

INCLUSIVE AND EFFECTIVE TEACHING: EVIDENCE FROM A LIBERAL ARTS ECONOMICS DEPARTMENT

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Abstract

There is a recent focus in economics on being inclusive and welcoming. One of the ways that educators can improve inclusivity is by being intentional about using inclusive teaching methods. In this work, we discuss an initiative to implement inclusive teaching methods in all principles of economics courses at the Authors' Institution, starting in Fall 2018. First, we outline what is meant by inclusive teaching methods and the reason that educators should consider them. We also report on the specific changes made to the principles of economics courses at the Authors' Institution. Finally, we examine the effectiveness of these methods by reporting on multiple metrics, including student performance and retention at the university. We find enhanced test scores, indicating a positive correlation between tutoring and test performance. Additionally, there are statistically significant improvements in university retention rates among students enrolled in economics courses.

Key Words: inclusive teaching, tutoring, student outcomes

JEL Classification: A22

Introduction

There is a recent focus on diversity and inclusion within economics. For example, the American Economic Association (AEA) founded an annual Outstanding Achievement in Diversity and Inclusion award in 2020.⁷ Other new initiatives include departmental seed grants⁸ and an undergraduate essay prize.⁹ The AEA recommends that economics educators “use effective and inclusive classroom techniques” when teaching. While many departments or individual professors may wish to become more inclusive in their teaching, there is a question on how to proceed. What

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⁷ <https://www.aeaweb.org/about-aea/honors-awards/outstanding-achieve-diversity-inclusion>

⁸ <https://www.aeaweb.org/about-aea/committees/csmgep/diversity-initiatives/dept-seed-grants>

⁹ <https://www.aeaweb.org/about-aea/honors-awards/brimmer-undergrad-essay-prize>

methods in a classroom will help students from all backgrounds learn better? What does it mean to use an effective classroom technique or an inclusive technique?

Prior to this renewed interest by the AEA, the Authors' Institution decided to focus on thinking about inclusive methods in teaching for two key reasons. First, students today are different than students from five or ten years ago, representing a very diverse demographic group in terms of race, ethnicity, sexual orientation, with a large fraction being first generation students (Selingo 2018). Their high level of engagement with technology had an effect on their learning styles which necessitates different pedagogical approaches. And second, students entering college – even if capable of succeeding – come with diverse backgrounds and preparation, with some having access to good quality high school education and others experiencing a lack of resources that disadvantage them during college studies. The lingering challenges as a result of the pandemic among K through 12 has added an additional layer of complication when it comes to high school students' preparation for college success.

To improve teaching with these two issues in mind, in the summer of 2018, the economics faculty at the Authors' Institution participated in training to make principles of economics courses more inclusive through a course redesign. More specifically, the main components of inclusive teaching include putting more structure into a course with clear instructions, as well as facilitating class discussions so that everyone feels welcome to participate (Supiano 2018).

As a part of this effort, the economics department faculty implemented a mandatory tutoring initiative within the principle of microeconomics and macroeconomics classes, as well as implementing active and engaging teaching strategies supported by the best pedagogic practices on inclusive teaching.¹⁰ This initiative was supported by both the dean and the provost. The rationale was this would not only improve the economics courses but given two economics courses are required for all business students, it was also seen as a potential way to improve student retention and, therefore, graduation rates.

In this paper, we will outline the background research we used to assess how students learn differently today and how this should impact our teaching. We show the steps taken in the department to change the principles of economics courses to be more inclusive and effective. Through this, we will provide an outline for teachers and departments hoping to improve their teaching. Finally, we highlight the data showing a positive impact of using inclusive and effective classroom techniques on both student performance in economics classes and on first- year retention rates.

Background

As the population of traditional college-age students changes, the teaching methods that would best prepare them for success in and after college are also changing. Student changes have been precipitated by changes in the demographic composition of the US population and also recently by their pandemic experience. The face of the American population is changing as it is becoming more diverse, the projected inward migration trends are changing, more women are in the workforce, and two-parent homes are declining. The Gen Z generation is now entering higher education, and they bring both new characteristics and expectations as to what they want out of their college experience. First, they are the most diverse generation in recent American history with respect to race, ethnicity, sexual orientation, and gender identity (Selingo 2018). Added to

¹⁰ Hogan and Sathy (2022), Davidson and Katopodis (2022), Andersen (2023) discuss in detail various types of inclusive teaching strategies.

these changes is an increasing percentage of first-generation students entering college (56% of incoming students in 2023). These students have had different upbringings than previous generations. They were raised in the digital age, and computers and handheld devices have always been part of how they consume information, communicate, and learn. They have come of age after the Great Recession of 2008, and the main reason they enter college is to launch their career, and the first (job or graduate school) destination is more important to these students (Selingo 2018).

