

Technical Report
Optimizing Office Hours in Computer Science Through Data Analysis

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Spring 2025

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Research Paper - CS 4980
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Introduction:

My name is Nikhita Guntu and I am a third year computer science student at the University of Virginia in the School for Engineering. I have recently gained an interest in implementing CS in a higher regard, such as Machine Learning and Artificial Intelligence. This led me to seek out this opportunity with Professor Basit, researching methods to construct more efficient office hours. During this past semester, I took on a role as both researcher and analyst. I was responsible for looking into various similar studies, and formulating conclusions on the gathered data.

Dataset:

There were two csv: CS 3130 and CS 1112. Both of these csv files had the same attributes. These attributes included course_id, issue, issue_subjet, location, status, group_option, entry_time, fulfillment_time, exit_time, session_id, user_id, and role. The CS 112 csv had 579 data points while the CS 3130 had 2810 data points. The key features were entry_time, fulfillment_time, and exit_time along with group_option.

Findings:

Through general studies about office hours, it was evident that higher office hour participation leads to higher student success. However, there are many drawbacks to attending office hours, such as the stigma to ask for help or the inability to get help. I also focused on virtual vs in person office hours. In a study called “Does It Really Matter? Using Virtual Office

Hours to Enhance Student-Faculty Interaction”, virtual office hours were held through Facebook’s instant messaging. This article concluded that there were higher levels of satisfaction compared to traditional face-to-face meetings. In another study called “EdCode: Towards Personalized Support at Scale for Remote Assistance in CS Education”, researchers made a program called EdCode that was a IDE plugin that would mimic the functionality of Piazza. Students can select a section of code and incorporate it into their question. This question and snippet of code will be seen by other students and can be answered by the instructor. There is also a real-time chatbox and plagiarism detection. While the results of this program's efficiency is not included, we can use this as a way to understand how to incorporate different tools for students.

When looking at the data collected last semester, I was able to create a script to draw basic statistical conclusions and visualization tools. For CS 1112, having a group session did not have a strong effect on overall duration and wait time. However, for the time a student was being helped, the average time with a group was 884.9 seconds, while the average time without a group was 1056.3 seconds. This shows that a group session was beneficial to reducing the time spent with the TA. When looking at the data for CS01, there was no significant difference except for wait time. Students on average waited for 1661.94 seconds when there was a group, and 1554.48 when there was no group. This means wait time was higher when a group was incorporated. While there was no strong correlation between the data, I was able to synthesize a hypothesis. Maybe the incorporation of group sessions is not helpful for higher level classes? This may be true because questions get more specialized and are more code dependent as the classes get more difficult. This means a TA cannot group students efficiently to help them all with the same topic, since students have different levels of background leading to specific questions.

Conclusion

Throughout this study, I was looking at how office hours can be optimized and how the current data supports the use of group sessions to optimize office hours. In terms of next steps, I would like to add more filters to do the data to see if stronger conclusions can be drawn. One filter would be to only analyze the data for a “student” role, rather than looking at all the data collectively. I would also like to analyze classes to see if the group sessions are only helpful for low level classes. I would also like to figure out what an “Inactive” TA means, to help further clean up the data.

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