# Persistence at a Liberal Arts University and Participation in a Study-Abroad Program

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# PERSISTENCE AT A LIBERAL ARTS UNIVERSITY AND PARTICIPATION IN A STUDY-ABROAD PROGRAM


## Abstract

A longitudinal study with 6 years of cohort data examined the association between persistence at a private liberal arts university and participation in a study-abroad program. After adjustment for several factors that are known to affect persistence, results of regression analysis showed that students in the study-abroad program persisted longer than non-participants. According to Tinto's Theory of Individual Departure, persistence is related to how much a student is integrated into the academic and social subsystems of the university. It is hypothesized that participation in the study-abroad program contributed to both academic and social integration. Statistical, practical, clinical, and economic significance of the results are discussed.

## Introduction

Retention and persistence of students is an important issue in contemporary American higher education. Tinto (1993) stated than 60% of students entering higher education for the first time in 1993 will leave their first institution and that about 46% will leave higher education without receiving a 2- or 4-year degree. McLaughlin, Brozovsky and McLaughlin (1998) urged institutional researchers and other senior administrators to view student retention as a strategic issue that can have serious long-term effects on the future of their institutions.

## Theoretical Basis

Much of the early research on persistence and attrition was descriptive, in which characteristics of students who persisted in higher education were summarized and compared with those who left (Summerskill, 1962). Theory-based studies on student departure have become more common since the 1970s. Tinto (1986) grouped theories of student departure into five categories: psychological, societal, economic, organizational, and interactional. Hossler (1984) viewed Tinto's Theory of Individual Departure (Tinto, 1975), an interactional theory, as one of the most promising in explaining the process of student attrition. Yorke (1999) stated that Tinto had been the greatest influence on retention studies during the past 20 years. In brief, Tinto's theory considers the college experience to be comprised of academic and social systems. Higher degrees of integration into these systems by students lead to greater commitment to the educational institution and to the goal of degree completion. Tinto (1993) suggested that academic integration could be measured by grade point average and the amount of interaction students have with faculty, and that social integration could be measured by peer-group interactions and involvement in extracurricular activities

Astin (1977, p. 21) defines the construct of involvement as “the time and effort expended by the student in the activities that relate directly to the institution and its programs.” He states that attrition can be decreased by increased student involvement, including special academic programs. A study-abroad program is an example of a special academic program. Although there are many studies reported in the research literature on study-abroad experiences, few mention persistence or attrition.

## Purpose of the Study

The purpose of this study was to explore the association between persistence at a private liberal arts university (referred to throughout this paper as PLA University) and participation in a study-abroad program. Students who participate in the study-abroad program at PLA University spend one semester (typically during the sophomore year) at the Rome campus of the university. This is a 12-acre campus that includes classrooms, dormitory accommodations, housing for faculty, a small chapel, library, and student lounges. Students can spend only one semester in Rome. All students study essentially the same courses in Rome (i.e., art and architecture, literary traditions, western civilization, philosophy, theology, Italian) and live on the same campus with faculty and staff and their families. The Rome Program provides an opportunity for students to more intensely experience the PLA University core curriculum, which focuses on the great deeds, ideas, and works of western civilization (*PLA University General Bulletin*, 2002). Informal interaction between students and faculty are an integral part of the Rome experience.

## Research Questions

1. After adjusting for background characteristics, academic integration, and social integration, what was the association between participation in the Rome Program and the number of semesters of persistence at PLA University after the Rome Program experience?

2. What percentage of participants in the Rome Program persisted at PLA University one semester after their participation?

3. What percentage of participants in the Rome Program persisted at PLA University two semesters after their participation?

4. What percentage of participants in the Rome Program graduated from PLA University within 4 years of initial entry?

## Methodology

This study used a quasi-experimental research design with 1,237 students to investigate the association between persistence at a liberal arts university and participation in a study-abroad program. The theoretical basis for the study was Tinto's Theory of Individual Departure.

Data for this study were extracted from the administrative computing system at PLA University. The following student-level data were used: (a) year of entry to PLA University, (b) gender, (c) ethnicity, (d) religion, (e) whether or not a state resident, (f) SAT combined score, (g) percentile of high school rank, (h) major at the end of first semester, (i) first-year grade point average (GPA) at PLA University, (j) whether or not a commuter during the first semester of freshman year, (k) undergraduate degree date, and (l) semester of Rome participation.

