

## An Evaluation of Predictors of Achievement on Selected Outcomes in a Self-Paced Online Course

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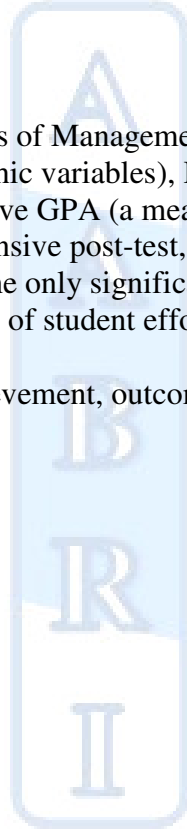
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### **ABSTRACT**

A self-paced online Principles of Management course was utilized to measure the effects of gender and age (demographic variables), Locus of Control (LOC, a psychosocial measure), and cumulative GPA (a measure of effort) on three separate outcomes: written work, a comprehensive post-test, and the final score earned in the course. In two of the three models, the only significant predictor of student outcomes was cumulative GPA, which is a measure of student effort.

**Keywords:** Online, self-paced, achievement, outcomes, predictors



## INTRODUCTION

Distance education has been an option for learners since the mid-1800's (Parker, 2003). Written correspondence courses delivered by the postal service represent one of the earlier technologies used for distance learning. Over time correspondence courses incorporated the media of television and radio. The technology used in today's distance learning courses involves computer-mediated communications and the Internet (Artino, 2007). There is a well-established history of research studies which have compared the attitudes and academic achievements of distance learners in a wide variety of distance learning formats with those of traditional classroom students. The results from such studies have repeatedly reported no statistically significant differences in student learning between the various distance learning formats (Russell, 1999). This distance learning study examines the use of a self-paced course design with course delivery provided via the Internet.

According to Artino (2008), the Internet as a technology-of-choice for learning and teaching at a distance has been developing for slightly more than a decade. Online course offerings and number of student enrollments are expanding rapidly in postsecondary schools. This is evidenced by a growth rate of 9.7 percent for online enrollments as compared with a growth rate of 1.7 percent for the overall higher education student population (Allen & Seaman, 2007).

A variety of reasons have been cited as the motivation underlying the propensity of postsecondary level students to select online courses. These vary from increased student access to higher education (Ebersole, 2008) to meeting needs of both geographically dispersed working adults and traditional students (Marks, Sibley & Arbaugh (2005). Other online students may be attracted to this environment because of the need for being a lifelong learner who must also continue to pursue their selected career path and continue meeting family commitments and responsibilities (Parker, 2003). Another issue of importance to both the online students and the postsecondary school offering online courses is the quality of learning taking place in the online environment (Ebersole, 2008; Gaytan & McEwen, 2007; Roblyer, Davis, Mills, Marshall, & Pape, 2008).

The purpose of this paper is to explore learning outcomes in a self-paced online course and to determine the factors influencing these outcomes. Self-paced courses are a sub-section of the online genre in that there is little or no synchronicity vis-à-vis other students and the professor. Thus, students proceed through the course at their own speed, influenced only by the parameters of an end date for the term, as well as their own motivation level and lifestyle.

Specifically, three broad types of factors are considered in this study (demographic, psychosocial and student effort), as are three types of learning outcomes (student performance on the overall final course score, student scores on a comprehensive post-test assessment instrument, and student scores on written exercises). Our contribution to the literature is a greater understanding of the interplay of these factors on three separate measures of student achievement within the context of a self-paced course.

## THEORETICAL FRAMEWORK

As online course offerings continue to expand and student enrollments continue to increase, it is important to provide evidence that online learning does add value for student learning outcomes (Jennings & Bayless, 2003; Moskal, Dziuban, Upchurch, Hartman & Truman, 2006; Waschull, 2005). One evidence of student learning might be simply the overall score attained in an individual course at the end of the semester. This would be applicable to courses taught in any of the currently popular formats: traditional classroom format, online format, and a hybrid format that combines both the traditional classroom and online formats. In each of these formats, student learning can be examined both as an overall score achieved and in light of student performance in terms of program learning outcomes (Terry, 2007).

