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Embedded Tutoring: One Initiative To Help Struggling Students

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Abstract

This study sought to determine if utilizing an embedded tutor in a liberal studies history course would impact student grades. This course was selected due to its high D/F or W (withdraw) rates; particularly for students who are admitted with an at-risk profile. The researcher analyzed the number of times a student attended tutoring and if there was an impact in the final grade for the course. The researcher discovered that students who utilized the embedded tutoring five or more times earned a higher final grade than students who did not utilize tutoring. This study was conducted in fall 2017 at a four-year, public institution in Western Pennsylvania.

Keywords:

tutoring, academic support, academic success, persistence

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Throughout the last 50 years, there has been an intentional commitment to increase the opportunity for students from diverse backgrounds to attend college. The influx of students enrolling in college has led to a greater number of students who are under-prepared; therefore, there are more students placing into developmental coursework. According to the National Center for Education Statistics (2016), 39.6% of students attending a four-year institution enroll in one or more developmental courses. Often placement into a developmental course increases the number of classes a student needs to take in order to graduate and delays graduation. The U.S. Department of Education (2017) reported that full-time, bachelor's degree seeking students who take a developmental course are 74% more likely to drop out of college than students who do not need developmental courses. Additionally, only one out of 10 students who take developmental courses complete their degrees on time (U.S. Department of Education, 2017). Due to these trends, institutions are being pushed to increase the retention rates and decrease the time-to-degree completion for these students. Furthermore, university administrators recognize that it is more effective and less costly to retain current students than to continuously locate, recruit, and enroll new first-year and transfer students (Delicath, 1999).

It can be difficult for institutions to determine what initiatives to implement in order to help at-risk students succeed. According to Miller (1990), research suggests that early attention and intervention is needed for at-risk students to be successful; however, specific interventions are not identified. There have been many interventions utilized to improve the completion rates of students

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enrolled in developmental courses including linking courses, using conceptualization as a teaching tool, and providing academic support such as tutoring and Supplemental Instruction (SI).

Research demonstrates that there is a relationship between students who use student support services and first to second year persistence, improved grade point average, and degree completion (Bean & Eaton, 2001). Although we know that using support services early and often can assist with student success, it can be difficult to get students to utilize these resources. According to Zimmerman (2000), at-risk students have difficulty seeking out help and may not be aware that they are struggling until it is too late in the academic semester. Therefore, offering academic support programs that are embedded in courses with high fail rates could encourage regular participation beginning at the start of the semester.

On this researcher's campus, SI is offered for approximately 20 course sections per semester. The courses are selected based on high rates of students earning a D/F or W (withdraw). SI has traditionally been offered in gateway courses in chemistry, anatomy, physiology, and microbiology. For the past 10 years, students who attended SI five or more times earn on average .75 of a letter-grade higher than their peers who did not attend. The SI Leaders are paid to attend class, to facilitate two one-hour sessions per week, and to participate in a weekly one-hour staff meeting. Additionally, SI Leaders are paid for 1.5 hours of planning time for each session. On average it costs $950.00 to offer SI for each course. The SI Leaders are paid minimum wage at $7.25 per hour. Although SI has a positive impact on our science-based courses, we have found it difficult to implement in other courses with high D/F/W rates. Factors that impacted the feasibility of offering SI included costs, lack of student attendance when piloting SI in non-science-based courses, faculty buy-in, and the rigidity of the SI model. In an effort to combat these issues, this researcher created an Embedded Tutoring Model to pilot in a liberal studies history course. On this researcher's campus, students often find themselves struggling to pass many liberal studies courses including history, which historically has a D/F/W rate of 20% or higher. Since each course section focuses on a different aspect of American History, it can be difficult to hire a student who is proficient and comfortable serving as a tutor for

every section (during any given semester there can be 10 or more faculty teaching this course). Since SI has not worked in non-science-based courses on this researcher's campus and it has been difficult to hire a walk-in tutor, this researcher needed to explore another option for offering academic support for this course. This study examined if utilizing an embedded tutor in a liberal studies history course would positively impact student grades and course completion.

Relevant Literature

Academic support programs are classified based on the extent by which they are responsive to the various needs of students and to the degree that they are supported and integrated into the campus (Keimig, 1983). According to Keimig's (1983) Hierarchy of Learning Improvement Programs, there are four different types of programs.

