The Effect of Team-Based Active Learning and Embedded Tutors in the First Course in Accounting

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We evaluate the impact of teams-based active learning mode on student performance in the first course in accounting as compared to a traditional instructor-led passive mode. We find positive results for active learning mode, indicating its impact on the long-term knowledge retention. We also test the effect of embedded (in-class) peer-to-peer tutors in the active learning mode. The averages of all three exams of sections with embedded tutors are all significantly higher than those with no embedded tutors. When controlled for the time spent with traditional outside tutors, the role of the embedded tutors remains significant in Exam 1 and 2.

Keywords: active learning, embedded tutor, first accounting course

INTRODUCTION

The first course in accounting provides a foundation to overall educational success and yet these students struggle to learn "the language of business" as evidenced in a wide body of teaching and learning research in the accounting discipline (Alanzi and Alfraih, 2017). This first course in accounting challenges students who may lack relevant work experience to comprehend industry jargon embedded in a seemingly arbitrary set of accounting standards toward practical problem-solving. Mere memorization techniques soon prove inadequate as exercises become increasingly challenging across assessments exposing a need for *deep learning* (Phillips & Graeff, 2014; Riley & Ward, 2017). Instructors are therefore challenged to deploy innovative pedagogies that ensure knowledge retention as these problem-solving skills provide a critical basis for academic success in business courses of higher education.

Well known pedagogical approaches include passive learning and active learning. While traditional instructor-led lecture and problem-solving drives passive learning, active learning challenges the student to

lead in solving problems, engaging in discussion, and reflecting on the learning (Bonwell and Eisen, 1991; Misseyanni et al., 2018). Students may recall and apply techniques to complete tasks and correct their mistakes through trial and error in an active learning assignment for instance. Such applied learning experiences are intended to impart deep learning in contrast to passively accumulating knowledge through traditional lecture or *"teaching by telling"* (Freeman et al., 2014).

Active learning in this study includes primarily the use of collaborative learning activities, such as team-based learning and embedded tutors following a short lecture. In team-based learning, instructors assign problem-sets or cases to a group of students to be completed both inside and outside of class. Student may also seek collaborative support in the form of outside individual or group tutoring. An active learning pedagogy less explored, however is "embedded-tutoring," which refers to peer-to-peer tutoring in the classroom.

This IRB approved study uses student exams, total grade, and embedded tutor participation data to evaluate the impact of active learning methods on student performance as compared to a traditional passive learning methodology in the first course in accounting. We utilize six sections of enrolled student data and measure their exam performance throughout. Of the six sections, four are taught using an active learning mode and two sections using a passive mode. Secondly, we test the effect of embedded tutors in two of the four active learning modes with an overall 2x2 experiment design. We expect that students in the active learning mode will perform better on exams, demonstrate a stronger application of knowledge, and attain greater retention than those in passive learning mode. We also expect that embedded tutors will enhance the effect of active learning toward improved retention of critical knowledge on the cumulative final exam.

We find results for active versus passive learning in the direction as predicted suggesting greater overall retention. Embedded tutors also play an important role in the active learning mode as the exam averages of sections with tutors are significantly higher than those with no tutors. The role of the embedded in-class tutors was significant especially in the first and second exams when controlled for the time spent with external tutors.

The remainder of the study is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 identifies the research design. Section 4 presents descriptive empirical evidence, and hypothesis test results. Section 5 provides the conclusion to the study.

LITERATURE REVIEW AND HYPOTHESES

Active Learning

Research on effective pedagogy in accounting education is relevant due to the foundational nature of the first accounting course. This relevancy is enhanced by the recent pandemic effect on higher education driving increased pressure for faculty to adopt best teaching practices across multiple modalities such as traditional face-to-face, hybrid online, or asynchronous online (Chen et al., 2021). Online course quality-control programs such as Quality Matters emphasize the usage of active learning in course design to promote effective learning. Past research on active learning is split on findings. Research in multiple disciplines generally support the notion that active learning leads to a deeper level of learning. Past educational research across various subjects has shown that active learning positively impacts engagement, knowledge retention, and satisfaction when compared to passive learning (Gleason et al., 2011; Freeman et al., 2014; Riley and Ward, 2017; Oliveira Neto et al., 2017). Yet other studies have found that active learning has little or no effect, that there are mitigating factors to success, and that the process of structuring active-learning activities is quite challenging. This is particularly found in studies rooted in traditional accounting education where students passively take notes while listening to a guided problem-based or conceptual lecture (Riley and Ward, 2017; Loeb, 2015; Duxbury et al., 2016). We propose that the first course in accounting is a good fit for further testing the effect of active learning.

