

*David Reinheimer,
Kelly McKenzie*

The Impact of Tutoring on the Academic Success of Undeclared Students

A cohort of first-time, full-time, degree-seeking undeclared freshmen at a medium-sized university in Pennsylvania was used to study the relationship between tutoring and the retention rates and decision paths of undeclared students. Undeclared students who did and did not receive tutoring were tracked over four years to determine rate and longevity of retention, academic performance, and time span for selecting a major. This research utilized a non-experimental, causal-comparative methodology with data analyzed through t-tests, chi-square procedures, logistic regression, and survival analysis. Findings from the study indicate that tutoring had a significant impact on retention, but not on GPA or on time to select a major.

Regardless of university efforts to retain students, nearly half of all students are still failing to graduate from four-year institutions (Dennis, 1998; Fiske, 2004; Lederman, 2009). Data show that the proportion of first year students who returned to their colleges as sophomores in 2007-8, 65.7 percent, dropped to the lowest level in 25 years (Lederman, 2009). The intractability of this low retention rate has led to a plethora of research studies into the efficacy of student support programs in improving retention rates. Unfortunately, research has not provided clear results for how to improve retention rates, especially for the particular type of college student who has not yet declared a major—the undeclared student.

The purpose of this paper is to discuss a study conducted to investigate whether retention rates of the undeclared student improve with tutoring. This study is a new area of research that may provide some strategies for improving the retention rates of undeclared college students.

Review of Literature

There is little research on the effects of tutoring on the retention of undeclared students. The greater part of the research on retention has focused on the social and academic integration of students; characteristics of the university, such as public versus private, size, and quality; pre-enrollment attributes, such as race-ethnicity, age, first-generation status, hours in paid employment, socioeconomic status, high school performance, and SAT scores; and programmatic interventions, such as first-year seminars, supplemental instruction, financial aid programs, learning communities, and interactions with peers and faculty (Pascarella & Terenzini, 2005; Tinto, 1993). A review of studies on tutoring reveals that the area of research most closely related to persistence of undeclared students is efficacy of tutoring for success of students at risk of dropping out of college due to GPA issues, academic background, poor decision-making skills, and other factors. Such research has documented the positive effectiveness of tutorial programs on retention of the at-risk student (Colvin, 2007; Topping, 1998).

Undecided or undeclared students are students who are unwilling, unable, or unready to make educational or vocational decisions upon entering college (Gordon, 1995). Undeclared students typically represent one of the largest clusters of potentially at-risk students on a university campus. Twenty to 50 percent of college students enter college undecided about their vocational goals (Stark, 2002), making the “undeclared major” usually one of the largest majors on a university campus. Within the last decade, research interest in the undeclared student has increased because of concerns about decreasing retention rates among this student population (Gordon, 1995; Jurgens, 2000).

According to Gordon (1995), there are multiple subsets of subgroups of students who can be found within the undeclared population. The following are the three most common subsets at the institution where this study took place:

1. Academically underprepared students. Some undeclared students enter college as undeclared due to poor academic performance in high school, which has prevented them from entering the degree program they want to pursue.
2. Developmentally not prepared students. Some undeclared students are not ready to make life-long career decisions.
3. Investigating students. Some undeclared students are interested in exploring various majors by taking general education courses and introductory level major courses before declaring a major.

Because the undeclared student is often unwilling or unable to declare a major, the undeclared student may be disconnected academically and socially. As Tinto (1993) postulates, students who are disconnected and not integrated (socially and academically) into the fabric of a university are less likely to be retained. The undeclared student may not become fully integrated because she does not identify herself with an academic department (Young & Redlinger, 2000). Undeclared students may be disconnected socially from an institution because they do not have opportunities, comparable to those students who have declared a major, to interact on a weekly basis with groups of students who have similar academic interests. These students often do not have the opportunities to participate in extracurricular academic programs offered by specific major departments and do not have the same opportunities as their declared counterparts to become connected to a network of professors within particular majors. As Wolff and Tinney (2006) point out, the social and academic experience a student has within an institution may be more important than individual-level predictors such as prior academic experiences, background characteristics, or personality.