Student learning and development can be reviewed through a variety of program assessment methods (Sinha, 2007). Program assessment has been defined as a “systematic collection, review, and use of information about educational programs undertaken for the purpose of improving student learning and development” (Palomba & Banta, 1999, p. 4). Research literature reflects that program assessment has become an explicit obligation of modern programs (Terry, Mills, Rosa, & Sollosy; 2008; Martell & Calderon, 2005; Trapnell, 2005). This focus on student-centered and learning-oriented assessments is evidenced in accreditation requirements of The Association to Advance Collegiate Schools of Business (AACSB International) for business programs aspiring to attain or maintain AACSB International accreditation (Gerlich & Sollosy, 2008). In business programs following AACSB accreditation requirements, there is utilization of direct measures of student achievement for specified learning goals for each program (Martell, 2007; Pringle & Michel, 2007). Online course offerings are included in these program assessments and represent a rapidly expanding component of overall course offerings as discussed earlier.

It is the position of these researchers that as the growth of online course offerings and student enrollments continue to expand and mature, it is important to study potential predictors of student learning in the online format. The purpose of this study is to examine potential predictors of student achievement on selected outcomes in a Principles of Management course taught in a self-paced online format. Potential predictors of student outcomes included students' Locus of Control (Rotter, 1966) scores, gender, age, and grade point average.

Rotter (1966, p. 1) stated, “the effects of reward or reinforcement on preceding behavior depend in part on whether the person perceives the reward as contingent on his own behavior or independent of it.” Rotter created an instrument, Locus of Control (LOC), to measure a person's perception of the role of preceding behavior as a determinant of a particular reward (1966). The instrument has been used by a number of researchers to examine the possibility of LOC score as a predictor of course achievement.

Rotter's scale ranged in value from 0 to 23. Individuals scoring less than 12 were said to have an internal locus of control (LOC), with all others having an external LOC. Internals typically demonstrate a high degree of control over their environment and outcomes, while externals tend to believe more in luck, fate, and outcomes being determined by others.

Several studies have shown that externality was significantly related to course achievement with the comment that this finding was unusual (Massari & Rosenblum, 1972; Wilhite, 1990). Current researchers continue to look for correlations between LOC scores and achievement with several studies now being conducted with students who are taking courses in an online environment. Yukselturk and Bulut (2007) describe mixed reports of LOC scores as a predictor of course achievement and indicate their position that there is agreement among some researchers for the existence of a relationship between LOC scores and student success. At the same time, other research reports show that internals seem to be more successful in an online environment (Kerr, Rynearson & Kerr, 2008; Yukselturk & Bulut, 2007). Other researchers have found that although students had an strong internal LOC score they were likely to use surface learning strategies in online discussions (Knowles & Kerkman, 2007). Still another report related to the relationship between LOC scores and student academic success shows student LOC scores tend to change over the course of a semester, moving to stronger internal scores by the end of the course (Liu, Lavelle & Andiris, 2002).

Writing in 1966, Rotter addresses the idea that reward, reinforcement, or gratification are crucial in the acquisition and performance of skills and knowledge. Yet, in 1975 he specifically addresses problems and misconceptions related to the construct of internal versus external control of reinforcement (Rotter, p. 57):

“When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in *external control*. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in *internal control*.”

Rotter (1975, p. 59), still writing to address possible misunderstandings of the construct of internal versus external control of reinforcement states, “to make a locus of control prediction, one must either control reinforcement value or measure it, and systematically take it into account.”

Perhaps there exists a perceived face validity that someone with a strong internal score would persevere longer or work harder to achieve a higher score in a traditional or online course without consideration of a student’s self value or interest related to a particular course or other goal. Rotter (1975) expressed ideas, that when considered from the perspective of an academic course setting, could explain behaviors by students with either a strong external LOC score or a strong internal LOC score. For example, drawing from Rotter’s work, a student with a strong external LOC score in an online course today might persist in a particular activity because they like some of the other people involved, they enjoyed the group activities, they didn’t want to disappoint their parents by dropping the course, or they wanted to stay on track to be able to graduate with their friends. On the other hand, it might be possible to extrapolate Rotter’s ideas to say that a student with a high internal LOC score may not persist because they are not interested in the course content, don’t see a personal relation or benefit to them personally or think their time and

energy would be better invested in other activities (e.g., work activities or perhaps a different course).