Team-Based Active Learning

Collaborative active learning refers to team-based active learning versus individual-based active learning. Collaborative learning does have certain challenges in ensuring that all members actively and

evenly participate in the learning process, developing a conducive class structure, and addressing conflict. Literature is mixed on the effectiveness of team-based learning. Riley and Ward (2017) found in a higher-level accounting information systems course, the effect of individual-based active learning was higher than teams-based active learning particularly emphasizing the potential of an unfair or unbalanced workload (social loafing). Pelegrini Giacomelli et al. (2021) found increased quality of team submissions over individual-based submissions using supporting technology in the classroom. Kim and Iwuchukwu (2022) also found greater success in teams-based learning using cross-discipline research to establish norms for team-based learning in a pharmacy course to address known challenges. They also found the instructors' role in forming teams as compared to students self-selecting teams particularly important toward ensuring greater learning and satisfaction.

We propose an experiment to explore the effect of team-based active learning further within the first course in accounting. First, we limit the number of team members to four to minimize the potential effect of social loafing (Riley and Ward, 2017). Second, we implement embedded (in-class) tutoring to monitor team performance and provide timely support. Third, we restructure the course with required pre-class preparation and shorter instructor lectures to create a class structure conducive to allow for peer-to-peer tutoring interactions during collaborative activities. We expect that team-based active learning with these controls will maintain the benefit of active learning design, specifically:

H1: *Students in the team-based active learning mode will score higher on examinations than students in a passive learning mode*.

Embedded Tutors

One challenge for faculty in an active learning mode design is the construction of engaging and meaningful learning experiences for all students. Due to the gateway nature of the first course in accounting, students who fail may find their remaining academic success in business education limited (Alanzi and Alfraih, 2017). Rather than excuse away high fail/withdraw and low retention, determined faculty can adopt a growth-mindset in their own teaching (Dweck, 2006). A potential related trail to blaze for the willing pioneer is available as there are no existing studies on embedded tutoring in an accounting classroom. Results are currently mixed in other disciplines and programs. Chester et al. (n.d.) found that embedded tutoring led to significant improvement in student engagement, achievement, and retention in Civil Engineering and Psychology but not in Industrial Design. Channing and Okada (2020) found failure rates in introductory math and English went down substantially when embedded tutors were used in the classroom. Koselak (2017) found just-in-time embedded classroom tutoring enhanced graduation rates of underrepresented minorities in a high-school setting. Tucker et al. (2020) found that introductory courses such as biology, math, English, and psychology with high failure rates benefited from embedded tutoring as retention increased and failure rates decreased significantly.

Embedded tutoring requires the instructor to give up a prescribed amount of control to a select group of in-class peer-to-peer tutors to help assist students. Alternatively, traditional approaches to tutoring take place outside of the classroom. Another model to compare would be teaching assistants (Tas) who may hold office hours, provide substitute instruction, and help with exam preparation. In contrast, embedded tutors work alongside the faculty in the classroom to provide just-in-time support during active learning assignments (Channing and Okada, 2020).

The embedded tutoring model promotes a team-based active learning environment where qualified peers are on-site to magnify the efforts of a roaming instructor to increase student support and reach during classroom activities. Embedded tutors act as additional facilitators of learning while supervising team-based performance and offering additional timely feedback to faculty on the success of each activity including common pitfalls hindering the learning process. The adapted peer-to-peer model is geared to help students feel more comfortable asking questions and even seeking additional supplemental instructions outside of class time. Successful embedded tutors can build a rapport and promote enhanced trust in the classroom despite known challenges for the peer tutors and faculty in building such enhanced inclusion and community.

