



The following report is an evaluation of the embedded tutoring program. Twenty-three course sections took part in the program during the fall 2016 semester. The selected course sections included seven English, 13 Math, and two ESL. This evaluation report focuses on the relationship between enrollment in an embedded tutoring section and three academic outcomes – grades, success rate, and retention. It explores differences in outcomes between a group of students who received embedded tutoring and a comparison group of students who did not receive it. The report also examines differences in outcomes among the group of students who received embedded tutoring. More specifically, it examines whether students who combined embedded tutoring with additional tutoring sessions outside of class had better outcomes than students who only received embedded tutoring.

Executive Summary

- Students enrolled in embedded tutoring sections had a higher retention rate than students in comparison sections.
- Students who were not only enrolled in embedded tutoring sections but also attended additional tutoring sessions had higher grades than students who did not attend additional tutoring sessions.
- Students who were not only enrolled in embedded tutoring sections but also attended additional tutoring sessions had a significantly higher retention rate than students who did not attend additional tutoring sessions.

Data and Analysis

This report evaluates the embedded tutoring program during fall 2016. The evaluation compares students in an embedded tutoring section with a comparison group of students who took a traditional section. We used administrative records to locate information about the sections as well as the academic outcomes of the students enrolled in each section. We created the comparison group using stratified random sampling. The procedure matched each of the embedded tutoring sections with a randomly selected comparison section from the same course¹. For example, we matched the English 20 embedded tutoring section with a comparison section that did not use embedded tutoring. Table 1 shows the number of students enrolled in the embedded tutor and comparison sections.

¹ We were unable to match the two ESL 152 embedded tutoring sections because there were no sections of ESL 152 given without embedded tutoring during fall 2016.

Table 1. Number of students enrolled in the embedded tutor and comparison sections.

Course	Section Type	
	Embedded Tutor	Comparison
English 20	4	5
English 52	15	27
English 72	4	5
English 100	12	11
Math 40	16	25
Math 60	23	31
Math 75	14	15
Math 80	44	21
Math 112	118	113
Math 140	21	8
Math 170	17	26
ESL 152	17	0
Total	305	287

Measures

Grades: Student grades for the fall 2016 semester.

Success rate: Students' fall 2016 grades were put into two categories, success and failure. Grades A, B, and C were categorized as "Success." Grades D, F, and W were categorized as "Failure." We calculated the success rate by dividing the number of students categorized as a success by the total number of students in their respective group.

Persistence rate. We measured persistence by examining both fall 2016 and spring 2017 data. Students who enrolled in at least one unit during spring 2017 were considered to have persisted.

The Relationship between Enrollment in Embedded Tutoring Sections and Academic Outcomes

The first set of analyses concerned differences in outcomes between students enrolled in an embedded tutoring section and a group of comparison students who did not enroll in an embedded tutoring section. These analyses focused on three outcomes, grades earned, success rate, and retention rate. They were intended to demonstrate the extent to which enrollment in an embedded tutoring section led to improved academic outcomes.

Grades earned. Figure 1 shows the distribution of grades earned for students enrolled in the embedded tutoring sections (blue bars) and students enrolled in comparison sections (grey bars). See Table 2 for the raw numbers. Students enrolled in embedded tutoring sections ($M = 1.73$, $SD = 1.45$) and students enrolled in the comparison sections ($M = 1.66$, $SD = 1.43$) earned similar grades. An ANOVA test confirmed that there was no statistically significant difference in grades between the embedded tutoring group and the comparison group, $F(1, 592) = .39$, $p = n.s.$

Figure 1. Percent of embedded tutor and comparison group students earning each grade.

