

TUTORING: A Support Strategy for At-risk Students

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Abstract

A longitudinal research study was conducted at a public university in Pennsylvania on a sample of 129 at-risk students from a state-funded program (Act 101) designed to provide support services for economically and educationally disadvantaged students. This research employed a non-experimental, ex post facto methodology to assess the impact of tutoring on persistence, retention, and graduation. Study variables included measures of academic performance, retention, use and frequency of tutoring, the number of years in college, gender, and total credits earned toward graduation. Data were analyzed with t-tests, chi-square tests, multivariate and multiple regressions, and logistic regression. Results of the study showed that tutoring had significant positive relationships with retention and academic performance and demonstrate that tutoring can be effective as a strategy for succeeding to graduation.

Tutoring as a mode of instruction has a long history in higher education. Early European colleges, royalty, and the upper classes used tutoring as one of the primary forms of instruction, and such instruction continued well into the 19th and early 20th centuries across most of Europe and the United States (Gordon & Gordon, 1990). In many colleges today, tutoring continues to be an integral part of academic support programs designed for the general student population. Academic support programs often target at-risk students, such as those likely to drop out of college due to inadequate preparation.

Despite the extensive use by higher education of tutoring as a mode of instruction and as a learning strategy, few comprehensive studies have assessed the benefits derived from tutoring. A review of the literature suggests that some indirect effects achieved by tutoring include persistence, academic achievement, retention, and degree attainment (Astin, 1993; Rheinheimer & Mann, 2000; Rouche & Snow, 1977).

The expansion of equal educational access programs throughout the 1970s, 1980s, and 1990s resulted in increased enrollment of students from diverse racial, ethnic, and economic backgrounds. Consequently, governmental policy makers and educators developed, funded, and instituted programs designed to reduce attrition and increase retention of underserved and sometimes underprepared students. This was done primarily through the implementation of comprehensive developmental/remedial programs designed to enhance fundamental academic skills of at-risk students. These programs increased students' persistence and retention (Boylan, Bliss, & Bonham, 1993; Kulik, C., Kulik, J., & Shwalb, 1983; Vallone, Reid, Umali, & Pohlert, 2003).

Today, most higher education institutions have some form of academic support programs, most especially tutoring and advisory services. Theorists posit that tutoring enhances mastery of subject matter, thereby boosting academic self-efficacy, and increasing persistence and retention (Astin, 1993, 1998; Pascarella & Terenzini, 1991, 2005).

Background and Research Findings

The literature on undergraduates' persistence, retention, and graduation rates indicates that tutoring (peer, professional, and supplemental) plays a crucial role in undergraduates' sense of social and academic integration (Astin, 1984, 1993; Bean & Eaton, 2001; Riggio, Fantuzzo, Connelly & Dimeff, 1991; Pascarella & Terenzini, 1991, 2005; Tinto, 1987, 1993, 2000). Peer, professional, drop-in, and Supplemental Instruction are an integral part of the learning strategy of higher education.

Peer and professional tutoring are highly utilized tools of college and university academic support services. Research shows that peer tutors who possess high cognitive abilities are more likely to volunteer and/or be hired as tutors (Astin, 1993; Topping, 1996; Topping, Watson, Jarvis, & Hill, 1996). Presumably, these students are excellent role models, and at-risk students are more likely to emulate the good study habits and attitudes of their peer tutors (Pascarella & Terenzini, 2005). However, studies show that at-risk students are less likely to seek help when they need it (Bandura, 1986; Zimmerman, 2000; Zimmerman, Bandura, & Martinez-Pons, 1992). Therefore, educators must encourage and empower at-risk students to utilize tutoring early in the matriculation process.

This early intervention draws at-risk students into the college and university community, facilitating connections that foster student persistence, retention, and degree attainment (Fisher, 2007; Tinto, 1987, 1993). Further research reveals that early academic success promotes students' self-concept and self-efficacy, leading to the development of self-regulation skills (Pejares, 1997; Schunk, 1991; Collins, 2007; Zimmerman, 1990, 2000, 2002; Zimmerman et al., 1992). Once this occurs, students are more likely to seek help when they need it (Bandura, 1997).

Peer and professional tutors, who are trained in interpersonal and effective communication skills, are well positioned to articulate their duties, responsibilities, and expectations to undergraduates, providing clear parameters for what the undergraduate can expect from the tutoring

experience. Tutees are reminded that they are responsible for their education and they should attend and be prepared for scheduled tutoring sessions. If tutees come to their sessions prepared, one of the immediate benefits is the increase in knowledge gains and academic achievement. Studies show that good grades reduce dropouts and stopouts and serve as one of the best predictors for academic success (Astin, Keup, & Lindholm, 2002; Pascarella & Terenzini, 2005).

