

## **Optimizing Instructor Office Hours for Enhanced Student Success: A Post-Pandemic Perspective in Undergraduate Engineering Education**

**Dr. Adam Kaplan, Kennesaw State University**

**Dr. Jayhyun Kwon, Kennesaw State University**

Dr. Jay Kwon is an associate professor at Kennesaw State University. Dr. Kwon specializes in geotechnical engineering with research interests and expertise in the characterization and sustainable use of geomaterials, structural pavement performance monitoring using innovative non-destructive testing devices, and dynamic response measurement and analyses of pavement and railroad track systems. Dr. Kwon has 23 years of research and industry experience in the field of transportation geotechnical engineering. Dr. Kwon has authored and co-authored over 50 peer-reviewed publications and conference papers from his research projects with a corresponding h-Index of 17 and 1086 citations. Dr. Kwon is an active member of the Transportation Research Board (TRB) and serves as handling editor of the Transportation Research Record: Journal of the Transportation Research Board. Dr. Kwon is a member of TRB technical committees on the Stabilization of Geomaterials and Recycled Materials (AKG90) and Geosynthetics (AKG80).

# **Optimizing Instructor Office Hours for Enhanced Student Success: A Post-Pandemic Perspective in Undergraduate Engineering Education**

## **Introduction**

In the dynamic landscape of engineering education, the effective utilization of resources plays a pivotal role in students' academic success. One such resource that holds immense potential yet often remains underutilized is the instructor's office hours. Despite being strategically scheduled to align with students' availability, these designated time slots frequently witness minimal attendance. Recognizing the importance of this issue, our research seeks to delve into the factors influencing the utilization of office hours by undergraduate engineering students and to propose strategies for enhancing their effectiveness.

The decision to investigate this topic stems from a growing concern that students may not be reaping the full benefits of this valuable academic support system. As educational landscapes evolve, particularly in response to the challenges posed by the global pandemic, understanding how shifting study habits and expectations impact the use of office hours becomes imperative. To comprehensively explore this issue, we conducted surveys not only among engineering students but also among faculty specializing in civil and environmental engineering. Our research builds on this context, aiming to provide insights that can inform educators and administrators in creating a more responsive and student-centric learning environment.

To narrow our focus, we conducted surveys that explore engineering students' experiences with office hours across different academic levels—sophomore, junior, and senior. Through this, we aim to identify patterns, challenges, and potential areas for improvement. This research is not merely an exploration of current practices but a proactive effort to suggest practical enhancements that can positively impact student success.

As we progress, we will delve into the findings of our surveys, shedding light on the reasons behind the underutilization of office hours and unveiling potential improvements suggested by students, faculty, and existing educational literature. By addressing these issues, our research aspires to contribute to the ongoing discourse on effective teaching methodologies in engineering education, with the ultimate goal of fostering a more supportive and engaging learning environment.

## **Literature Survey**

Engineering students can derive numerous benefits from regularly utilizing instructors' office hours. Firstly, these sessions offer a platform for seeking clarification on intricate engineering concepts and course materials, with instructors providing additional explanations and examples tailored to individual needs. The one-on-one interaction during office hours allows for personalized assistance, enabling students to delve deeper into challenging topics and address specific learning gaps. Moreover, office hours are conducive to discussing feedback on

assignments and exams, facilitating a clearer understanding of mistakes and offering insights for improvement. By actively engaging in office hours, students not only receive academic support but also build meaningful relationships with their instructors, laying the groundwork for networking opportunities, career advice, and potential letters of recommendation. Additionally, these sessions provide a space for students to discuss career goals, research interests, and professional development, contributing to a holistic learning experience. Ultimately, participation in office hours showcases a commitment to learning and proactive academic success, fostering an environment conducive to enhanced comprehension and skill development for engineering students.