Research further asserts that one means of contributing positively to the social and academic integration of a student, and perhaps especially the undeclared student, is by providing frequent and substantive peer and faculty interaction (Pascarella & Terenzini, 2005). Researchers have not established the specific type of interactive or academic experience that provides for social and academic integration (Flowers, 2006); however, tutoring might be one form of interactive and academic experience that may help the undeclared student be retained longer.

It is reasonable to assume that tutoring can provide a social connection for the undeclared student to the campus community—a connection outside the context of the classroom. Tutoring may provide a means for the undeclared student to become more socially integrated because tutoring fits the theory that knowledge is socially constructed (Belenky, Clinchy, Goldberg, & Tarule, 1986; Claxton, 1991; Hartman, 1990). Tutoring naturally creates a learning environment where knowledge is socially constructed, where tutors and students interact on an informal basis, and where material is clarified and understood with contributions made by both the tutor and the tutee (MacDonald, 2000). This type of learning environment inherent in tutoring provides students the means to develop a relationship and a sense of belonging within an institution of higher education (Thomas, 2006). Research cited in Stephen, O'Connell and Hall (2008) stresses that students realize the importance of a good relationship with their tutor because the tutor provides both personal and academic support.

As with most students, the undeclared student may become more socially integrated into the university community by engaging in substantive interaction with a tutor. Since undeclared students lack a major, this type of environment provides the undeclared student with the opportunity to engage in substantive peer interactions, which might not otherwise occur. Tutoring can smooth the progression of the social and academic integration of the undeclared student, and some research shows that students who are tutored are able to improve their grades, motivation, and learning skills through the social interaction of tutoring sessions (Hartman, 1990).

Methodology

The research surveyed above establishes a need for a study to examine the role that tutoring may play in retaining undeclared students at their institution. The study we conducted examined data collected on two sets of undeclared students, those who have received tutoring versus those who have not received tutoring. Multiple dimensions of the relationship between tutoring and the decision path of undeclared students explored in this study are expressed as hypotheses below:

- H₁: Undeclared students who receive tutoring are more likely to be retained than those who do not receive tutoring.
- H₂: Undeclared students who receive tutoring will be retained longer than those who do not.
- H₃: Undeclared students who receive tutoring will earn a higher grade point average (GPA) than those who do not.
- H₄: Undeclared students who receive tutoring are more likely to select a major by the end of their second year than those who do not.

Sample

The sample for this study consisted of undeclared students enrolled at a mid-sized public university in Pennsylvania in the Fall Semester of 2004. A total of 207 students, consisting of 117 females and 90 males, were tracked for four cohort years, 2004-2008. Within this four-year time of the study, 57 of the students graduated, 85 of the students withdrew from college, and 65 students were still enrolled in college. Of the 207 students in the study, approximately 37% (77 students) received tutoring.

Student records were examined to collect academic information and to identify students who graduated or withdrew from college. For each student, the number of subjects in which tutors were requested was recorded for each semester the students were enrolled.

Procedure

The methodological design of this study was causal-comparative, or non-experimental, research, with both descriptive and inferential procedures used to analyze the data. Causal-comparative designs are appropriate for studies involving preexisting data and when the independent variable cannot be manipulated (Gay, Mills, & Airasian, 2006). The primary independent variable in this study was a grouping variable involving students who were and were not tutored. Since it is not ethical to randomly assign students to such a group, a true experimental study was not possible for this research.

For the descriptive analyses of this study, means, standard deviations, and correlations were calculated, while *t*-tests, chi-square procedures, logistic regression, and survival analyses were utilized to conduct the inferential analyses. The level of significance, α , for all statistical tests was set at .05, and all statistical analyses were conducted with the SAS statistical package.

Logistic regression was used to examine the effect of performance variables on retention. This procedure determines the relationship between independent and dependent variables when the dependent variable is dichotomous, such as whether or not a student graduated. Survival analysis is a statistical method used to model the time until the occurrence of some event (Zwick, 1991). In any study across time, some of the participants will not reach the target event (e.g., graduation) before data collection is terminated. These observations are considered to be censored. By controlling for censored data, survival analysis provides a clearer picture of when an event is likely to occur (Miller, 1994).