Table 1.
Hierarchy of Learning Improvement Programs

Levels of Integration	Peer Cooperative Learning Programs	Likelihood of Improved Student Outcomes
Level Four: Comprehensive learning system in the course	Emerging Scholars Program, Peer Assisted Learning,	High
	Peer-Led Team Learning, Video-based Supplemental Instruction	
Level Three: Course-related supplementary learning activities	Accelerated Learning Groups, Structured Learning Assistance, Supplemental Instruction	Above Average
Level Two: Learning assistance to individual students	Tutoring	Below Average
Level One: Isolated courses in remedial skills		Low

Note. Keimig's (1983) Hierarchy of Learning Improvement Programs. Adapted from "Postsecondary Peer Cooperative Learning Programs: Annotated Bibliography 2018," by D. Arendale, 2018, Unpublished manuscript, p. 7. Copyright 1983 by Department of Curriculum and Instruction, University of Minnesota, Minneapolis, MN.

The first level consists of offering isolated courses that teach developmental skills. The second level provides

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learning assistance to individual students. The third level provides activities outside of the classroom that supplement the material being taught in class. The fourth level includes a comprehensive learning system within the course. The programs at the top of the hierarchy have a higher likelihood of improved student outcomes; however, they are also the most demanding of institutional resources and oftentimes require changes in the campus culture in order to implement (Keimig, 1983). The third level includes programs such as SI, which typically yield higher student outcomes than one-on-one tutoring or enrollment in isolated developmental courses (Arendale, 2018). SI is a peer-facilitated learning enhancement model designed to impact the way students learn difficult content in a specific course. The SI Leader is a student who has demonstrated proficiency in a targeted course and undergoes extensive training to plan effective SI sessions. In most cases, the SI Leader attends the class to keep up with course content and model effective student practices and attitudes. The SI Leader plans and facilitates two or more SI sessions per week. During these sessions, the SI Leader engages students using interactive learning strategies, which encourage involvement, comprehension, and synthesis of subject content (International Center for Supplemental Instruction, 2014).

Numerous studies demonstrate the impact of SI on individual course grades, course pass rates, and persistence and graduation rates (Dawson et al., 2014). According to Altomare and Moreno-Gongora (2018), between Fall 2015 and Spring 2017 it was found that grade performance for students who participated in SI for both Beginning Algebra and Intermediate Algebra was statistically significant. In addition, the pass rate was higher in accelerated sections of Intermediate Algebra where SI was utilized. A study conducted by Hodges et al. (2001) found that students who attended SI on a voluntary or required basis earned significantly higher course grades in a freshmen-level, writing-intensive U.S. History course than peers who did not utilize SI. Additionally, a study at an urban community college in Dallas, TX indicated that 83 % of students who regularly attended SI for a general psychology course earned a C or higher versus 64% for those students who did not attend SI (Goomas, 2014). Although the literature shows that SI can produce positive outcomes for students, it can be difficult to implement based on costs, time commitment for the SI leader, faculty buy-in, and rigidity of the

program. Institutions often look for other models that can provide similar outcomes but are more cost effective and flexible.

One option that can be utilized is an Embedded Tutoring Model. There is not a clear definition of how this model is constructed; however, it can serve as a hybrid between traditional tutoring and SI. Depending on how the model is designed, peer tutors attend class and assist within the lecture as well as offer tutoring outside of class several hours a week. The literature on the impact of utilizing an embedded tutor is sparse. One campus utilized an embedded peer tutor in three courses and had experimental and control groups for each section. In two out of the three courses, the mean grades for those who attended tutoring were higher (Chester et al., n.d.). According to Vick et al. (2015), students enrolled in an Introduction to Psychology course who utilized an embedded tutor had a course pass rate of 88% compared to 76% for students who did not attend tutoring.

Research demonstrates that making a connection with a peer can increase the likelihood that a student is retained (Tinto, 1993). Embedding a tutor into a specific class helps students gain familiarity with the tutor and can help the students establish a relationship. Promoting a relationship between the tutor and student is a factor that leads to greater retention and supports students who are at-risk (Maggio et al., 2005). Often at-risk students do not ask for help until it is too late. Providing access to a tutor within the classroom gives students access to academic support without having to seek it out. Another factor that contributes to the success of students is seeking out academic support early and often. Munley et al. (2010) conducted a study that examined the numbers of hours of tutoring utilized and the impact on final course grade. Students who utilized 10 or more hours of tutoring during a semester had a positive grade change and those attending 20 hours or more earned a full letter grade higher than their peers.

Course embedded tutoring may be a suitable option for institutions that are not able to implement a comprehensive learning system or the SI model. It is imperative that institutions find an academic support model that is financially feasible and that meets the needs of their students and faculty. This study sought to determine if offering an embedded tutor in a liberal studies history course could generate similar results to the

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SI program that has been in existence at this institution for over a decade.