The underutilization of office hours by engineering students can be attributed to several factors. Firstly, the demanding nature of engineering programs often leaves students with limited time, making it challenging to prioritize attendance at office hours amid numerous academic commitments. Additionally, a lack of awareness about the benefits of office hours and how they contribute to academic success may hinder students from taking advantage of this resource. Some students may also be reluctant to seek help during office hours due to a fear of judgment or a preference for independent study. Ineffective communication about the availability of office hours, technological barriers, perceived inefficiency, and cultural or social factors can further contribute to the underutilization of this valuable support system. Addressing these challenges through improved communication, creating a supportive and inclusive environment, and emphasizing the personalized assistance available during office hours can encourage more engineering students to engage with this resource actively.

Office hours, despite being scheduled at convenient times, are frequently underutilized, prompting studies to explore the factors influencing students' attendance. Unapproachable professors and large class sizes discourage attendance, with students perceiving instructors as too busy or intimidating. Faculty can address this by expressing a willingness to interact and actively encouraging attendance. Additionally, the time and location of office hours significantly impact attendance, with inconvenience as a deterrent. To enhance participation, efforts should be made to make office hours more accessible and less intimidating and clearly communicate that help is available for all students [1].

Another study [2] investigated student barriers to attending office hours in STEM classes. The most common reason cited was students not having questions or feeling a full understanding of the course content, possibly reflecting overestimation of their own abilities. Many noted structural barriers, such as conflicting schedules with other classes or activities. This emphasizes the importance of flexible scheduling to accommodate diverse student timetables. Another prominent barrier was the perception of intimidation, fear, or a social stigma associated with attending office hours, suggesting the need for instructors to actively work on creating inclusive and welcoming environments. The findings underscore the importance of addressing these barriers through strategic scheduling, changing perceptions, and fostering inclusivity in office hour environments. Additionally, the study highlights the need for further research on factors influencing inclusivity and student stress during office hours, particularly in the context of different demographic groups, providing valuable avenues for future investigations.

Li et al. [3] examined the impact of different communication methods (asynchronous versus synchronous) on student-faculty interaction outside the classroom, focusing on information system courses with over ninety participants. The research revealed that students offered an email-turnaround-time guarantee reported significantly higher satisfaction levels in seeking help outside the classroom compared to those without such a guarantee. Interestingly, when participants were provided both virtual office hours and an email-turnaround-time guarantee, they showed a preference for the latter in communication with professors. The study suggests that while computer-mediated communication (CMC) technologies, including virtual classrooms, aim to enhance course delivery, the effectiveness hinges on how the technology is employed. In this case, the simplicity and guaranteed turnaround time of email significantly improved student satisfaction in seeking help outside the classroom.

Schubert et al. [4] explored the impact of utilizing an ideation space equipped with reconfigurable walls and collaborative tools for hosting engineering faculty office hours. The ideation space provided an innovative alternative for group and individual learning. Initial student feedback suggested a preference for the ideation space mentoring, viewing it as a more effective learning experience. The ideation space adds weight to the idea that considering different models for office hour delivery can contribute to a more effective and student-friendly learning experience, which aligns with student feedback in our surveys.

Cyrus et al. [5] suggests the implementation of mandatory office hours during the initial weeks of the semester as a beneficial strategy. This initiative advocates for combining this approach with other online tools, active learning methods, and cooperative learning techniques, anticipating a synergistic effect that would collectively enhance students' overall learning experience.

## **Methods**

To gather information on students' perceptions and experiences with office hour visits, a survey was developed and distributed to 291 engineering students. The survey consists of both multiple-choice questions and open-ended questions. The survey is limited in scope to assessing students' perceptions regarding the usability and effectiveness of their office hour experiences. Concurrently, we surveyed 12 Civil and Environmental Engineering faculty, investigating their current office hour practices, and eliciting their ideas for potential improvements.

## **Results and Discussions**

### **Student Survey Results**

We asked students how frequently they use office hours in a semester. The survey results highlight a significant underutilization of instructors' office hours among undergraduate engineering students. A substantial 39.52% of respondents reported never using office hours, while 47.77% utilized them fewer than five times in a single semester. Moreover, only 10.65% of students engaged with office hours between 5 and 10 times, with a mere 2.06% utilizing them more than 10 times. These findings shown in figure 1 underscore a prevailing trend of low participation in this valuable academic support system.