For the purposes of this study, variable names were created to more efficiently describe the dataset. Those variable names and their descriptions are STATUS (whether a student was retained or withdrew), TUTORED (whether or not a student was tutored), FINALGPA (student's final cumulative grade point average), GRADSTATUS (whether a student was retained, graduated, or withdrew from school), VSAT (verbal SAT score), MSAT (math SAT score), HSRANK (high school rank), GENDER, and MAJORSTATUS (whether a student declared a major, withdrew from school before declaring a major, or had not yet declared a major at the end of the study). Verbal SAT score (VSAT), MSAT, HSRANK, and GENDER were included in the analyses because of their possible associations with college academic performance.

Results

The results of selected data analyses are given in Tables 1 through 7. Significant results were found for the contingency table for GRADSTATUS by TUTORED (Table 1), and for the variables VSAT and MSAT for the TUTORED group (Table 2). No significance was found between the TUTORED group levels for the variables FINALGPA and HSRANK (Table 2).

An examination of the expected values in Table 1 reveals that, among those students who were tutored, fewer students than expected withdrew from school, while more students than expected graduated or were retained. Among the students who were not tutored, however, more students than expected withdrew from school and fewer students than expected graduated or were retained. From the *t*-test results in Table 2, it can be seen that students who were tutored had significantly lower verbal and math SAT scores than students who were not tutored. No significant differences were found between students who were and were not tutored for high school rank and final grade point averages.

The logistic regression analysis (Table 3) found TUTORED to be a significant predictor for STATUS. Five variables were entered into the logistic regression model, but only the dichotomous variable TUTORED emerged as a significant predictor for whether or not a student was retained.

The results of the survival analysis for GRADSTATUS (Tables 4-6) showed that students who were tutored were retained longer than students who were not tutored. The cumulative survival rates in column 2 of Tables 4 and 5 show higher survival rates for each semester for the tutored group than for the undeclared students who were not tutored. The Wilcoxon test results in Table 6 reveal the significance of this disparity.

The survival analysis for MAJORSTATUS (Table 7) showed that students who were tutored took longer to declare a major than students who were not tutored. The Kaplan-Meier survival rates for these results are not tabled here, but the Wilcoxon test results in Table 7 show that there is a significant difference for the time taken to declare a major in favor of the undeclared students who were not tutored.

Table 1*The Contingency Table for GRADSTATUS Crossed With TUTORED*

Gradstatus ¹	Classification	
	Tutored	Not Tutored
Withdrew	22 (32)	63 (53)
Graduated	30 (24)	35 (41)
Retained	25 (21)	32 (36)

Note. Numbers in parenthesis represent expected cell values.

$$^1\chi^2_{(2)} = 7.97, p < .05.$$

Table 2

Descriptive Statistics and t-Test Comparisons for the Variables FINALGPA, VSAT, MSAT, and HSRANK Grouped by TUTORED

Variable	N	Mean	Std. Dev.	t-Score	F-Ratio
FINALGPA	55	2.93	0.43	0.06	1.48
	68	2.94	0.52		
VSAT	77	476.50	57.90	2.47*	1.13
	130	497.90	61.42		
MSAT	77	473.60	64.03	2.79**	1.03
	130	499.10	63.12		
HSRANK	68	126.00	99.76	1.05	1.02
	121	141.90	100.79		

Note. The first line for each variable represents the statistics for students who were tutored, and the second line is for students who were not tutored.

$$*p < .05. **p < .01.$$

Table 3
The Logistic Regression Model for STATUS (N = 189)

Variable	B	SE	Exp(B)	95% CI for Exp(B)
Constant	0.15	1.51		
TUTORED	1.00**	0.35	2.72	(1.37, 5.37)
GENDER	-0.03	0.33	1.00	(0.51, 1.84)
VSAT	< -0.00	< 0.00	1.00	(0.99, 1.00)
MSAT	< 0.00	< 0.00	1.00	(1.00, 1.01)
HSRANK	< -0.00	< 0.00	1.00	(0.99, 1.00)

Note. $R^2 = .094$ (Nagelkerke). Model $\chi^2_{(1)} = 13.14$, $p < .05$.