The independent variable of interest, also known as the treatment, was participation in the study-abroad program during the sophomore year. The control group consisted of students who were qualified to participate in the study-abroad program, but chose not to do so. The dependent variable was the number of fall and spring semesters enrolled as an undergraduate at the university post-treatment through spring 2003.

The primary method for ascertaining the association between participation in the Rome Program and persistence was the use of sequential regression analysis to measure the increase in

$R^2$ when the dummy variable for treatment was added to a model containing variables known to be associated with persistence and representing adjustment for background characteristics, academic integration, and social integration. Additional insight was gained through interpretation of unstandardized regression coefficients, standardized regression coefficients, and structure coefficients.

A component of Tinto's construct of academic integration is academic performance, which was operationalized as first-year GPA. Commuter status served as a measure of Tinto's construct of social integration. According to Tinto (1993), social integration is primarily a function of extracurricular activities and peer group interactions. Pascarella et al. (1981) cited several studies in which commuting students were not as involved in extracurricular activities nor had as much interaction with faculty and students as did residential students. Several demographic and pre-college variables were used to represent what Tinto (1993) described as pre-entry attributes.

## Means and Standard Deviations of Variables

Means and standard deviations of variables used in this study are shown in Table 1.

<INSERT TABLE 1 ABOUT HERE>

Several of the variables were dichotomously dummy-coded using 0 and 1. In such instances, the mean is the proportion of observations in the category coded 1 (Hardy, 1993). Two of the variables—SAT score and percentile of high school rank—were missing for some students. Because all but 14 of the 1,237 students in the study had a SAT score, these few missing values were of negligible importance. Of greater concern was that 241 students did not have a value for percentile of high school rank because some high schools do not rank their students. Students who had missing values for any of the variables in the full regression model were excluded from the sequential regression analysis. Allison (2002) recommended this method when the data are missing completely at random, as was presumed the case with high school rank. Table 2 contains means and standard deviations for the 988 students included in regression. They are similar to those in Table 1, indicating that that the exclusion of 249 students with either missing SAT score or percentile of high school rank had little effect on the variables of interest, and confirming the assumption that the data were missing completely at random.

<INSERT TABLE 2 ABOUT HERE>

Because subjects were not randomly assigned to the treatment and control groups, it was not unexpected to find pre-treatment differences between the two groups for the variables used in the study (Table 2). In a true experimental design, the random assignment of subjects to treatment and control groups should minimize such differences as those noted. However, in a quasi-experimental design such as this study, these differences are expected and dealt with as part of the statistical analysis. The rationale for the sequential regression approach in this study was so that the association between treatment and persistence could be determined after adjusting for differences in demographic and academic characteristics. Differences between the treatment and control groups for the independent variables were not the focus of this study; however, the differences in Table 2 illustrate the importance of adjusting for these variables so that the differences between the two groups on the dependent variable can be attributed to the treatment and not to the differences in characteristics of the two groups.

## Findings Related to Research Question 1

*Sequential Regression Analysis*

Results of the sequential regression analysis are shown in Table 3. The regression model containing only year of entry explained 2.8% of the variation in the number of semesters enrolled post-treatment. Only students entering PLA University as first-time college students in the fall semesters of 1995, 1996, 1997, 1998, 1999, and 2000 were included in this study. Because the dependent variable (number of semesters of enrollment post-treatment) was measured in spring 2003, students in the earlier cohorts had the opportunity to enroll in more semesters than did students in the later cohorts. The association between semester of entry and the dependent variable was measured and adjusted for by including dummy variables for semester of entry in the regression equation. An additional 3.8% of the variation was explained by the nine variables that measured background characteristics, academic integration, and social integration. Participation in the study-abroad program explained an additional 4.2% of the variation in number of semesters enrolled post-treatment.

<INSERT TABLE 3 ABOUT HERE>

*Unstandardized Regression Coefficient for Treatment*

The regression coefficient for treatment was .83, which means that holding all other variables constant, students who participated in the study-abroad program persisted on average .83 semesters longer post-treatment at the university than the control group. Comparison of unstandardized regression coefficients provides little information in studies such as this, where independent variables were measured in different units. However, $p$ values for each unstandardized variable can be compared and used to assess statistical significance. Treatment, along with first-year GPA and the 2000 cohort year of entry, were the only variables with *p* values <.01. The next highest *p* value (.06) was for undeclared major.

*Standardized Regression Coefficients*

If all of the independent variables are measured in the same units on the same scale, the unstandardized regression coefficients can be compared and used to determine their relative importance. However, if the independent variables are measured on different scales, as was the case in this study, then standardized regression coefficients should be used to evaluate the relative importance of each independent variable (Fox, 1997; Lewis-Beck, 1980; Schroeder, Sjoquist, & Stephan, 1986).

