

## **AC 2008-2797: COMMUNICATING IN AN ELECTRONIC ENVIRONMENT: EFFECTIVE TEACHING USING ELECTRONIC APPLICATIONS FOR OFFICE HOURS**

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## **Communicating in an Electronic Environment: Effective Teaching using Electronic Applications for Office Hours**

As technologically-competent students enter college, the dependency on electronic formats of communications continues to rise. The capacity to utilize electronic formats of communications is becoming increasingly important with each entering class. From e-mail to instant messaging software, students desire the ability to use electronic tools to communicate with their instructors. While e-mail is already used worldwide in the learning environment, instant messaging software has not been fully embraced by instructors. Online office hours can be a useful application of standard office hours in order to enhance the learning environment of students. In addition to face-to-face contact time, online office hours permit the instructor to extend his/her office hours to electronic formats and provide additional contact time with students.

This paper looks at how to effectively run online office hours using applications such as AOL® Instant Messenger™. The focus will be given to implementation and sustainability of online office hours. The instructor must demonstrate the viability of their online office hours such that his/her students believe in its effectiveness and will want to continue using the application. In addition, the approach to running online office hours changes slightly due to the nature of the environment. From cheating to ethical concerns, these topics will be discussed to help the instructor feel comfortable and have confidence running online office hours. A previous study showed a significant increase in student contact time with the implementation of online office hours. Approximately 90% of students chose to take part in online office hours compared to 40% utilizing standard office hours. While it is understood that situations vary with college and classroom environment, the principle remains the same across all venues and will be discussed.

### **The Evolving Classroom**

Over the past 10 years, the classroom environment has been evolving. Within the classroom, students have continually been introduced to new formats for class lectures and discussion sections. From online lectures to interactive discussions using electronic devices, students are being introduced to new means of learning, which is having profound influence on how professors, teaching assistants, and students interact. Online lectures have revolutionized how classes in particular fields are operated. Students can log on from the comforts of their dorm room and do exactly what they could do during face-to-face contact with the professor. The advantage of this form of giving lectures is that the professor is not required to have a set of prepared lectures, but instead, can record those sets of lectures in one sitting then put them a class website for students to access at the appropriate time. A major disadvantage to this format is that students are not able to ask immediate questions of the professor regarding the content that is presented in the lecture. This leads to a high dependence on office hours, with the teaching assistant or professor, for students to gain the face-to-face contact time that was not available with the online lecture. Depending on the structure of the class, this can leave students with very few options for getting their questions answered in a timely fashion.

Interactive lectures using electronic devices (Quizdom®, eInstruction®, and the like) have recently become popular in very large classes, such as freshman chemistry or math<sup>1</sup>. Still in its infancy, a format using these devices allows an instructor to gauge the level of understanding of

a particular topic by the whole class immediately instead of relying on the teaching assistants or an exam to uncover any deficiencies. A professor asks the class a question with several possible answers and the students are asked to select the correct answer. After students have inputted their response, the professor is informed of the percentage of correct responses, giving him/her immediate information as to whether the students understand the concepts being presented. While this is advantageous for the professor, it does not provide accurate information as to the level of understanding by the students. Are students simply selecting their friend's answer? What level of confidence should be used in the results presented from using these devices? What happens if some of the devices fail during the lecture period? These are questions that potentially could arise as this format continues to develop.

Outside of the classroom, there are other technologies that can be utilized to enhance the learning environment<sup>2,3</sup>. While such technology has been around for many years, these electronic applications have not been fully embraced by the teaching community due to a possible disconnect between student and professor. As more professors come onboard, these applications become more important as our society as a whole continues to move to an all electronic state. One of the more prominent electronic applications currently in use is e-mail. This electronic application once was a great way for students to communicate with professors. Unfortunately, with the increase in spam, students are continuing to move away from using email to avoid the mass influx of spam into their inboxes. This leaves a hole for instructors to fill in order expand their class beyond the classroom. Specifically, the question remains on how to effectively run office hours when face-to-face contact time is simply not enough with the size of the class.

### **Office Hours and Electronic Applications: Advantages and Disadvantages**

Traditionally, it has been the norm for office hours to be held face-to-face between the instructor and students. What happens when the size of the class or other factors do not permit adequate office hour time to be held? Instructors can be overwhelmed with students flooding their office or designated location to get their questions answered. Unfortunately, this will leave some students in the dark after waiting patiently to get help but merely being victims of time running out. Students eventually become frustrated with what appears to be neglect on the instructor's part to provide sufficient time for students to get the help they require.