** $p < .01$.

Table 4
*The Kaplan-Meier (K-M) Product-Limit Survival Estimates for the
Tutored Group and GRADSTATUS*

Semester (Sem)	Cum Surv Rate (K-M)	Survival Std Err	Cum N W/drawn	Censored Obs (Cum)	Cum N Cont
0	1.00	0.00	0	0	77
1	1.00	0.00	0	0	77
2	0.97	0.02	2	0	75
3	0.87	0.04	10	0	67
4	0.86	0.04	11	0	66
5	0.82	0.04	14	0	63
6	0.78	0.05	17	0	60
7	0.74	0.05	20	2	57
8	0.71	0.05	22	55	0

Table 5

The Kaplan-Meier (K-M) Product-Limit Survival Estimates for the No Tutoring Group and GRADSTATUS

Semester (Sem)	Cum Surv Rate (K-M)	Survival Std Err	Cum N W/drawn	Censored Obs (Cum)	Cum N Cont
0	1.00	0.00	0	0	130
1	0.99	0.02	2	0	128
2	0.89	0.12	15	0	115
3	0.76	0.24	31	0	99
4	0.69	0.31	40	0	90
5	0.60	0.40	52	0	78
6	0.57	0.43	56	0	74
7	0.54	0.46	60	1	69
8	0.52	0.49	63	67	0

Table 6

Summary Data and Wilcoxon Test for Survival Analysis Comparison for TUTORED and GRADSTATUS

N	W/drew	Censored (Grad/Cont)	%Cen- sored	Quantiles (Sem)	Mean (Sem)	Std Err
Group						
Tutored:						
77	22	55	71.43	25% 7	7.04	0.21
Not Tutored:						
130	63	67	51.54	25% 4	6.03	0.21
<i>Wilcoxon Test Results</i>						
		Variable		Test Statistic		
		Tutored		10.92**		

** $p < .01$.

Table 7
Summary Data and Wilcoxon Test for Survival Analysis Comparison for TUTORED and MAJORSTATUS

N	W/drew	Censored (Grad/Cont)	%Cen- sored	Quantiles (Sem)	Mean (Sem)	Std Err
Group						
Tutored:						
77	63	14	18.18	25% 3	3.89	0.22
				50% 4		
				75% 5		
Not Tutored:						
130	82	48	36.92	25% 2	3.30	0.18
				50% 3		
				75% 4		
Wilcoxon Test Results						
Variable		Test Statistic				
Tutored		6.97*				

* $p < .05$.

Discussion

Hypotheses 1 and 2

The results of this study demonstrate the positive impact of tutoring on students' academic performance and retention in college. The contingency table in Table 1 shows the positive association between being tutored and graduating or being retained. Students who were tutored had lower than expected frequencies for the Withdrawn cell, and higher than expected frequencies for the Graduated and Retained cells.

The analyses in Tables 3 through 6 provide the strongest evidence for the positive effect of tutoring. In the logistic regression in Table 3, TUTORED is a highly significant predictor for the dependent variable STATUS, a dichotomous variable which indicates retention. In fact, TUTORED was the only significant predictor for the logistic regression model.

The value of a predictor for a logistic regression model provides additional insight into the impact of this parameter on the dependent measure. In Table 3, the values of the predictor variables are indicated by the column headed by B , with the other statistic of interest indicated by $Exp(B)$. $Exp(B)$ 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. For the population in this study, the significant predictor was TUTORED, which had a value for $Exp(B)$ of 2.715. The interpretation of this statistic is that a student who requests tutoring is more than 2.7 times as likely to be retained as a student who does not request tutoring. Therefore, hypothesis 1 was supported.

Tables 4 through 6 give the results of the survival analysis for the effect of tutoring on the duration of retention for undeclared students. Tables 4 and 5 give the Kaplan-Meier survival estimates for the undeclared students who were and were not tutored. An inspection of the survival rates shows that for each semester the survival rates for the tutored group were higher than those for the non-tutored group. These findings are further supported by the summary data in Table 6, which shows a higher percentage of students retained or graduated for the tutored group. In addition, the mean number of semesters that students were retained was one semester longer for students who were tutored, and the number of semesters it took to reach the upper 25th percentile for the cumulative survival rate was higher for the tutored group (7) than for the non-tutored group (4). Finally, the Wilcoxon test results in Table 6 confirm that the students who were tutored were retained significantly longer than those students who were not. Thus, hypothesis 2 was supported.