Another support strategy is Supplemental Instruction (SI), which utilizes trained leaders who serve as facilitators/tutors and are either upper class students or professional tutors (National Center for Supplemental Instruction, 1997). Supplemental Instruction leaders traditionally attend the courses along with the students, taking notes, reading texts, and providing positive feedback and content explanation to tutees through small group help sessions (Arendale, 1994; Burmeister, 1995; Eig, 1997).

The literature shows that SI positively impacts short-term persistence, especially from first to second year, while also improving the passing grades of students in higher education's historically difficult courses, such as chemistry and psychology (Pascarella & Terenzini, 2005; Visor, Johnson, Schollaet, Good-Majah, & Davenport, 1995). Additionally, SI appears to promote academic and social integration, which is crucial to the academic performance of undergraduate students in general and to at-risk students in particular.

Statement of the Problem

Despite the ability to acknowledge the benefits of tutoring on persistence, retention, and graduation, few studies assess the measurable impact of tutoring as a support strategy for at-risk students. The problem is complicated by the evidence that at-risk students are less likely to seek help when they need it. A strategy must be developed to empower at-risk students to seek academic assistance when they need it.

Act 101 Programs in Pennsylvania provide support services for economically and educationally disadvantaged students enrolled in higher education institutions throughout the state. These at-risk students enter college with the potential to succeed, but they lack the skills and background necessary to survive the rigors of academic life. The support services offered to these students include counseling and tutoring, and many of the students attend summer bridge programs prior to enrollment for their freshmen year. Tutoring is advocated for Act 101 students as an important academic assistance strategy that should be requested early in the semester.

The purpose of this article is to inform readers of the results of research on the academic performance of at-risk students from an Act 101 Program at one university in Pennsylvania. This research employs a non-experimental, ex post facto methodology to assess the impact of tutoring on persistence, retention, and graduation. The variables in the student sample include measures of academic performance, use and frequency of

tutoring, graduation rate, the number of years in college, gender, and total credits earned toward graduation. Little published research exists that links these variables to, or that shows the impact of support service programs on, student academic success.

Method

Sample

The sample consisted of incoming Act 101 students from the 1999, 2000, and 2001 summer bridge programs at a public university in Pennsylvania. A total of 129 students were tracked for the three cohort years, 1999-2001, through to graduation or withdrawal from college. Only students who made it through the summer programs and returned for at least one semester were tracked. The student sample consisted of 64 males and 65 females, with 25 of the students graduating and 103 of the students withdrawing from college.

Students were able to request tutors in as many subjects as they desired, as long as they were enrolled in the classes. To request a tutor, students needed to complete an application, which were available in the Learning Center where the tutoring was conducted. Detailed databases are maintained each semester by the tutoring staff for all tutoring data, including requests for tutors, tutors assigned to students, and dates when requests are made and assigned. These databases provided all the tutoring data needed for this study. For each student, the number of subjects in which students were assigned tutors was recorded for each semester the students were enrolled. Student records were examined to collect academic information and to identify students who graduated or withdrew from college.

Procedure

Both descriptive and inferential procedures were used to analyze the data collected on the students, which included data compiled from the tutoring databases and academic performance data (grade point averages, credits earned toward graduation, and number of years of study) gathered from student records. Means, standard deviations, and correlations provided the descriptive analyses, while t-tests, chi-square tests, multivariate and multiple regressions, and logistic regression were utilized to conduct inferential analyses. Logistic regression was used to examine the effect of predictors on graduation. This procedure determines the relationship between independent and dependent variables when the dependent variable is dichotomous, such as whether or not a student graduated. The level of significance, α , for all statistical tests was set at .05, and all statistical analyses were conducted with the SAS statistical package.

Results

For the purposes of this study, variable names were created to more efficiently describe the dataset. The variable names and their descriptions are TUTRTOTL (total number of courses in which each student was assigned tutors), GPA (student's cumulative grade point average), TCTG (total number of credits earned toward graduation), TUTORED (whether or not a

student was tutored), STATUS (whether a student graduated or withdrew), YOS (number of years in college), and GENDER (student's gender).

The results of selected data analyses are given in Tables 1 through 5. Significant results were found for correlations between TUTRTOTL, GPA, TCTG, and YOS (Table 1). We would expect GPA, TCTG, and YOS to be significantly correlated with each other, but the significant correlations between TUTRTOTL and GPA, TUTRTOTL and TCTG, and TUTRTOTL and YOS are important results for tutoring.