How Frequently Students Use Office Hours in a Semester

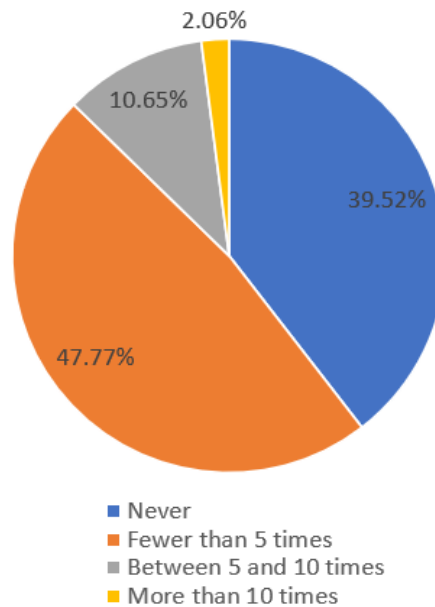


Figure 1: How frequently students use office hours in a semester.

We asked students their motivation to attend office hours. The survey results, shown in figure 2, reveal diverse motivations driving undergraduate engineering students to attend their instructors' office hours. The majority (43.31%) are primarily motivated by the need to clarify course content, indicating a desire for deeper comprehension. Seeking additional help with assignments is a close second at 39.76%, underlining the importance of personalized assistance in academic tasks. A smaller percentage, 7.87%, attend for career or academic guidance, showcasing a subset of students focused on broader professional development. Building a stronger rapport with instructors is a motivation for 9.06% of respondents, emphasizing the significance of interpersonal connections in the educational experience. Notably, no respondents selected the "Other" category, indicating a clear alignment of student motivations with the provided options.

What Motivates Students to Attend Office Hours

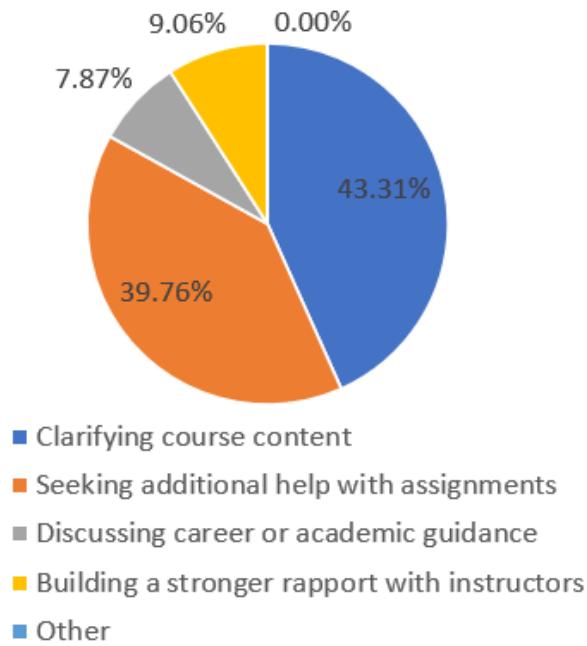


Figure 2: What motivates students to attend office hours.

The survey results, shown in figure 3, shed light on the alternative resources preferred by undergraduate engineering students when they are unable or choose not to attend their instructor's office hours. A notable 32.90% indicated that they resort to sending emails to the instructor with specific questions, showcasing a preference for asynchronous communication. Accessing additional textbooks or online resources is a close second at 31.87%, highlighting the significance of self-directed learning. Study groups are utilized by 26.42% of respondents, emphasizing the collaborative nature of academic support. Seeking help from a tutor or academic support center is chosen by 8.81% of students. A small percentage, 1.04%, selected the "Other" category, suggesting a variety of additional resources outside the specified options. These insights underscore the diverse strategies employed by engineering students to supplement their learning experience.