Hypothesis 3

From Table 2 we see that there was no difference in the final grade point averages of students who were and were not tutored, thus, hypothesis 3 was not supported. However, an examination of Table 2 also shows that the students who were tutored had significantly lower math and verbal SAT scores than the students who were not tutored. This would indicate that the students who were tutored had a pre-college profile more closely aligned with that of at-risk students. Since there was no difference in the FINALGPA for both levels of the TUTORED group, it would appear that tutoring may have had some positive impact on the cohort of students who were tutored. This finding makes the significance of TUTORED in the logistic regression and survival analyses all the more impressive.

Hypothesis 4

The results of the survival analysis for the time to declare a major showed that the students who were not tutored took significantly less time to declare a major than students who were tutored (Table 7). Thus, hypothesis 4 was not supported. While it was expected that tutoring would facilitate undeclared students in declaring a major, it may be that the risk features characterizing the cohort of students who were tutored affected this finding. These students were more likely to have lower freshman GPAs, which could delay their access to majors with minimum GPA requirements.

Limitations and Recommendations

One limitation to the study is that the results of this research are restricted in application to the population of undeclared students at the university at which this study was conducted. These findings are certainly very useful and most important for this institution, and since many colleges and universities have large numbers of undeclared students, the outcomes from this research would likely apply to numerous university settings. However, to make generalizations to a broad population, this study needs to be replicated with student samples from a variety of colleges and universities with different demographics. Additionally, students other than undeclared 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 value in the logistic regression model, there are more variables that need to be considered for studies such as this. Variables such as motivation, self-regulation, and self-reliance may prompt undeclared students to seek tutoring and to persist academically, although controlling for such variables may be difficult (Gattis, 2002). Future studies should investigate the effects of these and other variables, along with the problem of self-selection bias, to more accurately evaluate the effect of tutoring on retention and academic success.

Another possible limitation is that tutoring was measured as a dichotomous variable. A tutoring variable that was measured as interval/ratio might have enhanced the interpretation of the influence of tutoring in this model, allowing the strength of tutoring to be manifested on a gradient. It should be noted, however, that the dichotomous structure of TUTORED can also signify the importance of tutoring in the regression model. As a significant variable in a yes/no format, TUTORED is indicating that the mere presence of tutoring is positively associated with the outcome variable, which can be viewed as a compelling endorsement of the value of tutoring.

Conclusions

It appears that tutoring has a positive impact on the persistence, retention and degree attainment for undeclared students. The results of this study support this assertion and demonstrate that, for a local population of undeclared students, tutoring is effective as a strategy for retention and succeeding to graduation. The outcomes from this study reinforce observations noted in reviews of prior studies. Similar to the situation for other students, tutoring improves the undeclared students' academic performance, as shown by the undeclared students' increased rates of persistence and retention, and by undeclared students' earning a GPA above what is expected from SAT scores.

Tutoring has been shown to enhance the undeclared students' possibility of becoming more academically and socially integrated. Professors and administrators working with undeclared students should encourage students to seek tutoring, thereby assisting students to become more academically and socially integrated into the fabric of higher education. Tutoring should be one of the key programs utilized to help change the future of retention rates, and by making the most of tutoring programs, we may soon realize significant changes in retention rates across more college and university campuses.

