



Effects of Voluntary Tutoring and Mandatory Tutoring on Academic Performance*

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Abstract

Purpose: Providing tutoring services may be one of the most effective practices for improving academic performance and student retention. However, there is little information on the difference between mandatory tutoring (MT) and voluntary tutoring (VT) on the impact of student academic performance. This investigation compared the effectiveness of VT and MT services in the three upper level undergraduate classes. **Research design, data, and methodology:** Baseline data were collected in a spring semester where no tutoring of any kind was offered (control group (CG), n=78). The MT (n=104) was required in the following fall semester, and in the next spring semester only VT (n=97) was offered. Descriptive statistics and One-way ANOVA using IBM SPSS v23 (Chicago, IL) were used to analyze the final grades of the courses to identify differences in final grades between semesters. **Results:** Although final grades averaged from three classes were highest in the MT group, there were no statistical differences between the MT and VT groups, $F(2, 292) = 1.150, p = .318$. **Conclusion:** This study indicates there was no significant difference in academic performance between the two tutoring types, but that both tutoring services can be effective.

Keywords: Tutoring Session, Mandatory Tutoring, Voluntary Tutoring, Student Retention, Tutoring Satisfaction

JEL Classification Code: I10, I20

1. Introduction

In the past 20 years, dropout rates in higher education have increased due to various reasons such as lack of family engagement, poor academic performance, financial difficulty, and non-preparedness. Seventy percent of Americans will study at a four-year college, but less than two-thirds will graduate with a degree (College Atlas, 2018), which indicates that about 30% of first-year students drop out after their first year of college. While there may be no single reason why students drop out of college, the importance of academic integration is very relevant in student retention and degree attainment (Colvin, 2007). Academic integration can be defined as when students accept courses and academic content that are at their level and can succeed without losing confidence and can be measured by grade, academic self-esteem, study patterns, as well as identification with academic norms and values. To increase student retention, many universities adopt various strategies for assisting and supporting students to stay in higher education. Although academic integration may be one component needed to combat student dropout rates, many models have been developed that try to explain factors influencing student retention in higher education (Astin, 1984; Berger & Braxton, 1998; Tinto, 1975). The results have been a sophisticated understanding of the complex events that shape student retention or dropout rates (Tinto, 2007).

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One of the most cited models of student retention in the literature was developed by Tinto (1975), who noted that pre-enrollment variables such as family background, individual attributes, and pre-college success are indicators for retention, but that post-enrollment variables are more important. Since academic performance, which can be defined as college grade point average (DeBerard Spielmans, & Julka, 2004; Griffel, 2007; Noel Levitz, 2018) and/or academic rank (Billups, 2008; Schreiner & Nelson, 2013), is the most influential post-enrollment variable for student retention, educators have implemented different types of strategies for advancing student learning that would improve these variables (Colvin, 2007). One of these strategies to increase the retention rate is by providing academic support, which can include implementing a learning center, math lab, tutoring service, and honor program as well as giving students practical work experiences in their major (Noel Levitz, 2018). Tutoring services can be considered the centerpiece of academic support and many studies have been conducted to determine the effectiveness of tutoring services in higher education, and these results are mixed.

Although some studies indicated tutoring services significantly increased students' academic performance (Colver & Fry, 2016; Jose et al, 2020; Lidren, Meier, & Brigham, 1991; Reinheimer & McKenzie, 2011), others revealed no significant effects (Griffin & Griffin, 1997). For example, previous literature shows that students who received two semesters of tutoring in a one-on-one setting (n=55) had significantly lower final grades (66.4) compared to final grades (78.9) of those who received group tutoring (n=40), defined as more than one and up to five students (Russ, 2015). On the other hand, while one-on-one tutoring may be inferior to group tutoring, there is evidence that it is still effective compared to no tutoring at all. This is supported by a study in which faculty met with at-risk college students (n=22) in one-on-one sessions at least nine times over the academic year, which resulted in significantly more students passing previously failed classes compared to a control group (n=22) that received no tutoring (Guerra-Martín, Lima-Serrano, & Lima-Rodríguez, 2017). It must be noted, however, that the specific criterion for passing a class was not provided by the authors and therefore it is difficult to ascertain the effectiveness of one-on-one tutoring to other types of tutoring in terms of the magnitude of improvement.