Only three of the standardized regression coefficients (β weights) in Table 3 were of sufficient magnitude to be of interest (-0.14, 2000 cohort; 0.11, first-year GPA; and 0.22, treatment). With the exception of the 2000 cohort, the standardized regression coefficients for the other years of entry were essentially 0. The standardized regression coefficient of -0.14 for the 2000 cohort year of entry was probably a reflection of the fact that this cohort was limited by the date of data collection (spring 2003) to a maximum of three semesters post-treatment. The standardized regression coefficient for the treatment (0.22) was twice that for first-year GPA (0.11). However Cohen, Cohen, West, and Aiken (2003) and Fox (1997) urged caution in the interpretation of standardized regression coefficients for dummy variables. A standardized regression coefficient represents the number of standard deviations of change in the dependent variable associated with a 1 standard deviation increase in the independent variable. Fox (1997) stated that it makes no sense to standardize dummy variables because they cannot increase by 1 standard deviation—they can only take on the values of 0 or 1, regardless of the size of the standard deviation. As an alternative, Fox (1997) suggested that only the dependent variable and the continuous independent variables be standardized, and that the dummy variables be left alone.

Table 4 contains the results of the sequential regression analysis when the continuous independent variables were standardized, but not the dummy variables, as recommended by Fox (1997). Although it is common practice to standardize the dependent variable, it is not required because the relative sizes of the standardized regression coefficients are not affected by the units of scale of the dependent variable (Fox, 1997). In order to keep the dependent variable in easily understandable units (number of semesters of enrollment post-treatment), it was not standardized for the regression results reported in Table 4.

<INSERT TABLE 4 ABOUT HERE>

The $R^2$ values and the β weights in Table 4 are the same as those in Table 3. Of particular interest in Table 4 are the b weights for treatment (.83) and first-year grade point average (.16). Because only the three continuous variables were standardized prior to the regression, the interpretations for these coefficients are not the same as when all variables are standardized. Holding all else constant, a 1 standard deviation increase in first-year grade point average was associated with a .16 increase in number of semesters enrolled post- treatment. Holding all else constant, the treatment was associated with an increase of .83 semesters enrolled post-treatment over the control.

The ratio of the treatment β weight to first-year GPA β weight was 2 in Table 3 (.22/.11 = 2). The ratio of treatment b weight to first-year GPA b weight was 5.2 in Table 4 (.83/16 =5.2). The problem with the interpretation of the treatment β weight in Table 3 is that treatment cannot increase by 1 standard deviation because the standard deviation for treatment was .39 and treatment can assume only the values of 0 or 1. However, it makes sense for treatment to increase by 2.6 standard deviations because that results in the value for treatment moving from 0 (control group) to 1 (treatment group). Applying this to the ratio of β weights from Table 3, the relative importance of treatment to first-year GPA was (.22 * 2.6)/ .11 = 5.2, which is the same result if b weights from Table 4 are used. This demonstrates that the adjusted β weights in Table 4, obtained by standardizing only the continuous independent variables as recommended by Fox (1997), are more appropriate interpretations of the relative importance of the independent variables than are the β weights in Table 3.

*Structure Coefficients*

Structure coefficients are presented in Table 5. Several authors (Burdenski, 2000; Courville & Thompson, 2001; Thompson & Borrello, 1985) have stressed the importance of interpreting structure coefficients along with regression coefficients. Structure coefficients are the correlation coefficients between each independent variable and the predicted dependent variable. When squared, they can be interpreted as the amount of variance in the predicted dependent variable that is accounted for by each independent variable. Courville and Thompson (2001) pointed out that it is erroneous to presume that independent variables with β weights near 0 do not add to the explanatory value of the regression equation. Two correlated independent variables share some explanatory ability, which may be arbitrarily assigned to one of the variables, causing it to have a higher β weight. This assignment of shared variance may result in a low β weight for the other correlated variable, appearing as though it makes little contribution (Burdenski, 2000). Because structure coefficients are correlation coefficients (the correlation between the predicted dependent variable and each independent variable), their interpretation can be aided by Cohen’s (1988) guidelines on effect sizes for a correlation coefficient. He suggested that values of .10, .30, and .50 be considered small, medium, and large effect sizes, respectively, for a correlation coefficient.