References

- Belenky, M. F., Clinchy, B. M., Goldberg, N. R., & Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind*. New York, NY: Basic Books.
- Claxton, C. S. (1991). Teaching, learning, and community: An interview with Parker J. Palmer. *Journal of Developmental Education, 15*(2), 22-25.
- Colvin, J. W. (2007). Peer tutoring and social dynamics in higher education. *Mentoring and Tutoring, 15*(2), 15-181.
- Dennis, M. J. (1998). A practical guide to enrollment management. In D. Hossler, J. P. Bean, & Associates (Eds.), *The strategies management of college enrollments* (pp. 170-185). San Francisco, CA: Jossey-Bass.
- Fiske, E. (2004). Refuse to lose: Today's colleges and universities must work to foster student success. *A report of the Lumina Foundation, Focus*. [PowerPoint slides]. Retrieved from <http://www.luminafoundation.org/publications/focus.pdf>.
- Gay, L. R., Mills, G. E., & Airasian, P. (2006). *Educational research: Competencies for analysis and applications* (8th ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Gattis, K. W. (2002). Responding to self-selection bias in assessments of academic support programs: A motivational control study of Supplemental Instruction. *The Learning Assistance Review, 7*(2), 26-36.
- Flowers, L. A. (2006). Effects of attending a 2-year institution on African-American males' academic and social integration in the first year of college. *Teachers College Record, 108*(2), 267-286.

- Gordon, V. N. (1995). *The undecided college student: An academic and career advising challenge* (2nd ed.). Springfield, IL: Charles C. Thomas.
- Hartman, H. J. (1990). Factors affecting the tutoring process. *Journal of Developmental Education*, 14(2), 2-6.
- Jurgens, J. C. (2000). The undecided student: Effects of combining levels of treatment parameters on career certainty, career indecision and client satisfaction. *The Career Development Quarterly*, 48, 237-250.
- Lederman, D. (2009, January 23). As talk about retention rises, rates drop [Electronic version]. *Inside Higher Ed*. <http://www.insidehighered.com/news/2009/01/23/retain>
- MacDonald, R. B. (2000). *The master tutor: A guidebook for more effective tutoring* (2nd ed.). New York, NY: Cambridge Stratford.
- Miller, E. F. (1994). The effect of developmental reading instruction on the academic success of underprepared college freshmen. *Dissertation Abstracts International*, 55(12), 3797A. (UMI No. 9512851) Temple University, Philadelphia, PA.
- Pascarella, E. & Terenzini, P. (2005). *How college affects students: A third decade of research* (Vol. 2). San Francisco, CA: Jossey-Bass.
- Stark, K. (2002). Advising undecided students: What works best? *The Mentor: An Academic Advising Journal*. <http://www.psu.edu/dus/mentor/090107so.html>.
- Stephen, D., O'Connell, P., & Hall, M. (2008). 'Going the extra mile', 'fire-fighting', or laissez-faire? Re-evaluating personal tutoring relationships within mass higher education. *Teaching in Higher Education*, 13(4), 1-13.
- Thomas, L. (2006). Widening participation and the increased need for personal tutoring. In L. Thomas & P. Hixenbaugh (Eds.), *Personal tutoring in higher education* (pp. 21-31). Stoke on Trent: Trentham Books.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and the cures of student attrition*. Chicago, IL: University of Chicago.
- Topping, K. (1998). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. In S. Goodlad (Ed.), *Mentoring and tutoring by students* (pp. 49-69). London, UK: Kogan.
- Wolff, M. K., & Tinney, S. M. (2006). Service-learning & college success. *Academic Exchange Quarterly*, 10 (1), 57-61.
- Young, D. Y., & Redlinger, L. J. (2000). *Modeling student flows through the university pipelines*. Paper presented at the 41st Forum of the Association for Institutional Research, San Antonio, TX.
- Zwick, R. (1991). *Difference in graduate school attainment patterns across academic programs and demographic groups: A research report of the Minority Graduate Education Project*. Princeton, NJ: Educational Testing Service. Retrieved from ERIC database. (ED354852)

David C. Rheinheimer, Ed.D., is Distinguished Professor and Director of the University-Wide Tutorial Program at East Stroudsburg University. Dr. Rheinheimer also serves as adjunct professor to the Department of Professional and Secondary Education at ESU where he teaches the research seminar courses in their doctoral program. Dr. Rheinheimer's current research interests include student retention, self-efficacy, and other issues involving student success and academic achievement.

Kelly McKenzie, M.Ed., is a Professor of the Undeclared Advising Program at East Stroudsburg University. Before serving as professor of advising, Professor McKenzie was a professor of Communication Studies. Professor McKenzie's current research interests include student retention, at-risk student populations, undeclared students, advising, communication, and other issues involving student success and academic achievement.