### Alternative Help Resources

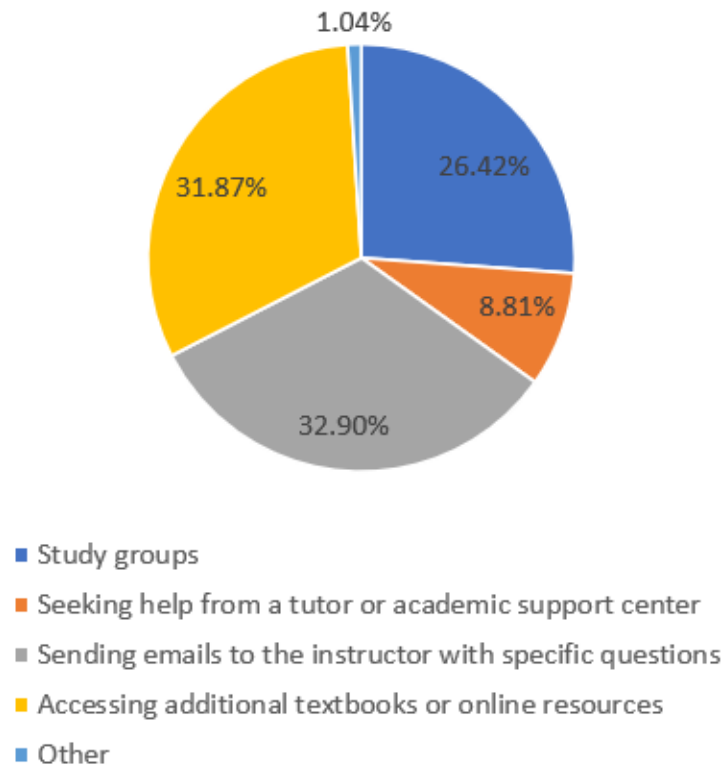


Figure 3: Alternative help resources students consider.

Finally, in open-end questions, we inquired about students' opinions on ways to enhance the effectiveness of office hours, yielding a rich array of responses. In this exploration, we present a synthesis of the most prevalent ideas voiced by students, categorizing their suggestions to provide a comprehensive overview of strategies that could significantly impact the utilization and effectiveness of office hours in the undergraduate engineering context. The responses are summarized as follows:

**More Availability and Virtual Office Hours (54 responses):** Students overwhelmingly expressed the need for increased accessibility through extended office hours and the integration of virtual options. This allows for flexibility, accommodating diverse schedules and preferences. Virtual office hours also facilitate remote participation, addressing potential barriers.

**Incentives and Bonus Points (18 responses):** A substantial number of students suggested incentivizing office hour attendance with bonus points or extra credit opportunities. This approach not only motivates students to engage but also reinforces the value of seeking additional support.

**Additional Examples and Group Office Hours (7 responses):** Providing additional examples and offering group office hours were cited as strategies to enhance the learning

experience. Group sessions promote collaborative learning, and extra examples cater to varied learning preferences.

**Office Hour Structure (6 responses):** Students indicated a preference for longer office hours over more days, along with more reminders throughout the semester. These suggestions aim to address time constraints and ensure consistent engagement.

**Clear Communication and Reminders (5 responses):** Several students emphasized the importance of instructors making their office hours known to the class and sending regular reminders. Clear communication helps students remember and plan their attendance, promoting a proactive approach to seeking assistance.

**Friendly Attitude and Welcoming Environment (5 responses):** Students value a friendly attitude from instructors, emphasizing the significance of creating a welcoming environment. This includes being approachable and encouraging, fostering positive interactions during office hours.

**Preparation and Specific Questions (4 responses):** Encouraging students to come prepared with specific questions was suggested to maximize the effectiveness of office hours. This approach enhances efficiency and ensures that students get the most out of their time.

**Learning-Centric Office Hours (3 responses):** Some students proposed having specific help sessions focused on learning, providing targeted assistance for challenging course content. This aligns with the desire for more structured and purposeful engagement during office hours.