What can be inferred from the volume of studies based on Rotter's work still being conducted today is that there remains a high level of academic interest in Rotter's concepts and how they may or may not apply to student success today. Locus of Control is one of four predictors of student outcomes examined for this research project. A review of each of the other three predictors of student success follows.

The effect of gender on performance in online courses has been addressed by a number of research studies with little to no differences in success outcomes reported (Daymont & Blau, 2008; Friday, Friday-Stroud, Green & Hill, 2006; Dutton, Dutton & Perry, 2002). Arbaugh (2005) reported that females had somewhat lower perceived learning expectations while Friday, et al (2006) reported that females earned somewhat higher final grades.

The effect of age as a predictor of success in an online class has been reported as not significant in a study by Dutton, Dutton & Perry (2002). A study conducted by Yukselturk and Bulut (2007) also found that age was not a significant factor in predicting student success in an online course. Artino (2008) has reported that younger students are more likely to use surface processing in online discussion forums. Several research studies included gender as a possible predictor of student success in an online course but omitted age (Friday, et al, 2006; Daymount & Blau, 2008).

Artino (2007) reported GPA as a significant predictor of student success in an online course. Prior GPA as a determinant of student success was not included in the research findings discussed earlier in this paper. Artino (2008) did report research findings that showed students with higher self-regulating behaviors tended to have higher GPAs.

The methodology used in this research project is described in the following section. Also included is an explanation of each hypothesis examined as part of this project.

## **METHODOLOGY AND HYPOTHESES**

One online section of a Principles of Management course was tracked for an 8-week summer term at a Division II public university in the southwest. The course utilized a self-paced format. Students could access materials for the next chapter once they had earned a score of 80 percent or higher on the chapter quiz for the current chapter. There were a total of thirteen chapters included in the course. There were specific course assignments for each chapter in addition to the required chapter quizzes. Students were provided with a grading schedule for chapter assignments at the beginning of the semester. The grading schedule determined assignments and dates by which the assigned work would need to be completed in order to earn a grade. The self-paced component of the course allowed students to move through the assigned chapters at a schedule that fit their individual needs as long as they met the dates specified in the grading schedule.

A veteran of online course delivery who had taught the course multiple times in the preceding ten years taught the course. A total of 40 students completed the course in its entirety, and thus formed the sample for this study.

At the onset of the course, students completed Rotter's (1966) Locus of Control instrument. Locus of Control as a predictor of performance in college courses has shown mixed results (Wilhite 1990; Blackner 2000), but is a significant predictor of dropout rate (Parker 1999; Moore & Kearsley, 2005). Blackner's study, though, is comprehensive in scope and unilaterally showed LOC to be positively related to achievement in academic coursework (i.e., higher LOC is related to higher achievement scores). Students with internal LOCs understand the cause-and-effect relationship between effort and outcome, and realize that they are in control of affecting their own outcomes. Upon completing the LOC the bulk of the course was opened to the students.

The course was organized into 13 chapters of material that supplemented the textbook; students were required to perform at the 80% level or better on a short quiz at the end of each chapter. Upon reaching the minimum grade, the subsequent chapter was opened. Students could thus not move around the course at will, but rather in a linear progression based on their performance.

In addition to graded exams and projects throughout the course, a comprehensive outcomes assessment instrument (PostTest) was required of students. This instrument formed the basis of internal assessment for all sections of this course taught throughout the academic year. The last variable to be collected was Final Score, reflecting the total points earned by the students in the term.

As a measure of overall achievement in the course, a final score was calculated for each student using the points earned on a variety of exercises (articles, cases, and discussion board), and two exams. A comprehensive assessment exam was embedded as a portion of the final exam. The Assessment variable contains a percentage score between 0 and 100.

Locus of Control (LOC) was reported in a range from 0 to 23, with those scoring 11 or less being characterized as having an internal LOC. All others were characterized as having an external LOC.