<INSERT TABLE 5 ABOUT HERE>

The structure coefficients in Table 5 are the correlations between each independent variable (except for year of entry) in Table 3 and the number of semesters of post-treatment enrollment predicted by the b weights in Table 3. Because the data contained six entering freshman cohorts, there were five dummy variables for year of entry. Interpretation of structure coefficients in such situations is not recommended. Using Cohen's (1988) guidelines, all but three of the structure coefficients in Table 5 were in the range of small-to-medium effect size. The structure coefficient for female was essentially 0 (no effect). Structure coefficients for minority (-.34) and first-year GPA (.39) demonstrated a medium-to-large effect for each of these variables. Most importantly, the structure coefficient for treatment was .83, demonstrating a large association between Rome participation and number of semesters of enrollment post-treatment. The importance of Rome participation, as evidenced by the structure coefficient, concurred with the adjusted β weights in Table 5. When the structure coefficients in Table 5 were squared, it can be seen that treatment alone accounted for 69% of the total variance accounted for by all the variables in the model.

A variable with a β weight near 0 and a larger squared structure coefficient indicates that the variable is important in prediction but the shared predictive power of that variable was assigned to another independent variable (Courville & Thompson, 2001). A comparison of the adjusted β weights in Table 4 to the squared structure coefficients in Table 5 showed that the variables with the lowest adjusted β weights (state resident, -0.0004; percentile of high school rank, -0.01; SAT score, -0.02) had squared structure coefficients of .04, .01, and .05, respectively, indicating some multi-collinearity in these data. A variable with a large absolute β weight and near-0 squared structure coefficient is indicative of a suppressor effect (Courville & Thompson, 2001). The largest absolute adjusted β weight was for treatment (0.83), with the next largest in the range of 0.16 to 0.18 for first-year GPA, minority, Catholic and undeclared major. Of these variables, undeclared major had the lowest squared structure coefficient (.03), and the next lowest was .08 for Catholic. Based on the guidelines given by Courville and Thompson (2001), these data showed little evidence of a suppressor effect; however the change of sign for commuter between the adjusted β weight (0.08) and the structure coefficient (-0.18) was suspicious.

## Findings Related to Research Questions 2 and 3

The data in Table 6 show that 96% of the treatment group was enrolled at PLA University one semester after receiving the treatment and that 91% was enrolled two semesters post-treatment. In contrast, 80% and 72% of the control group were enrolled one and two semesters post-treatment, respectively. No hypothesis tests were conducted on the differences between the treatment and control groups because the data in Table 6 are population, not sample, data. However, the practical significance of the magnitude of the differences between the treatment and control groups were evaluated using Cohen's (1988) effect size *h* for differences between proportions. According to Cohen (1988), values of .20, .50, and .80 should be considered small, medium, and large effect sizes, respectively, for *h*. The differences between the treatment and control groups in the proportion of students enrolled one and two semesters post-treatment were of medium effect size.

<INSERT TABLE 6 ABOUT HERE>

## Findings Related to Research Question 4

The data in Table 7 show that 79% of the treatment group graduated from PLA University within 4 years of initial entry. In contrast, 51% of the control group graduated within 4 years. No hypothesis tests were conducted on the difference between the treatment and control groups because the data in Table 7 are population, not sample, data. However, the practical significance of the magnitude of the difference between the treatment and control groups was evaluated using Cohen's (1988) effect size *h* for differences between proportions. According to Cohen (1988), values of .20, .50, and .80 should be considered small, medium, and large effect sizes, respectively, for *h*. The difference in 4-year graduation rates between the treatment and control groups was a medium-to-large effect.

<INSERT TABLE 7 ABOUT HERE>

## Discussion

### *Association Between Persistence and Participation in the Rome Program*

The $R^2$ for the regression equation containing the full complement of variables was .1078 (Tables 3 and 4). Cohen (1988) suggested $R^2$ values of .0196, .13, and .26 as guidelines for small, medium, and large effect sizes in social science research. Based on these values, the overall model $R^2$ of .1078 indicated that these variables taken together had a medium effect on number of semesters enrolled post-treatment The importance of the treatment in explaining the number of semesters enrolled post-treatment was demonstrated not only by the increase of .0421 in $R^2$ for participation in the Rome Program in the sequential regression, but also by the sizes of the b weight for treatment (Table 3), adjusted β weights (Table 4), and structure coefficient for treatment (Table 5). The b weights (Table 3) would be used if one were interested in predicting the number of semesters of enrollment post-treatment for a particular student. The interpretation of the b weight of .83 for treatment was that, holding all other variables constant, students who participated in the Rome Program persisted on average .83 semesters longer post-treatment at PLA University than those who did not go to Rome. The interpretation of the adjusted β weights (Table 4) was that treatment was far more important in predicting number of semesters enrolled post-treatment than any other variable, more than 4.5 times as important as the next highest variables (Catholic, undeclared major, minority, and first-year GPA). The analysis of structure coefficients (Table 5) confirmed the pre-eminent importance of treatment. The structure coefficient for treatment was more than twice the size of the next largest structure coefficients (first-year GPA, minority, and Catholic). Together, all of the variables in the regression model explained about 11% of the variance in number of semesters enrolled post-treatment; however, the structure coefficient of .83 for treatment indicated that 69% of the explained variance was due to the solitary contribution of treatment. First-year-grade point average and minority status made the next-highest solitary contributions at 15% and 12%, respectively.