Second, this generation of students is more focused on finances and how to pay for college. They value transparency on costs of their education and readily available supports such as counseling, tutoring and career development services. They expect virtual services they can access with their mobile devices. Given their upbringing and preferences, the learning style for many in this generation of students is not the same as before, and many do not prefer a traditional classroom. This generation of students is more likely to look to the virtual world for information but does not believe that technology is the perfect solution for learning in an academic setting (Selingo 2018).

A few noteworthy preferences Gen Z students are wanting project-based learning that can develop their critical skills, flexible spaces that allow for interactions with professors and colleagues, and more guidance on issues like study habits (Selingo 2018).

Finally, students bring a diverse set of skills, or lack thereof. For instance, some are more likely to succeed in college because of prior attendance at quality high schools with strong preparation, or by having parents who continually encourage them to achieve, while others coming from more disadvantaged backgrounds might be lacking skills that we as instructors take for granted (Supiano 2018). Hence, it is our responsibility as instructors to provide ample opportunities for all students to succeed.

Being inclusive of students from different backgrounds

The Center for Research on Learning and Teaching at the University of Michigan has a good definition of inclusive teaching¹¹: “Inclusive teaching involves deliberately cultivating a learning environment where all students are treated equitably, have equal access to learning, and feel valued and supported in their learning. Such teaching attends to social identities and seeks to change the ways systemic inequities shape dynamics in teaching-learning spaces, affect individuals’ experiences of those spaces, and influence course and curriculum design.”

Similarly, Viji Sathy and Kelly Hogan, authors of a book on inclusive teaching, point out: “Teaching inclusively means embracing student diversity in all forms — race, ethnicity, gender, disability, socioeconomic background, ideology, even personality traits like introversion — as an asset. It means designing and teaching courses in ways that foster talent in all students, but especially those who come from groups traditionally excluded in higher education”¹² (Hogan and Sathy 2019).

Students have different backgrounds and identities; therefore, it makes sense that they learn differently. Further, there are vast differences in the academic preparations students may receive across school districts, states, and countries. Socio-economic background has been shown to potentially impact a student’s academic performance. Research by Yee (2016) illustrates that children of college graduates have a broader range of learning strategies compared to first-

¹¹ (Center for Research on Learning and Teaching at the University of Michigan, 2018).

¹² Additional resources and a more detailed discussion on inclusive teaching strategies can be found here: <https://www.chronicle.com/article/how-to-make-your-teaching-more-inclusive/>

generation students. According to Yee, middle class students have a broader repertoire of strategies for engagement, are more likely to interact with others to succeed academically and generally believe that they are responsible for reaching out to get help. On the other hand, first-generation students tend to rely on themselves and believe that they are expected to work hard but independently of others. According to Yee, this could be problematic in a higher education setting where “interactive engagement is prized,” thus creating a disparity in learning and academic performance.

How did we make the economics instruction more inclusive?

The Author’s Institution is a small liberal art college with slightly over 2000 students, located in a rural setting. In the 2023-2024 academic year, over 95 percent of the students were full-time students, 56 percent were female, 2 percent were international students, 18 percent were minority students, and over 95 percent were 22 years old or younger. The economics department at the Author’s Institution at the time of this writing consisted of 4 full-time faculty members and several adjunct faculty.

In the summer of 2018, the provost, dean, department chair, and economics faculty members met to discuss changing the teaching style to incorporate methods that would result in a more inclusive teaching environment where each student feels included and provided with opportunities to thrive. All department members agreed to implement changes, and stipends were provided to compensate faculty members for the time needed to change the course curriculum.

Keeping in mind that students have different levels of abilities, we attempted to make economics instruction at the Authors’ Institution more inclusive by implementing an integrated teaching strategy. We adopted new teaching methods to ensure active participation and engagement of students.

Professors learned and implemented more in-class experiments and games to demonstrate and reinforce basic concepts. The exact activities differed by faculty and by course, but examples of experiments implemented include activities illustrating supply and demand, pricing, opportunity cost, comparative advantage, gains from trade, production costs, revenue, elasticities, and profit. One of the major initiatives implemented by the department was to change the existing tutoring system policy from voluntary to mandatory tutoring hours.

Below we provide more details on the mandatory tutoring initiative as well as several other teaching strategies implemented as part of this project.

