

# **Virtual Office Hours: Tutoring Distance Students in Statistics and Economics**

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## **Abstract**

How can students separated from a professor by distance still have the advantage of stopping in during office hours and benefit from the same kind of face-to-face contact that traditional students have? This paper will show how a student can attend virtual office hours with their professor by one click on a web page link. This link is a simple web-based application running on a Flash communications server. We create a virtual space on the web that becomes the virtual equivalent of a student dropping by a professor's office.

## **Introduction**

Most technological mediums for communication with the professor lack utility in the highly visual disciplines such as math, statistics and economics where the written equation and the drawn graphic are often utilized to answer students' questions. This paper explains how a free writing and drawing surface (whiteboard) is integrated with the other communication technologies to achieve the goals of achieving an office-hours in virtual space. This paper will demonstrate via distance the creation and use of this virtual space on the web, the virtual equivalent of a student dropping by a professor's office.

## **The Value of Office Hours**

Office hours, regularly held by a professor, gives a student the opportunity to stop by a professor's office to discuss ideas, to inquire and have that inquiry answered or directed. This face-to-face interaction is deemed by many to have value to the extent that holding

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office hours may be a requirement of the college or university or is steeped in tradition and expectation.<sup>2</sup> The hours are posted with the departmental secretary and advisors so referrals may be made. Their value is extolled in many outside Ohio venues including Acitelli (University of Michigan) [1] who lists the benefits of office hours as being crucial to creating good relations between the graduate teaching assistant and their students, and with providing a valuable opportunity for individualized teaching and learning. At the University of Washington [8] the main virtue is to give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

### **The Use of Office Hours**

*“Some of your most effective teaching may occur during office hours.”  
(McKeachie [5] p. 161).*

Casual observation and talking to the faculty in the halls suggest that the use of office hours has declined over time. As the cost of student time rises due to working, providing dependent care and attempting to balance time in a two-worker family, the likelihood of a student attending a professor’s office falls. The Internet has created a ready substitute for office visits through use of email and course websites that feature threaded discussion lists and remote submission of assignments. Since visits to professor’s office often are to turn in an assignment or to ask the type of question that email is suitable to answer, technology will and has hastened the demise of the usefulness of face-to-face office hours. “Office hours are a thing of the past and will never return due to the Internet” says Tom Angelo. Email and threaded discussion boards and a myriad of other technologies allow the student to time and

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<sup>2</sup> Office of General Council, The University of Akron, Rule 3359-42-01(C)(3) Student Rights and Responsibility. “Faculty members shall maintain office hours and establish alternative means of communication which are reasonable and convenient both for themselves and for the students whom they teach.”

place shift his or her need to seek a professor's help. However, email and most course management systems do not allow for the spontaneous synchronous interaction that is a hallmark of the office visit as the professor takes pen in hand and begins to illustrate the answer to a thorny problem.<sup>3</sup>

In the face-to-face use of office hours the student has a question or issue to bring to the professor and arrives during the scheduled time. In visual based disciplines such as economics, mathematics and statistics, more often than not the professor is going to put pen to paper to begin outlining the answer or to direct the student in discovery. As the problem or discovery unfolds the student at anytime can interject a question or response as can the professor if the student is presenting. This style of one-on-one teaching is little researched according to McKeachie ([5] pp. 255-256), nevertheless he offers 12 principles gathered from elsewhere in his book to highlight the very valuable interaction that can be had in the office during office hours.

### **The Value of Office Hours for Distance Students**

The primary reason that a student seeks out the professor during office hours is to address a problem with the course. Face-to-face students can make contact before and after class and can often address their problems then, making an appointment to follow-up for problems that require longer than a few minutes duration to reach resolution. Although the Internet has allowed technological advances to replace much of the need for office hours for most distance students, the lack of the casual face-to-face personal time before and after class may

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<sup>3</sup> Coincident timing and the lack of a drawing surface limit all chatware such as AOL instant messenger, Yahoo messenger and MSN messenger. Only Microsoft NetMeeting offers a set of tools freely available and comprehensive enough to meet the objectives of this study. However, NetMeeting is difficult to use for novices and has much trouble with firewalls making it not suitable for a general purpose assessable tool for students.

make some problems worse. Richard Light [4] discusses research results that point to two symptoms of students in trouble. The first of these symptoms is a sense of isolation from the community. It is certain that distance students can feel a greater isolation than their face-to-face counterparts. The second symptom is the student in trouble being unwilling to seek help. In interviews with 40 sophomores that were academically struggling (none of them distance students), fully half were unable and unwilling to seek help. These require an extra push for these students to acquire help. This latter point emphasizes a reason for virtual office hours inasmuch as the announced availability created more opportunity for students to overcome this unwillingness to seek assistance.