Table 1

Intercorrelations Between Selected Study Variables (N = 129)

	TUTRTOTL	GPA	TCTG	YOS
TUTRTOTL	--	.185*	.504***	.520***
GPA		--	.606***	.534***
TCTG			--	.964***
YOS				--

Note. TUTRTOTL = the total number of tutoring requests per student; GPA = the student's cumulative grade point average; TCTG = the total number of credits earned toward graduation; YOS = the number of years in college. * $p < .05$. *** $p < .0001$.

Table 2 gives the results for two contingency tables, STATUS by TUTORED and GENDER by TUTORED. A significant association was found between STATUS and TUTORED, but not between GENDER and TUTORED. The significance of the STATUS by TUTORED table can be attributed to the very small number of students (one) who graduated and were not tutored, as opposed to the proportion of students who withdrew and were not tutored. Based on the odds ratio for this table, students who were tutored were 13.5 times more likely to graduate than students who were not tutored.

Table 2

The Contingency Tables for the Status of Students (Graduated or Withdrew) and Gender Crossed with Whether or Not Students Were Tutored

	Tutored	Not Tutored
Status¹		
Withdrew	68	35
Graduated	25	1
Gender²		
Female	47	18
Male	46	18

¹ $\chi^2(1)=9.37, p < .01$. ² $\chi^2(1) = 0.00, p > .05$.

In Table 3, the variables TUTRTOTL, GPA, and YOS are grouped by STATUS and compared with t-tests. The results of these t-test comparisons reveal significant differences in favor of students who graduated for all three variables, the total number of courses in which each student was assigned tutors (TUTRTOTL), GPA, and the number of years in college (YOS).

Table 3

Descriptive Statistics and t-Test Comparisons for the Variables TUTRTOTL, GPA, and YOS Grouped by STATUS.

Variable	N	Mean	Std. Dev.	Min	Max	t-score	F-ratio
TUTRTOTL	103	3.11	3.70	0.00	16.0	5.19**	2.46*
	26	9.31	5.81	0.00	27.0		
GPA	103	1.80	0.68	0.17	3.33	9.13**	3.07*
	26	2.72	0.39	2.07	3.80		
YOS	103	1.32	0.51	1.00	3.00	18.20**	3.68**
	26	4.92	0.98	1.00	6.00		

Note. The first line for each variable represents the statistics for students who withdrew, and the second line is for students who graduated. * $p < .05$. ** $p < .001$.

Because the dependent variables for the regression analyses were correlated, a multivariate regression analysis was conducted to determine if one or more significant regressions existed. The multivariate regression analysis showed overall significance (Wilk's $\lambda = 0.72$, $F(4,250) = 11.10$, $p < .001$); therefore, follow-up regression analyses were conducted for the effects of predictors GENDER and TUTRTOTL on GPA and TCTG. These regressions found TUTRTOTL to be a significant predictor for both dependent variables (Table 4). The logistic regression analysis in Table 5 showed TUTRTOTL to be a significant predictor for STATUS.

Discussion

The results of this study demonstrate that tutoring significantly improves students' academic performance and retention. The correlations in Table 1 show the significant positive associations between the total number of courses in which each student was assigned tutors (TUTRTOTL) and student's cumulative grade point average (GPA), total number of credits earned toward graduation (TCTG), and the number of years in college (YOS). The first contingency table (Table 2) shows the significant association between being tutored (TUTORED) and graduating (STATUS). The impact of this association is more clearly expressed by the odds ratio, which reveals that students who were tutored were 13.5 times more likely to graduate than students who were not tutored — an overwhelming endorsement for tutoring.

The t-test comparisons in Table 3 provide additional evidence for the effectiveness of tutoring. Students who graduated made significantly ($p < .001$) more requests for tutors than students who withdrew from school. On average, students who graduated ($\bar{x} = 9.31$) were assigned over six more tutors per semester than students who withdrew from college ($\bar{x} = 3.11$).

The regression analyses in Tables 4 and 5 provide the strongest evidence for the positive effect of tutoring, with the total number of courses in which each student was assigned tutors (TUTRTOTL) emerging as a significant

predictor in all three regressions. In the first two regressions (Table 4), TUTRTOTL was a significant predictor for student's cumulative grade point average (GPA) and the total number of credits earned toward graduation (TCTG), two indicators of academic performance. In the third analysis (Table 5), a logistic regression, TUTRTOTL was a highly significant predictor for whether a student graduated or withdrew (STATUS).

Table 4

The Linear Regression Models with GPA and TCTG as the Dependent Variables and TUTRTOTL and GENDER as the Predictors (N = 129).