Mandatory tutoring initiative

Education literature has extensively examined the role of tutoring in student academic success and retention, primarily within PreK-12 settings. In a recent meta-analysis of experimental studies, Nickow, Oreopoulos, and Quan (2020) document significant and consistent positive effects of tutoring on academic outcomes. More specifically, they find that a student at the 50th percentile would improve to the 66th percentile by attending tutoring hours. The empirical evidence on the effectiveness of tutoring at the postsecondary level is more difficult to find due in part to less research in this area. Nevertheless, Xu et al. (2001), accounting for student academic characteristics, find that tutoring had a significant positive effect on final exam mathematics scores. Munley et al. (2010) document that, after accounting for student selection into tutoring, participation in peer tutoring and the length of tutoring had positive effects on student GPA. Reinheimer and McKenzie (2011), Reinheimer et al. (2010), and Laskey and Hetzel (2011), relying

on regression analysis, find a significant positive effect of tutoring on retention rates for undeclared undergraduate students and at-risk students.

Research also focuses on the social implication of tutoring in the context of cooperative learning. Tutoring is considered an important strategy for inclusive pedagogy because it relies heavily on the dynamics of social interactions to facilitate inclusive learning (Qureshi and Stormyhr 2012). Working with tutors, individually or in groups, on problem-solving fosters equity and mutual collaboration within a supportive environment. Students learn how to listen, engage with each other, explain their understanding of class material, and respect each other's points of view. This type of learning environment is conducive to developing connections outside of the classroom and a sense of belonging to an institution and campus community (Reinheimer and Mckenzie 2011).

Tutoring as a form of peer instruction is also found to benefit peer instructors themselves. Studies indicate that peer-instructors reported higher levels of self-esteem, improved communication skills, higher level of confidence, a better understanding of the subject matter, and improvement in other personal skills (Parkin and McKegany 2000; Kerr and MacDonald 1997; Klein et al., 1994; Galbraith and Winterbottom 2011).

With the above-mentioned evidence of the positive effects of tutoring in mind, in the fall of 2018, the Authors' Institution's department of economics asked all students taking principles of microeconomics and macroeconomics to attend tutoring sessions. Unlike most cases where tutoring is suggested only for students who need academic support, in this case tutoring was expected of all students regardless of their level of readiness. The mandatory nature of tutoring leveled the playing field, eliminating the stigma of tutoring among less academically successful students. The department opted to provide tutoring services to students directly through the department itself rather than through the academic support program run by the university. All professors told students that tutoring was required and several also incentivized participation with modest amounts of extra credit or counting it in a participation grade. Periodically and at the end of the semester, instructors examined tutoring logs to verify each student's tutoring attendance and incorporated it into their final grade calculations.

While multiple tutoring sessions were encouraged throughout the week, students were only required to attend one tutoring session per week. To accommodate student schedules and various college commitments, tutoring was offered in multiple time slots, almost every day, including weekends. More specifically, with slight variations, depending on the semester, tutoring was available 6 days a week (excluding Saturdays). Most days, the first available appointment was at 10 or 11am, with subsequent appointments running hourly until 6 or 7 pm depending on the day. Hence, sessions would run continuously throughout the day, 6 days a week. These were publicized in class, through the university's LMS (Blackboard or Canvas), and on flyers and TV monitors in many buildings. Since the Authors' Institution is a residential college, most of our students live on campus, thus attending tutoring sessions is more straightforward. For a handful of commuting students, we would allow tutoring over Zoom to simplify participation.

Tutors were students who successfully completed principles of microeconomics or macroeconomics and were recommended by professors to the department chair. They were responsible for creating detailed attendance logs, including student's name, instructor's name, and the start and end times of each tutoring session for each student.

Students would often attend tutoring with their friends, and it would help their learning by discussing topics with their friends and asking tutors for help with concepts they struggled to comprehend. Since many of the tutoring sessions would take place in the suite of offices of the

department of economics, some of the economics faculty would get a glimpse at the extent of student interaction. It was not uncommon to see lively student discussions at the tutoring table, and students engaging with each other working on their homework assignments or prepping for exams. Students who otherwise were very shy or quiet in class opened up and engaged in conversations with their peers.

We are not aware of other departments implementing similar pedagogical changes. In fact, the changes implemented in the economics department were a pilot program specific to our department.

Other strategies

In addition to tutoring, the department focused on active and engaging teaching strategies that are supported by best pedagogic practices. Many of the strategies mentioned below have been empathized by Sathy and Hogan (2022) as effective means to a more inclusive teaching approach.