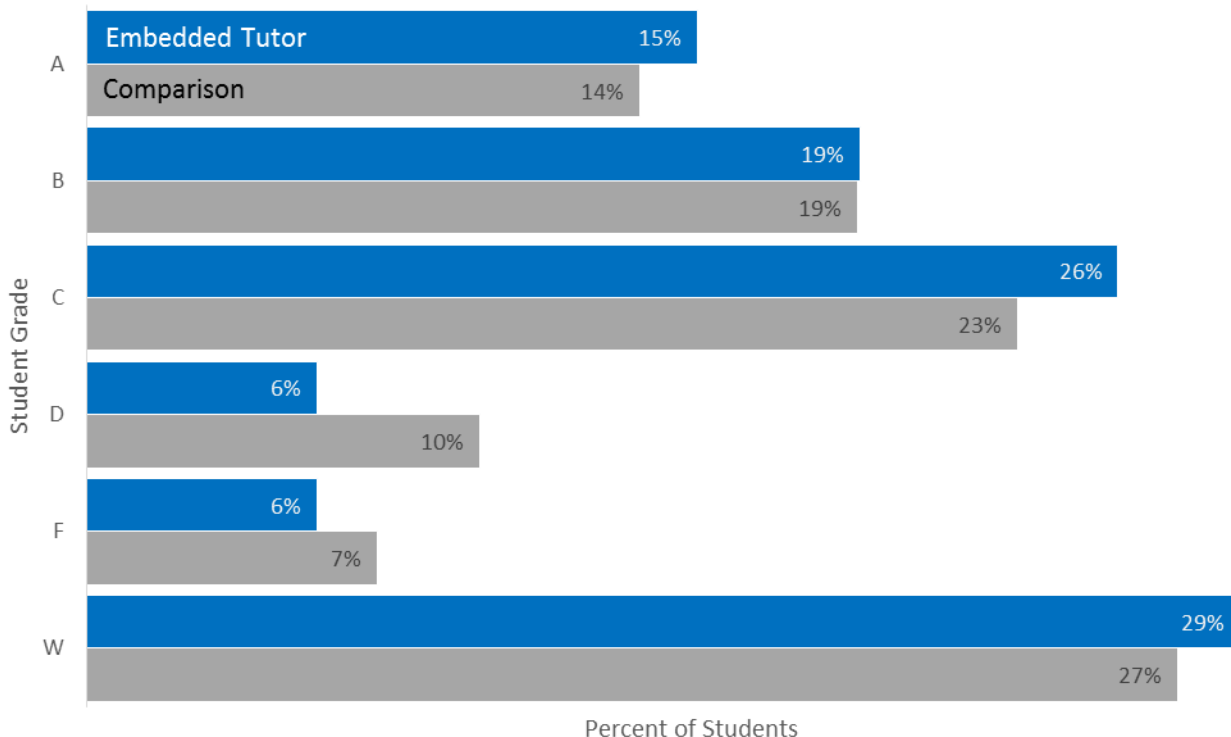


Table 2. Number of embedded tutor and comparison group students who earned each grade.

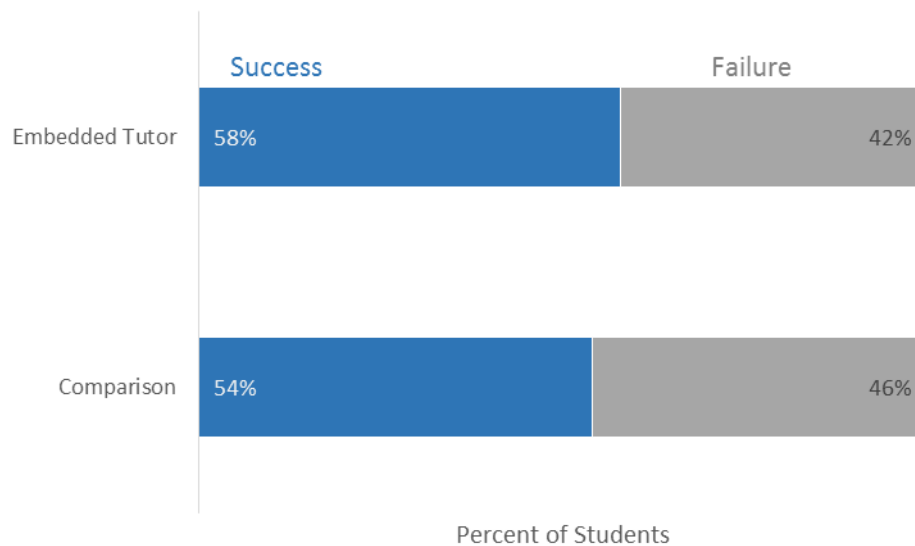
Course	Section Type	
	Embedded Tutor	Comparison
A	45	38
B	57	53
C	76	64
D	17	27
F	17	20
W	85	75
Other	8	10
Total	305	287