It also seems there is a benefit to tutoring whether the tutor is a peer, faculty, or staff. For example, American River College (1993) utilized twenty-four paid 'learning assistants' for three hours per week with groups of two to six tutored students. The result indicated that tutored students earned higher scores compared to non-tutored students. The tutored students also perceived that their academic performances were positively affected by tutoring services. Furthermore, Mallatrat (1994) targeted students at risk of dropping out for a peer tutoring project in computing. Participants (N = 55) had a tutoring session once a week for 40 minutes and results indicated that the grades of tutored students were significantly improved compared to the grades of cohort students who were not tutored. Overall subjective feedback on tutoring service was positive and seven students reported that tutoring service had been the critical factor in preventing them from dropping the course. Schmidt, Arend, Kokx and Boon (1994) compared the academic performance of 334 peer-tutored and 400 faculty-tutored students in a problem-based health science course. The tutoring session was provided twice a week throughout the semester. Overall, both groups showed improvement in their grades, however, faculty-tutored students had significantly higher final grades than peer-tutored students. Finally, college students who met with faculty (n=339) over an academic year with no particular structure or format had significantly greater GPA (2.45) compared to the GPA (2.29) of students (n=339) who did not receive tutoring (Campbell & Campbell, 1997). While these differences may be small, the cumulative effects over a 4-year career could be substantial, thus showing the impact of less structured tutoring. While peer tutoring and faculty tutoring are commonly employed in colleges and universities worldwide, it must be understood that peer students tutor differently than faculty tutors (Moust & Schmidt, 1995) and this can impact the degree of success of the service.

Some studies investigate the effectiveness of mandatory vs. voluntary tutoring services on students' academic performance. Hodge, Dochen, and Joy (2001) assessed the effectiveness of making supplemental instruction as a required part of the course and mandating student participation. The total number of students (N=432) was divided into three groups: mandatory supplemental instruction (SI) (n=108), voluntary SI (n=105), and non-SI (n=219). Students in both mandatory and voluntary SI groups earned significantly higher course grades and semester GPAs than students in the non-SI group. However, there was no significant difference between participation in mandatory SI or voluntary SI groups for these two outcomes. Further evidence indicates that voluntarily attending tutoring sessions can increase academic performance. For example, students who visited a tutoring center 10 times or more per quarter had a 0.2 higher GPA than those who visited infrequently or not at all (Cooper, 2010). While this difference seems rather small, it was deemed as significant and as suggested by Campbell and Campbell (1997), the cumulative effect of this small increase could be sizeable. The effectiveness of voluntary tutoring is supported by a study in which students who voluntarily sought tutoring at least three times in one semester (n=377) achieved a significantly higher final grade (4.46) compared to the final grade (3.86) of those who attended fewer than three sessions or none at all (n=1,346) (Jiménez, Acuña, Quiero, López, & Zahn, 2015). On the other hand, it has been suggested that voluntary tutoring has direct negative effects on student retention (Maggio, White, Molstad, & Kher, 2005), which can be related to academic performance.

When directly comparing mandatory and voluntary tutoring, previous research has indicated that both are effective. Sessions were held three times per week for 50 minutes per session led by either a professional or peer

member, with peer members having attended three days of training. Students were either in the mandatory group (n=108), voluntary group (n=100), or the control group that received no tutoring (n=214), with final grades in the mandatory (2.74) and voluntary (2.49) being significantly higher than the control group (2.13), with no significant difference between the mandatory and voluntary group.

Although there have been many studies conducted to evaluate the effectiveness of tutoring services on academic performance, there is a scarcity of studies directly examining the effectiveness of voluntary and mandatory tutoring on students' academic performance. The purpose of this study was to compare academic performance in mandatory vs. voluntary tutoring service sessions in highly challenging courses. Hypotheses in the present study include 1) There will be a statistically significant improvement in final grades for highly challenging courses in tutored semesters compared to that of the non-tutored semester, 2) There will be a statistically significant difference in students' final grades between those who participated in mandatory vs. voluntary tutoring sessions, and 3) The students will be satisfied with the tutoring services in terms of usefulness and quality of the tutor.