**Use of Technology (2 responses):** Incorporating technology, such as Teams or email, was mentioned by a few students to enhance accessibility and accommodate varying schedules.

**Accommodating Learning Preferences (1 response):** One student highlighted the importance of instructors accommodating various learning preferences

These insights collectively suggest a multifaceted strategy for instructors to improve the effectiveness of office hours, including a balance of incentives, clear communication, learning-focused sessions, and technological integration. By implementing these measures, instructors can foster a more engaging and accessible environment for student support.



### Faculty Survey Results

The responses, shown in figure 4, from Civil and Environmental Engineering Faculty regarding their office hour practices provide valuable insights into the diverse approaches employed. None of the respondents reported utilizing a walk-in or appointment-only system, indicating a departure from more traditional methods. Instead, a notable portion (7 respondents) prefer a combination of flexibility and structure by offering both walk-in and appointment-based options. A smaller yet significant number (3 respondents) opt for a hybrid approach, blending in-person and virtual interactions to cater to varying preferences and circumstances. Two respondents specified alternative methods, suggesting a spectrum of practices within the faculty. This diversity in office hour strategies emphasizes the need for a nuanced understanding of instructor preferences and student needs when considering improvements to these essential support mechanisms.

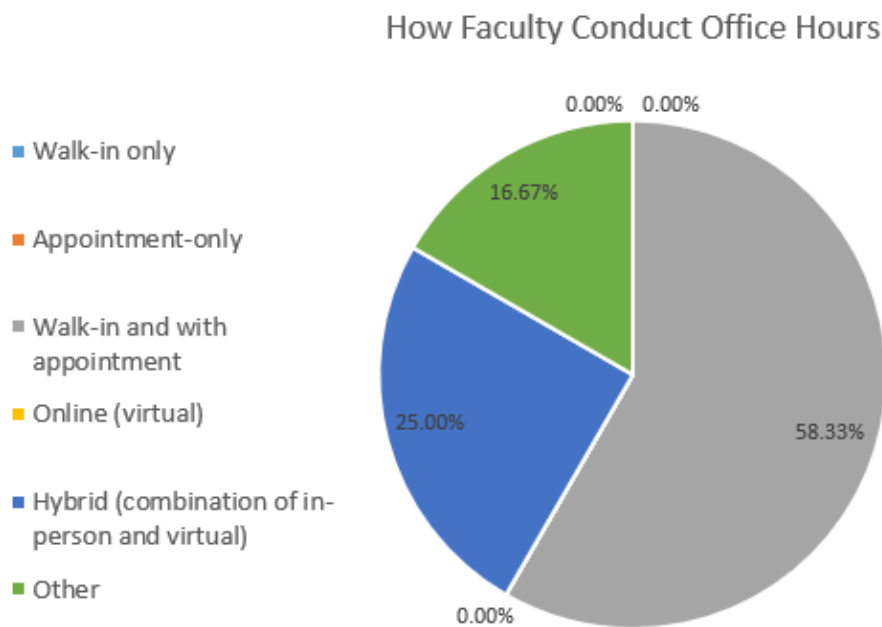


Figure 4: How faculty conduct their office hours.

The survey responses, shown in figure 5, regarding strategies to enhance the effectiveness of office hours provide a glimpse into the varied approaches employed by instructors. Notably, none of the respondents reported utilizing a structured agenda for each session or incorporating peer-assisted support during office hours. However, a small yet significant number of faculty members (2 respondents) embrace technology by employing virtual whiteboards and screen sharing to facilitate interactive and engaging sessions. Another subset of instructors (3 respondents) adopts a course-specific focus during designated hours, tailoring the content to align with the immediate needs of their students. Additionally, a considerable number (4 respondents) frequently remind students about office hours, recognizing the importance of proactive communication. Three respondents specified alternative strategies, highlighting the diversity of methods employed by faculty to optimize the effectiveness of this crucial academic support system. These insights underscore the potential for a multifaceted approach when

considering enhancements to office hour practices within the Civil and Environmental Engineering discipline.