Success rate. Table 3 shows the number of embedded tutor and comparison students who either succeeded (grade C or better) or failed (grade D or below) during fall 2016. Students in the embedded tutoring sections (Figure 2) had a slightly higher success rate (58%) than their counterparts in the comparison group (54%). A chi-square test showed that this difference in success rates was not statistically significant, $\chi^2(1) = 1.14$, $p = n.s.$

Table 3. Number of embedded tutor and comparison group students who succeeded and failed during fall 2016.

Group	Outcome		Total
	Success	Failure	
Embedded Tutor	178	127	305
Comparison	155	132	287
Total	333	259	592

Figure 2. Success rates for students in embedded tutor and comparison sections.

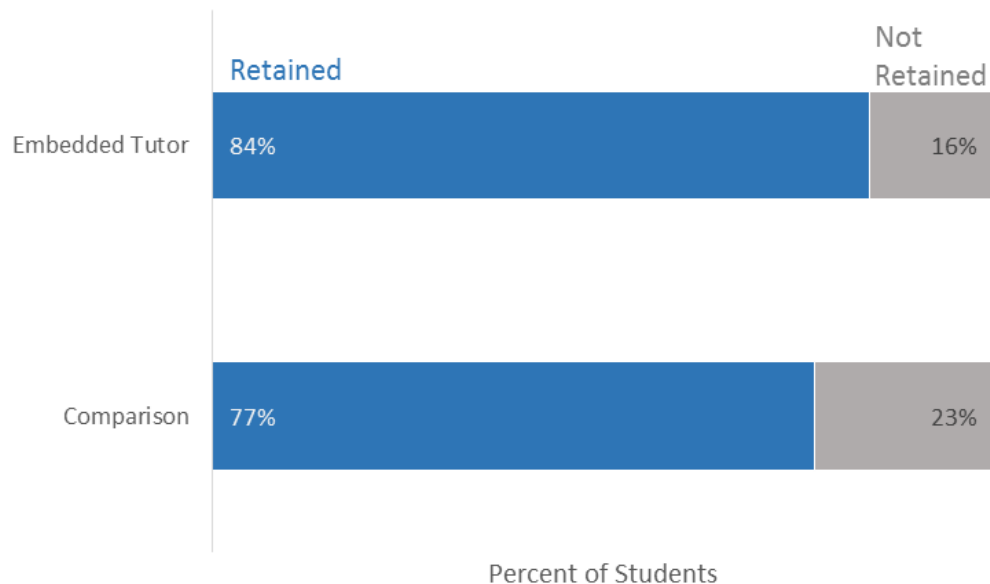


Persistence rate. Figure 3 shows the persistence rates for the embedded tutor and comparison groups. The analysis showed that students in the embedded tutoring sections (84%) had a higher persistence rate than students in the comparison group (77%). A chi-squared test showed that this difference in retention rates was statistically significant, $\chi^2 (1) = 4.09, p < .05$. We calculated the relative risk ratio (RR) to quantify the size of the difference in retention rates. This analysis showed that students in the comparison section were 1.40 times as likely to leave the college. In other words, students in the comparison group were 40% more likely to leave the college than group in the embedded tutor sections.

Table 4. Number of embedded tutor and comparison group students persisting from fall 2016 to spring 2017.

Group	Outcome		Total
	Retained	Not Retained	
Embedded Tutor	221	66	287
Comparison	255	50	305
Total	476	116	592

Figure 3. Persistence rates for students in embedded tutor and comparison sections.