Research Questions

1. Is there a difference in grades for students who utilized the embedded tutor versus those who did not?
2. Would the percentage of students who regularly attend (five or more times a semester) embedded tutoring be higher than the percentage of students who regularly attend SI?

Methodology

Historically students at this institution have difficulty earning a C or higher in many liberal studies courses including history, which has high D/F and W (withdraw) rates. As a result, the researcher collaborated with the history department to embed a tutor in three sections of a U.S. History course. All three sections were taught by the same faculty member.

The embedded tutor was recommended by the faculty member teaching the U.S. History course. The recommended student had previously earned an "A" in the course, possessed an interest in helping others learn (education major), and had an established relationship with the faculty member. Upon successful completion of an interview, the student was hired as an embedded tutor. The tutor also completed the institution's training program for the College Reading and Learning Association's Level One Certification. The training program consisted of two, one-half day sessions and all content was delivered face-to-face. It started by defining the role and responsibilities of a tutor and discussing how tutoring differs from SI. The training then covered the tutor cycle and modeled how to conduct a tutoring session. This portion of the training was reinforced by having the tutors role play with one another while receiving feedback from the training facilitator. The first day of training ended with an overview of learning preferences and how to incorporate study strategies into a tutoring session. The second day of training focused on communication skills and active listening. The training continued by discussing the dos and don'ts of a tutor session as well as a review of ethical considerations. To reinforce application of these concepts, the tutors were provided scenarios and asked how they would respond.

The second day of training ended with an overview of campus resources and when and how to make referrals. The tutor training took place the first week of the semester, so that tutors were ready to begin working by week two. This training program provides flexibility compared to the SI Leader training. Supplemental Instruction Leaders are required to take a one-credit course the semester prior to when they begin working. The SI Leaders must pay for the course; however, it does count as a free elective toward graduation. The training course covers the history of SI as well as the fundamental principles that are incorporated into SI sessions including redirecting questions, wait time, and checking for understanding. The SI Leader training also incorporates an overview of student development theory. In order to apply this information, the SI Leaders are required to analyze their development in relation to the theories discussed. The SI Leaders are taught about the principles of collaborative learning strategies and how to incorporate them into an SI session. There is some overlap between the tutoring training and SI Leader training such as an overview of learning preferences, communication skills, active listening, ethical considerations, and campus resources.

The embedded tutor routinely attended one section of the U.S. History course, although students from all three sections could attend tutoring. The embedded tutor was introduced to the additional two sections and attended their class section periodically throughout the semester so that the students had a familiarity with the tutor. This approach was utilized so that the students could develop a rapport with the tutor and so that the tutor was familiar with the specific content that the faculty member discussed during the lecture. While attending the class, the tutor demonstrated effective student behaviors and successful academic habits. During class discussions, the embedded tutor offered the perspective of an experienced student. The embedded tutor also assisted individual students who needed support during in-class activities. The SI Leaders are utilized in the same capacity in the classroom. In addition to assisting in class, the embedded tutor offered walk-in tutoring hours two times a week for two hours each session. During the walk-in tutoring hours, students could meet with the tutor in order to address specific questions that they had about content from the textbook and lectures. The tutoring generally occurred in a small group format where the tutor utilized the Socratic Method in order to

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meet students where they are and guide them to a higher level of understanding.

Every student who attended tutoring completed a contact form and their information was recorded on a tracking sheet for the Tutoring Center. At the end of the semester, the tracking sheet was analyzed to determine who received tutoring and the number of sessions attended.

Participants

The participants in the study included 116 students who were enrolled in three sections of the U.S. History course. One of the sections of the U.S. History course was offered to students who were part of a Promising Scholars Program (high achieving students with low socioeconomic status); another section consisted of students who randomly enrolled in the course; the third section included students who randomly enrolled in the course and 19 students who were admitted with an at-risk profile (SAT score below 850 and/or a high school GPA below 3.0). These 19 students were enrolled in the U.S. History and a linked section of a developmental reading course.

A convenience sample of students was used. The students who sought tutoring were all enrolled in one of the three sections of the U.S. History course. All students who utilized the embedded tutor during the walk-in tutoring hours were counted in the study.