One of the earliest documents to suggest good practices for distance education has as one of their principles “provid(ing) for appropriate real-time or delayed interaction between faculty and students and among students (WICHE [9] p. 6). Out-of-classroom time can provide this real-time interaction. This can be achieved during the office visit (real-time), or by use of technology through chat (real-time) or a discussion board (delayed). Nevertheless the needs of distance students will not be met without resorting to appropriate technology. Office hours for distance students were held to be so important that the Southeastern Louisiana University Faculty Senate passed a resolution on distance learning policy and faculty office hours that require online office hours.<sup>4</sup> Nevertheless, the choice of technology is left out of the definition.

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<sup>4</sup> Resolution of Distance Learning Policy and Faculty Office Hours, Resolution 01, 2003-2004 Academic Year: Whereas office hours are intended to facilitate communication between students and their professors; and Whereas distance learning students want to be able to communicate with faculty members during the evenings and weekends; Now be it therefore resolved that the distance education policy explicitly include a provision for office hours to be done online, as a percentage of the distance education coursed the instructor is teaching, meaning that the faculty member does not have to be physically in the office on campus for these online office hours. <http://www.selu.edu/Academics/Depts/FacSen/resolution030401.html>.

In distance learning, especially 100% online courses, there can be a disconnect between the student and the professor causing alienation and fostering an already strong tendency to not seek help when needed. Online students may not benefit as much without the kind of one-on-one and face-to-face contact that traditional students have, that is, the ability to drop into a professor's office during announced office hours.

### **Present Technological Solutions**

The online student may phone, email, or engage in a discussion board or instant message with the professor. This may be adequate in some disciplines and some circumstances, but is lacking of utility in the highly visual disciplines such as math, statistics and economics where the written equation and the drawn graphic are often utilized to answer students' questions. What is needed is to combine these features with a free writing and drawing surface that is integrated with the other communication technologies in a simple to use format requiring no special skill or significant client on the users part. Before we can do that, there is one other area that must be covered.

### **Past Instructional Technology Developments**

We taught by using the chalkboard and the lecture, what is referred to as "chalk-and-talk." The chalkboard allowed us to be both planned and spontaneous, but everything had to be written in the classroom. Overhead transparency followed allowing for some slides to be created in advance and still allowing the professor to be spontaneous and write what was needed to better present and to respond to student's questions. PowerPoint soon followed almost as a craze and while it takes the prepared slides to a much more professional level the

spontaneity and the ability to respond to students' questions in writing and drawing is gone. While some professors try to balance the use of a projected PowerPoint slide and an overhead or chalkboard, the change in lighting and medium can be tedious for the students. Newest technologically enhanced classrooms may include an interactive white board such as a SMART Board Interactive Whiteboard or a SMART Sympodium. With this addition the message of the PowerPoint and the spontaneity of the chalkboard are seamlessly combined. By this I mean that the static well prepared slides in a prepared presentation can be written on, annotated, highlighted and extended using the digital pen technology.<sup>5</sup>

### **Virtual Office Hours Are Needed**

Now take this to the case of distance learning. The professor needs to be able to show a prepared slide, draw an original graph or annotate a prepared slide while the student watches from the other side and even interacts with the explanation. This is the promise of virtual Office Hours, a program created on the Flash com server at The University of Akron and designed to integrate with WebCT so that distance students can drop into the virtual office anytime that the professor's virtual door is open.