2. Methodology

2.1. Participants

This study was approved by the University Institutional Review Board and all subjects signed informed consent before participating. This study was conducted over an academic year from the start of the spring semester to the end of the following spring semester. All of the participants were junior and senior students (n=279) majoring in Kinesiology (Table 1).

Table 1: The number of enrollments by semester and course.

Course Title	Spring (CG)	Fall (MT)	Spring (VT)	Total
3445 Measurement and Evaluation	34	46	42	122
3315 Functional Anatomy	24	32	32	88
3426 Basic Physiology of Exercise	20	26	23	69
Total enrollment	78	104	97	279

Note.: CG, Control Group; MT, Mandatory Tutoring; VT, Voluntary Tutoring.

2.2. Study Design

Baseline data were collected in a spring semester where no tutoring of any kind was offered (control group (CG), n=78). Mandatory tutoring (MT, n=104) was required in the following fall semester, and in the next spring semester only voluntary tutoring (VT, n=97) was offered (Figure 1).

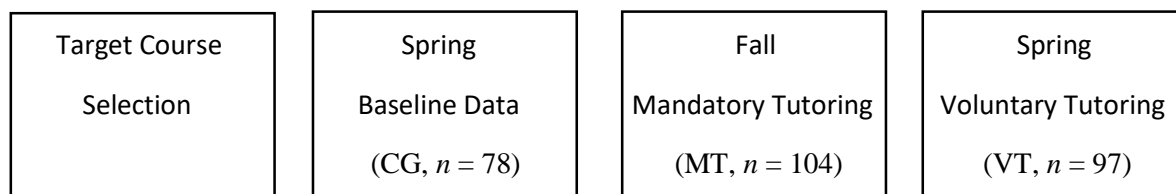


Figure 1: Study flow

Mandatory tutoring in the fall semester was implemented on the target courses based on the students' overall GPA. Students with lower than 2.5 GPA were required to take at least six tutoring sessions throughout the semester and those with a GPA higher than 2.5 were required to take three tutoring sessions throughout the semester.

At the beginning of the final spring semester, instructors of the three target courses provided information on VT services for all Kinesiology students. Tutoring was not mandatory and students were encouraged to take advantage of the VT service throughout the semester.

2.3. Selection of Target Courses

The sampling selection was based on purposeful sampling (Martinez, 2016). Final grades of all the required major courses were tracked to gain an understanding of which of the required credit hours students found most difficult for three semesters preceding the study. Based on the percentage of D's and F's of all required major courses, three courses (EDKN 3445 Measurement and Evaluation (25.47%), EDKN 3426 Basic Physiology of Exercise (25.42%), and EDKN 3315 Functional Anatomy (22.95%)) were identified as the most challenging courses (Table 1).

2.4. Tutor Selection and Training

After choosing the target courses, the tutoring program team was established. The possible tutor pool included graduate students and senior undergraduate students from the Kinesiology program. The job description was posted on the University's human resources website. After the initial screening and interview process, one graduate student and one undergraduate student met the criteria below and were hired along with a supervising faculty.

- Earned Bachelors' degree (or senior level) in Kinesiology
- Earned an A for their final grade of three target courses
- Ability to articulate well in English
- Excellent overall communication skills

After hiring the tutors, the training for the tutors was provided by supervising faculty in Kinesiology. Harrison's structure tutoring guideline (Harrison, 1971) was implemented for the tutor training protocol, which included the following: 1) pretesting procedures, 2) preparing instructional materials, 3) establishing principles of learning commensurate with the specific objectives, 4) maintaining adequate records of rate of learning, and 5) systematically checking the rate of students' learning.

Supervising faculty delivered the orientation session to train tutors and provide basic information such as course overviews, textbooks, and course materials. Additionally, instructional materials for teaching strategies and communication strategies were provided. To establish principles of learning for each course, instructors of the target courses provided all the course materials for tutors, and tutors were able to log in to the online module (Blackboard) of the courses to access teaching materials, announcements, and any class-related activities. Every week, tutors had a meeting with supervising faculty to discuss issues about tutored students' areas of difficulty in each course and tutors' concerns about tutored student's progress.