In-class activities and games

Most economics courses are taught using “chalk-and-talk” techniques (Becker and Watts 1996; 2001; 2006; Onger 2017; Christoffersen 2002; Ray 2018). However, in recent years more activities have been designed to actively engage students in the learning process (Christoffersen 2002; Hettler 2015; Imazeki 2015; Muchiri et al., 2022; Vazquez and Chiang 2015; Wooten et al., 2021). Economics department members agreed to add some activities. Specific activities were not mandated, as each professor has their own style and may find a benefit in using different methods, but activities that are now used in the Authors’ Institution’s principles of economics classes include:

- (1) Paper Baseballs and Paper Planes: helps students understand what the production possibility frontier (PPF) does; it also teaches them the concepts of absolute advantage, comparative advantage, and trade (Powers 2018).
- (2) Tennis ball exercise to illustrate production, costs, and profits (Hedges 2004).
- (3) Trading pit: helps students understand the concepts of demand, supply, and market equilibrium well before these theories are taught in the course¹³.
- (4) Virtual tour of the Federal Reserve: helps students understand the monetary system and functions of the Fed.^{14,15}
- (5) Using balls with different rebounds to explain the concept of elasticity of demand and supply (Paraschiv and Muchiri 2019).

In addition to the above-mentioned activities and games, some instructors relied on in-class videos by bringing in examples from PBS, TedTalks, commercial networks, and YouTube. These videos showcased examples of economic theory applied in the real world. All instructors committed to showing videos and music clips with economics content.

More low-stakes assignments

Given more opportunities for recall can help learning (Lang 2016), we implemented more low-stakes assignments, such as small writing assignments and chapter quizzes with low point values, assignments with multiple attempts, etc. Some of them were homework, others in-class. These low-stakes assignments moved up studying and avoided the usual cramming for exams. Students were commonly paired with peers for graded or ungraded in-class activities. Working in groups

¹³ https://blog.lud.io/wp-content/uploads/2017/12/Market_Experiment.pdf

¹⁴ <https://www.youtube.com/watch?v=XhpS8d5UAug&list=PL3nIbYC5VRj3eazdZbjyM4brcmhQx8Uf9>

¹⁵ <https://www.atlantafed.org/about/tours/virtual/>

allows the participants the opportunity to discuss the topics, which has been shown to improve their learning (Steele 2011). Recent research is a bit more mixed, showing that more frequent required assignments help some students – particularly those generally with lower or mid-ranged GPAs, but can lower exam scores for top students (Al-Bahrani et al. 2022). Group work, discussions, assignments, projects, and presentations were also helpful in getting the students involved in and discussing the economics concepts they were learning.

The many smaller assignments created more frequent feedback, or in some cases immediate feedback, for students. Because of this, if a student did well on one chapter quiz but poorly on another, they would know where to focus more attention and what concepts to ask for help about during tutorial sessions and office hours. In discussing the concepts, the tutors and professors could determine the students' gaps in understanding and help with immediate feedback.

Some of the instructors utilized polling software in class for instant feedback. By using special log-in information, students were able to respond to class questions in real-time. This allowed instructors to track responses and immediately address any deficiencies in understanding the class material. In many instances, students were given a polling question, and after answering a given question on their own, they were paired with their classmates to discuss the solution and possibly change their responses before the final answer was revealed.

Data and Results

Once we implemented mandatory tutoring alongside other inclusive teaching strategies at the Authors' Institution, our next step was to determine whether we could identify a measurable impact of the program. To accomplish this, we identified two data points that would allow us to track the initiative's impact. These two outcome measures were (1) the impact of tutoring on academic performance and (2) retention rates of the program participants compared to the University overall. A note of caution: While we do not estimate the effect of the mandatory tutoring initiative in a traditional "pre-post" sense (as we did not track tutoring hours prior to the implemented changes), we do examine the impacts of mandatory tutoring following the implementation of the inclusive teaching initiative.

Impact on academic performance

One of the immediate goals of the inclusive teaching initiative was to improve students' academic performance. Given the available tutoring attendance data, and an established relationship between tutoring and outcomes, we decided to focus on the impact of mandatory tutoring on student outcomes. Following the literature, we hypothesized that students who attended more tutoring would perform better on assignments and exams in their economics classes compared to students who attended less tutoring.