Similar to related studies on embedded tutoring in STEM subjects and gateway high failure rate classes, we expect embedded tutoring in the first course in accounting to have a significant impact on student outcomes, specifically:

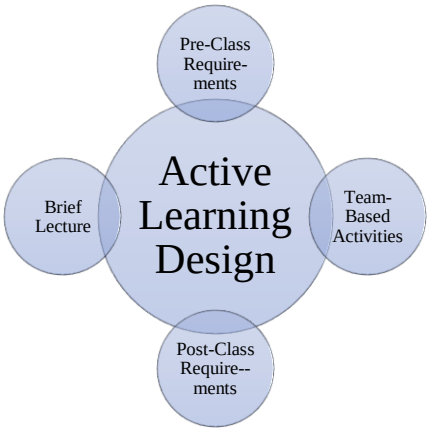
H2: *Students in the active learning mode with embedded tutors will score higher on examinations than students in active learning mode but without embedded tutors.*

RESEARCH DESIGN

We employ an overall 2x1 between subject experiment design with two basic learning modalities: active learning versus passive learning within the first course in accounting. In addition, under the active learning mode, we follow a 2x1 design with embedded tutor as the independent variable.

The class structure of the active learning design is modeled below:

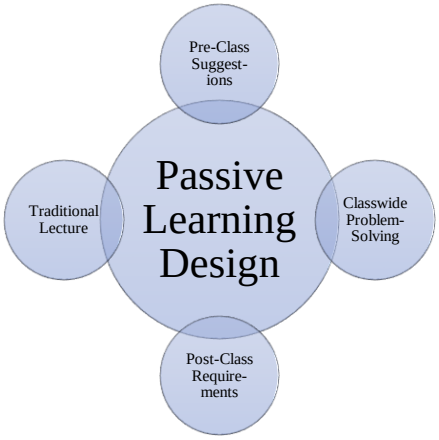
FIGURE 1
CLASS STRUCTURE OF ACTIVE LEARNING DESIGN



- *Administration:* random assignment of teams of up to four students, establishment of an inclusive learning community with group norms, and setting seating arrangements early in the term.
- *Pre-class requirements:* (1) chapter reading with workbook questions, (2) video tutorials, and (3) graded pre-class assessment.
- *Brief Lecture:* short twenty-minute interactive overview of key concepts, problem-solving techniques, and tips for success using a document camera to model active notetaking and comprehension check-ins to encourage engagement or allow for questions.
- *Team-based activities:* (1) workbook problems and cases, or (2) reflective discussions.
- *Post-class requirements:* (1) graded individualized (algorithmic/pooled) homework assignments, (2) graded adaptive-learning tool assignment to identify individual strengths and weaknesses, (3) graded post-class assessment.

The class structure of the passive learning design is modeled below:

FIGURE 2
CLASS STRUCTURE OF PASSIVE LEARNING DESIGN



- *Administration:* students are encouraged but not required to self-select in-class work groups or work individually at the start of the semester.
- *Pre-class non-graded suggestions:* (1) chapter reading with workbook questions and (2) video tutorials.
- *Traditional Lecture:* Comprehensive overview of key concepts, problem-solving techniques, and tips for success using a document camera to model active notetaking and comprehension check-ins to encourage engagement or allow for questions.
- *Individual of Self-Selected Team Class Activities:* Fifteen-minute reflective problem-based learning activity for individuals or teams to solve with instructor support as needed.
- *Post-class requirements:* (1) graded individualized (algorithmic/pooled) homework assignments, (2) graded adaptive-learning tool assignment to identify individual strengths and weaknesses.

There are four sections of students involved in the active learning mode, resulting in two cross conditions of (1) two sections with embedded tutor (2) two sections without embedded tutor. There are two sections of students in the passive learning mode. We control each of the six sections to be taught by the same instructor, with a class enrollment limit of 45, and to be held either in the morning or early afternoon, to avoid the confounding factor of evening class time. Classes are held twice per week for seventy-five minutes during a regular semester. In addition, for students in the active learning mode, we conduct an end-of-semester survey to control for, accounting major versus other major student, number of accounting courses taken in high school, primary language, average course study time per week, time spent in tutoring per week, and weekly employment hours.