The following variables were gathered by querying the university database. Gender was coded as 0 for females and 1 for males. GPA ranged from 0.00 to 4.00; Age was reported in years.

A general model as depicted below in Figure 1 (Appendix) illustrates the relationships we seek to study. Essentially, three categories of inputs (Demographics, Psychosocial and Effort) are proposed to affect outcomes in both Final Score and PostTest.

Based on the theoretical background reported above, we hypothesize the following relationships:

H1a: Gender will not be a positive and significant predictor of Final Score

H2a: LOC will be a negative and significant predictor of Final Score

H3a: GPA will be a positive and significant predictor of Final Score

H4a: Age will be a positive and significant predictor of Final Score

H1b: Gender will not be a positive and significant predictor of PostTest

H2b: LOC will be a negative and significant predictor of PostTest

H3b: GPA will be a positive and significant predictor of PostTest

H4b: Age will be a positive and significant predictor of PostTest



- H1c: Gender will not be a positive and significant predictor of Written  
 H2c: LOC will be a negative and significant predictor of Written  
 H3c: GPA will be a positive and significant predictor of Written  
 H4c: Age will be a positive and significant predictor of Written

Based on these hypotheses, the following three models are proposed:

Model 1:

$$\text{Final Score}_i = a + B1a(\text{Gender}_i) + B2a(\text{LOC}_i) + B3a(\text{GPA}_i) + B4a(\text{Age}_i) + e_i$$

Model 2:

$$\text{PostTest}_i = a + B1b(\text{Gender}_i) + B2b(\text{LOC}_i) + B3b(\text{GPA}_i) + B4b(\text{Age}_i) + e_i$$

Model 3:

$$\text{Written}_i = a + B1c(\text{Gender}_i) + B2c(\text{LOC}_i) + B3c(\text{GPA}_i) + B4c(\text{Age}_i) + e_i$$

## RESULTS & DISCUSSION

Multiple regressions using Final Score (Model 1), PostTest (Model 2) and Written (Model 3) as Dependent Variables were run using SPSS software. Tables 1a and 1b (Appendix) report findings for Model 1, tables 2a and 2b report findings for Model 2, and tables 3a and 3b report findings for Model 3. While the sample size is somewhat small (40 observations), Elliott and Woodward (2006) report that it is commonly acceptable to use multiple regression as long as there are 10 or more observations for each independent variable, which equals the results and parameters of the models used herein. In all cases, the Independent Variables were Gender, LOC, GPA, and Age.  $R^2$  (Model 1) = 0.562,  $R^2$  (Model 2) = 0.144,  $R^2$  (Model 3) = 0.524. Regression analysis for the models showed that only the GPA variable, a measure of student effort throughout their cumulative academic career, is a significant predictor of student achievement in Models 1 and 3. Based on these results, only H3a and H3c were retained; all other hypotheses were rejected.

Of particular interest is the inconsistent relationship between LOC and the three dependent variables. In the case of Final Score and Written, externals scored lower, while on the comprehensive PostTest, externals scored higher. Correlations between LOC and the three dependent variables are reported in Table 4 below. While not statistically significant, this difference may result from internals feeling much more in control in the overall breadth of course assignments (which included a large writing component), than they do on multiple choice objective exams under which they have no control other than what they have in short-term memory. It should also be noted that Final and Written are highly correlated, as about 80% of the course grade was determined from scores on written exercises. There were also 13 multiple-choice quizzes in the course that were not tallied in the final grade, but served as gateways to subsequent chapters once a score of 80% or higher was earned.

Also of interest is the Age variable. Although this variable was not a significant predictor in any of the three models, a general relationship was observed in that age was inversely related to performance on the three outcomes. It is possible that older students felt less at home with the online format than did their younger peers.

## CONCLUSIONS

The results reported above appear to indicate that GPA is the sole predictor of success in a course of this type, and that various other factors such as a student's Locus of Control and demographics are not significant predictors of achievement. This study is limited, though, in that it reports the findings from one online course at one institution, and at one period in time.