For our analysis, we created a novel data set combining the number of hours a student attended tutoring during the semester, their final exam grade, and their homework performance (measured in points earned). To keep our analysis simple, we restricted the data set to principles of macroeconomics classes. We include eight sections of classes taught by two different faculty members during the following time periods: Fall 2018, and Spring and Fall 2019. The remaining two department faculty members were either not teaching the principles classes, or left the institution, hence, there would be no available data for them. For all eight sections used for this analysis, the instructors required weekly mandatory tutoring, which comprised 2.5 to 3% of the total grade, depending on the instructor. While tutoring was mandatory, some of the students chose to forgo it, consequently, forfeiting the class points. In our sample, mandatory tutoring comprised

2.5 to 3% of the final grade, and 60 out of 240 students had zero tutoring hours. Had the point value been higher, it is feasible that we would have had a more robust participation rate. Table 1 shows the summary statistics for the variables included in Tables 2 and 3 and indicates that the average student spent around five hours per semester in tutoring.

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Tutoring Hours	240	5.046	4.362	0	15
Homework	240	79.245	15.962	6	99
Final Exam	240	69.534	16.502	0	102
Female	240	0.371	0.484	0	1
Nonwhite	240	0.196	0.397	0	1
International	240	0.038	0.484	0	1
First-Year, First-Semester	240	0.279	0.449	0	1
First Gen Student	240	0.271	0.445	0	1
Retained	240	0.942	0.235	0	1
Graduated	240	0.838	0.369	0	1

In Table 2, we present the results of six OLS regressions in which we tested whether we could find a relationship between the number of tutoring hours a student attended and their homework grade and final exam grade. We also illustrate the unconditional results in Figures 1 and 2. For each regression, we controlled for sex, ethnicity, first-year status, whether the student was an international student and whether the student identified as a first-generation college student. We also included fixed effects by instructor to capture differences in teaching style and assignment difficulty.¹⁶ Columns (1) and (2) present the baseline results. The baseline results suggest that if a student attended one more tutoring hour, they earned 1.379 points higher on their homework grade ($p < 0.001$) and 0.893 points higher on the final exam ($p < 0.001$).

If this result is causal, it suggests that students who attend tutoring during the entire semester would benefit from an increase in their homework grade¹⁷ of 19.306 points and an increase in their final exam grade of 12.502 points compared to a similar student who does not attend tutoring at all during the semester.¹⁸ These results are robust to a non-linear specification for tutoring hours as well as the exclusion of all students who did not attend any tutoring during the given semester (60 out of the 240 students in the sample). The results of these robustness checks are in the Appendix.

¹⁶ We omit the coefficient for the instructor fixed effect because it is not of substantive interest and could be misinterpreted as direct evaluations of instructor quality.

¹⁷ All of the homework and exam grades are out of 100 points.

¹⁸ These estimates are calculated by multiplying the coefficient estimates by 14 for the 14 weeks of the semester.

Table 2: OLS Results: Impact of Tutoring on Student Performance

Dependent Variable: Assignment Grade						
Assignment	Unconditional Results		Below Average on First Exam		Above Average on First Exam	
	Homework	Final Exam	Homework	Final Exam	Homework	Final Exam
Total Tutoring Hours	1.379*** (0.238)	0.893*** (0.309)	1.688*** (0.334)	1.101** (0.494)	1.099*** (0.307)	0.612** (0.295)
Female	3.657* (1.872)	0.109 (2.382)	1.500 (2.805)	-3.365 (3.492)	4.345* (2.337)	2.313 (2.401)
Nonwhite	-0.888 (2.400)	-9.129** (2.975)	0.242 (3.109)	-9.726*** (3.620)	2.513 (2.621)	-0.465 (2.946)
International	-11.911** (5.621)	-3.325 (3.564)	-21.352*** (5.973)	3.802 (4.804)	-0.333 (4.939)	-2.753 (3.244)
First-Year, First-Semester	5.583*** (1.882)	4.220* (2.220)	6.344** (2.728)	6.792** (3.071)	6.758** (2.628)	7.208*** (2.673)
First Gen Student	-5.306** (2.083)	-0.256 (2.259)	-2.691 (3.046)	4.390 (3.430)	-5.630** (2.471)	-2.719 (2.515)
Instructor Fixed Effect Included?	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.3151	0.1878	0.4065	0.2301	0.2840	0.2843
Adj. R ²	0.2944	0.1633	0.3649	0.1762	0.2436	0.2439
Sample	n = 240	n = 240	n=108	n=108	n=132	n=132

