

The Impact of In-Class Bonus Point Assignments on Attendance and Learning Outcomes in Principles of Macroeconomics at an HBCU

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This study investigates the impact of low-stakes and in-class bonus point assignments on student attendance and academic performance in Principles of Macroeconomics courses at an HBCU. The study examines data from 24-course sections taught over multiple semesters, comparing the outcomes of 12 sections where bonus point assignments were implemented to 12 sections without such assignments. Results show that students in the bonus point group had a significantly higher attendance rate (54.1%) compared to the control group (50.19%) and achieved higher average final exam scores (64.67% vs. 59.43%). ANOVA analysis further demonstrates a positive relationship between attendance and academic performance.

Keywords: attendance, in-class assignments, student learning

INTRODUCTION

Student attendance and engagement are important to student academic success, particularly in courses that rely heavily on active student application of theoretical concepts, such as Principles of Economics courses. Research consistently shows a positive correlation between class attendance and student performance (Schmidt, 1983; Romer, 1993; Durden & Ellis, 1995). Additionally, pedagogical strategies that encourage active learning in class have been linked to improved student learning outcomes (Dorestani, 2005; Ball et al., 2006). Unfortunately, instructors can face challenges motivating students to attend class and engage actively with the course material, including those teaching Principle of Economics courses, and especially at colleges where many first-generation college students attend—students who are less familiar with the rigorous nature of student actions and behaviors required to succeed academically.

This study examines the impact of incorporating low-stakes in-class bonus point assignments on student attendance and learning outcomes in Principles of Macroeconomics courses at a Historically Black College and University (HBCU) where enrollment includes many first-generation college students. Bonus point assignments, administered at the end of class sessions, are theorized to increase attendance by offering credit toward the course grade, and to improve student learning through the active application of theoretical concepts. Unlike traditional chalk-and-talk lectures, where students passively receive information, these assignments compel students to engage with the material in real time, potentially reinforcing their understanding and retention of key concepts.

The central hypothesis of this study is that students in sections of Principles of Macroeconomics that include in-class bonus point assignments will exhibit higher attendance rates and improved performance on final exams compared to students in sections that do not include such assignments.

To test these hypotheses, data were collected from 24 sections of Principles of Macroeconomics taught over multiple semesters, with 12 sections receiving bonus point assignments and 12 sections serving as a control group. The results of the study show that students in sections with bonus point assignments had a significantly higher average attendance rate (54.1%) compared to the control group (50.19%). Furthermore, students in the bonus point group outperformed the control group on their final exams, with an average score of 64.67%, compared to 59.43% for the control group. ANOVA analysis confirmed the positive relationship between attendance and final exam performance, showing that students with higher attendance scores had significantly better exam outcomes. These results suggest that incorporating low-stakes bonus point assignments can effectively improve both student attendance and academic performance, particularly in environments with high populations of first-generation college students, such as HBCUs.

LITERATURE REVIEW

Several studies have established a positive correlation between class attendance and academic performance in Principles of Economics courses. Schmidt (1983), in one of the oldest published studies, found that each additional hour of class attendance increased students' semester grades in Principles of Economics by approximately 0.25 percentage points. Romer (1993) buttressed these findings by showing that for every 1% increase in class attendance, students experienced a 0.21 percentage point improvement in their final grades in Principles of Economics. Durden and Ellis (1995) found that each additional Principles of Economics class attended resulted in a 0.31 percentage point increase in the semester grade; they also provided a more nuanced understanding by demonstrating that the benefits of increased attendance are particularly pronounced in courses that require a strong grasp of abstract concepts, such as economics. These findings suggest that strategies to increase attendance, such as in-class bonus point assignments, could significantly positively impact student outcomes in Principles of Economics courses.

Beyond attendance, active learning- which involves students actively engaging with the material through discussion, problem-solving, and other interactive methods- has significantly improved learning outcomes. Dorestani (2005) conducted a study on active learning strategies in Principles of Economic courses and found that students who participated in group problem-solving activities led by the professor scored, on average, 11.9 percentage points higher on their final exams than those in traditional lecture-based courses.

Further evidence for the efficacy of active learning comes from Nguyen and Trimarchi (2010), who investigated the impact of online learning tools, such as MyEconLab and Aplia, on student performance in economics courses. Their study found that students who used MyEconLab and Aplia experienced course grade improvements of 2.12 and 1.84 percentage points, respectively. Although these tools are used outside the classroom, the study demonstrates that any form of active engagement--whether in-class or outside class--can significantly impact student learning.