### **Software Requirements for Students and Professors**

Virtual Office Hours is a web client that requires little or nothing on the part of the user, no program to install (typically), nothing to start up, no options and preferences to mess with, just a single click on a hyperlink and the Virtual Office Hours are joined. When someone comes to the office of a professor in a mathematical discipline such as statistics and economics, it is a very brief interval until the professor reaches for pen and paper to illustrate

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<sup>5</sup> Myers has written elsewhere about this use of interactive PowerPoint in "Digital Pen Technology in Electronic Technologies" [7] and "Six Uses of Technology to Improve Teaching and Learning." [6]

their points. They will expect the same from the Virtual Office Hours. That is, they want the same flexibility online that I have in my office.

### **Hardware Requirements for Students and Professors**

Professors need a computer with a “digital ink” presentation device such as an Aiptek Pen Tablet<sup>6</sup> or a SMART Symposium,<sup>7</sup> or an integrated device such as a Tablet PC<sup>8</sup>. Additionally, by adding a digital video camera and a headset (including earphones and a microphone) you add face recognition and identification and the aural part of being able to converse. For two-way audio (dialog), both the professor and the student need to have headsets. If only the professor has a headset, the student may type in chat while the professor explains in words (monolog). The Virtual Office Hours product serves the visual and aural parts of learning style preferences very well, reinforces the read/write learning style preference and supports the kinesthetic preference as the student responds back in kind.

### **Hardware Requirements for the University: The Flash Com Server**

For the Virtual Office Hours (VOH) application we chose to use Macromedia’s Flash Communication Server (Flash Com). Macromedia Flash Communication Server MX is a server-based platform for creating and deploying compelling, interactive web-based audio/video applications such as video on demand, live event broadcasts, web cam chat, and real-time collaboration applications.

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<sup>6</sup> For a Pen Tablet example see <http://aiptek.com> for the Hyperpen 8000U. Specifically the 8000U can be seen at <http://aiptek.com/products/pctablets/8000u.htm>.

<sup>7</sup> The SMART Symposium is discussed at <http://www.smarttech.com/Products/symposium/TL150.asp>.

<sup>8</sup> Since there are so many different brands of Table PCs a page to find information is <http://thetabletpc.net>.

The VOH application is a modification of one of the programs that The University of Akron (UA) developed for “An Exercise in Hard Choices,” an educational program conducted throughout the country each year to help U.S. citizens and students better understand the federal budget process [3]. Launched in 1983, the Exercise is designed to closely replicate House and Senate Budget Committee mark-ups. The University of Akron created online versions of the group exercise for both synchronous and asynchronous settings that can be moderated remotely. Flash Com was used to create a version in which each participant could be at a remote location and form a virtual round table.

We decided to use the Flash Com for the Virtual Office Hours project because we can integrate rich communications into our existing Macromedia Flash applications, creating communication solutions that would be difficult or impossible to achieve otherwise. Other current video conferencing methods involve high cost of hardware and also the trouble of working with propriety systems.

Flash Com has enabled us to bring many previously separate capabilities—streaming media, rich media messaging, and real-time collaboration—into a single platform. This makes it possible to deliver them through a single, lightweight, ubiquitous Flash player which is free to download, but is usually present in more than 90% of the browsers by default. There is no other installation necessary for a user to use this application hence making it error-free. Also, there is no additional expense for the project, since there already exists set-up at the University of Akron for the Exercise in Hard Choices project. Hence our application just piggybacks on the existing hardware and software infrastructure. Users from remote location can have a total two-way communication through a web browser connected to the Internet.



Multi-user audio/video streaming with built-in control plus capabilities to share text and data provide the perfect platform for custom collaboration applications. With replicated audio/video streams and the Shared Object synchronization between servers, we can build scalable server clusters that support large numbers of small group interactions, as well as, large-scale broadcast applications. Finally since this product is from the Macromedia MX studio family, it seamlessly integrates into our already existing Cold Fusion Application server for any server side scripting capabilities in the future.

### **Conducting a Virtual Office Hours Session**

This product is at this writing still in testing and has not been used in a real classroom setting. Beginning in late Spring or Summer 2004 it will be introduced to undergraduate and graduate distance learning classes in economic analysis that are currently running on and created in WebCT. To begin a session the professor needs only to announce the virtual office hours to the students and to provide them with a link to the client. Announcing the times and link in WebCT means that you may reasonably expect only the registered students to attend. The professor waits in the virtual office with his or her cam and the headset. When students click on the link they are immediately joined to the session without any need to make choices or set options. They may chat, listen to the professor with speakers and voice their questions and comments with a microphone. All the while they are able to view the drawing surface as the professor explains a graph or an equation. Figure 1 shows a session with the professor on cam using his microphone and answering a question in economics about Supply and Demand.