That GPA is the only significant predictor of success is not surprising in light of the literature cited above. GPA is a valid measure of student effort, and cumulatively becomes a good predictor of future outcomes. Given that the course observed in this project is a junior-level class, most students enrolling will have already completed about one-half of their degree requirements (i.e., 60 hours). Their cumulative GPAs thus reflect their efforts to date.

The disconfirmation of LOC as a significant predictor in this study is somewhat surprising, especially given that the course is well-suited for a take-charge individual (i.e., strong internal LOC). This result may have occurred because the course utilized a mix of both objective and subjective graded components. Had the course relied exclusively on subjective (i.e., written) exercises, it is possible the impact of LOC would be different.

It would be interesting to assess how LOC scores change over the course of a semester. The literature cited above shows that students tend to move toward stronger internal scores by the end of the course. Also of interest is the possibility of LOC being a subset of self-efficacy; in other words, as the semester unfolds and students gain mastery of the content, the shift toward more internal LOC scores may be explained.

That age and gender are not significant predictors is not surprising, given the findings of prior research. While age was indeed negatively correlated with the three outcomes, its effect was not large enough to warrant attention. Any differences (significant or non-significant) may very well be minimized over time as an increasing proportion of future students enter academic programs with substantial computer experience.

A future study would thus be advised to test these variables in other settings, including comparing results for identical courses taught in other formats (self-paced online, other-paced online and face-to-face). Furthermore, it would be interesting to test these variables with same-course sections taught by different professors, across time, perhaps across business disciplines, and even at multiple institutions before sweeping generalizations may be made.

## REFERENCES

- Allen, I. & Seaman, J. (2007). *Online Nation: Five years of growth in online learning*. Needham, MA: Sloan Consortium.
- Arbaugh, J. (2005). Interaction and learning. *Academy of Management Learning & Education*, 4(2), 135-149.
- Artino, Jr., A. (2008). Promoting academic motivation and self-regulation: Practical guidelines for online instructors. *TechTrends*, 52(3), 37-45.



- Artino, Jr., A. (2007b). Self-regulated learning in online education: A review of the empirical literature. *International Journal of Instructional Technology and Distance Learning*, 4(6), 3-18.
- Blackner, D. (2000). Prediction of community college students' success in developmental math with traditional classroom, computer-based on-campus and computer-based at a distance instruction using locus of control, math anxiety and learning style. (Doctoral dissertation, University of North Texas, 2000). Retrieved September 1, 2008 from [http://www.library.unt.edu/theses/open/20001/blackner\\_deborah/Dissertation.pdf](http://www.library.unt.edu/theses/open/20001/blackner_deborah/Dissertation.pdf)
- Daymount, T. & Blau, G. (2008). Student performance in online and traditional sections of an undergraduate management course. *Institute of Behavioral and Applied Management*, 275–294.
- Dutton, J., Dutton, M. & Perry, J. (2002). How do online students differ from lecture students? *Journal for Asynchronous Learning Networks (JALN)*, 6(1), 1-20.
- Ebersole, J. (2008). Online learning: An unexpected resource. *The Presidency: The American Council on Education's Magazine for Higher Education Leaders*, 11(1), 24-26, 28-29.
- Elliott, Alan C. and Wayne A. Woodward (2006), *Statistical Analysis Quick reference Guidebook*, Thousand Oaks CA: Sage.
- Friday, E., Friday-Stroud, S., Green, A. & Hill, A. (2006). A multi-semester comparison of student performance between multiple traditional and online sections of two management courses. *Journal of Behavioral and Applied Management*, 8, 66-81.
- Gaytan, J. & McEwen, B. (2007). Effective online instructional and assessment strategies. *American Journal of Distance Education*, 21(3), 117-132.
- Gerlich, N. & Sollosy, M. (2008). Evaluating the assessment outcomes in the principles of marketing course. *Academy of Educational Leadership Journal*. In Press.
- Jennings, S. & Bayless, M. (2003). Online vs. traditional instruction: A comparison of student success. *The Delta Pi Epsilon Journal*, XLV(3), 183-190.
- Kerr, M., Rynearson, K. & Kerr, M. (2003). Predicting student success in online courses: A new measure. In R. Han & J. Woosley (Eds.), *Proceedings of the 10<sup>th</sup> Annual International Distance Education Conference*.
- Knowles, E. & Kerkman, D. (2007). An investigation of students' attitude and motivation toward online learning. *Student Motivation*, 2, 70-80.
- Liu, Y., Lavelle, E., & Andris, J. (2002). Effects of online instruction on locus of control and achievement motivation. Paper presentation at *AERA Annual Conference in New Orleans on April 1, 2002*.
- Marks, B., Sibley, T. & Arbaugh, J. (2005). A structural equation model of predictors for effective online learning. *Journal of Management Education*, 29(4), 531-563.
- Martell, K. & Calderon, T. (2005). Assessment in business schools: What it is, where we are, and where we need to go now. In K. Martell & T. Calderon Eds, *Assessment of student learning in business schools* (pages 1-26). Tallahassee, FL: Association for Institutional Research.
- Martell, K. (2007). Assessing student learning: Are business schools making the grade? *The Journal of Education for Business*, 82(4), 189-195.
- Massari, D. & Rosenblum, D. (1972). Locus of control, interpersonal trust and academic achievement. *Psychological Reports*, 31, 355-360.