Strong evidence of a positive association between participation in the Rome Program and the number of semesters enrolled post-treatment was present in all of the statistical measures examined in this study (incremental increase in $R^2$, b weights, adjusted β weights, and structure coefficients). Why was this single variable so important? Perhaps it was because participation in the Rome Program was associated with both academic and social integration, whereas the other variables in the model were either background measures or contributed to only one aspect of integration. The nature of the Rome Program created an environment ripe for student interaction with each other and with faculty. It is likely that the living and learning arrangements of the Rome Program created an atmosphere of enhanced interaction with faculty and peer groups that exceeded the interactions experienced by students who did not go to Rome. Thus, participation in the Rome Program was likely associated with both academic and social integration as defined by Tinto (1993), and was of pre-eminent importance in explaining number of semesters enrolled post-treatment.

*Assessment of Significance of Participation in Rome Program*

Statistical significance testing has been widely used for decades to determine the probability of obtaining the results (or more extreme results) observed in the sample given that the specified null hypothesis is true for the population (Kirk, 1996). A variety of short-comings of statistical significance testing have been noted by Cohen (1994), Kirk (1996) and Thompson (2002). Most notable is that statistical significance tests provide no information as to whether or not the results are axiologically important. Kirk (1996) defined practical significance as "concerned with whether the result is useful in the real world" (p. 746) and suggested a number of measures of effect magnitude that could be used to assess practical significance. Thompson (2002) argued that researchers should supplement statistical significance with practical and clinical significance. Clinical significance refers to whether a treatment makes a real difference in the quality of life of the participants. In addition to statistical, practical, and clinical significance, Leech and Onwuegbuzie (2003) proposed the use of economic significance, which they defined as the economic value of effect of a treatment, when making educational policy decisions. There was strong quantitative evidence for statistical and practical significance for the association between participation in the Rome Program and number of semesters enrolled post-treatment. In addition, there was anecdotal evidence for clinical and economic significance.

Statistical significance was demonstrated by a $p$ value of $<.01$ for treatment (Tables 3 and 4). Furthermore, the $F$ test for the increase in $R^2$ (Cohen et al., 2003) from .0657 to .1078 when treatment was added to the model (Tables 3 and 4) had a $p$ value $<.01$.

Practical significance can be assessed by evaluating various measures of strength of association, such as r, $r^2$, R, and $R^2$ (Kirk, 1996). Based on Cohen's (1988) guidelines, the $R^2$ for the overall model (.1078) was a medium effect size and the increase in $R^2$ of .0421 when treatment was added to the model represented a small-to-medium effect. Cohen (1988) stated that a medium effect size "is large enough to be visible to the naked eye" and that "in the course of normal experience, one would become aware of an average difference…between…groups" (p. 26). Because structure coefficients are correlation coefficients, they also can be used to evaluate practical significance. Based on Cohen's (1988) guidelines, the structure coefficient for treatment (.83, Table 5) represented a large effect.

Clinical significance refers to whether a treatment makes a real difference in the quality of life of the participants (Thompson, 2002). Anecdotal data from students who participated in the Rome Program have shown that it greatly enhanced their educational experience (Heyne, 2002; Loufus, 2003). Alumni have fond memories of their semester in Rome. Furthermore, Rome participants graduated at a higher rate than non-participants (Table 7). The positive effects on a person's life of obtaining a college degree are well documented (Alexander, 1996; Pascarella & Terenzini, 1991).