Theoretical underpinnings of using in-class low-stakes bonus point assignments stem from attendance and active learning research. Bonus point assignments encourage students to attend class by offering immediate rewards for participation, which aligns with the findings of Schmidt (1983), Romer (1993), and Durden and Ellis (1995) on the importance of attendance. Additionally, by requiring students to actively apply the concepts they learned during class, low stakes assignments promote active learning, as highlighted in the studies by Dorestani (2005) and Beam (2021). These assignments serve as a form of "practice" that helps students better prepare for exams by reinforcing their understanding of key concepts.

We would be remiss if we omitted some countervailing concerns--that in-class student learning activities can negatively impact student learning. Some researchers have raised concerns about the potential for in-class activities to "crowd out" lecture time, which could limit the amount of material covered during a class session. This issue is particularly relevant in courses with extensive curricula such as economics, where instructors must balance the benefits of active learning with the need to comprehensively cover all

required material. Prince (2004) discusses this trade-off, noting that while active learning strategies, such as group discussions and problem-solving exercises, can improve student engagement and retention, they may reduce the time available for instructors to delve deeply into core concepts. This could lead to gaps in students' understanding of the subject matter, particularly in more content-heavy courses.

Another concern relates to the "crowding out" effect of in-class assignments on at-home study; bonus point assignments that reward in-class participation may inadvertently reduce students' motivation to engage in study outside of class. Michel, Jimenez, Haley & Campbell (2021), found that students who earn points for in-class activities may place less emphasis on out-of-class study, mistakenly believing that their in-class activities will sufficiently boost their final grade. This over-reliance on class-based performance can diminish the time students spend on independent study, which has been shown to be one of the most critical factors in long-term academic success (Plant, Ericsson, Hill, & Asberg, 2005). Students may focus more on earning easy points through classwork than on a deeper understanding of the material through focused, independent study.

On the other hand, research shows that first-generation students, such as many at HBCUs, often face challenges that can affect their academic engagement, including attendance, active learning, and time spent studying outside of class. According to the United Negro College Fund's "HBCU Effect" research, first-generation students frequently have more difficulty navigating higher education compared to their non-first-generation peers. This challenge is especially significant for first-generation Black students at HBCUs, where many students also come from low-income backgrounds, and are often underprepared due to systemic issues in K-12 education (UNCF, 2021). These students may struggle with managing coursework demands, which can contribute to lower attendance and less time spent in active learning activities. The Black First-gen Collective also highlights that these students, facing unique social and academic pressures, often do not engage with academic resources as readily as their peers, and may spend fewer hours studying outside of class due to external responsibilities like work and family obligations (Black First-gen Collective, 2020).

These issues, including a lack of confidence and academic success that some first-generation college students might feel, can be ameliorated by techniques that encourage student attendance and class participation such as assigning low-pressure bonus point questions in class, which trepidatious students can solve with help from the professor and other students. Shrum and Hong (2022) and Warnock (2013) argue that assigning low-pressure, short assignments can inspire student confidence and act as a "nudge" for greater engagement in learning. Low-stakes assignments provide early positive feedback, help students feel a sense of success and reduce the anxiety associated with high-stakes assessments. These students will learn course material and simultaneously have increased confidence in their abilities, which may engender more active participation in the learning process.

Indeed, significant evidence supports the idea that actions encouraging attendance, active learning, and studying at HBCUs can improve student learning outcomes, particularly in STEM and general education courses. For example, research conducted at Florida A&M University, an HBCU, showed that using a Student-Centered Active Learning Environment (SCALE-UP) approach in a flipped classroom setting improved student engagement and critical thinking in General Biology I courses. This method, which includes group activities and pre-class preparation using videos and reading materials, significantly boosted student understanding and academic performance compared to traditional lecture-based formats (Hacisalihoglu, Stephens, Johnson, & Edington, 2018).

Another study (Theobald et al, 2020) focusing on active learning in undergraduate STEM courses found that replacing passive lectures with active learning technique, such as group problem-solving and peer interaction, narrowed the achievement gap between underrepresented and overrepresented students. This study found that active learning led to a 33% reduction in the gap for exam scores and a 45% increase in course passing rates for underrepresented students.

The body of research reviewed above provides a solid foundation for hypothesizing that bonus point assignments can effectively enhance student attendance and performance at an HBCU, (though further research is needed to fully understand the extent to which these assignments might crowd out at-home studying). In light of these findings, this study explores whether the combination of attendance and active

learning effects from in-class bonus point assignments can lead to improved academic outcomes in Principles of Macroeconomics courses at an HBCU.

