

BOARD #136: WIP: Enhancing Student Success - The Impact of Active Group Office Hours on Engagement and Discipline Interest

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WIP: Enhancing Student Success - The Impact of Active Group Office Hours on Engagement and Discipline Interest

Abstract - This work in progress paper investigates the transformative potential of active group office hours in large engineering classes. We assert that our innovative approach significantly enhances student success, engagement, and stimulates increased interest in the engineering discipline. Preliminary results from our ongoing surveys indicate that this format and overall methodology significantly improves student perceptions of their learning experience. This paper delves into the various motivational factors that draw students to office hours, explores avenues for refining these sessions, and discusses the intriguing balance between delivering high-value interactions and managing the logistical challenges of large class sizes. This research provides insights that may inform the structuring of instructor office hours and could serve as a blueprint for effective recitation sessions that teaching assistants might implement. Through this exploration, we aim to contribute to the broader discourse on optimizing student support mechanisms in higher educational settings, particularly in engineering disciplines.

Introduction

Traditional office hours in undergraduate engineering courses often present several challenges. Typically structured as one-on-one interactions between the student and the instructor, they tend to be transactional, focusing on quick clarifications rather than deep engagement. This setup may not facilitate collaborative learning or peer-to-peer interaction, missing an opportunity for students to learn from each other's questions and experiences. Additionally, low attendance is a common issue, which further limits the potential impact of these sessions on student learning and engagement.

Students are often motivated to attend office hours due to several intentionally implemented practices. Some of these practices include learning all student names (or as many as possible), being approachable, sometimes funny, being invested in student learning experience, talking to students outside class, chatting about their activities, being willing to help, respecting students and their privacy, pointing out errors gently and announcing strengths, and asking homework questions that promote mental health and self-care [1] [2].

In our study, we want to investigate the benefits of intentionally designed "active group office hour" (AGOH) sessions on students' course success, engagement, and disciplinary interest. We define active group office hours (AGOH) as times when the teaching team facilitates problem-solving practice in small groups. This format of AGOH can be used by the instructor, teaching assistants, or for recitation sessions. In our work so far, we have focused on the implementation of this format for instructor office hours. This format upholds the commitments made during lectures, aligning our approach with recommended best practices [3]. A strong correlation has been demonstrated between going to office hours and course success [4] [5]. The atmosphere of the AGOH is vibrant and enthusiastic. To accommodate as many students as possible, we utilize a spacious setting with round tables, allowing for easy circulation and support [6]. We promote collaboration and peer learning by organizing seating based on specific topics or homework problem numbers. AGOH typically last for two hours each week and are entirely voluntary, with no grade incentives tied to attendance. For those seeking more personalized support, individual

appointments are also available, allowing students to receive private assistance tailored to their specific academic concerns. It is to be noted that in our initial work, we scheduled AGOH based on the availability of the instructor. As our work matures, we plan to offer such office hours at times when students are available, such as weekday evenings, or investigate ways to schedule them when the students register for the class.

Additionally, this format of office hours aims to serve as a space for fostering a sense of community and belonging among students [7]. In departments without a structured cohort system, office hours can become a central hub for students to build connections and develop a supportive network.

Course Overview

We used the course EE 215 Fundamentals of Electrical Engineering offered at the University of Washington, Seattle, during the Autumn quarter of 2024 as a test case for our initial study. This cross-departmental course registered an enrollment of 283 students. Of these, 35% were majoring in Electrical and Computer Engineering, 50% in Mechanical Engineering, and the remaining 15% were distributed among various other engineering disciplines, such as Industrial Engineering, Material Science and Engineering, Computer Science, Civil Engineering, Aeronautics and Astronautics, with a small proportion being undeclared engineering majors.

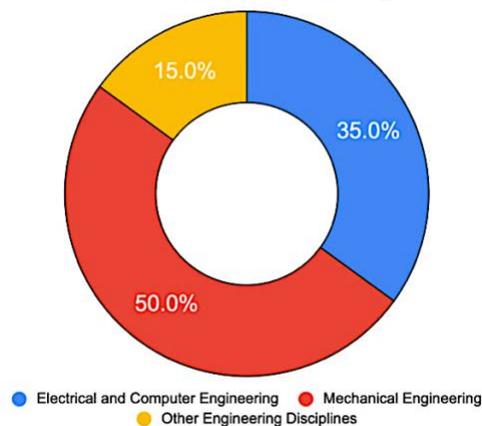


Fig. 1. Distribution of Students by Engineering Discipline in EE 215 during Autumn 2024

From prior experience and anecdotal feedback, students who participated in AGOH have expressed that these sessions were beneficial. During Autumn 2023, in addition to knowledge transfer, AGOH evolved into a social space where students could relax, connect with peers, seek career guidance, expand their professional networks, and stay engaged with the teaching team. This was particularly significant since many of these students belonged to engineering departments other than that of the teaching team. Many of these connections persist even a year after the course has been offered.