2.5. Tutor Session

The tutoring sessions were developed based on Harrison's structured tutoring (Harrison, 1972; Harrison 1975). The sessions were designed to 1) develop instructional objectives aligning with the course objectives of EDKN 3415, 3426, and 3445, 2) identify achievement of objectives, 3) provide materials as needed, 4) systematically check student understanding of the material, and 5) record information of each student's visit.

The formats of the session also followed Harrison (1971) and included 1) one-on-one appointment tutoring, 2) group sessions (up to four students), and 3) email responses. Tutoring was available for 20 hours a week four days a week during the semesters, in two different locations with morning and afternoon sessions in 2-3 hour blocks. Instructional supplies, such as textbooks, audio and visual aids, and whiteboards, were provided to support effective tutoring services. Students in the tutoring session were required to fill out a sign-in sheet for each visit, which included the date, time-in and-out, target class, purpose of the visit, and satisfaction survey.

2.6. Measurements

Final grades in the target courses, a satisfaction survey, and a sign-in sheet to document attendance were used to collect data in this study. The final grades of all the students who were taking one or more of the three target courses were tracked for each of the three semesters. At the end of each semester, all the final grades on a calculated 100% scale were provided by the instructor. Since students' perception of the tutoring service is an important intermediate outcome (Astin, 1993) that influences the student's level of motivation (Chute, Thompson, & Hancock, 1999; Donohue & Wong, 1997), the satisfaction survey was completed after each semester to measure the participant's level of satisfaction for each semester. A total of 12 questions were developed and included nine closed-ended and three open-ended questions. The Likert-type responses ranged from 1 to 5, with 1 indicating "strongly disagree" and 5 akin to "strongly agree". The questions were developed based on three areas; manner, knowledge, and effectiveness of the tutoring service. The three open-ended questions were used to verify the level

of satisfaction in each area.

2.7. Data Analysis

After collecting data from the three courses for three semesters, the data were analyzed using IBM SPSS v23 (Chicago, IL). Descriptive statistics and One-way ANOVA were used to analyze the final grades of the courses to identify the differences in final grades between semesters, with Alpha used .05 to determine significance. The frequency distribution and ratio scale were used to analyze the satisfaction survey.

3. Results

3.1. Attendance Rate

The total duration of the students spent in MT sessions was 7,814 minutes for 166 visits (47.1±12.5 minutes/session). The purpose of the visits included homework help (56%), test prep (31%), and chapter reviews (13%). In contrast, students in VT visited only 14 times with 362 minutes in the tutoring session (25.9±6.4 minutes/session) for homework help (65%) and test prep (35%) (Table 2).

Table 2: Total number of visits and minutes students spent in the tutoring sessions.

Group	MT			VT		
	Visits	Total	Average	Visits	Total	Average
		minutes	Minutes		minutes	Minutes
3445 Measurement and Evaluation	112	5,261	46.9	3	100	33.3
3315 Functional Anatomy	23	874	38.0	9	172	19.1
3426 Basic Physiology	31	1,679	54.2	2	90	45.0
Total	166	7,814	47.1	14	362	25.9

Note: MT, Mandatory Tutoring; VT, Voluntary Tutoring.

3.2. Final Grade

Although final grades averaged from the three classes were highest in the MT group, there were no statistical differences between the three groups, $F(2, 292) = 1.150, p = .318$ (Table 3). The final grades of each course were analyzed each semester for differences between CG, MT, and VT (Table 4). There were no significant differences for EDKN 3445 Measurement and Evaluation course, $F(2, 199) = 1.879, p = .157$, and although final grades tended to be highest in MT for EDKN 3426, differences between semesters were not significant, $F(2, 69) = 1.830, p = .168$. The only statistical difference for final grades between semesters was in EDKN 3315 Functional Anatomy, $F(2, 98) = 6.924, p = .002$. Tukey HSD was used to compare the means to each of the semesters, indicating significantly higher final grades in MT compared to CG ($p = .003$) and VT compared to CG ($p = .015$). However, there was no significant difference between MT and VT ($p = .867$).

Table 3: Overall Final Grade.

Group	<i>n</i>	Mean	SD
CG	78	75.77	14.67
MT	104	78.54	12.24
VT	97	77.91	13.05
Total	279	77.37	13.40

Note: SD, Standard Deviation; CG, Control Group; MT, Mandatory Tutoring; VT, Voluntary Tutoring.