METHODOLOGY

This study aims to examine the impact of in-class bonus point assignments on student attendance and learning outcomes in Principles of Macroeconomics courses at an HBCU. This section outlines the research design and data collection, used in this study.

Research Design

The participants in this study were undergraduate students enrolled in Principles of Macroeconomics courses at a public HBCU. The sample comprises 906 students over 16 semesters in 24 course sections, from 2012-2019. This sample includes 100% of the students enrolled in these 24 course sections and who completed the final exam.

For this analysis, the students are divided into two groups, Group 1 and Group 2.

- Group 1 consists of 474 students in 12 sections in which in-class bonus point assignments were administered.
- Group 2 consists of 432 students in 12 sections which did not include any in-class bonus point assignments.

All 24 course sections were taught by the same instructor using the same syllabus, course materials (including textbook and lecture notes), and teaching methods, except for including the bonus point assignments in Group 1. Final exams in all course sections were comprehensive, 2-hour exams comprising multiple choice questions of similar difficulty, testing similar concepts in each course section. Still, the specific final exam questions were changed every semester.

In Group 1 course sections, bonus point assignments were administered at the end of each non-exam class session and were designed to take no more than 10 minutes to complete. The questions on the bonus point assignments were aligned with key concepts covered in the day's lecture and were structured to encourage students to engage with the material actively. Students were allowed to work together on the assignments and to ask the professor for help; thus, these were low-pressure assignments. Students in Group 1 were awarded 1 bonus point for completing each assignment; at the end of semester, points were applied to improve a student's semester grade average by up to 10 percentage points, if all bonus point assignments during the semester were completed.

Figure 1 displays one of the bonus point assignments used in the Principles of Macroeconomics courses.

Data Collection

Data on student attendance and academic performance were collected for all 906 students. Attendance data were recorded for each class period and analyzed as the percentage of classes attended over the semester. Academic performance was measured using students' final exam scores.

For the Group 1 students, data on bonus point assignments was collected to determine the percentage of all bonus point assignments each student completed during a semester; most students who attended a given class period also completed the bonus point assignment for that class period, the exception being those few students in any given class period who left class early.

Summary data for Group 1 students is shown in Table 1. Summary data for Group 2 students is shown in Table 2.

TABLE 1
SUMMARY DATA FOR GROUP 1 STUDENTS (BONUS POINTS)

Course Section Number	Student Count	Classes Attended, Percent	Bonus Point Assignments Completed, Percent	Final Exam Mean Score, Percent
1	49	61.4	58.4	68.1
2	44	54.9	52.1	64.1
3	45	62.5	60.6	62.7
4	40	54.7	52.8	65.4
5	44	50.9	50.0	63.4
6	38	49.5	44.2	62.3
7	46	54.4	51.4	64.4
8	45	44.8	40.6	65.5
9	35	56.2	42.6	69.5
10	36	49.2	45.2	62.3
11	35	55.2	54.9	66.5
12	17	53.6	40.0	57.9

TABLE 2
SUMMARY DATA FOR GROUP 2 STUDENTS (NO BONUS POINTS)

Course Section Number	Student Count	Classes Attended, Percent	Final Exam Mean Score, Percent
13	40	49.8	60.5
14	23	43.0	52.8
15	44	60.6	67.9
16	44	48.1	62.9
17	23	44.1	52.9
18	29	44.7	54.2
19	36	49.7	56.7
20	41	45.0	54.2
21	41	48.1	49.9
22	42	58.9	69.3
23	34	45.5	57.3
24	35	56.5	66.5

ANALYSIS

Bonus Point Assignments Increase Attendance: Data Analysis

We believe a priori that in-class bonus point assignments increase class attendance. More formally, we believe the following hypothesis:

Hypothesis #1: Mean percentage of classes attended is lower for Group 2 students (no in-class bonus point assignments) than for Group 1 students (in-class bonus point assignments).

Casual observation of the data supports hypothesis 1. We see that the mean percentage of class periods attended for Group 2 students, 50.2%, is lower than the mean percentage of class periods attended for Group 1 students, 54.1%. More rigorously, we performed hypothesis testing which shows that the difference between means is statistically significant at the 99% confidence level. Summary data is in table 3 below.

