimums for the introductory accounting course.

Previous experience in the course is the final control variable suggested to be significant in the explanation of success of a student in the introductory accounting class. This supports two previous studies profiling at-risk students (Prinsloo et. al., 2010); (Du Plessis et. al., 2005). The emergence of a direct relationship between PREV and GRADE suggests that students with a previously unfavorable experience in the class tended to do less favorably in subsequent attempts. While it is not recommended that students be barred from a second attempt at introductory accounting, previous literature suggested a formal appraisal of risk assessment in the form of a questionnaire was effective in improving the performance of repeat students (Prinsloo et. al., 2010). The use of such a risk assessment tool in conjunction with extra credit offered for attendance at tutoring sessions might be a very effective means to improve repeat student performance.

Taken as a whole, results suggest performance in introductory accounting could be improved by requiring a minimum GPA and that all mathematics requirements be met as a prerequisite for registration. In addition, retention strategies should be focused on repeat students to ensure a more successful experience on the second try at introductory accounting.

The implications for future studies from this project are extensive. A follow-up study, "*Raising Minimum Grade Standards – Does it Improve Performance in the Introductory Financial Accounting Course*", has been designed using data gathered in the current research. Results of this study will be extremely relevant and interesting as the project will examine the effectiveness initiatives established to improve student performance in introductory accounting. As mentioned previously, it is impossible to over-estimate the importance of the introductory accounting course to the education of the business student.

Table 1
Variable Description
 (All variables were gathered from student transcripts)

Name	Description	Support
Independent Variable:		
MAJOR	Accounting Majors assigned a “1”, non-accounting majors a “0”.	(Doran et al., 1991); (Fedoryshyn et al., 2010).
Control Variables:		
GPA	Overall grade point average (GPA) of student at conclusion of semester immediately preceding semester of enrollment in introductory accounting.	(Gist et al., 1996); (Elias, 2005); (Fedoryshyn et al., 2010); (Doran et al., 1991); (Wooten, 1998) (Triki, Nicholls, Wegener, Bay, & Cook, 2012).
MATH	A mathematics score calculated using a factor to represent the level of the most recent mathematics class from 0.50 to 2.0 multiplied by the quality points of the grade received for the class. The grade range was a 4.3 for an A+ through a 0 for an F. As a result, the maximum “MATH” variable was equal to 8.6, and the minimum was 0. (Classes transferred in were assigned a 2.0.)	(Gist et al., 1996); (Fedoryshyn et al., 2010) (Brown, 1992).
PREV	<p>The following variables were assigned to capture the impact of repeating the introductory accounting course:</p> <ul style="list-style-type: none"> • First time students = 0; • Transferred class from a previous university* = 2.0 • Received a “D” = 1.0 • Withdrew from the class = “-0.50” • Received an “F” = “-1.0” <p>* Students <i>were</i> required to retake the 4 credit introductory accounting class where they transferred in a 3 credit class before the creation of a one credit bridge class.</p>	(Prinsloo et. al., 2010); (Du Plessis et. al., 2005)
TRANS	<p>Measured usually two different variables:</p> <ol style="list-style-type: none"> 1. Number of credits transferred into the university. 2. A dichotomous variable (i.e., 0 for non-transfer and 1 for transfer student). 	(Schmidt & Wartick, 2013); (Duchac & Amoruso, 2012)

Table 2
Descriptive Statistics
Dependent and Independent Variables

	N	Minimum	Maximum	Mean	Std. Deviation
GRADE	398	.0000	4.3000	2.496231	1.0463856
GPA	398	.0000	4.0000	2.663417	.8222133
MATH	398	.0000	8.0000	2.057852	1.5569175
MAJOR	398	0	1	.21	.407
PREV	397	-1	2	.11	.594
TRANS(Credits)	395	.00	135.00	17.1778	24.26757
TRANS(Yes/NO)	398	0	1	.56	.497
Valid N (list wise)	385				

Table 3
Bivariate Correlations
Dependent and Independent Variables

		GRADE	GPA	MATH	MAJOR	PREV	TRANS (Credits)	TRANS (Yes/No)
GRADE	Pearson Correlation	1	.439**	.406**	.404**	.130**	.062	.071
	Sig. (2-tailed)		.000	.000	.000	.009	.216	.155
	N	398	398	398	398	397	395	398
GPA	Pearson Correlation	.439**	1	.394**	.154**	-.093	-.258**	-.058
	Sig. (2-tailed)	.000		.000	.002	.063	.000	.248
	N	398	398	398	398	397	395	398
MATH	Pearson Correlation	.406**	.394**	1	.227**	.019	.016	.025
	Sig. (2-tailed)	.000	.000		.000	.709	.753	.616
	N	398	398	398	398	397	395	398
MAJOR	Pearson Correlation	.404**	.154**	.227**	1	.179**	.028	.053
	Sig. (2-tailed)	.000	.002	.000		.000	.578	.288
	N	398	398	398	398	397	395	398
PREV	Pearson Correlation	.130**	-.093	.019	.179**	1	.344**	.181**
	Sig. (2-tailed)	.009	.063	.709	.000		.000	.000
	N	397	397	397	397	397	394	397
TRANS (Credits)	Pearson Correlation	.062	-.258**	.016	.028	.344**	1	.619
	Sig. (2-tailed)	.216	.000	.753	.578	.000		.000
	N	395	395	395	395	394	395	395
TRANS (Yes/NO)	Pearson Correlation	.071	-.258**	.016	.028	.344**	1	1
	Sig. (2-tailed)	.155	.000	.753	.578	.000		
	N	398	395	395	395	394	395	398

** = significant at 1% level
* = significant at 5% level

Table 4

Multivariate Regression Results – Grade

Variable	B	SE	β	t	Sig.
Constant	0.951	0.144		6.604	0.000
GPA	0.407	0.056	0.322	7.250	0.000
MATH	0.143	0.030	0.214	4.781	0.000
MAJOR	0.732	0.108	0.287	6.762	0.000
PREV	0.184	0.073	0.105	2.537	0.012

Model Adjusted $R^2=0.352$

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