Leech and Onwuegbuzie (2003) defined economic significance as the economic value of the effect of a treatment, and advocated its use by policy makers when assessing educational interventions. Cost-effectiveness, cost-benefit, cost-utility, cost-feasibility, and cost-sensitivity were among the measures they proposed for economic significance. The regression coefficient for treatment was .83 (Tables 3 and 4), indicating that students who participated in the Rome Program were enrolled at PLA University for almost one semester more than non-participants. At current (2003-04 academic year) tuition and discount rate, an additional semester of enrollment for 200 students per year yields net tuition revenue of $833,224. For the fiscal year ending May 31, 2003, there was a net loss of $799,659 for the Rome Program; however, $356,500 of that loss was debt service for the Rome facilities, which will diminish each year and eventually reach $0. When the net tuition revenue associated with increased persistence by students who go to Rome is considered, the annual economic benefit of the Rome Program is approximately $33,565 ($833,224 - $799,659). The results of this study provide solid evidence for making a business case that the $800,000 annual loss on the Rome program is over-stated and should be viewed differently.

*Understanding Persistence Beyond Freshman-to-Sophomore Retention*

Most of the persistence research reported in the literature is based on freshman-to-sophomore retention. Studies on graduation rates do not always provide details on year-to-year retention. This study was about persistence during and after the sophomore year because students had to be enrolled during the sophomore year to be included in the study. Although the $R^2$ for the full regression model was about 11%, which was a medium effect size according to Cohen (1988), these variables were a long way from explaining the majority of the variance. In previous research with the cohorts in this study, the same independent variables were used, but the dependent variable was defined as total number of fall and spring semesters enrolled at PLA University. Also, students who completed their freshman year at PLA University with a GPA of 2.0 or above, but who did not return for their sophomore year, were included in the control group. In that model, year of entry explained about 6% of the variance, with the nine variables in step 2 adding an additional 25%, and treatment adding an additional 20% for a total $R^2$ of .51. So it was surprising to find that only 11% of the variance was explained in the model in this study. A comparison of the results from these two studies indicated that persistence during and after the sophomore year was not associated to the same extent with pre-entry background characteristics, academic integration, and social integration as was persistence from freshman to sophomore year.

## Summary of Findings

The four research questions and their answers follow.

1. After adjusting for background characteristics, academic integration, and social integration, what was the association between participation in the Rome Program and the number of semesters of persistence at PLA University after the Rome Program experience?

Nine variables that measured background characteristics, academic integration, and social integration explained 3.8% of the variation in number of semesters enrolled post-treatment. Participation in the Rome Program explained an additional 4.2%. In all of the statistical measures examined in this study (incremental increase in $R^2$, b weights, adjusted β weights, and structure coefficients), there was evidence of an important positive association between participation in the Rome Program and persistence. Based on the b weight in the regression equation, holding all other variables constant, students who participated in the Rome Program persisted on average .83 semesters longer post-treatment at PLA University than those who did not go to Rome.

2. What percentage of participants in the Rome Program persisted at PLA University one semester after their participation?

Of the 1,007 students in this study who went to Rome, 96% were enrolled at PLA University one semester after Rome participation. This compared to 80% for the 230 students in the control group.

3. What percentage of participants in the Rome Program persisted at PLA University two semesters after their participation?

Of the 1,007 students in this study who went to Rome, 91% were enrolled at PLA University two semesters after Rome participation. This compared to 72% for the 230 students in control group.

4. What percentage of participants in the Rome Program graduated from PLA University within 4 years of initial entry?

Of the 674 students in the study who went to Rome and had the opportunity to graduate within 4 years, 79% graduated within 4 years. This compared to 51% for 123 students in the control group.

## Conclusions

There is a statistically and practically significant positive association between participation in the Rome Program and persistence at PLA University. The results of various statistical measures and the demonstration of projected additional net tuition revenue indicate a large effect size for participation in the Rome Program. It is likely that participation in this particular study-abroad program is associated with both academic and social integration as defined by Tinto (1993) because of the amount of interaction between students and faculty (one of Tinto's measures of academic integration) and between students themselves (one of Tinto's measures of social integration).

## Recommendations

Four recommendations emerged from this study:

1. PLA University should continue the Rome Program.

2. More research is needed to gain a better understanding of the factors associated with persistence beyond the sophomore year.

3. A model that more fully operationalizes Tinto's model would be helpful in understanding the association between participation in the Rome Program and persistence.

4. When conducting regression analysis with continuous and dummy variables and evaluating standardized regression coefficients, the dummy variables should not be standardized.