TABLE 3
SUMMARY STATS, DIFFERENCE IN MEANS, PERCENT OF CLASSES ATTENDED

Group 2 Mean	Group 1 Mean	Difference	T-Statistic, $\mu_2 - \mu_1 < 0$	P-Value
50.2%	54.1%	-3.9%	-2.61	0.005

Bonus Point Assignments Increase Final Exam Scores: Data Analysis

We believe a priori that in-class bonus point assignments increase final exam scores. More formally, we believe the following hypothesis:

Hypothesis #2: Mean final exam percentage score is lower for Group 2 students (no in-class bonus point assignments) than for Group 1 students (in-class bonus point assignments).

Casual observation of the data supports hypothesis 2. The mean final exam score for Group 2 students, 59.4%, is lower than the mean final exam score for Group 1 students, 64.7%. More rigorously, we performed hypothesis testing which shows that the difference between means is statistically significant at the 99% confidence level. Summary data is in table 4 below.

TABLE 4
SUMMARY STATS, DIFFERENCE IN MEANS, FINAL EXAM SCORES

Group 2 Mean	Group 1 Mean	Difference	T-Statistic, $\mu_2 - \mu_1 < 0$	P-Value
59.4%	64.7%	-5.3%	-4.16	0.000

ANOVA Analysis: The Effect of Attendance on Final Exam Percentage Scores

To better understand the effect of attendance levels on student performance, we conducted a one-way Analysis of Variance (ANOVA) comparing the final exam percentage scores across three levels of student attendance: low, medium, and high. We (somewhat arbitrarily) divided the 906 students into 3 groups:

- Low Attendance students attended fewer than 30% of class periods
- Medium Attendance students attended between 30% and 70% of class periods
- High Attendance students attended more than 70% of class periods

The ANOVA results show a significant difference in final exam scores across the three attendance levels.

Group Means

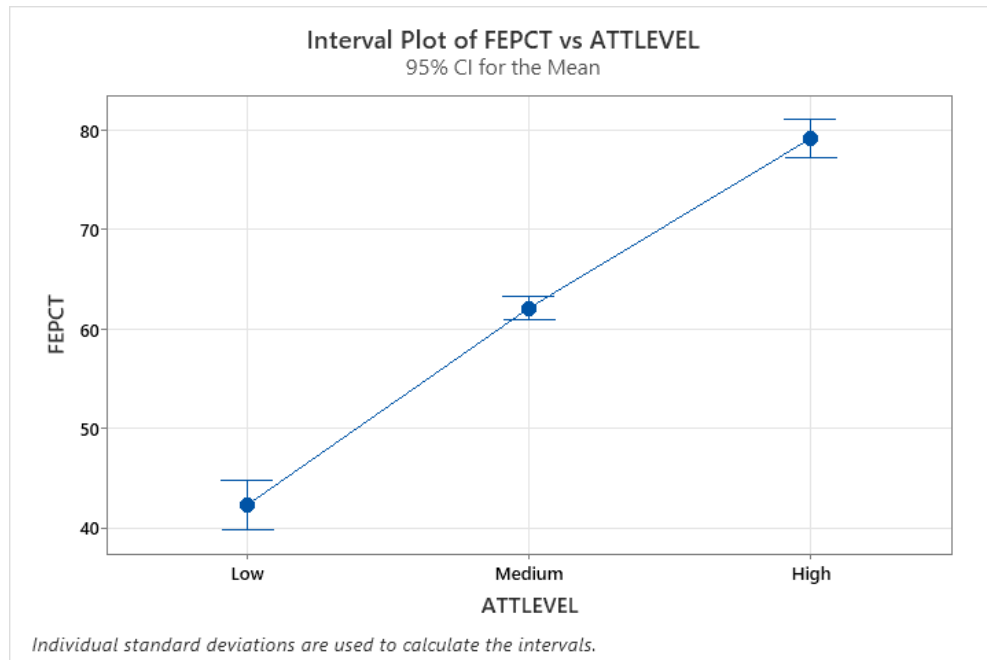
The mean final exam scores for the three attendance levels were as follows:

- Low attendance: 42.29% (95% CI: 39.85% to 44.73%), n = 192 students
- Medium attendance: 62.07% (95% CI: 60.90% to 63.25%), n = 486 students
- High attendance: 79.11% (95% CI: 77.23% to 80.99%), n = 228 students (Welch's F-statistic is 282.91, P-value is 0.000, R-squared is 42.95%)

These results demonstrate that students with higher attendance significantly outperformed their peers with lower attendance. *Ceteris paribus*, low attendance students have an expected final exam score of 42.29%. Medium-attendance students have an expected final exam score that is 19.78 points higher than low-attendance students. High-attendance students have an expected final exam score that is 36.82 points higher than low attendance students.