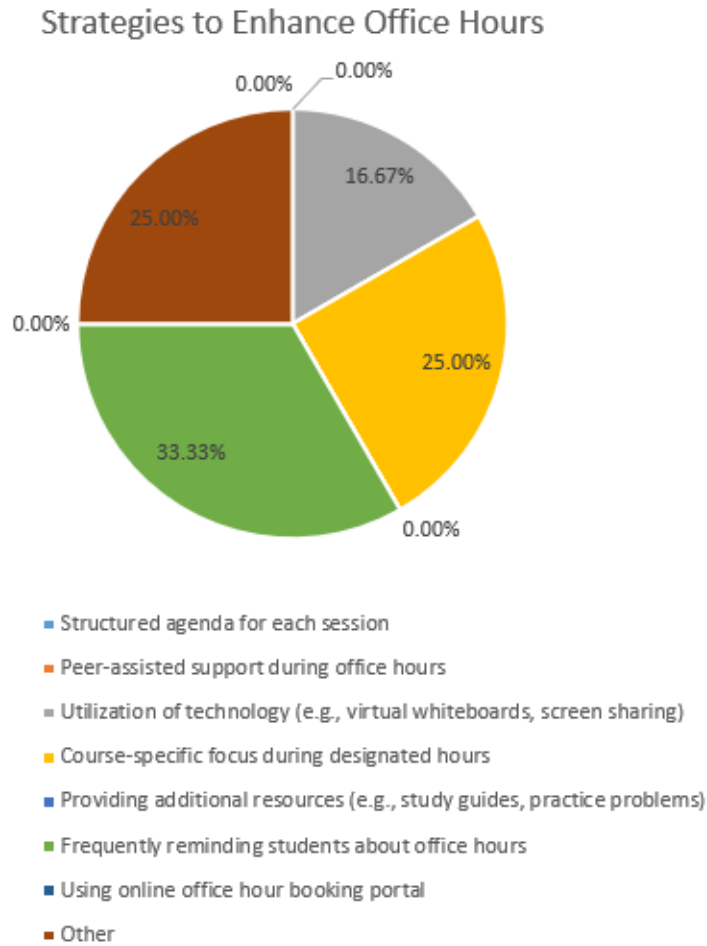


Figure 5: Strategies to enhance office hours.

To enhance the understanding of faculty perceptions regarding student engagement with office hours, we posed a rating question: "On a scale of 1 to 10, with 1 being 'Not at all' and 10 being 'Extensively,' please rate how well you believe students in your courses are currently taking advantage of instructors' office hours to seek assistance, clarification, or additional support." This query aimed to capture instructors' subjective evaluations of the current level of student utilization of office hours within the Civil and Environmental Engineering discipline. The average rating is 5.5, suggesting a moderate overall perception.

The faculty responses to the inquiry about the utilization of the online booking portal for scheduling office hours reveal a mixed perception of its effectiveness. The average rating of 5.25, obtained on a scale where 1 signifies "Not helpful" and 10 represents "Very helpful," suggests a neutral stance among faculty members. Some instructors may find the online booking portal moderately helpful, while others may have reservations about its efficacy in facilitating the scheduling of office hour appointments and improving accessibility.

The faculty responses regarding their plans for future improvements in office hours demonstrate a commitment to enhancing accessibility, engagement, and support for students within the Civil and Environmental Engineering discipline. Here's a summary of the key ideas:

**More Encouragement to Attend Office Hours:** Faculty members express an intention to provide additional encouragement for students to attend office hours, emphasizing the importance of proactive engagement.

**Utilizing Booking Tool and Providing Food/Snacks:** Some instructors highlight the positive response from students to online booking tools and the provision of food/snacks during office hours, suggesting a consideration for these amenities to further enhance accessibility.