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Table 1

*Means (Standard Deviations) of Variables*

| Variable | All<br>N=1,237 | Treatment Group<br>N=1,007 | Control Group<br>N=230 |
|---|---|---|---|
| Independent variables | | | |
| Female (yes=1, no=0) | .63 (.48) | .66 (.48) | .52 (.50) |
| Minority (yes=1, no=0) | .26 (.44) | .23 (.42) | .41 (.49) |
| Catholic (yes=1, no=0) | .76 (.42) | .80 (.40) | .61 (.49) |
| State resident (yes=1, no=0) | .51 (.50) | .47 (.50) | .68 (.47) |
| Commuter (yes=1, no=0) | .09 (.29) | .06 (.23) | .23 (.42) |
| Undeclared major (yes=1, no=0) | .30 (.46) | .30 (.46) | .28 (.45) |
| SAT score[a] | 1,210 (149) | 1,218 (146) | 1,175 (155) |
| Percentile of high school rank[b] | 82 (17) | 82 (16) | 82 (18) |
| First-year grade point average | 3.10 (.52) | 3.15 (0.51) | 2.92 (0.52) |
| Dependent variable | | | |
| Semesters enrolled post-treatment | 3.8 (1.4) | 4.0 (1.2) | 3.0 (1.7) |

[a]Missing SAT score for 10 students in treatment group and 4 students in control group. [b]Missing high school rank for 201 students in treatment group and 40 students in control group.

Table 2

*Means (Standard Deviations) of Variables Used in Regression*

| Variable | All N=988 | Treatment Group N=798 | Control Group N=190 | Effect Size[a] |
|---|---|---|---|---|
| Independent variables | | | | |
| Female (yes=1, no=0) | .63 (.48) | .66 (.48) | .54 (.50) | 0.25 |
| Minority (yes=1, no=0) | .26 (.44) | .23 (.42) | .41 (.49) | -0.39 |
| Catholic (yes=1, no=0) | .75 (.43) | .79 (.41) | .59 (.49) | 0.44 |
| State resident (yes=1, no=0) | .54 (.50) | .50 (.50) | .72 (.45) | -0.46 |
| Commuter (yes=1, no=0) | .09 (.28) | .06 (.23) | .23 (.42) | -0.51 |
| Undeclared major (yes=1, no=0) | .29 (.45) | .29 (.45) | .26 (.44) | 0.07 |
| SAT score | 1,206 (148) | 1,213 (147) | 1,174 (149) | 0.26 |
| Percentile of high school rank | 82 (17) | 83 (16) | 82 (17) | 0.06 |
| First-year grade point average | 3.09 (0.52) | 3.14 (0.52) | 2.91 (0.50) | 0.44 |
| Dependent variable | | | | |
| Semesters enrolled post-treatment | 3.8 (1.5) | 4.0 (1.3) | 3.0 (1.8) | 0.66 |

[a]Effect sizes for differences between treatment and control groups were computed using Cohen's *d* for continuous variables and Cohen's *h* for dichotomous variables. Magnitude of effect sizes: .2 = small, .5 = medium, .8 = large (Cohen, 1988).

Table 3

*Summary of Sequential Regression Analysis for Predicting Number of Semesters of Post-Treatment Enrollment (N=988)*

| Variable | b Weight | SE | *P* Value | β Weight |
|---|---|---|---|---|
| Intercept | 2.48 | 0.42 | <.01 | 0 |
| 1996 cohort (yes=1, no=0) | -0.06 | 0.15 | .70 | -0.01 |
| 1997 cohort (yes=1, no=0) | -0.13 | 0.16 | .39 | -0.03 |
| 1998 cohort (yes=1, no=0) | 0.04 | 0.15 | .78 | 0.01 |
| 1999 cohort (yes=1, no=0) | -0.15 | 0.15 | .31 | -0.04 |
| 2000 cohort (yes=1, no=0) | -0.57 | 0.16 | <.01 | -0.14 |
| Female (yes=1, no=0) | -0.09 | 0.09 | .33 | -0.03 |
| Minority (yes=1, no=0) | -0.17 | 0.11 | .11 | -0.05 |
| Catholic (yes=1, no=0) | -0.18 | 0.11 | .10 | 0.05 |
| State resident (yes=1, no=0) | -0.0004 | 0.09 | .99 | -0.0002 |
| Commuter (yes=1, no=0) | 0.08 | 0.17 | .65 | 0.01 |
| Undeclared major (yes=1, no=0) | 0.18 | 0.10 | .06 | 0.06 |
| SAT score | -0.0001 | 0.0004 | .73 | -0.01 |
| Percentile of high school rank | -0.0009 | 0.003 | .79 | -0.01 |
| First-year grade point average | 0.30 | 0.11 | <.01 | 0.11 |
| Treatment (yes=1, no=0) | 0.83 | 0.12 | <.01 | 0.22 |

*Note*. $R^2$ = .1078; increase in $R^2$ from model without treatment = .0421. There were 1,237 students in this study, but 988 were used in the regression analysis because of missing data, which had minimal impact because the data were determined to be missing at random.