We collect the student scores of identical exams administered within the passive and active learning environments and total grade scores in each section. The total grade composition varies across learning modalities to ensure active mode students are motivated to prepare in advance of class to accommodate a shorter lecture. In the passive learning mode, exams are worth 68% of the grade with the remaining 32% of points assigned to homework quizzes, problem sets, and projects. Comparatively, the active learning mode exams are worth 50% of the grade, pre and post quizzes are worth 20%, and the remaining 30% covers the homework quizzes, problem sets, and projects.

The exams consist of two midterms and one final examination. Each exam contains 10 to 15 comprehensive multiple-choice questions and two to five short-answer problems. In the first course in accounting, Exam 1 covers the basics of accounting – introduction of debits and credits, journal entries, the accounting cycle, and financial statements. The instructor spends a significant amount of time focusing on the fundamental topics of the accounting cycle toward building knowledge of financial statement

preparation before moving on to the remaining journal entries. Exam 2 covers detailed journal entries for sales, receivables, and inventories. The final exam covers depreciation methods, bond liabilities, and stock journal entries as well as one cumulative question requiring students to prepare a set of financial statements.

Students receive traditional extensive related lecture with short problem-solving in the passive learning mode. While in an active learning environment, students receive shorter lectures to allow for more related hands-on team-based assignments and workbook activities. The instructor also conducts similar face-to face-exam reviews, extra office hours, and posts video reviews of critical topics for each mode to help students prepare for all exams.

RESULTS

After excluding students who withdrew from the course and those with missing data, there are altogether 236 students remaining in the study, out of which 151 students are in the active learning mode and 85 in the passive learning mode. There are 123 (52.1%) female students and 113 (47.9%) male students. Most of the students are at a freshman or sophomore grade level as this is a first accounting course. The majority of the students are business majors (151 or 64.0%). These demographics are presented in Table 1.

TABLE 1
DEMOGRAPHICS (N=236)

Gender			**Academic Level**			**Major**	
Female	123		Freshman	87		Non-business	85
Male	113		Sophomore	128		Business	151
			Junior	15			
			Senior	6			

When analyzing the effect of active versus passive mode, we exclude Total scores because the composition of Total for these modes are different. We present the three exam performance scores in Table 2. As expected, we observe that all the exam means for passive mode are lower than or similar to that of active mode. We also note that Final exam scores demonstrate the largest difference between the active (66.72) vs. passive (61.75) learning modes.

TABLE 2
COMPARATIVE MEANS OF EXAM SCORES*

Learning Mode		Exam1	Exam2	Final
Passive	Mean	77.40	66.55	61.75
(N=85)	*Std. Deviation*	*13.18*	*17.43*	*17.80*
Active	Mean	78.65	66.51	66.72
(N=151)	*Std. Deviation*	*12.76*	*19.08*	*13.30*
Total	Mean	78.20	66.52	64.93
(N=236)	Std. Deviation	*12.90*	*18.47*	*15.23*

*Exam scores are out of 100 maximum points. Only the Final exam is comprehensive.

Given that all three exam scores are highly positively correlated, as seen in Table 3, Panel A, we choose to conduct a multivariate analysis of variances (MANOVA) test. The model includes Learning Mode, Gender, Business Major and Academic Level as the independent variables. It follows the full factorial design with all main effects and interaction effects. The test results for main effects are displayed in Table 3, Panel B; interaction effects are not displayed as none is expected or found. Although the average of Exam

1 is higher for students in the active learning mode than those in the passive mode (78.65 vs. 77.40), there is no statistically significant difference between the two (F=1.328; P-value=0.250). However, for both Exam 2 and the Final scores, students in the active learning mode score significantly higher than those in the passive mode (For Exam2, F= 5.035, P-value=0.026; For Final, F = 9.669; P-value =0.002).

