Virtual Office Hours In Times Of Need

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 2023

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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Introduction

Why do we use office hours? Well, as it turns out, many of us don't even use them. Let us start by defining office hours. According to Lockwood (2019), office hours are the time that professors or instructors are required to be in their offices and available for students to meet with them. Students come to office hours (OH) in order to receive individual support or feedback, discuss assignments, and clarify concepts that were confusing in class. Well, despite the help that they could be getting from office hours, many college students don't make use of their professors' office hours. According to a study by Community College Journal of Research and Practice, almost half of students never even attend office hours (Arendale, 2008). Many students don't realize that the time investment of going to office hours can often help them come to an answer for whatever they're struggling with much quicker than if they just try to figure it out themselves. They're actually paying for this help through college tuition.

The topic of my research is regarding both the efficacy of different styles of office hours – namely in-person and virtual – and how they should be optimized to suit the needs of the students coming for help. Among in-person and virtual office hours there are sub-categories of delivery methods such as group office hours and individualized office hours in the case of in-person and then video, audio, and text-based office hours for virtual office hours. I want to understand better the users of office hours and how they could be improved to suit whatever the user is in need of regardless of their physical or mental abilities.

By improving the overall user experience in office hours, office hour attendance and, in turn, student grades, will increase. In my literature review section I cover the correlation between students' grades and their attendance in office hours, both the benefits and drawbacks of using a

virtual style of office hours, and how users' experience of a virtual style of office hours can be improved to be as seamless and simple as possible. I gathered research articles, academic journals, books, etc. talking about the previously listed literature review topics as well as informal interviews with TAs using the virtual office hour system I helped design. Through my analysis of the research, I've found that office hours is an invaluable tool for the support of college students struggling with their work. I also found that virtual office hours is a helpful tool for extenuating circumstances but tends to lack some of the benefits which students can receive through direct in-person help. I also identified several potential barriers that could be removed or at least lessened to improve the experience of online office hours for students. In this paper I will show that virtual office hours can be successfully used as a substitute for in-person office hours by showing the importance of office hours, the multiple benefits which can be reaped through an online format, and the different ways in which the online format could be improved for the user.

Literature review

Office hours are shown to have a positive correlation with students' grades in the given class that they're seeking help in. Visiting office hours has been shown to have a positive correlation with a student's academic performance in that class. The hope is that with showing this positive correlation that it may encourage instructors to invest more time and effort into their office hours (Guerrero, 2013). Professors are judged by administration on things like the success of the students in their classes so it is in their best interest to do what they can to help their students succeed. Office hours is both an incredibly important and underestimated tool afforded to students. As Limberg (2007) has argued, there is great importance in going to office hours and

being able to develop both an academic and social relationship between student and professor. He breaks down the average office hours interaction into a framework of sorts depending on what the student has come there to get help with. Limberg really seems to emphasize the importance of receiving in-person help for not just the immediate help that it provides but also the future benefits that creating that social connection will do.

Virtual office hours can be used as a substitute for in-person office hours in times of great need such as the COVID pandemic. One of the great benefits of a virtual style of office hours is that it becomes much easier to scale up the help being offered to students. By solving problems that come with large classes and streamlining everything, office hours will thrive, not only by a growth of attendance, but also in terms of efficiency (MacWilliam, 2013). Through virtual office hours students are able to avoid traveling from their place of residence to a classroom in order to get help. One of the large problems that we see with in person office hours is attendance and I would argue that much of the lack of attendance could be attributed to the inconvenience of having to go somewhere to get help (especially in the case when the problem seems to be something small). There are varying degrees of benefit from going to office hours based on the data collected on students from a Virtual Office Hours implemented during COVID 19. The paper brings the efficacy of online office hours into question (Hall, 2021). One large loss is simply less interactivity with the instructor, even with a video format like Zoom. Websites with more interactivity are more appealing to the users. It was shown that the preference for a more interactive website also increased over time as users spent time on said website (Al-Shamaileh, 2012). To me this means that adding more interactivity also results in a better user experience and retention. In a post-COVID world, students' learning experience could worsen because of teaching being transferred from offline to online. This is because, as previously mentioned, with

online learning there is a lack of teacher-student interaction. A way to counteract that would be an integrated media platform (IMP) which could host a Virtual Office Hours (VOH) (Chen, 2021). In a study by Gao (2012), they compare virtual and in-person office hours based on performance, interaction time, and characteristics of the students who utilize the office hours. The data was gathered from a dataset covering two semesters of a CS2 course; the first of which used in-person office hours in the Fall of 2019 and the second using virtual office hours in the Fall of 2020. The data covers how the students used office hours, the type of questions asked, how long they received help for, their demographics, and attitude. Some interesting findings from this study were that female students, students with a fixed mindset in computing, and those with weaker skills in transferring theory to practice were more likely to attend OH. More interestingly is that there wasn't correlation between OH attendance and class performance which directly contradicts what we've heard previously.