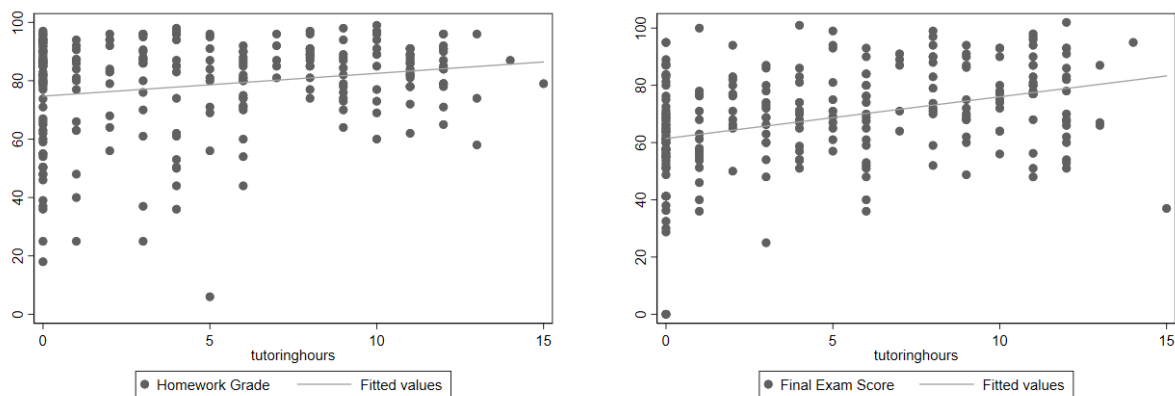
Notes: ***p < 0.01; **p < 0.05; *p < 0.1; Robust standard errors are reported.

Recognizing that these results may be capturing student effort instead of the effectiveness of tutoring, we divided our sample in two based on performance on the first exam. Columns (3) and (4) show the results of the baseline regressions when only including students who performed below average on the first exam. Columns (5) and (6) present the baseline results when only including those students who earned an above average grade on the first exam. The average exam grade was calculated by dividing the sample between the two instructors and finding the within-group average to allow for variation in assignment style and grading.

The coefficient estimates in Columns (5) and (6) are smaller in magnitude compared to the coefficient estimates for Columns (3) and (4). These conditional regression results suggest that the effects of tutoring on the final exam are greater for those students who performed worse on the first exam compared to students who performed better on the first exam. These estimates suggest that students who performed below average on the first exam receive a 79.90% greater benefit from attending tutoring hours for their final exam grade.¹⁹ The results for homework grade are consistent with the results for the final exam grade. The data suggests that students benefited more from tutoring in their homework grade if they performed better on the first exam. Students who performed below average on the first exam receive a 53.59% greater benefit from attending tutoring hours for their homework grade.²⁰ These results are robust to other specifications for performance on the first exam.

The results in Table 2 are suggestive of the positive effect of tutoring on academic performance, but as the R^2 and Adjusted R^2 imply for each regression result, there are individual characteristics that are beyond our measurement that influence a student's academic performance.

Figures 1 and 2. Impact of Tutoring on Academic Outcomes (Unconditional Results)



Impact on retention

One reason for the inclusive teaching initiative at the Authors' Institution was to improve retention and graduation rates. An improvement in retention rates leads to an improvement in graduation rates, and we believe that the most critical objective for faculty members is to help students graduate. Graduating from college gives students – especially those from disadvantaged

¹⁹ Calculated as $((1.101 - 0.612) / 0.612) * 100 = 79.90\%$

²⁰ Calculated as $((1.688 - 1.099) / 1.099) * 100 = 53.59\%$

backgrounds – a better career trajectory. College graduates also earn higher incomes on average than non-college graduates. However, a student who attends college and drops out will not earn as high of an income as a college graduate and, worse yet, will often need to pay back student loans.

Given the difficulty many students have in principles of economics courses compared to other classes (e.g., Reilly and Bachan 2005), we theorized that mandatory tutoring coupled with improved teaching in principles of economics courses could lead to an increase in retention rates. These data points will be noisy because there are dozens of factors that go into whether a student graduates, of course, but successful academics is a key component. We present here the results of two empirical analyses: impact of tutoring on individual-level retention rates and aggregate-level results for overall retention rates.

Using the same dataset as the previous section, we run a logit test on the effect of the number of tutoring hours on a student's probability of being retained until the next academic year. We also run a logit test for the effect of tutoring on the student's probability of graduating in the next 5 years. We include the same covariates as the baseline results in Table 2. Our first dependent variable is Retained, an indicator variable that takes a value of 1 if the student persisted until the next academic year and 0 otherwise. Our second dependent variable is Graduated, an indicator variable that takes a value of 1 if the student graduated in the next five years and 0 otherwise. The results of these logit tests are presented in Table 3.