One solution to this ongoing problem is the development of office hours that extend beyond the traditional face-to-face setting<sup>3</sup>. Electronic office hours (e-office hours for short) provide a means for instructors to open themselves up to assist as many students as possible to achieve success in the course. Options range from e-mail to chat room discussions. Each of these options has its advantages and disadvantages and two of them will be discussed using a case study. This case study involved a group of students spread across two classes and numbering 60 in size. All of these students attended a major university in the northeast United States. Students were told that this new form of office hours would be instituted to provide an additional means for getting the required help. Strict rules were put into place to manage the hours used for these electronic office hours. They were also informed that traditional office hours would not be replaced by e-office hours and that they should continue to see the instructor whenever possible. This case study spanned from the middle of the fall quarter through the end of the winter quarter to examine the effectiveness of e-office hours with different groups of students.

Before implementation of e-office hours, student use of traditional office hours was limited to less than half (~24) of students. The majority of the students stated that the times provided for office hours never allowed for them to come. An attempt was made at finding an optimal time for a vast majority of the students to come to regular office hours, however, this was unsuccessful due to schedule conflicts (notably labs, other lecture/discussion sections) that interfered with the best time period. It was observed that of those students who were able to utilize face-to-face contact time during office hours, half used them on a regular basis while the other half attended only when they had serious questions they needed answered to fully understand the material.

After implementation of e-office hours, the number of students getting help demonstrated a significant increase. Of the 60 students included in this study, 54 (~90%) students used the electronic office hours setting. Initially, e-office hours were limited to 9pm-11pm three days a week. Hours were expanded when an exam was being administered the following day. Students were allowed to use e-mail and AOL® Instant Messenger™ (AIM®) during the specified hours. To expedite the responses given to students, priority was given to e-mail requests over AIM®. Students were made aware of this fact and agreed with its implementation.

Use of e-mail during the specified office hour times was not as high as those utilizing instant messaging. Approximately 14 of the 54 students chose to use e-mail on a regular basis to get their questions answered. One of the positive outcomes with communicating by e-mail was that students could keep track of the conversation with each message sent. This allowed them to scan back through the conversation to see where they may have missed something mentioned earlier. Two disadvantages of using e-mail included making sure messages didn't end up in the spam box and dependence on students to respond in a timely manner during the set time period. During the initial message with students, it was found that some messages were automatically being sent to the spam box. Students would write back asking if the instructor had seen their message. The instructor would respond saying that he/she did see it and the students had to do massive searches to discover that their messages were being marked as spam. It was advised that students add the instructor's e-mail to their safe/contact list. Students were also encouraged not to wait until the last minute to ask additional questions but send any important questions at one time so that the instructor could provide the most help.

Introducing the AIM® application into the office hour setting had a major impact. All 54 students used the instant messaging application and it became the highlight of e-office hours. Students commented that they wished their other classes used this tool in a similar manner. Instant messaging allowed for instant communication between the student and instructor. Students were able to hold fluid conversations with the instructor without having to wait for responses via email that could take several minutes to an hour. Instant messaging, however, did not come without its disadvantages. One major disadvantage was that certain versions of the AIM® application required many windows to be open at one time which cluttered the instructor's screen. With today's advances, instant messaging applications now provide one window with tabs that the instructor can select when students ask questions. Still, the instructor could be faced with the problem of having to answer the same question multiple times through the different tabs.

An even more useful tool is the chat room feature AIM® and other sites provide. In this setting, the instructor can open a dedicated room and have students join in the conversation already taking place. Students who join late can scroll through the conversation to see if their particular question was answered. This is a win-win situation: the instructor does not have to worry about the same question being asked multiple times and students do not have to wait for their question to be answered if it already has been a short time earlier.

The table below summarizes the applications with their advantages and disadvantages. In this case study, the chat room was not utilized but was noted for use after the study ended. While no one application is the best, each one can be tailored to meet the needs of the instructor and students. These applications are also not the only possibilities. Other applications that the instructor finds meaningful can be interwoven into that particular classroom setting.

**Table 1 – Electronic applications with advantages and disadvantages**

Application	Advantages	Disadvantages
E-mail	<ul style="list-style-type: none"> <li>• Allows for thorough responses in one message instead of multiple short responses</li> <li>• Can provide additional instruction beyond set office hour times</li> </ul>	<ul style="list-style-type: none"> <li>• Messages can get lost in spam box</li> <li>• High dependency on student and instructor to respond in timely fashion during office hours</li> <li>• Lack of real-time discussion can lead to disjointed discussion</li> </ul>
Instant Messaging	<ul style="list-style-type: none"> <li>• Rapid response to student’s questions</li> <li>• Can help many students at one time in a fast-paced setting</li> <li>• Real-time discussion facilitates smooth dialogue</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple tabs can lead to confusion when answering multiple questions at one time</li> <li>• Do not have all fonts available (e.g. symbols) which can make complex discussions difficult</li> </ul>
Chat Room	<ul style="list-style-type: none"> <li>• Allows for roundtable discussion between instructor and students</li> <li>• Conversation can flow smoothly without having to stop to answer the same questions multiple times</li> </ul>	<ul style="list-style-type: none"> <li>• Requires instructor to invite students to join room delaying the conversation</li> <li>• Instructor must monitor room so that unauthorized people are not permitted to view conversation</li> </ul>

## Adapting to Technology outside the Classroom

The case study presented above resulted in a wide student acceptance of electronic applications for office hours. As technology continues to develop, greater appreciation for these electronic formats over the traditional pencil and paper will also increase. This increase in acceptance generates a new question of how an instructor adapts to this new environment. For some instructors, moving to an electronic style of office hours would be out of the question. There are a variety of reasons for this position, including disruption of their current format that has been established and worked for many years. While this view is true, it must be realized that the classroom is moving toward becoming completely electronic so making adjustments now will only help in the future.