TABLE 3
EFFECTS OF ACTIVE LEARNING ON EXAM 1, EXAM 2 AND FINAL SCORES

Panel A: Exam Scores Correlation (N=236)

		Exam2	Final
Exam1	Pearson Correlation	.575**	.433**
	Sig. (2-tailed)	<.001	<.001
Exam2	Pearson Correlation		.525**
	Sig. (2-tailed)		<.001

Panel B: MANOVA Tests of Between-Subject Effects of Learning Mode on Exam Scores*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Exam1	3931.051[a]	25	157.242	0.939	0.552
	Exam2	9744.725[b]	25	389.789	1.163	0.277
	Final	6307.385[c]	25	252.295	1.100	0.345
Intercept	Exam1	347296.807	1	347296.807	2073.252	0.000
	Exam2	235742.431	1	235742.431	703.371	0.000
	Final	209248.456	1	209248.456	912.246	0.000
Learning mode	Exam1	222.453	1	222.453	1.328	0.250
	Exam2	1687.387	1	1687.387	5.035	0.026
	Final	2217.827	1	2217.827	9.669	0.002
Gender	Exam1	94.220	1	94.220	0.562	0.454
	Exam2	2314.458	1	2314.458	6.906	0.009
	Final	545.870	1	545.870	2.380	0.124
Business	Exam1	35.456	1	35.456	0.212	0.646
	Exam2	53.129	1	53.129	0.159	0.691
	Final	109.783	1	109.783	0.479	0.490
Level	Exam1	471.902	3	157.301	0.939	0.423
	Exam2	506.590	3	168.863	0.504	0.680
	Final	538.837	3	179.612	0.783	0.505
a. R Squared = .101 (Adjusted R Squared = -.007)						
b. R Squared = .122 (Adjusted R Squared = .017)						
c. R Squared = .116 (Adjusted R Squared = .011)						

*Model includes all main and interaction effects. The results of interaction terms are omitted.

We further compare student performance on every part of the cumulative Final Exam, including multiple-choice question scores, scores of each short answer question and problem to see which part is causing such a difference. We find the problem that is driven such a difference between students in active and passive mode is the problem of preparation of financial statements. We found that students in the active

learning mode an average scored 21.96 points out of 25 total (88%) while students in a passive class mode received 15.41 out of 25 (62%). As financial statement preparation is mostly introduced, practiced, and tested before Exam 1, we conclude that the students with an active learning mode are able retain their knowledge better until the end of semester. Thus, our Hypothesis 1 is strongly supported for all performance measures other than Exam 1, suggesting that it might need some time for active learning to take effect, and that its effect on long-term memory retention is the most prominent.

Next, we test the effect of embedded tutoring in sections with active learning mode. The exam score averages, and standard deviations are presented in Table 4. Within active learning, embedded tutoring adds value in Exams 1 and 2. We observe that in the difference in average scores between no tutor sections and tutor sections in Exam 1 is 5.10 (81.29 – 76.19) and the difference in exam 2 is 4.25 (68.70 – 64.45). However, such difference in the Final Exam is only 1.24 (67.36 – 66.12), while the difference in the Total is slightly higher, 2.29 (79.63-77.34).

TABLE 4
EXAM SCORES IN ACTIVE LEARNING MODE BY EMBEDDED TUTOR

Tutor	Game		Exam1	Exam2	Final	Total
Without Embedded Tutor	(N=78)	Mean	76.19	64.45	66.12	77.34
		Std. Deviation	*12.15*	*19.01*	*12.65*	*8.49*
With Embedded Tutor	(N=73)	Mean	81.29	68.70	67.36	79.63
		Std. Deviation	*12.95*	*19.04*	*14.02*	*10.75*

To test the effect of embedded tutoring, we conduct MANOVA analysis with out of class tutoring time and work hours as the covariates. These two variables are chosen because they are correlated with Exam1, Exam2 and Total scores, as shown in Table 5. Specifically, out of class self-reported tutoring time is negatively and significantly correlated with Exam 1, Exam 2, and Total scores, indicating that the longer tutoring time reported, the worse a student performs in these measures. The evidence suggests that students self-select into having tutoring when they know they do not understand the material and are unable to keep up with the class expectations. Those who are strong in the subject do not utilize tutoring outside of the class, instead choose to study on their own.

As to work hours, it is also negative associated with Exam 1, Exam 2, and Total scores, indicating that students with longer work time per week demonstrate worse exam performance. There is no correlation between work hours and the Final Exam, suggesting that students likely take off from work during the final exam week, therefore mitigating the impact of work time on exam performance. Weekly self-reported studying time has no significant correlation with exam performance and is hence dropped from analysis. Similarly, accounting major status or prior accounting course taken are also omitted from analysis due to no significant association. Very few students are of accounting major as this is a freshman year course. Also, whether English is students' native language or not does not affect any of the performance scores.