Table 4: Overall Final Grade per each class.

Course	Group	N	Mean	SD
Measurement & Evaluation	CG	40	78.52	11.02
	MT	38	75.31	10.82
	VT	43	72.91	16.60
	Total	121	75.49	13.35
Functional Anatomy	CG	36	71.54	17.39
	MT	33	83.41*	9.60
	VT	32	82.20*	7.33
	Total	101	78.79	13.48
Basic Physiology	CG	25	77.48	14.69
	MT	23	83.21	7.59
	VT	23	81.35	7.70
	Total	71	80.60	10.76

Note: SD=Standard Deviation, * Significant difference from CG

3.3. Satisfaction Survey

A total of 12 questions were included in the survey. Three questions were related to the quality of organization in the tutoring service, six questions addressed the quality of the tutors, and three questions were for the quality of the service. Forty-three and 23 students completed the survey in the MT and VT groups, respectively. The results indicated that students appreciated the tutoring service and had a stress-free and friendly environment (Table 5). Most of the students also indicated that the tutor sessions were enjoyable and helpful, that the tutor was organized throughout the sessions, and was knowledgeable enough to answer students' questions.

Table 5: Satisfaction Survey Result.

Group		Mean	Mode
MT	Organization	4.31	5
	Quality of Tutor	4.59	5
	Quality of Service	4.40	5
VT	Organization	4.25	5
	Quality of Tutor	4.42	5
	Quality of Service	4.33	5

Note: MT, Mandatory Tutoring; VT, Voluntary Tutoring.

4. Discussion

Tutoring services have been adopted at many universities and colleges in hopes of improving students' academic performance. The current study provides some evidence for the effectiveness of tutoring in increasing final grades, however, the degree of effectiveness was not as strong as expected.

The findings of this study may be due to a variety of circumstances, one being the type of tutoring offered. Tutoring can be offered in a one-on-one or group setting with peers or with professionals in a voluntary or a mandatory setting. There are also different tutoring models, such as instructional tutoring and assignment-assistance tutoring (Hock, Deshler, & Schumaker, 1999). This study used a traditional method where students were scheduled with a tutor in a one-to-one or group format of up to four students in a voluntary or mandatory setting without a restriction for instruction or assignment assistance. Three classes were addressed, one that emphasized statistics (Measurements & Evaluations) and the other two with the function of the body and certain systems (Functional Anatomy and Basic Physiology). While there were no significant differences in final grades between mandatory or voluntary groups in any of the classes, only the Functional Anatomy class had significantly higher final grades of the two groups when compared to the group that received no tutoring. Although not significant, this trend was also evident in the Basic Physiology class but non-existent in the Measurements and Evaluations class. The same tutors taught all sessions for all classes and although they completed all orientation training sessions, it may be that they were stronger in or favored concepts of the body over statistical concepts. The nature of the statistics class may also be more unique for kinesiology students, many of whom already have some background knowledge of the human body upon entering the program after being involved with physical education, athletics, and taking introductory kinesiology classes. Other than a required math class, Measurements and Evaluations are the first foray into statistics for many of these students, and thus they struggle to a greater degree.

This is evidenced by at least a 4-fold increase in mandatory visits compared to the other two classes. Despite these struggles, one would not expect the tutoring groups to result in lower final grades compared to the control group. There is evidence, however, that tutoring will not always result in favorable outcomes as evidenced by no significant impact on the GPA of 207 college students (Reinheimer & McKenzie, 2011). While this study does not give any information on how often or what kind of tutoring was offered, it may be that the current study was not direct enough to provide consistency in tutoring across all sessions. For example, a single student attending multiple sessions may have encountered one-on-one in some sessions and groups in others. As noted by Russ (2015), students in one-on-one settings do not perform as well as those in group settings and this may be a factor in our findings. One would expect, however, even one-on-one tutoring to result in increased performance over no tutoring (Guerra-Martín, Lima-Serrano, & Lima-Rodríguez, 2017).