How does an instructor bring these virtual office hours to the classroom? The answer to this question depends on the person. There is no one right way of holding e-office hours. The key is to know your limitations. An instructor should not attempt to offer different modes of communication simultaneously (e.g. instant messaging and e-mail) the first time he/she implements e-office hours. As demonstrated by the case study, simultaneously running AIM® and e-mail required a delicate balance in order to ensure all questions were accurately answered. Here are three important tips when considering how to operate electronic office hours:

- **Know your students** – All students are not created equal. The worst thing an instructor can do is to assume all of his/her students will use instant messaging when there are some students who prefer not to use it for various reasons. Get to know your students before attempting to launch an electronic application to avoid receiving complaints from your students in the future.
- **Watch the clock** – As with traditional, non-electronic office hours, time management is important when running an electronic version. With a higher volume of students all wanting to ask questions, an instructor can easily lose track of the time. Students should be made aware that e-office hours occur during a set period of time and deviations from this time shouldn't occur unless necessary. Self-discipline on both the student and instructor's part will make implementation of e-office hours easier and more beneficial.
- **Keep them focused** – When using instant messaging or chat rooms, the academic conversation can easily be sidetracked if not monitored. Remember to state and enforce the ground rules to ensure the learning environment is not lost. Ethics become critical when running electronic office hours so it is important to maintain order from start to finish. Students should not be allowed to hold side conversations they wouldn't have during lecture. Not only is it disruptive but the conversation could be something you would not want others to remember.

Keeping these tips in mind will provide any instructor some initial guidance for running office hours in an electronic setting. After evaluating the first session, remaining sessions can be easily altered to meet the needs of all involved.

## **Implementing e-Office Hours**

The implementation of e-office hours can be made easy by understanding how your students will benefit from using these applications. E-mail and one-on-one instant messaging should be reserved for times when simple, straightforward answers can be given to the students. For more advanced discussions, involving equations and tables, the chat room should be considered. To get started with instant messaging, an instructor should sign up for an account. There are many outlets available today including the more popular AOL Instant Messaging<sup>®</sup> and Google Talk<sup>®</sup>. These outlets allow for an instructor to quickly get started with their e-office hours. Instructors should make sure to set up their preferences so that access is limited to students in that particular class. Students should then be told of the new opportunity and how it will be run in the beginning. Be sure students clearly understand what your policies are regarding e-office hours and how they will be enforced. Instructors may find the initial response to be slow or quick depending on the type of class being taught and the students' comfort with using this new tool. Once a system has been put into place, the instructor may wish to take advantage of some of the special features found in the various outlets. Of particular use is the direct connection ability. Here, the instructor can directly connect with one or more students to perform file transfers quickly as well as send diagrams and equations as part of a file. Through the chat room, everyone in the room can receive the file at once without having to send it numerous times. Additional information on all of the potential applications can be found at the respective websites for each of these outlets: [www.aim.com](http://www.aim.com) for AOL Instant Messenger<sup>®</sup> and [www.google.com/talk](http://www.google.com/talk) for Google Talk<sup>®</sup>. There are other outlets available e-office hours so one should not limit themselves to these two sources. Whatever outlet is chosen, though, the instructor must remember that implementation is based on the individual and that there are no set standards for running e-office hours. The key is to make the learning environment interactive and fun for everyone!

## **The Future of the Classroom**

This paper was written to provide new instructors with ways to move the classroom beyond the building and into the electronic world. As our society continues to evolve with technology, instructors must adapt to the changes presented to them. It is not enough to assume that traditional methods will continue to be the norm in the classroom. In fact, we are already beginning to get a glimpse of what the future classroom will be like. More and more lectures are being presented not with a chalkboard but using computers. Students are using sophisticated devices to demonstrate their knowledge to instructors during lecture. Exams for upper level courses are now being given outside the classroom with students signing honor pledges. With all of these changes, one might envision that classrooms as we know them today will no longer be needed in the future. Instructors must begin to adapt to these changes and adjust how they go about teaching concepts to their students with each incoming class. While none of the applications presented for e-office hours are perfect, they do provide positive means for enhancing a class. As such, instructors should consider their benefits when developing their courses.

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