- Moore, M. & Kearsley, G. (2005). *Distance education: A systems view* (2nd ed.) Belmont, CA:Wadsworth.
- Moskal, P., Dziuban, C., Upchurch, R. Hartman, J. & Truman, B. (2006). Assessing online learning: What one university learned about student success, persistence, and satisfaction. *peerReview, Fall*, 26-29.
- Palomba, C. & Banta, T. (1999). *Assessment essentials: Planning, implementing, and improving assessment in higher education*. San Francisco, CA: Jossey-Bass.
- Parker, A. (1999). A study of variables that predict dropout from distance education, *International Journal of Educational Technology* [Online], 1(2). Retrieved September 1,2008 from <http://www.ed.uiuc.edu/ijet/v1n2/parker/index.html>
- Parker, A. (2003). Identifying predictors of academic persistence in distance education. *USDLA Journal*, 17(1), 55-62.
- Pringle, C. & Michel, M. (2007). Assessment practices in AACSB-accredited business schools. *The Journal of Education for Business*, 83(4), 202-211.
- Roblyer, M.D., Davis, L., Mills, S., Marshall, J., & Pape, L. (2008). Toward Practical Procedures for Predicting and Promoting Success in Virtual School Students, *The American Journal of Distance Education*, 22(2), 90-109.
- Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1-28.
- Rotter, J. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. *Journal of Consulting and clinical Psychology*, 43(1), 56-67.
- Russell, T. (1999). *The no significant difference phenomenon as reported in 355 research reports, summaries & papers*. Raleigh, NC: North Carolina State University.
- Sinha, N. (2007). An active student centered learning (ASCL) approach to instruct and assess a software engineering course. *International Journal of Instructional Technology & Distance Learning*, 4(6).
- Terry, N. (2007). Assessing the difference in learning outcomes for campus, online, and hybrid instruction modes for MBA courses. *The Journal of Education for Business*, 83(4), 220-225.
- Terry, N., Mills, L., Rosa, D., & Sollosy, M. (in press, 2008). Do online students make the grade on the business major field ETS exam? *Academy of Educational Leadership Journal*.
- Trapnell, J. (2005). Forward. In K. Martell & T. Calderon Eds. *Assessment of student learning in business schools*. Tallahassee, FL: Association for Institutional Research.
- Waschull, S. (2005). Predicting success in online psychology courses: Self-discipline and motivation. *Teaching of Psychology*, 32(3), 190-192.
- Wilhite, S. (1990). Self-efficacy, locus of control, self assessment or memory and study activities as predictors of college course achievement. *Journal of Educational Psychology*, 82(4), 696-700.
- Yukselturk, E. & Bulut, S. (2007). Predictors for student success in an online course. *Educational Technology & Society*, 10(2), 71-83.