**Flexible Scheduling and Availability Reminders:** Faculty members express a commitment to providing flexibility in scheduling office hour appointments and reminding students that assistance is available beyond formal office hour times.

**Projects Requiring Extra Research and Guidance:** A proactive approach involves assigning projects that require additional research and guidance, encouraging students to seek assistance during office hours. This promotes a hands-on, practical learning experience.

**Encouraging Email Communication:** Recognizing student preferences, some instructors encourage email communication for specific questions and provide a turnaround time for responses. This accommodates diverse communication styles and ensures timely support.

**Incorporating Minimum Meeting Requirements in Syllabus:** One faculty member suggests including a minimum number of meetings with the instructor in the syllabus, setting clear expectations for student-instructor interactions.

**Utilizing Online Booking Portals:** Faculty members express interest in or plan to continue using online booking portals as a means of streamlining the appointment scheduling process.

**Exploring Alternative Venues:** Considering the current high student turnout, one faculty member suggests exploring a change of venue for office hours to better accommodate the number of students seeking assistance.

**Assessing Student Learning through Follow-up Questions:** Instructors plan to assess student learning by posing follow-up questions related to the topics discussed during office hours.

**Potential Adoption of Online Booking Tools:** Some faculty members express consideration for adopting online booking tools in the future to enhance the efficiency of appointment scheduling.

These diverse strategies reflect a proactive and adaptive approach by faculty to tailor office hour practices, ensuring they align with the needs and preferences of engineering students.

## **Conclusions and Recommendations**

The synthesis of survey responses from both engineering students and faculty within the Civil and Environmental Engineering discipline provides valuable insights into the current landscape of office hour utilization and perceptions. The findings reveal a range of perspectives on the effectiveness of office hours, with students expressing varying levels of engagement and faculty members employing diverse strategies to enhance accessibility and support. The following recommendations, showing areas of alignment and divergence, are derived from the survey results:

### **Enhanced Communication and Awareness:**

**Student Perspective:** Encourage proactive participation by raising awareness of the benefits of office hours through targeted communication channels.

**Faculty Perspective:** Implement consistent reminders about office hours and leverage multiple communication platforms to ensure students are well-informed.

### **Flexibility in Scheduling:**

**Student Perspective:** Advocate for the adoption of flexible scheduling options, allowing for both walk-in and appointment-based formats.

**Faculty Perspective:** Consider incorporating a hybrid approach, blending in-person and virtual office hours to accommodate diverse student schedules and preferences.

### **Incentives and Engagement:**

**Student Perspective:** Embrace opportunities for bonus points or incentives for attending office hours to motivate increased participation.

**Faculty Perspective:** Consider exploring initiatives like providing snacks during office hours, as suggested by faculty, to enhance the overall experience and engagement.

### **Technology Integration:**

**Student Perspective:** Encourage the use of technology for remote engagement, such as virtual whiteboards or online booking portals.

**Faculty Perspective:** Continue leveraging technology, like online booking portals, to streamline appointment scheduling and enhance accessibility.

### **Project-Based Learning:**

**Student Perspective:** Embrace project-based learning that necessitates additional research and guidance, fostering a more interactive and applied learning experience.

**Faculty Perspective:** Incorporate projects that require students to seek assistance during office hours, promoting hands-on learning and personalized support.

### **Alternative Venues and Larger Spaces:**

**Student Perspective:** Express preferences for alternative venues if current office hours become crowded, ensuring a comfortable learning environment.

Faculty Perspective: Consider exploring larger spaces or alternative venues to accommodate the growing demand for office hour attendance.