TABLE 5
CORRELATIONS OF EXAM SCORES, OUT-OF-CLASS TUTORING TIME, STUDY TIME AND WORK HOURS IN ACTIVE LEARNING MODE (N=151)

		Exam2	Final	Total	Tutor_time[a]	Study_time[b]	Work_hr[c]
Exam1	Pearson Correlation	.580**	.430**	.660**	-.271**	-.007	-.191*
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	.930	.019
Exam2	Pearson Correlation		.508**	.711**	-.223**	.022	-.276**
	Sig. (2-tailed)		<.001	<.001	.006	.789	<.001
Final	Pearson Correlation			.691	-.110	.059	.019
	Sig. (2-tailed)			<.001	.177	.473	.817

Total	Pearson Correlation				-.151	.100	-.202*
	Sig. (2-tailed)				.065	.222	.013
Tutor_time	Pearson Correlation					.194*	.109
	Sig. (2-tailed)					.017	.181
Study_time	Pearson Correlation						-.041
	Sig. (2-tailed)						.620

a. Tutor_time is student self-reported tutoring time per week outside of classes.
b. Study_time is student self-reported studying time per week.
c. Work_hr is student self-reported work hours per week, with "0" for no work time; "1" for work 1-10 hours; "2" for 11-20 hours; "3" for 21-30 hours; "4" for 31-40 or more hours.

The MANOVA analysis results are presented in Table 6. As expected, sections with embedded tutors report significantly higher Exam 1 (F=11.243, P-value= 0.001) and Exam 2 (F =3.132; P-value = 0.079) scores than those without embedded tutors. However, neither embedded tutors nor the outside tutoring time or work hours has any impact on Final exam scores. We surmise that due to the high stake of Final Exam and the fact that all finals are held in the final exam week, students might take time off from work during that time. If so, the regular work time will have less of an impact on the study time in the final exam week. Also, by the end of semester, students are busy with assignments and projects due in most of their classes, reducing the potential time needed to visit tutors during weekdays. In addition, the instructor of the course offers extensive extra office hours during the final review week, and on the Saturday before exam week. When given a choice between seeing an outside tutor and seeing the instructor who is offering additional office hours on Saturday, students tend to take advantage of the extra faculty office hours, hence negating the effect of outside tutoring time or embedded tutors. Overall Total performance, however, does display a marginal impact of embedded tutors (F=2.888; P-value =.091). Thus, if the embedded tutors are utilized, as reflected in the scores of Exam 1 and Exam 2, and for the entire course performance Total, Hypothesis 2 is supported.

TABLE 6
MANOVA BETWEEN-SUBJECT EFFECTS OF EMBEDDED TUTOR ON EXAM SCORES IN ACTIVE LEARNING MODE (N=151)

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Exam1	4000.776[a]	3	1333.592	9.596	<.001
	Exam2	7242.088[b]	3	2414.029	7.491	<.001
	Final	522.264[c]	3	174.088	0.984	0.402
	Total	1062.806[d]	3	354.269	4.006	0.009
Intercept	Exam1	469191.4	1	469191.4	3376.211	<.001
	Exam2	371305.8	1	371305.8	1152.139	<.001
	Final	310204	1	310204	1753.81	<.001
	Total	451188.4	1	451188.4	5102.512	<.001
Tutor_time	Exam1	2309.077	1	2309.077	16.616	<.001
	Exam2	2700.182	1	2700.182	8.379	0.004
	Final	448.015	1	448.015	2.533	0.114
	Total	357.315	1	357.315	4.041	0.046

Work_hr	Exam1	386.267	1	386.267	2.78	0.098
	Exam2	2940.398	1	2940.398	9.124	0.003
	Final	47.282	1	47.282	0.267	0.606
	Total	385.8	1	385.8	4.363	0.038
Embedded-Tutor	Exam1	1562.389	1	1562.389	11.243	0.001
	Exam2	1009.392	1	1009.392	3.132	0.079
	Final	173.338	1	173.338	0.98	0.324
	Total	255.402	1	255.402	2.888	0.091

a. R Squared = .164 (Adjusted R Squared = .147)

b. R Squared = .133 (Adjusted R Squared = .115)

c. R Squared = .020 (Adjusted R Squared = .000)

d R Squared = .076 (Adjusted R Squared = .057)