The results from Table 3 imply that participation in the tutoring initiative, as measured by total tutoring hours, increases the likelihood that the student will be retained until the next academic year and will graduate within the next five years. The marginal effects of the regression imply that for every additional hour of tutoring that the students attend, their likelihood of being retained increases by 0.0118 or 1.18%. Therefore, if the student attended an average of 5 hours of tutoring in the semester, they are 5.9% more likely to persist until the next academic year.

The estimated effect for graduation from Table 3 is similar, with a marginal effect of 0.0184, which implies that the student's likelihood to graduate in the next five years is increased by 1.84% for every hour of tutoring they attend. This means that the average student, who attended 5 hours of tutoring, would be 9% more likely to graduate within the next five years as a result of this initiative.

Table 3: Impact of Tutoring on Retention and Graduation

Dep. Variable:	Retention	Graduation
Total Tutoring Hours	0.111*** (0.039)	0.082*** (0.026)
Female	-0.178 (0.297)	-0.279 (0.199)
Nonwhite	0.086 (0.323)	-0.301 (0.235)
International	-0.465 (0.614)	-0.087 (0.488)
First-Year, First-Semester	0.305 (0.367)	0.047 (0.224)
First Gen Student	-0.255 (0.302)	-0.231 (0.213)
Instructor Fixed Effect Included?	Yes	Yes
Pseudo R ²	0.0942	0.0566
Sample	n = 240	n = 240

Notes: ***p < 0.01; **p < 0.05; *p < 0.1; Robust standard errors are reported. Retention is an indicator variable that takes a value of 1 if the student persisted until the next academic year following the economics course and 0 otherwise. Graduation is an indicator variable that takes a value of 1 if the student graduated and 0 otherwise.

It is worth noting that the Pseudo R² results for the regressions in Table 3 are relatively low and should be interpreted with caution. This is not surprising given that a student's retention at a university is likely influenced by multiple factors beyond the performance in one class (e.g. personal and financial reasons). Still, the results are suggestive that the effect of the tutoring initiative is positive in improving retention and graduation rates at the individual level.

While the individual-level dataset is valuable for producing the predicted effects of each hour of tutoring, this dataset is only a sample and may not fully capture the effect of tutoring. We also employ an aggregate-level analysis by examining the first-year retention rates for business school students. All business students must take principles of microeconomics and macroeconomics, and a vast majority take at least one in their first year and many take both. While students from other majors take economics courses as well, the majority of our students are business students. Nationally, and at the Authors' Institution, students of color historically graduate at a lower rate. Because the goal was to be more inclusive in teaching, we also examined first year retention rates for students of color.

Table 4 presents data on incoming business students and student attrition from the Authors' Institution.²¹ In 2017-2018, the year prior to introducing the inclusive teaching initiative, the overall first-year retention rate for business school students was 81.3%, and the retention rate for business school students of color was 66.7%. In the first year after introducing the new methods,

²¹ Note, for attrition, we are defining it as dropping out of the university, not switching from business to another major. From a societal perspective, a student who graduates but with a different major is fine.

the retention rate jumped to 89% overall and 85.7% for students of color.²² In the two years after, the retention rates are above 90% both overall and for students of color.

Table 4: Impact of Inclusive Teaching on Retention Rates

All First-Year Business Students				Business Students of Color			
Year	Incoming Class Size	First-Year Attrition	Retention Rate		Incoming Class Size	First-Year Attrition	Retention Rate
2017 - 2018	166	31	81.30%	2017 - 2018	24	8	66.70%
2018 - 2019	164	18	89.00%				
2019 - 2020	146	10	93.20%	2018 - 2019, 2019-2020, and 2020-2021	94	7	93.50%
2020 - 2021	175	17	90.30%				

As a validity check, we examined the retention rates at the rest of the university. If retention rates were going up dramatically university-wide, it would give less credence to the theory that the inclusive teaching pilot helped cause improved retention rates. However, as shown in Table 5, first-year retention rates for the rest of the university remained relatively stable at around 85%. Note that a small percentage of non-business students take principles of economics as an elective, so these methods could have had a negligible impact on non-business retention.

Table 5: Impact of Inclusive Teaching on Retention Rates: Robustness Check

First-Year Business Students				First-Year Non-Business Students		
Year	Incoming Class Size	First-Year Attrition	Retention Rate	Incoming Class Size	First-Year Attrition	Retention Rate
2017-2018	166	31	81.3%	468	70	85.00%
2018-2019	164	18	89.0%	455	70	84.60%
2019-2020	146	10	93.2%	474	69	85.40%

Conclusion

Professional educators should be honing their craft to do their best to “use effective and inclusive classroom techniques,” as recommended by the American Economic Association. In this paper, we discuss the Authors’ Institution’s attempt to implement inclusive and effective classroom techniques in the principles of economics coursework. To do this, faculty implemented more hands-on and visual activities in the classroom and added more low-stakes assignments and

²² The retention rate is not shown in Table 3. To comply with FERPA regulations, and due to small sample sizes, we combine 2018-2019, 2019-2020, 2020-2021 academic years and report average attrition and retention for students of color.

provided more frequent feedback. All students were also asked to attend weekly tutoring sessions, which gave students more frequent learning opportunities throughout the semester, avoided some of the usual problems associated with cramming before exams, and removed the stigma of attending tutoring given this was asked of all students.