Beyond weekly instructor AGOH, EE 215's main components include weekly TA-led lab sections and office hours, regular homework, two midterm exams, and a comprehensive final exam. By examining how AGOH affect students in our local context, we hope to inspire educators to consider experimenting with and studying this approach in their own institutions.

Research across a range of contexts would eventually help educators in deciding whether active group office hours might benefit them and guide the adaptation and adoption of the approach.

Our research questions are:

“What motivates undergraduate students to attend active group office hours?”

“How can AGOH contribute to undergraduate students’ course success, engagement, and interest in the discipline?”

Preliminary Data Collection Methods

Two primary measurement tools were employed to gather insights into students’ perceptions of their learning experiences in this course [8]. The student surveys and their administration were conducted in collaboration with the Office for the Advancement of Engineering Teaching and Learning (ET&L) at the University of Washington, Seattle.

1. **Exit Slips:** These were distributed to students who attended the AGOH throughout the quarter. The purpose of the exit slips was to capture immediate feedback and reflections from students on their learning experiences and the specific assistance they received during AGOH.
2. **End-of-Term Course Evaluation:** A comprehensive course evaluation form was made available to all students at the end of the term. This evaluation aimed to assess various aspects of the course, including the effectiveness of teaching methods, the utility of office hours, and overall student satisfaction.

Both measurement tools were designed to be anonymous. This ensured that student responses could be provided without any attribution to personal identifiers, thereby encouraging candid feedback and minimizing potential bias.

Exit-Slip Survey Results

Respondents

The exit slips, the initial measurement tool used in the study, commenced late in the quarter, covering only the last two AGOH sessions. It yielded a response rate of 12% with 35 of the 283 enrolled students who both attended an AGOH and responded to the survey.

The majority declared their current or intended major as Electrical and Computer Engineering, with 24 students. Mechanical Engineering was the next most common, with 10 students indicating this as their major. Additionally, two students reported Computer Engineering, and one indicated Applied Mathematics as their major. This distribution, shown below, highlights the primary academic backgrounds of students utilizing AGOH. While the most common majors (ECE, ME) were well represented among the 35 respondents, ECE majors are overrepresented, compared to MEs, possibly reflecting their greater engagement in a major course.

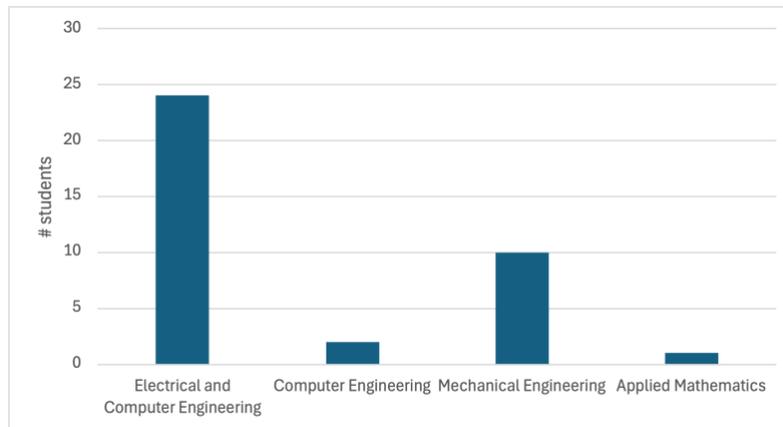


Fig. 2. Number of exit-slip respondents who indicated each major their current or intended major. Total exceeds sample size of 35, because two students chose more than one major.

Helpfulness of AGOH

Questions in the exit slip surveys were aimed at evaluating the effectiveness of office hours in supporting various aspects of student learning experience. Although the sample size of 35 is small, the results underscore the positive impact of AGOH, as perceived by these students.