Peoples' online experience can be improved through queueing algorithms and focusing on accessibility. We can make queueing algorithms both more efficient and fairer with something called Weighted Start-time Fair Queueing (WSFQ). This improves upon a regular Start-time Fair Queueing (SFQ) algorithm by not only ordering based on queue join time but also considers which queue has a smaller virtual finish time in the case of the start-time. (Allahyar, 2009). Another way in which the online experience could be improved for students is by gamifying the entire process of office hours. In this study, participants took regular quizzes and played a game as their quiz. People generally performed better in the game-based method and according to the surveys they took after their quizzes, the participants were happier with and learned more from the game than the normal quiz (Rajamohan, 2020). According to Elliza Guta (2022), website accessibility is the ability to perceive, understand, navigate, interact, and

contribute to the web. More broadly, it has to do with removing barriers to online platforms so individuals with any sort of disabilities can access the online content available to non-disabled individuals. An example would be something like a screen reader program that will translate text on the screen into audio content for the user. When looking at accessibility in websites, we should be focused on not just ensuring that the end-product website is accessible to end-users but even before that ensuring that the programmers creating said website have the capacity, resources, and wherewithal to design and create a widely accessible website (Law, 2005). This draws many similarities to Woolgar's "Configuring the User."

My analysis of virtual and in-person office hours draws on Steve Woolgar's "Configuring the User," which allows me to look at the impact that technology has on its users and see how its design can shape not just a user's experience but even the way that they think. Another aspect of Configuring the User is that different developers of technology can have very different ideas of who the user is and what this user needs in a solution. As a result, the user can end up misusing the technology. In my analysis I will use "Configuring the User" to look at website design in such a way that it is designed from the ground up around the experience user's experience with the website. This framework shows us that technology can at least be a factor in shaping the thoughts of its users based on the design choices made during development and the societal context it is used in. It emphasizes the importance of analyzing alternative perspectives. Woolgar tells us that it is imperative that the engineers working behind the scenes on this technology must be aware of how what they're creating will influence the various users of it (Woolgar, 1990).

Methods

My primary method of research is content and thematic analysis of previous studies that have already been done on the topic. Some of the recurring topics and themes that I've found from my research into office hours both online and in-person are those surrounding office hours' actual efficacy in terms of students' grades, the benefits and drawbacks of virtual office hours, and the importance of thoughtful design when creating something that will affect a large number of people. Some of the different actors affected by this research are college students that make use of office hours, faculty such as professors or even TAs who manage office hours, the engineers (if a virtual system is being used), and administration which has to look out for the school as well as the wellbeing of students. All of these actors aside from maybe the engineer building virtual OH systems should care about the efficacy of office hours because if it doesn't show any improvement in students' grades, then there isn't any point in using them. The benefits and drawbacks of virtual office hours likely matter most to the students using them and the engineers who allow virtual office hours. For students, the method of office hours greatly affects how easily they're going to receive help. For the engineer the usefulness of virtual office hours determines whether the system they've created will be used. The idea of being thoughtful with one's design choices in creating a large scale system is directed mostly at the engineer who builds it. This affects everyone else's experience using their platform but the engineer is the one who is tasked with actually creating something that is accessible to the users.

With content and thematic analysis being my only method of analysis, I am limited by the sources which I can find to analyze. One of the large limitations of this method of content and thematic analysis is that a large portion of the studies I found were exclusively done in the Western half of the world. Another potential limitation is the classes used in the studies of office hours don't represent an even distribution of subjects available to students. The first limitation

can be addressed in the future by collaborating with people from other parts of the world to look at what has been studied regarding office hours in other countries. The second limitation could be addressed by either finding more studies with a more diverse set of subjects used or perhaps performing my own studies that look at and compare the different office hour experiences for different classes.