The relationship between final exam score and attendance level is displayed in figure 2, where FEPCT represents final exam percentage score, and ATTLEVEL represents attendance level (low, medium, or high).

FIGURE 2
RELATIONSHIP BETWEEN FINAL EXAM SCORE AND ATTENDANCE



DISCUSSION

Our analysis supports the hypothesis that incorporating low-stakes, in-class bonus point assignments significantly improves both student attendance and academic performance in Principles of Macroeconomics courses at an HBCU. The statistical analysis revealed that students in Group 1 (who were given bonus point assignments) had higher mean attendance rates and performed better on their final exams than students in Group 2 (who were not given bonus point assignments). Specifically, the mean attendance rate for Group 1 was 54.1%, while the mean for Group 2 was 50.2%. Similarly, the final exam scores for Group 1 averaged 64.7%, while Group 2 students averaged 59.4%. These results suggest that bonus point assignments can effectively incentivize class attendance and enhance student engagement with the course material.

Our ANOVA analysis further showed a positive relationship between student attendance and final exam scores. Students with medium and high attendance rates significantly outperformed those with low attendance, with expected final exam scores 19.78 and 36.82 percentage points higher, respectively. This highlights regular class attendance's role in promoting student learning and success.

The improvements in attendance and performance observed in this study align with the broader literature on active learning and student engagement highlighted in the literature review section of this paper. Our findings contribute to this body of knowledge by demonstrating the effectiveness of low-stakes assignments in an HBCU context, where many students face unique challenges, such as being first-generation college attendees.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

A significant limitation of our study is the potential issue of self-selection bias related to class attendance. Students who attend more class periods may inherently differ from those who attend less, not simply due to the incentive of bonus point assignments, but because of other academic strengths or motivation. Stronger students, who are more capable or confident in their academic success, may be naturally more inclined to attend class regularly. In contrast, students who are weaker academically or struggle with the material may be more likely to miss class. This presents a potential confounding variable, as the relationship between attendance and academic performance may not be solely due to the impact of the bonus point assignments but could reflect differences in other student attributes (Crede, Roch & Kieszczynka 2010)

In addition, attendance likely correlates with effort outside of class, further complicating the interpretation of our findings. Students who exhibit high attendance may also be more likely to spend more time learning the course material outside of class. This correlation between attendance and outside effort could mean that students who perform well benefit from in-class participation and good study habits, which are not directly captured in our analysis. As a result, the higher exam scores of students with greater attendance might be partially attributed to their overall academic engagement, rather than the bonus point assignments alone.

Future research should attempt to control for academic ability and outside study time, potentially by incorporating students' GPA or performance in previous courses, to isolate the true effect of attendance and bonus point assignments on academic outcomes. Additionally, more robust data on students' study habits and effort outside of class could provide a clearer picture of how these factors interact with attendance to influence academic performance. One way to gather this data would be through a student survey that captures study habits, including hours spent studying outside of class, providing more nuanced insights into the relationship between attendance, engagement, and academic success.

A second limitation of our research is that it only measured short-term academic performance as reflected by final exam scores. While final exam performance is an important indicator of student learning, it may not capture long-term knowledge retention. Ambitious future studies could incorporate follow-up assessments to determine whether bonus point assignments' benefits persist beyond the semester's end.

CONCLUSION

This study proves that low-stakes, in-class bonus point assignments positively impact attendance and academic performance in Principles of Macroeconomics courses at an HBCU. Students in sections with bonus point assignments demonstrated higher attendance rates and performed better on their final exams than those without. The ANOVA analysis further supported the finding that higher attendance correlates strongly with improved academic outcomes.

This research contributes to the broader literature on active learning and student engagement, particularly in the context of Historically Black Colleges and Universities, where many students are first-generation college attendees. The findings suggest that incentive-based strategies such as bonus point

assignments can help mitigate some of the challenges first-generation students face, encouraging them to attend class more regularly and engage more deeply with the material.

However, as noted in the discussion of limitations, self-selection bias and the potential "crowding out" of independent study time remain areas that warrant further investigation. Future research should explore the long-term effects of bonus point assignments on knowledge retention and whether similar results can be observed across diverse educational settings and subject areas.

We believe that integrating low-pressure, in-class bonus point assignments offers a practical and effective method for improving student attendance and performance. This approach, while simple to implement, can potentially improve learning outcomes, providing instructors with a valuable tool to help students achieve academic success.

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