1. **Understanding Course Skills/Topics:** The responses indicate that the AGOH were immensely beneficial for understanding course skills and topics, with 26 out of the 35 students (74%) rating them as Very Helpful. This suggests a strong connection between the format of the office hours and students' perception of learning in the course.
2. **Increasing Interest in Course Skills/Topics:** For the question on whether AGOH increased interest in course skills and topics, just under half (17 of 35) of students also responded with Very Helpful. The same number of students responded with either Moderately Helpful or Somewhat Helpful. This indicates that the AGOH were quite effective in enhancing student interest for a substantial number of students, potentially affecting their engagement in other related courses within the discipline.
3. **Impact on Homework Performance:** The feedback on how AGOH helped students with their homework was overwhelmingly positive, with 28 out of the 35 students (80%) finding them Very Helpful. This result emphasizes the significant role that AGOH may play in aiding students' academic performance.
4. **Meeting Classmates:** The last question assessed how helpful the office hours were for meeting classmates. About half of responses were Very Helpful (17 of 35), with Moderately Helpful as a close second (14 of 35). This suggests that AGOH not only serve an academic purpose but also facilitate social interaction and possibly even community building among students.

These findings collectively demonstrate that students perceive AGOH as having multifaceted benefits, contributing to academic understanding, interest, success on homework, and peer engagement within the course.

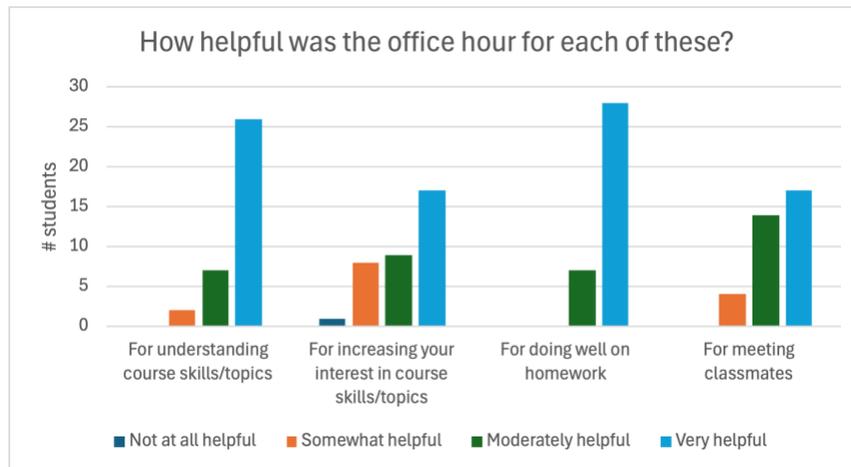


Fig. 3. Exit-slip respondents' ratings of helpfulness of AGOHs (N = 35)

Evaluation of Contributing Features to AGOH Effectiveness

We also wanted to confirm the effectiveness of salient features of AGOH: the instructor's answers to student questions, working with peers (the "active group" feature), and physical layout of the office hour space. The exit-slip survey asked students to indicate how much these features of office hours contributed to their perceived helpfulness:

1. **Instructor's Answers to Individual Questions:** Students overwhelmingly indicated that the instructor's direct responses to their questions were a critical feature, with 30 of 35 students indicating that this feature Very Much contributed to the helpfulness of office hours. This direct interaction was cited as being very beneficial.
2. **Instructor's Answers to Other Students' Questions:** Most of the students also found great value in listening to the instructor's answers to questions posed by other students, with 23 of 35 indicating this Very Much contributed to office hour helpfulness. This suggests that the communal learning environment fostered by AGOH was effective in enhancing understanding among students who might not have directly participated in the discussions. Notably, this feature is uniquely facilitated by group (vs. individual) office hours and highlights the importance of an instructor making in-the-moment decisions about when to share answers or just-in-time lecturing with the whole office hour group.
3. **Collaboration with Classmates:** Working alongside classmates during AGOH was another feature that students found beneficial, with 24 of 35 students saying that this Very Much contributed to office hour helpfulness. We believe this is because collaboration not only helped clarify academic concepts but also encouraged peer-to-peer learning, which is crucial in a comprehensive educational setting.
4. **Appropriate Infrastructure:** The physical setup of AGOH also played a significant role in their success, with 24 of 35 students indicating that having tables for group work Very Much contributed to office hour helpfulness. Students highlighted the importance of having suitable infrastructure, such as adequate space and tables for group work, which facilitated more effective learning and interaction during office hours.