Dependent Variable	Predictor	B	SE B	β
GPA	Constant	1.87***	0.11	
	TUTRTOTL	0.03*	0.01	0.18*
	GENDER	-0.02	0.13	-0.01
TCTG	Constant	22.8***	4.25	
	TUTRTOTL	4.28***	0.65	0.50***
	GENDER	-2.89	6.33	-0.04

Note. B = unstandardized beta coefficients. SE = standard error of beta. β = standardized beta coefficients. For GPA model $R^2 = .03$. For TCTG model $R^2 = .26$. * $p < .05$. *** $p < .0001$.

Table 5

The Stepwise Logistic Regression Model with STATUS as the Dependent Variable and TUTRTOTL as the Predictor (N = 129).

Variable	B (SE)	Lower	Exp(B)	Upper
Constant	-2.90*** (0.45)			
TUTRTOTL	0.27*** (0.06)	1.17	1.31	1.46

Note. B = unstandardized beta coefficients. SE = standard error of beta. $\text{Exp}(B) = e$, the base of natural logarithms, raised to the power of B. $R^2 = .34$ (Nagelkerke). Model $\chi^2_{(1)} = 31.57$, $p < .0001$. Hosmer and Lemeshow goodness-of-fit test statistic = 6.35, $p < .39$. *** $p < .0001$.

Although the regression between TUTRTOTL and GPA is weak ($R^2 = .03$), the regression models between TUTRTOTL and TCTG and TUTRTOTL and STATUS are strong for behavioral studies, accounting for 26% and 34% of the variability in TCTG and STATUS. The low R^2 value for the regression between TUTRTOTL and GPA is not surprising, however, because GPA is affected by numerous variables.

The parameters for the regression models provide additional insight into the impact of tutoring on the dependent measures. The value of the parameter (B value) for the linear regression with TCTG as the dependent variable, 4.28, indicates that the number of credits earned toward graduation increases this amount for every request for tutoring that a student makes. Multiplying the B value by the average number of requests for tutors, 9.31 (from Table 3), that students who graduated made shows that for students who graduated, tutoring translates to some 40 credits toward graduation.

The other statistic of interest is $\text{Exp}(B)$ from Table 5. $\text{Exp}(B)$ is e , the base of natural logarithms, raised to the power of B , the B -coefficient for the logistic regression, and is an indicator of the change in odds resulting from a unit change in the predictor, TUTRTOTL. For the population in this study, therefore, a student who requests tutoring is 1.31 times as likely to graduate as a student who does not request tutoring.

The findings from this study reinforce much of what was discussed in the literature review. Tutoring may improve one's persistence, retention, and graduation, and it behooves students to utilize tutoring to further promote academic success.

Although previous research has shown that women generally outperform men in terms of degree completion, gender was not a factor in this study. Women were not tutored proportionately any more than men (Table 2), and the absence of gender as a significant predictor in the regression analyses indicates that the academic performance and retention of women were no better than that of men. This might be attributed to the fact that Act 101 students are acculturated to take full advantage of tutoring, and that these students, both male and female, learn to take full responsibility for their own education.

Limitations and Recommendations

One obvious limitation is that the results of this study are restricted in application to the population of at-risk students at the university at which this study was conducted. While this is certainly very useful and most important for the university, and since many colleges and universities have equal opportunity programs similar to the Act 101 Program at this university, these findings may apply to numerous university settings. However, in order to make generalizations to a broad population, this study needs to be replicated to student samples from a variety of colleges and universities across different geographical regions. Additionally, students other than at-risk students should be included in such studies.

A second limitation to this research is that the study was restricted to just a few variables. As evidenced from the R^2 values in the regression models, there are additional variables to be considered for studies such as this. Even in the logistic regression model where the R^2 value, .34, was noticeably high for research involving humans, sixty-five per cent of the variability in the dependent variable, whether a student graduated or withdrew (STATUS), was unaccounted for. Replicating this study with additional variables included, such as subject area and some measure of academic self-efficacy, as well as the actual hours of tutoring that students received, would greatly enhance the value of any similarly conducted research.

Conclusions

When used effectively, tutoring can have a significant positive impact on the persistence, retention, and degree attainment for high risk students. The results of this study support this assertion and demonstrate that, for a local population of at-risk students, tutoring is effective as a strategy for succeeding to graduation. Educators need to encourage and facilitate undergraduates to seek help early, often, and, subsequently, to empower them to take control of their education.

The methodology of this study provides a format for other researchers who are interested in trying to link retention to tutoring or other possible predictors. Investigations such as this one are critical to establishing the necessity of tutoring and other academic support programs. It would also be helpful to discover why students who persisted with tutoring did so, and conversely, why some students chose not to persist with tutoring. Triangulating surveys, focus groups, and interviews with quantitative studies could provide much needed information about the efficacy of tutoring.

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