Students in the current study may have encountered instructional assistance in some sessions and assignment assistance in others while in sessions that were either one-on-one or grouped. This study was not designed to be focused on a singular design, but rather it was designed to be less structured to serve a variety of student needs. While evidence exists to show that less-structured tutoring sessions can have positive outcomes on academic achievement (Campbell & Campbell, 1997), it may be that the lower level of tutoring structure in the current study did not favor those struggling with the subject matter in the Measurements and Evaluations class. Since this study did not track the tutoring conditions of each student, it is difficult to specifically identify the reasoning of the control group to have higher final grades than the tutored groups.

Less research has focused on the effectiveness of voluntary tutoring compared to mandatory tutoring. While mandatory tutoring can often be assigned using a criterion, such as GPA and when students must attend, voluntary tutoring can also be assigned with a criterion but students have the choice whether or not to attend. Whether or not one attends is most likely based on factors such as intrinsic or extrinsic motivation. It is possible that students who are extrinsically motivated seek to earn higher grades to maintain a scholarship (reward) or seek to avoid a failing grade to keep from being dismissed (punishment). One can postulate that the success of students who seek tutoring on their own accord is due in part to how much they are motivated. This is supported by Hodges, Dochen, and Joy (2001), who found that students who volunteered to attend tutoring sessions had significantly greater motivation scores compared to those who were required to attend and those who selected not to attend. While the current study did not assess the motivation of students, it could be that this factor may have played a role in the outcome of those who were and were not successful in their tutoring sessions.

Regardless of the motivation, there is evidence to show that voluntarily attending tutoring sessions can increase academic performance (Campbell & Campbell, 1997; Cooper, 2010). This is in agreement with the Functional Anatomy class in the current study, where final grades were significantly greater in mandatory and voluntary groups compared to the control group.

While the ultimate goal for providing tutoring is greater student academic performance, there are many variables that must be considered when trying to identify the success of the tutoring program. In addition to those mentioned above, it has been suggested that students who earn higher grades after tutoring tend to be better prepared to begin with, have higher ability and/or more experience in college, and that there is no consistent evidence that tutoring helps the weakest students (Maxwell, 1990). Furthermore, it is important that tutoring is structured and that tutors are trained because if not, tutoring may be more harmful than good. An interview with 16 volunteer tutors for reading revealed that even though they completed six sessions of basic training, tutors often did not select proper instructional reading material, demonstrated inconsistent instructional behaviors stemming from undeveloped philosophies of reading instruction, and few tutors fostered a contextual approach to teach word meaning (Ceprano, 1995). Finally, while tutoring can be effective in reducing the total amount of time students

need to solve problems, increasing GPAs, retaining content knowledge, and improving scores on comprehensive exam content, it is not clear that tutoring programs teach the generalized use of academic skills for students to become independent learners (Hock, Deshler, & Schumaker, 1999).

The results of this study must be considered in light of several methodological limitations. First, this small-scale exploratory study was performed in one undergraduate program at a single university, which might limit the transferability of the findings. The second limitation arises from gathering data in the different periods across the three semesters. Even though the instructors were the same and used the same content materials throughout the three consecutive semesters, it is still one of the study limitations of this study. Finally, students' knowledge of course content was not measured or evaluated prior to the start of the semesters. Had this been done, it would have indicated the level of cohort students' ability in three different semesters. We assumed that learning ability and academic readiness for the courses in each semester were comparable since all the students were in the same academic program and following the same course sequence of the Kinesiology curriculum. However, the higher final grade average in the CG compared to the MT and VT in the Measurement and Evaluation course may indicate a different academic caliber cohort, which may have influenced the results of the study and therefore presents another limitation.

5. Conclusions

In conclusion, providing tutoring services may be one of the most effective practices for improving academic performance and student retention. We wanted to see if VT services would have a different impact than MT on the student's academic performance in highly challenging courses. We found that there were no significant differences in academic performance between VT and MT services. In conclusion, both tutoring services were effective in improving academic performance.

Future studies that explore the effectiveness of tutoring should identify a criterion that is practical and meaningful. For example, demonstrating a significant increase in GPA from 2.1 to 2.3 may lend to the effectiveness of tutoring, but may not suffice for scholarships, entry into other academic programs, or admittance to graduate schools. Considering this, a target performance outcome should be identified whether it be GPA, final grades in a class, or some other specific criterion related to academic performance. Perhaps most importantly, however, a criterion that assesses the degree to which independent learning can be improved as a result of being tutored should be explored.

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