These findings suggest that a combination of direct academic support from instructors, opportunities for peer learning, and a conducive learning environment are key to maximizing the effectiveness of office hours.

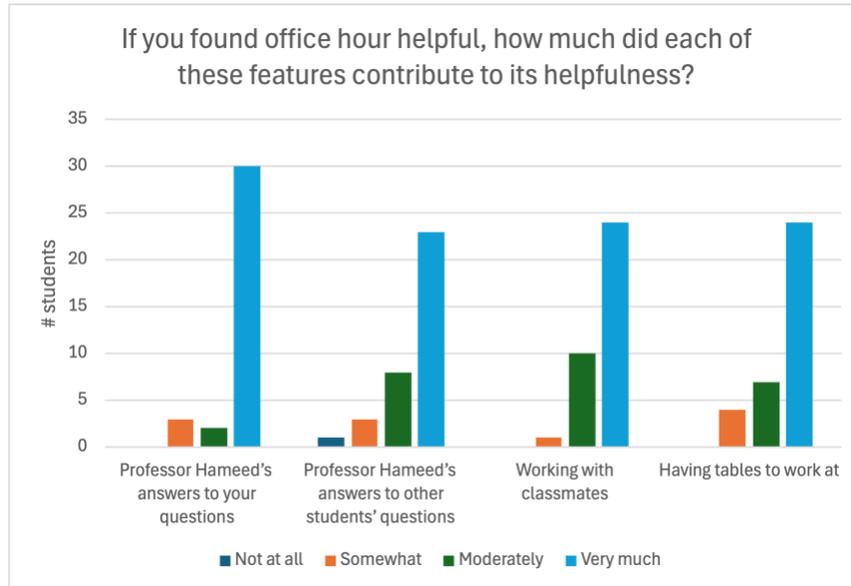


Fig. 4. AGOH features' contributions to helpfulness, according to exit-slip respondents (N = 35)

Frequency of Attendance at AGOH

An important measure of the perceived value of AGOH is the frequency with which students choose to attend. The exit slip responses revealed that a significant majority of the students found the AGOH highly beneficial, as evidenced by their repeated attendance. Specifically, 28 (82%) of the respondents indicated that they had attended the instructor's office hours (in the AGOH format) four or more times during the quarter, including their most recent visit. Six respondents reported attending three or fewer AGOH.

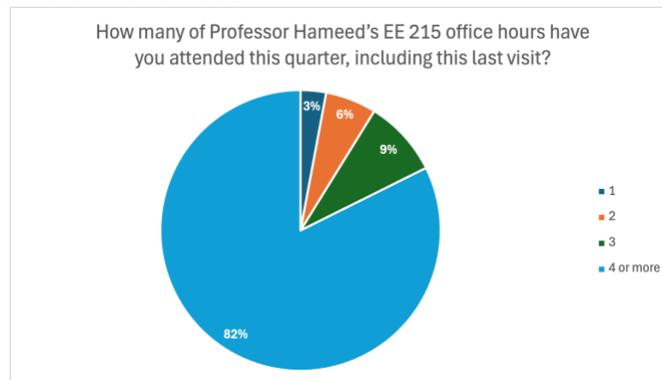


Fig. 5. Number of AGOHs attendances reported by exit-slip respondents (N = 34)

This pattern of attendance suggests that AGOH are not only valued but are considered an integral part of the learning process by the students, who return week after week to gain further assistance and clarification. Further insights into the overall impact and student perceptions will be discussed through the broader data collected from the end-of-term survey. This sequential

approach allows for a comprehensive understanding of AGOHs' effectiveness throughout the academic term.

Motivations for Attending Active Group Office Hours

One of the core research questions explored in this study was, "What motivates undergraduate students to attend active group office hours?" The exit-slip survey asked students for their main reason for visiting AGOH. In response, 33 of the 35 respondents provided one or more reasons that illuminate their motivations and underscore the design of the course components. These are four themes we identified in the responses:

1. **Assistance with Homework:** 28 of the 33 respondents (80%) cited the need for help with homework as their primary reason for attending AGOH. This finding aligns with the course design, which intentionally includes challenging homework problems to encourage students to seek out additional resources and support.
2. **Understanding Course Material:** About one third of the respondents indicated that their attendance was motivated by the need for help in understanding the course material more thoroughly. This reflects the AGOHs' role as a crucial support mechanism for clarifying and deepening comprehension of academic content.
3. **Collaboration with Peers:** About one quarter of the respondents attended AGOH to work with peers, suggesting a connection between AGOH and student engagement. This interaction can not only aid academic understanding but also foster a sense of belonging and community among students.
4. **Exam Preparation:** A smaller segment, 11%, reported that their motivation was to prepare for exams. This indicates that AGOH can also serve as a strategic resource for students aiming to enhance their performance in assessments.