The Relationship between Additional Tutoring and Academic Outcomes

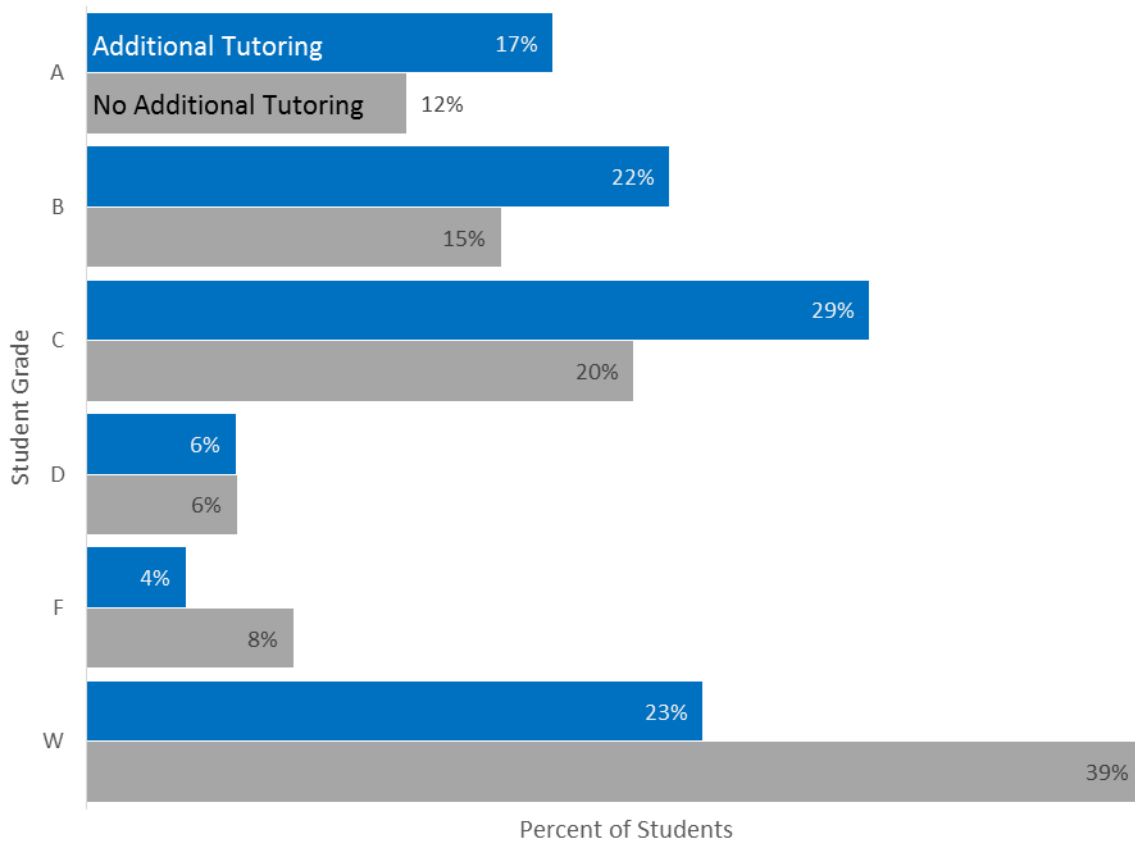
The second set of analyses concerned differences in outcomes within the group of students enrolled in embedded tutoring sections. We examined differences between students who took part in additional structured tutoring outside of class ($n = 162$) and students who did not take part in additional tutoring ($n = 143$). These analyses were intended to show the extent to which additional tutoring sessions were associated with improved student outcomes.

Grades earned. Figure 4 shows the distribution of grades earned for students who received additional out-of-class tutoring (blue bars) and students who did not receive additional tutoring (grey bars). Students who received additional tutoring earned more A's and B's than their counterparts. Additionally, students who received additional tutoring were less likely to withdraw from class than those who did not receive additional tutoring. Students who received additional tutoring earned higher grades ($M = 1.99$, $SD = 1.40$) than students who did not receive additional tutoring ($M = 1.44$, $SD = 1.46$). An ANOVA confirmed that the difference in grades was statistically significant, $F(1, 304) = 11.53$, $p = .001$. We calculated Cohen's d to estimate the size of the effect of additional tutoring. This analysis showed that the effect size ($d = .38$) was in the small to moderate range.