Appendix

Figure 1: Predictors of Student Outcomes

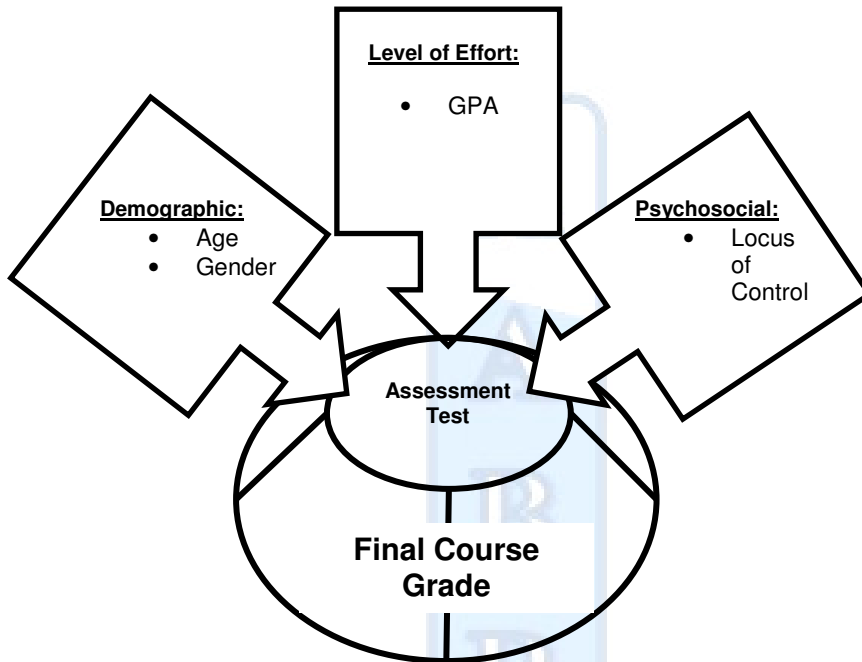


Table 1a

Model 1 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.750(a)	.562	.512	63.89724

a Predictors: (Constant), Age, Gender, GPA, LoC

**Table 1b**

**Model 1 Coefficients**

Mode 1		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant )	418.938	58.243		7.193	.000
	LoC	-1.848	2.718	-.079	-.680	.501
	Gender	.248	20.563	.001	.012	.990
	GPA	105.433	15.841	.768	6.656	.000
	Age	-1.840	1.060	-.208	-1.736	.091

a Dependent Variable: Final

**Table 2a**

**Model Summary**

Mode 1	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.380(a)	.144	.046	12.86974

a Predictors: (Constant), Age, Gender, GPA, LoC

**Table 2b**

**Model 2 Coefficients**

Mode 1		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant )	42.037	11.731		3.583	.001
	LoC	.841	.548	.249	1.537	.133
	Gender	1.684	4.142	.064	.407	.687
	GPA	5.800	3.191	.293	1.818	.078
	Age	-.017	.213	-.014	-.081	.936

a Dependent Variable: post

**Table 3a**

**Model Summary**

Mode 1	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.724(a)	.524	.470	60.92722

a Predictors: (Constant), Age, Gender, GPA, LoC

**Table 3b**

**Model 3 Coefficients**

Mode 1		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant )	379.529	55.536		6.834	.000
	LoC	-2.174	2.592	-.101	-.839	.407
	Gender	-2.310	19.608	-.014	-.118	.907
	GPA	92.717	15.105	.738	6.138	.000
	Age	-1.652	1.011	-.204	-1.635	.111

a Dependent Variable: Written

**Table 4**

**Correlations**

		LoC	Final	PostTest	Written
LoC	Pearson	1	-.077	.238	-.099
	Correlation				
	Sig. (2-tailed)				
	N	40	40	40	40
Final	Pearson	-.077	1	.124	.993(**)
	Correlation				
	Sig. (2-tailed)				
	N	40	40	40	40
PostTest	Pearson	.238	.124	1	.047
	Correlation				
	Sig. (2-tailed)				
	N	40	40	40	40
Written	Pearson	-.099	.993(**)	.047	1
	Correlation				
	Sig. (2-tailed)				
	N	40	40	40	40

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