These insights reveal that AGOH effectively address various student needs, from immediate academic support to fostering longer-term engagement and community building within the course.

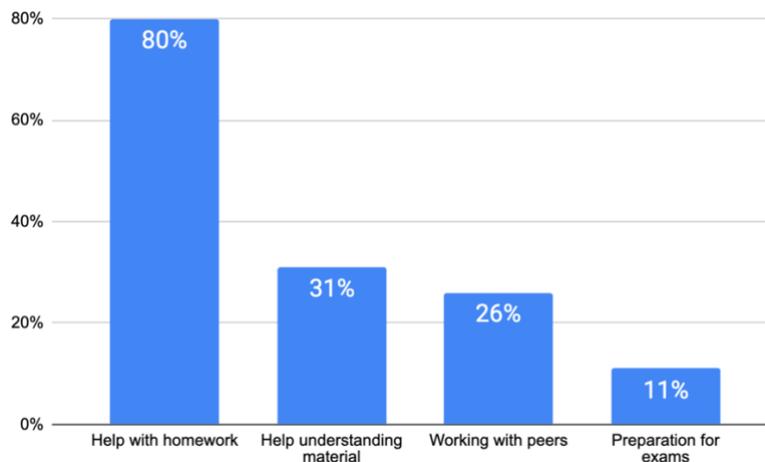


Fig. 6. Reason for attending AGOH

End-of-Term Course Evaluation Survey Results

To examine the perspectives of a larger and more representative sample of the course enrollment, we look to the end-of-term survey. 270 respondents (95% of the course enrollment) responded to this survey.

We explored the frequency of student attendance at instructor AGOH during the quarter by asking, “How many times did you attend the instructor’s office hours this quarter?” Out of 270 respondents, 13% reported attending six or more times, indicating a high level of engagement (i.e., attending more than half of the term’s weekly office hours). Approximately 15% of the students attended office hours between three to five times, while 26% attended once or twice. The remaining 46% of the respondents did not attend instructor office hours at all during the quarter. We analyze the reasons for non-attendance later in this subsection.

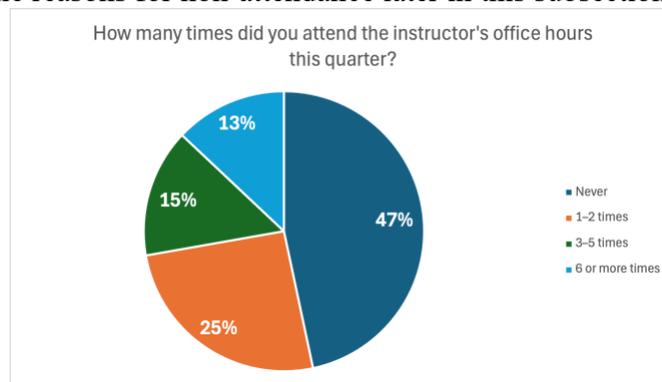


Fig. 7. Number of AGOHs attendances reported by end-of-term course evaluation respondents (N = 270)

In addition to frequency of attendance, the survey asked students to evaluate the quality of the instructor AGOH. Of the 144 respondents who reported attending at least once, 76% rated them as Very Good or Excellent, reflecting a positive perception among those who attended. These responses align with the strong, positive responses from the much smaller sample from the exit-slip survey. The response scales differ between the two surveys, because we opted, in the end-of-quarter survey, to use a response scale consistent with the rest of the university’s standard course evaluation form. Approximately 18% of the students who had attended deemed the AGOH as Good, and 6% rated them as Fair. No students rated instructor AGOH as Poor or Very Poor.