In analyzing the survey responses from both students and faculty within the Civil and Environmental Engineering discipline, several common themes and divergent perspectives have emerged. A shared emphasis on enhanced communication and reminders about office hours resonates across both groups, underlining the importance of proactive engagement. The alignment regarding technology integration, as expressed by both students and faculty, reflects a recognition of the transformative potential that technology holds in optimizing the effectiveness of office hours. Students appreciate the convenience and accessibility afforded by technology, such as virtual whiteboards, screen sharing, and online booking portals. These tools streamline the communication process, making it easier for students to schedule appointments, seek clarification, and engage with course materials remotely. Faculty members, too, recognize the benefits of leveraging technology to enhance the efficiency of office hour practices. Additionally, there is a consensus on the value of flexibility in scheduling, with preferences for a hybrid approach or a combination of walk-in and appointment-based options. However, divergent perspectives arise in terms of priorities. While students express a keen interest in incentives such as bonus points, faculty tend to offer snacks during office hours to enhance engagement. Overall, culmination of insights from both students and faculty can lead to a more comprehensive and effective enhancement of office hour practices in engineering education.

The authors have prioritized a list of top three recommendations aimed at enhancing the effectiveness of office hours in academic settings. These recommendations are tailored to address the specific needs and based on authors' observations and judgement.

#### 1) Enhanced Communication and Awareness:

Regular Announcements: Frequent in-class announcements about the availability and benefits of office hours.

Email Communications: Periodic emails to students highlighting office hour schedules and assistance offered.

LMS Announcements: Use of the Learning Management System for posting reminders and detailed office hour information.

Student Testimonials: Sharing experiences from students who have benefited from office hours.

Syllabus Inclusion: Emphasizing the importance of office hours in the course syllabus as a key component of the learning process.

#### 2) Alternative Venues and Larger Spaces:

Identify Appropriate Spaces: Locating larger or more suitable spaces for office hours.

Publicize Locations: Communicating any location changes through various channels.

Flexible Environment: Creating a welcoming environment in these spaces.

Utilize Campus Resources: Collaborating with campus facilities to secure optimal locations.

### 3) Utilizing Online Booking Portals:

Implement Booking Systems: Introduction of online booking systems for efficient scheduling such as Microsoft Bookings app.

Integrate with LMS: Ensuring booking system integration with the Learning Management System.

Clear Instructions: Providing instructions on using the booking system.

For future research, it is recommended to extend the survey to a larger and more diverse faculty sample across various engineering disciplines. This expansion aims to capture a broader range of experiences and strategies employed by instructors. Additionally, conducting in-depth follow-up studies with faculty actively using technology during office hours can provide deeper insights into the effectiveness and challenges associated with these interventions. Investigating barriers and facilitators to office hour utilization from both faculty and student perspectives is also crucial for understanding the dynamics influencing engagement.

### References

- [1] B.-L. Andrade, K. Pakala, D. Bairaktarova, D. Hagemeyer, and H. Subbaraman, "Faculty Perspectives on the Impact of Virtual Office Hours in Engineering Courses," in *2020 ASEE Virtual Annual Conference Content Access Proceedings*, Virtual On line: ASEE Conferences, Jun. 2020, p. 34664. doi: 10.18260/1-2--34664.
- [2] J. L. Hsu, M. Rowland-Goldsmith, and E. B. Schwartz, "Student Motivations and Barriers toward Online and In-Person Office Hours in STEM Courses," *CBE—Life Sci. Educ.*, vol. 21, no. 4, p. ar68, Dec. 2022, doi: 10.1187/cbe.22-03-0048.
- [3] L. Li, J. Finley, J. Pitts, and R. Guo, "Which is a better choice for student-faculty interaction: synchronous or asynchronous communication?"
- [4] T. Schubert, F. Jacobitz, and E. Kim, "Office Hours Re-imagined: Mentored Learning in Ideation Spaces," in *2016 ASEE Annual Conference & Exposition Proceedings*, New Orleans, Louisiana: ASEE Conferences, Jun. 2016, p. 25817. doi: 10.18260/p.25817.
- [5] S. C. Rezvanifar and R. Amini, "Board 25: Work in Progress: Mandatory Attendance in Office Hours to Improve Students' Learning Experience," in *2018 ASEE Annual Conference & Exposition Proceedings*, Salt Lake City, Utah: ASEE Conferences, Jun. 2018, p. 29992. doi: 10.18260/1-2--29992.