We further analyze the impact of embedded tutors and other components of the course through the student questionnaire responses at the end of the semester. In the questionnaire, we ask students "How strongly do you agree with the following statements?" on a 5-point Likert scale. The first statement is "The embedded tutors contributed to my success in this class," followed by "The in-class team-based activities," "The in-class lecture" and "The recorded exam reviews" contributed to my success in this class. Student responses are coded as 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree and 5 for strongly agree. The average response scores and standard deviations are listed in Table 7. Out of these 4 course components, the recorded exam review is ranked highest (4.69), followed by in-class lecture (4.58) and active team-based learning activities (4.25), all of which are higher than 4, indicating students on average highly agree that these contribute to their success. Embedded tutors are ranked the fourth (3.96,), indicating that students generally are close to agree that this is also an important contributor. These rankings provide additional evidence that active learning mode and embedded tutors are acknowledged by students as helpful to their learning experience.

TABLE 7
STUDENT RESPONSE ON THE IMPORTANCE OF COURSE COMPONENTS

How strongly do you agree with the following statements? 1-Strongly Disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strongly Agree	N	Mean	Std. dev.
The embedded tutors contributed to my success in this class	73	3.96	1.02
The in-class team-based activities contributed to my success in this class	151	4.25	0.95
The in-class lecture contributed to my success in the class	151	4.58	0.83
The recorded exam reviews contributed to my success in this class	147	4.69	0.75

CONCLUSION

This study contributes to the importance of retention of knowledge in the first course in accounting leading toward student success in business education. The results of this study are impactful as they indicate that embedded tutoring and active learning modes enhance the early foundational learning in the course. The evidence suggests that the teams-based active mode and specifically the use of in-class embedded peer-to-peer tutoring is an innovative approach toward reaching deep learning and improving student success.

This study specifically examines whether teams-based active learning helps students improve performance in the first course in accounting as compared to passive learning. We find that students in an active learning mode do retain better the knowledge of materials taught early in the semester and score

higher in the final exam when compared with the performance of students in a passive mode. This is evidenced by higher exam scores and total scores, particularly when reviewing the cumulative financial statement preparation problem required on the final exam.

We also analyze the impact of embedded tutoring in the active learning environment. For students in the active learning mode, we note that embedded tutors play a significant role in first two exams and the overall total course performance, but not for the final exam. Students also rank the embedded tutors forth after recorded exam reviews, in-class lecture, and in-class team-based activities suggesting importance to learning. External tutoring also demonstrates a marginal effect on the final exam as well suggesting students are unable to dedicate time to additional tutoring and instead rely on instructor reviews and office hours for support late in the course. Hence, we find no effect of embedded tutor or external tutoring time for final exam performance. However, there is a marginally positive effect of embedded tutors on Total performance, indicating the active class course structure with emphasis on collaborative learning, pre and post class preparation, and supplemental workbook resources can enhance student success when embedded tutors are unavailable.

We note that there are some caveats with the results. The embedded tutoring program will need on-going strategic and financial support at the college and university level. Instructors will also need to be willing to collaborate regularly with the embedded tutors to ensure consistency and quality of tutoring instruction. Embedded tutors need to be chosen and trained carefully, preferably seniors with experience in tutoring to maintain quality.

Finally, future research on embedded tutor and teams-based active learning may include measuring the impact of student use of optional class preparation and exam review videos and student learning preferences on performance. A longitudinal study on retention of accounting knowledge by business majors would also add value to the role of embedded tutors in student success.

In summary, the overall results of this study suggest that teams-based active learning enhances student performance when compared to passive learning. Embedded tutors further improve these desired outcomes. With the proper level of administrative support and instructor planning surrounding an active class structure and embedded tutor selection, students can achieve a deeper level of learning and knowledge retention. These evidenced-based results therefore demonstrate a path toward greater student success in the first course of accounting and overall business education leading toward improved outcomes for students, instructors, and administrators.

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