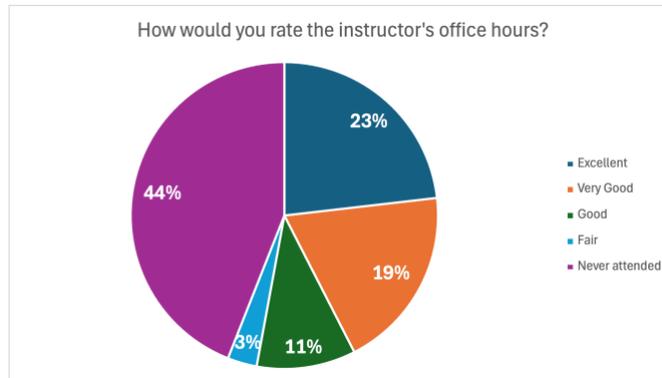


Fig. 8. End-of-term course evaluation respondents’ ratings of AGOHs (N = 259)

Regardless of how many times they attended instructor AGOH, respondents were asked, “If/when you did not attend the instructor’s office hours, what made you less likely to attend?” We tallied themes in the 160 free responses, and the most frequently cited reason was schedule conflicts, reported by 36% of the 160 students. The next most frequently cited reason was a lack of perceived need to attend (17% of students), with example responses like “when I was extremely confident about my work” and “Course material was not difficult enough to necessitate going to office hours in order to receive help or clarification.” Other reasons included overcrowding (12%; e.g., “Because they are too hectic and full of people”, “the amount of people versus how little space there was”) and lack of time (11%; e.g., “...just because I didn’t have enough time to attend”, “...because I was busy with other classes”). Less than 5% of respondents cited office hours not meeting their needs (3%), prioritization of other office hours (2%), discomfort with asking questions in front of peers (1%), and inconvenience of the location (1%). The bar graph below shows the frequency of reasons for non-attendance at instructor office hours.

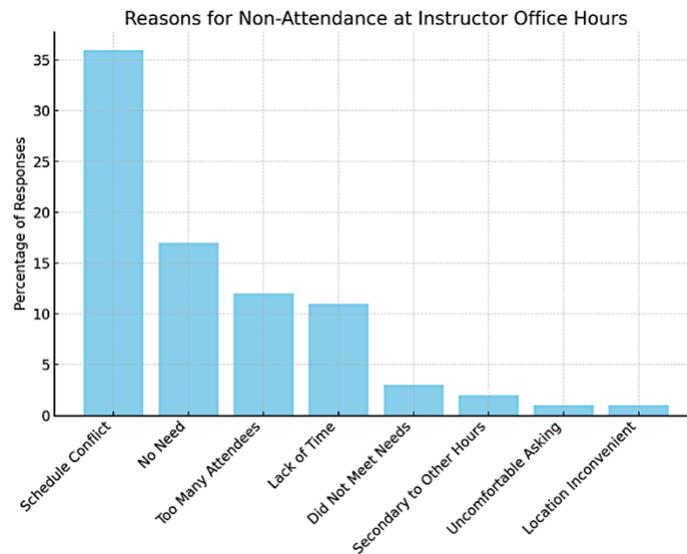


Fig. 9. Frequency of reasons for non-attendance at instructor office hours (end-of-term survey)

Discussion

Our study indicated that students perceived AGOH as highly beneficial evidenced by their repeated attendance. The course evaluation data shows that of the 144 students who reported attending at least one office hour, more than half of them attended three or more times. There were various reasons why students perceived attending group AGOH as beneficial to their learning. It helped them with homework, clarify course materials, work with peers, and prepare for exams. Scheduling conflicts was perceived to be a major barrier to students who did not attend AGOH. We plan to investigate ways in which the teaching team can further improve these office hours so that more students are benefitted.

Future Work

As we advance this research, we will continue to administer surveys in large Electrical and Computer Engineering (ECE) courses and conduct focus groups and/or interviews to deepen our

understanding of student needs and perceptions. We will look to answer questions like “How might active group office hours be adjusted to serve a large group more effectively (e.g., lower per-student/group wait times, perhaps with a TA assisting)?” and “How effective are active group office hours at reaching students who stand to benefit most from office hours?” Collecting data across multiple course offerings will allow us to integrate student feedback directly into the structure and execution of office hours. By adapting our methods in response to student input, we aim to refine our approach and enhance the effectiveness of these sessions. Future measurements will provide critical data to assess the impact of these changes, and we anticipate that the adjustments will yield positive outcomes in student engagement, success, and satisfaction.

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