Analysis

Visiting office hours has a positive correlation with a students' grade in that class. According to a scatterplot charting students' number of office hour visits and course grades, we can see a 1.273% grade increase on average for each visit to office hours (Guerrero, 2013). Something to note is that this is only the chart of students' grades from courses in political science, American politics, international relations, and research methods subfields. This is something important to consider when looking at this sort of data – different classes require completely different styles of office hours. A math class, for example works best with either an in-person style or something over zoom using a virtual whiteboard, but in the case of something like a CS class it could be argued that virtual office hours in general make more sense since it will often include code reviews. Regardless, it's been seen in both this and other studies using other classes that office hours tends to improve the grades of those who use them. Although the scope of this evidence is limited, it's still based off data from 406 undergraduate students over a 4-year period. I think it's still fair to trust data gathered from this study. According to another study from Limberg (2007) we can get a better idea of where problems occur and understand OH conversation flow better by deeply analyzing those conversations.

Virtual office hours have many potential benefits that could ease the office hour experience of students. One of the large problems with in-person office hours is that it becomes harder and harder to deal with large-scale classes. Some courses even have to deal with several thousands of students ("College Sizes: Small, Medium, or Large?"). With class sizes like this the staff in office hours can be easily overwhelmed. Some of these troubles can be slightly mitigated through the use of online office hours. With a good queueing algorithm and available waiting times, we can give students quicker access to help and a better idea of how long it may take to receive it. Online office hours will thrive, not only by a growth of attendance, but also in terms of efficiency, if we're able to learn to handle large loads of students. This can be shown in an online OH experiment done at Harvard in which attendance grew by about 4 times. This load was handled easier by the TAs through helpful web and ipad based systems (MacWilliam, 2013). It could be argued that this wouldn't be as beneficial to say an English class's office hours since every piece of help will be almost completely specialized to that student. According to Chen (2021) using online office hours rather than in-person could result in worse quality of office hours since there is less teacher-student interaction. A way to counteract this would be creating an integrated media platform to host virtual office hours. Students have been shown to receive higher test scores from getting office hour support over video rather than methods such as text and voice. An integrated online system like this could also serve other purposes like assignment submission, grading, support requests, etc. An example of text-based office hour support would be using technology such as Piazza. Emotional intelligence is especially important when working with students in online learning environments (Films Media Group, 2020). Hence, allowing the student to talk to a teacher or TA "face-to-face" over video will greatly help their learning.

The user experience in virtual office hours can be improved to be more efficient and accessible to a greater number of students. One such way that I've found from Allahyar (2009) is through overhauling the system used for queueing students. By implementing a fast and efficient queueing algorithm students won't have to deal with a slow system or unfair queueing in which their spot isn't secure. A Weighted Start-time Fair Queueing algorithm improves upon a regular queue by not ordering based on queue join time but also considering the virtual finish time. Websites can be made more accessible by shifting the design paradigm of the engineer building it. This is preferable to waiting until you have a finished product and then implementing accessibility options as almost a side note. Accessibility should be built into the system from the beginning to create something that will really work for anyone using the website (Law, 2005). With classes going online, one obvious option for continued learning would be an all-in-one solution where learning, assigned work, and receiving help is done. If a class decides to use an entirely integrated online learning platform, then something to consider would be gamifying the entire process of learning to increase student engagement. According to Rajamohan (2020), not only did students enjoy taking a gamified quiz more than a regular one, but they also performed better than they did otherwise. Although a solution such as this may take more work than just doing classes over videoconferencing services like Zoom and Google Meet, we can see benefits to students who take part in a more comprehensive online experience. Some of the benefits of using a Learning Management System (LMS) include an ease of organizing and conducting online classes, the ability to do assignments online, more easily accessible and available learning materials, and increased interactivity with the teacher from other forms of online learning (Prahani, 2022).

Conclusion

Hopefully you now understand the potential benefits that could be seen by some simple alterations to our classical approach to office hours. By just implementing a virtual option for office hours and optimizing it to the class it's used for, it could serve as a substitute for the regular in-person office hours and even improve upon that format in some scenarios.

My hope for this research is that it will be able to reach all sorts of college faculty. A professor with a very office hour-dependent class may see this and decide to change things up in the future for their OH sessions. Or perhaps an administrator will see this and decide that students should have the option for various modes of office hours. A future researcher may see this research and use it to develop their own ideas on the topic of office hours. Perhaps they'll continue this research by finding additional optimizations which would make OH a better experience for everyone involved. They could also perhaps investigate how different types of classes are affected by a transition to virtual OH. I think that's an important topic to research. We should always be searching for ways to improve what we're already doing. Future research should look for new ways to make the office hour experience better for students.

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