Table 5. Number of additional tutoring and no-additional tutoring group students earning each grade.

Grade	Tutoring	
	Additional	No Additional
A	17	28
B	22	35
C	29	47
D	8	9
F	11	6
W/Other	56	37
Total	143	162

Figure 4. Percent of additional tutoring and no-additional tutoring group students earning each grade.



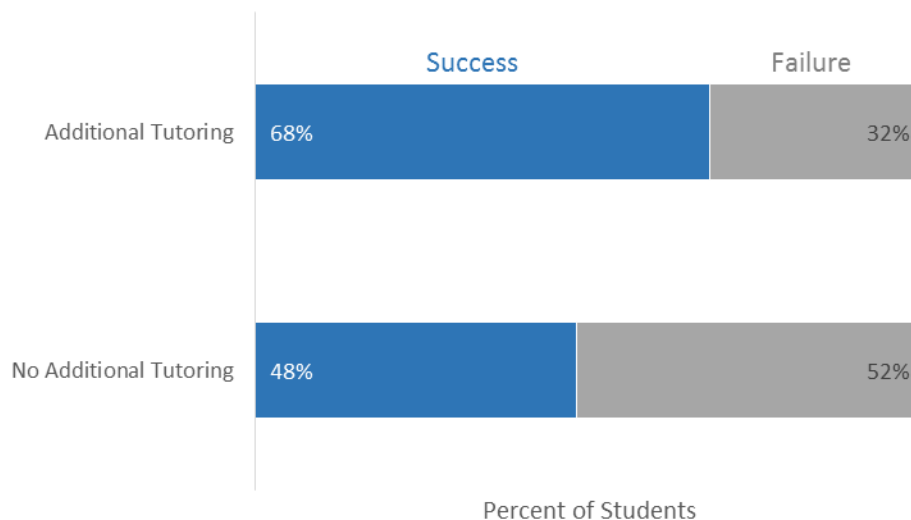
Success rate. Figure 2 shows the success rates for students who received additional tutoring and the rate for students who did not receive additional tutoring. The analysis showed that students who received additional tutoring had a higher success rate (68%) than students who did not receive additional tutoring (48%). A chi-square test showed that this difference in success rates was statistically significant, $\chi^2 (1) = 12.94, p < .001$. We calculated the relative

risk ratio to assess the size of the difference in success rates between the two groups. This analysis showed that the risk of failure was almost two times larger for students who did not attend tutoring (RR = 1.63). Students who did not attend additional tutoring were 63% more likely to fail their course than students who attended additional tutoring.

Table 6. Number of additional tutoring and no-additional tutoring group students earning each grade.

Group	Outcome		Total
	Success	Failure	
Additional	110	52	162
No Additional	68	75	143
Total	178	127	305

Figure 5. Success rates for students who did and did not receive additional tutoring.



Persistence rate. Figure 6 shows the persistence rates for students who received additional tutoring as well as the rate for students who did not receive additional tutoring. The analysis showed that students who received additional tutoring had a higher persistence rate (88%) than students who did not receive additional tutoring (79%). A chi-square test showed that this difference in retention rates was statistically significant, $\chi^2 (1) = 4.13, p = .05$. We calculated the relative risk ratio to assess the size of the difference in retention rates between the two groups. This analysis showed that the risk of leaving the college was almost doubled in the group that did not receive tutoring (RR = 1.69). Students who did not attend additional tutoring were 69% more likely to leave the college than students who attended additional tutoring.

Table 6. Number of additional tutoring and no-additional tutoring group students retained from fall 2016 to spring 2017.

Group	Outcome		Total
	Retained	Not Retained	
Additional	142	20	162
No Additional	113	30	143
Total	255	50	305

Figure 6. Persistence rates for students in embedded tutor and comparison sections.