Table 4

*Summary of Sequential Regression Analysis for Predicting Number of Semesters of Post-Treatment Enrollment – Independent Continuous Variables Standardized (N=988)*

| Variable | b Weight (adjusted β) | SE | *P* Value | β Weight |
|---|---|---|---|---|
| Intercept | 3.18 | 0.19 | <.01 | 0 |
| 1996 cohort (yes=1, no=0) | -0.06 | 0.15 | .70 | -0.01 |
| 1997 cohort (yes=1, no=0) | -0.13 | 0.16 | .39 | -0.03 |
| 1998 cohort (yes=1, no=0) | 0.04 | 0.15 | .78 | 0.01 |
| 1999 cohort (yes=1, no=0) | -0.15 | 0.15 | .31 | -0.04 |
| 2000 cohort (yes=1, no=0) | -0.57 | 0.16 | <.01 | -0.14 |
| Female (yes=1, no=0) | -0.09 | 0.09 | .33 | -0.03 |
| Minority (yes=1, no=0) | -0.17 | 0.11 | .11 | -0.05 |
| Catholic (yes=1, no=0) | 0.18 | 0.11 | .10 | 0.05 |
| State resident (yes=1, no=0) | -0.0004 | 0.09 | .99 | -0.0002 |
| Commuter (yes=1, no=0) | 0.08 | 0.17 | .65 | 0.01 |
| Undeclared major (yes=1, no=0) | 0.18 | 0.10 | .06 | 0.06 |
| SAT score (standardized) | -0.02 | 0.06 | .73 | -0.01 |
| Percentile of high school rank (standardized) | -0.01 | 0.05 | .79 | -0.01 |
| First-year grade point average (standardized) | 0.16 | 0.06 | <.01 | 0.11 |
| Treatment (yes=1, no=0) | 0.83 | 0.12 | <.01 | 0.22 |

*Note.* $R^2$ = .1078; increase in $R^2$ from model without treatment = .0421. There were 1,237 students in this study, but 988 were used in the regression analysis because of missing data, which had minimal impact because the data were determined to be missing at random.

Table 5

*Structure Coefficients for Predicting Number of Semesters of Post-Treatment Enrollment (N=988)*

| Variable | Structure Coefficient | (Structure Coefficient)$^2$ |
|---|---|---|
| Female (yes=1, no=0) | -.004 | .00002 |
| Minority (yes=1, no=0) | -.34 | .12 |
| Catholic (yes=1, no=0) | .29 | .08 |
| State resident (yes=1, no=0) | -.21 | .04 |
| Commuter (yes=1, no=0) | -.18 | .03 |
| Undeclared major (yes=1, no=0) | .18 | .03 |
| SAT score | .23 | .05 |
| Percentile of high school rank | .10 | .01 |
| First-year grade point average | .39 | .15 |
| Treatment (yes=1, no=0) | .83 | .69 |

Table 6

*Means (Standard Deviations) of Percentage of Students Enrolled 1 and 2 Semesters Post-Treatment (N=1,237)*

| Item | All N=1,237 | Treatment Group N=1,007 | Control Group N=230 | Effect Size[a] |
|---|---|---|---|---|
| Enrolled 1 semester post-treatment | .93 (.26) | .96 (.20) | .80 (.40) | .53 |
| Enrolled 2 semesters post-treatment | .88 (.33) | .91 (.28) | .72 (.45) | .51 |

[a]Effect sizes for the difference between treatment and control groups were computed using Cohen's *h*. Magnitude of effect sizes: .2 = small, .5 = medium, .8 = large (Cohen, 1988).

Table 7

*Means (Standard Deviations) of Percentage of Students Graduating Within 4 Years of Initial Entry (N=797)*

| Item | All N=797 | Treatment Group N=674 | Control Group N=123 | Effect Size[a] |
|---|---|---|---|---|
| Graduated within 4 years | .75 (.43) | .79 (.41) | .51 (.50) | .60 |

[a]Effect size for the difference between treatment and control groups was computed using Cohen's *h*. Magnitude of effect sizes: .2 = small, .5 = medium, .8 = large (Cohen, 1988).