First, we identified a positive relationship between tutoring hours attended and academic performance. On average, each extra hour of tutoring was associated with a 1.3-point increase in homework grades and a 1.2-point increase in final exam scores. We also found that tutoring helped all students, but it was especially helpful for those who struggled on the first exam. These students saw up to 25% more improvement in homework grades and over 70% more improvement in final exam scores compared to stronger students. Overall, tutoring appears to benefit everyone, but it gives the biggest boost to students who need the most help.

Second, we found a dramatic increase in first-year retention among business students who take principles of economics coursework in the first year. In the first year of the new approach, overall retention rose to 89%, and retention for students of color jumped to 85.7%. In the following two years, retention stayed above 90% for both groups. Meanwhile, retention rates in the rest of the university stayed steady at around 85%, suggesting that the improvement in the business school was likely due to the new teaching methods, not a campus-wide trend.

This study was initiated before the pandemic, and most of the results are pre-pandemic. That said, the pandemic caused significant issues, including that many K-12 students lost significant educational time. Inclusive and effective teaching methods can help students who lost progress during the pandemic bridge this gap and, therefore could profoundly impact persistence and graduation rates, which decreased nationwide during the pandemic.²³ Using an inclusive pedagogy is “a mind-set, a teaching-and-learning worldview, more than a discrete set of techniques. But that mind-set does value specific practices which, research suggests, are effective for a mix of students” (Gannon 2018). It also involves putting more structure into the course with clear instructions. This includes instructions on what to do before, during, and after class and facilitating classroom participation so that everyone participates (Supiano 2018).

While the results were promising, there are a few limitations worth noting. First, the efforts to change the courses were time-consuming, but additional financial compensation was provided by the institution to provide changes. Not all institutions may provide compensation to undertake a project like this. Second, the methods at the Authors’ Institution were implemented department wide. Department wide change is likely more feasible at a smaller, teaching-focused institution than at other universities. But the initiatives could all be undertaken by an individual professor, and most of the activities, except setting up the tutoring system where there are economies of scale, could be implemented just as easily by one faculty member.

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²³ <https://www.forbes.com/sites/michaelnietzel/2021/07/08/new-report-documents-more-pandemic-fallout-college-persistence-rates-suffer-historic-drop/?sh=1639362e23db>

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Appendix A

Table A1 presents the results for two robustness checks. In Columns (1) and (2), we present the baseline results from Table 2 for comparison. The results in Columns (3) and (4) present a test for non-linearity. We transformed the tutoring hours by taking the log of total tutoring hours + 1. The results indicate that the measure of total tutoring hours is still positive and statistically significant at the $p = 0.01$ level. The R^2 and Adjusted R^2 for the logarithmic specifications are lower than the baseline, which we interpret to mean that including a non-linear specification does not add to the explanatory power of the model. We present the results from dropping the observations of students who did not attend any tutoring (total tutoring hours = 0) in Columns (5) and (6). As the results show, the estimated coefficients for the effect of tutoring on academic performance are very similar in magnitude to baseline results, suggesting that the baseline results are not being driven by the zero-value observations.

Table A1 - OLS Results: Tutoring Specifications

Dependent Variable: Assignment Grade						
Assignment	Baseline Results (from Table 2)		Logarithmic		Drop if Tutoring = 0	
	Homework (1)	Final Exam (2)	Homework (3)	Final Exam (4)	Homework (5)	Final Exam (6)
Total Tutoring Hours	1.379*** (0.238)	0.893*** (0.309)			1.398*** (0.303)	0.826** (0.344)
Log (Total Tutoring Hours + 1)			5.640*** (1.145)	4.235*** (1.429)		
Baseline Controls?	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.3151	0.1878	0.2934	0.1904	0.3288	0.1282
Adj. R^2	0.2944	0.1633	0.2721	0.1660	0.3015	0.0927
Sample	n = 240	n = 240	n = 240	n = 240	n = 180	n = 180

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; Robust standard errors are reported.