Data and Results

Data Collected

When a student attended a session with the embedded tutor, they would complete a contact form and the graduate assistant for the Tutoring Center would enter the information into an Excel spreadsheet. At the end of the semester, the final grades for the students enrolled in the U.S. History course were analyzed. The total number of times a student attended tutoring was recorded next to their final grade. The number of times a student attended tutoring was coded and labeled for zero times, one to four times, and five or more times. These categories were utilized so that the results could be compared to the data that has been captured for the SI Program on this researcher's campus. These are the categories that

are identified by the University of Missouri-Kansas City (UMKC) model for SI. In order to develop these categories, The International Center for Supplemental Instruction surveyed many of the long-standing, high-quality programs (two-year and four-year) that they had worked with over the years, and this was the most common breakdown used by these programs (M. Cross, personal communication, December 6, 2019). For classes that follow the four tests and a final exam model, the one to four group captures students who came very few times and/or right before exams. The five or more group participate more than just before the exams, and in a 16-week semester, they average attendance approximately every other week. An additional group has recently been identified by the International Center, which is those students attending SI 10 or more times. These are the students who regularly attend SI. Beginning in Spring 2020, this researcher will begin analyzing data using the recently added group. The International Center set these standards as a guide for practice for other programs, but mostly so that their data reporting standards have consistency (M. Cross, personal communication, December 6, 2019). The data from this researcher's study was imported into SPSS for analysis.

Findings

There were 116 students enrolled in the U.S. History course. Twenty-nine students earned an "A", 50 students earned a "B", 22 students earned a "C", six students earned a "D", and nine students earned a "F" or "W". Overall, the sections that offered an embedded tutor had a D/F/W rate of 13%.

Table 2.
Final Grade in U.S. History Course with Embedded Tutor

Letter Grade	Number of Students	Percent of Class
A	29	25.0
B	50	43.1
C	22	19.0
D	6	5.2
F/W	9	7.8

There were 593 students enrolled in other sections of U.S. History where an embedded tutor was not offered. One hundred and eighty-two students earned an "A",

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179 students earned a "B", 115 students earned a "C", 48 students earned a "D", and 69 students earned a "F" or "W". Overall, the sections that did not offer an embedded tutor had a D/F/W rate of 19.7%.

Table 3.
Final Grade in U.S. History Sections without Embedded Tutor

Letter Grade	Number of Students	Percent of Population
A	182	30.9
B	179	30.2
C	115	19.4
D	48	8.1
F/W	69	11.6

Fifty-five students enrolled in the U.S. History course with the embedded tutor attended tutoring at least one time. Nineteen students earned an "A", 26 students earned a "B", eight students earned a "C", one student earned a "D", and one student earned a "F" or "W". The D/F/W rate for students who utilized the embedded tutor was 4.4%.

Table 4.
Final Grade for Students Who Utilized the Embedded Tutor

Letter Grade	Number of Students	Percent of Population
A	19	34.5
B	26	47.3
C	8	14.5
D	1	2.2
F/W	1	2.2

Eighteen students, or 15.5%, attended tutoring five or more times, 37 students, or 31.9%, attended tutoring one to four times, and 61 students, or 52.6%, did not attend tutoring. Students who attended tutoring five or more times on average earned a grade of 3.61 versus students who did not attend tutoring on average earned a grade of 2.38. The data indicated that students who received an A in the class went to the tutor, on average, 3.027 more times than those students receiving an F, 2.411 more times than those students receiving a C, and 1.838 more times than those students receiving a

B. Of the 19 students who were admitted with an at-risk profile (SAT score below 850 and/or a high school GPA below 3.0) and were enrolled in the U.S. History and a linked section of a developmental reading course, eight students, or 47.4%, attended tutoring one to four times, and 11 students did not attend tutoring. The eight students who attended tutoring one to four times, on average, earned a 1.56 higher grade than the 11 students who did not attend tutoring.

Table 5.
Number of Times Attended Tutoring by Section and Grade

Times Tutoring	Section	Mean	Std. Deviation	Number
Zero	1/3 Developmental Reading	2.00	1.323	33
	Promising Scholars	3.06	.873	18
	Random Enrollment	2.40	1.075	10
	Total	2.38	1.240	61
1-4	1/3 Developmental Reading	2.72	.752	18
	Promising Scholars	2.71	1.380	7
	Random Enrollment	3.17	.577	12
	Total	2.86	.855	37
5 or More	1/3 Developmental Reading	3.56	.726	9
	Promising Scholars	3.60	.548	5
	Random Enrollment	3.75	.500	4
	Total	3.61	.608	18
Total	1/3 Developmental Reading	2.45	1.227	60
	Promising Scholars	3.07	.980	30
	Random Enrollment	2.96	.916	26
	Total	2.72	1.131	116

A two way between-group analysis of variance was conducted to determine if the number of times a student attended tutoring and the section they were enrolled in had an impact on their final course grade. The number of times a student utilized the embedded tutor was divided into three groups (five or more times, one to four times, and zero times). There was a statistically significant main

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effect for number of tutoring visits $F(2,107) = 7.831$, p = 0.001. A post-hoc analysis (Tukey) revealed that students who attended tutoring five or more times had a 1.23 higher grade than those who attended zero times and a .75 higher grade than those who attended one to four times. The interaction effect between sections and number of tutoring visits was not statistically significant $F(4,107) = 1.417$, p = .233. Essentially the course section did not impact students' final grade; however, attending tutoring five or more times has a statistically significant impact regardless of section.

Table 6.
Multiple Comparisons Tukey HSD
Dependent Variable: Grade Final Grade

(I) Number of Times Attended Tutoring	(J) Number of Times Attended Tutoring	Mean Differ- ence (I-J)	Std. Er- ror	Sig.	95% Confi- dence Lower Bound	Inter- val Upper Bound
Zero	1-4	-.49	.211	.059	-.99	.01
	5 or more	-1.23*	.272	.000	-1.88	-.59
1-4	Zero	.49	.211	.059	-.01	.99
	5 or more	-.75*	.292	.032	-1.44	-.05
5 or more	Zero	1.23*	.272	.000	.59	1.88
	1-4	.75*	.292	.032	.05	1.44

Note. The mean difference (*) is significant at the .05 level.

Limitations

The main limitation of the study is that it has not been done in true experimental format; not all of the students were randomly assigned to the three sections of U.S. History and there was not a control group. This study does not control for pre-college characteristics nor does it utilize a pre and post-test. In regard to the random assignment, two of the sections that were included in the study had students that were assigned based on admission criteria (Promising Scholars and students who were admitted with an at-risk profile and placed into a developmental reading course). Therefore, it is difficult to demonstrate a causal relationship between utilizing an embedded tutor and their final grade. This analysis also examines only the first semester of data for a pilot project that began in a fall semester.

Discussion and Future Research

The statistical analyses support the use of an embedded tutor in the U.S. History course. On this researcher's campus, students who attended SI five or more times on average earned .72 of a letter-grade higher than their peers. The results for using an embedded tutor produced 1.234 of a letter-grade higher. The D/F/W rate for students who utilized the embedded tutor was 4% whereas the D/F/W rate for student who did not utilize the tutor was 20%. In addition, eight (42%) of the 19 students, who were enrolled in a linked developmental reading course, utilized the embedded tutor. Those students earned a 1.56 higher grade than the 11 students who did not attend tutoring. This initial data suggests that embedded tutoring could be an alternative method of offering academic support to at-risk students as well as students enrolled in courses with a high D/F/W rate. In addition, to offer SI for each course has an average cost of $950.00 while utilizing an embedded tutor has an average cost of $660.00.

Data from the SI Program indicated that 389 students attended SI five or more times. This is 32% of the total student enrollment for the 20 sections where SI is offered. This data showed that the percent of students who attended SI five or more times was higher than the percent of students who utilized the embedded tutor. In order to increase the percentage of students who utilize the embedded tutor in the future, the results from the pilot semester will be utilized to market the effectiveness of attending tutoring. In addition, a student who utilized the embedded tutor during the pilot semester and earned an "A" in the class, will be hired to serve as the embedded tutor for the following semester.

The main strength of this study is that it provides an alternative academic support initiative that can be utilized in courses that have D/F/W rates. This model is more cost effective and yields similar results to the SI model. Moving forward, additional classes with high D/F/W rates will be identified. The researcher will solicit buy-in from the faculty member(s) teaching these courses and an embedded tutor will be implemented. This study demonstrates the impact of utilizing embedded tutoring and this data can be utilized to solicit additional funding to expand the program.

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For a future study to better assess the impact of an embedded tutor, a pre-test and post-test measure could be utilized to see if the students with an embedded tutor had a better "gain score" rather than only utilizing the final course grade. Also, all students should be randomly assigned to the sections that are utilizing an embedded tutor or the students in the sections should be grouped by a stable variable such as SAT score, high school grade point average, or score on the reading placement test. In addition, a longitudinal study should be conducted to determine if the students who utilize embedded tutoring and SI continue to do so in future semesters and if using these academic support programs correlate with their GPA, retention, and graduation rates.

Conclusion

This study showed that students who regularly utilized an embedded tutor outperformed their peers. Due to the cost savings, flexibility of the model, and positive impact on students' final grades, an Embedded Tutoring Model is a viable option to support courses that have high D/F/W rates. Additional research is needed in order to refine the Embedded Tutoring Model and implement it in additional courses. Regardless of the academic support model that is utilized at your institution, we have a responsibility to provide a tutoring program that meets the needs of all of our students.

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