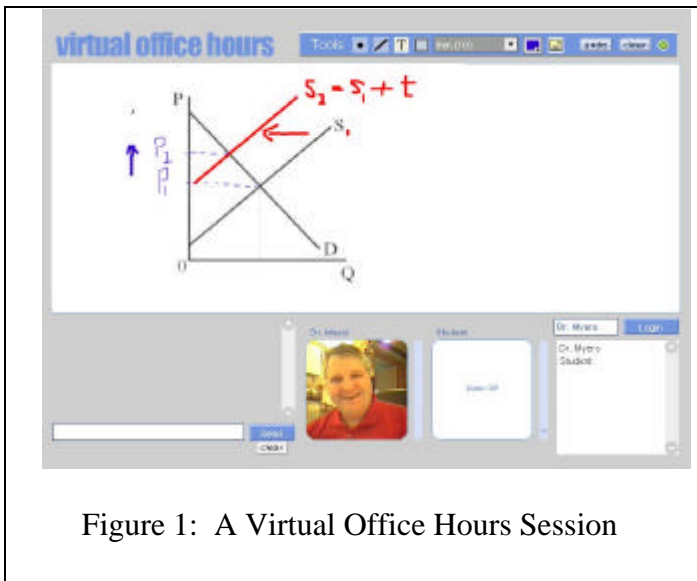


Figure 1: A Virtual Office Hours Session

The professor can share a URL through the chat window and when the student clicks on it a separate window is opened. Graphic files may be entered onto the white board and annotated (the graph in figure 1 is a jpg image). Freehand graphs and equations can be written in over

200 colors and 5 line thicknesses. Straight line and rectangular tools exist on the menu bar as well as a text tool for typing on the whiteboard. Cam and microphone tools exist including the ability to mute the audio and pause the camera. A zoom in feature exists to see small text and writing.

The VOH product is flexible. While planned on the office-hours model of one student at a time, there is no reason that many students can't be in the VOH room at the same time even though only one will be able to use the camera and microphone at a time (or two if the professor surrenders his). The VOH can serve as a drop in office hours, a required meeting, a tutoring session and even a virtual classroom.

### A Work in Progress

Many more perfections and enhancements are planned before this is fully deployed or released. For example, we are working on a way to force a logon requirement, lock the door (for private conversations), expand the use of graphic images, and be able to expand to multiple pages, share objects and save the content of a session for archiving and student

review. Additionally, we have to work out the scalability issues as multiple sessions may occur across the departments and faculty. Nevertheless, a few minutes with VOH and you know you are in the midst of something great for teaching.

## References

1. Linda Acitelli, Beverly Black & Elizabeth Axelson. "Learning and Teaching During Office Hours." July 2003. Center for Research on Learning and Teaching, The University of Michigan, 10 Feb 2004. <[http://www.crlt.umich.edu/gsis/P4\\_5.html](http://www.crlt.umich.edu/gsis/P4_5.html)>.
2. "Flash Communication Server MX 1.5." 2004. Macromedia. 11 Feb 2004. <<http://www.macromedia.com/software/flashcom/>>.
3. Hirschbuhl, John. "Fund for the Improvement of Postsecondary Education: An Exercise in Hard Choices." Ed Grant Number: P116Z030049.
4. Light, Richard J. Making the Most of College: Students Speak Their Minds, Harvard Press, 2001
5. McKeachie, Wilbert J. McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers. 11th ed. Boston: Houghton Mifflin, 2002.
6. Myers, Steven C. "Six Uses of Technology to Improve Teaching and Learning," Poster Session AEA Committee on Economic Education, ASSA meetings, San Diego, January 4, 2004. <<http://gozips.uakron.edu/~myers/scholarship>>
7. Myers, Steven C. "Digital Pen Technology in Electronic Technologies" Good Practice Showcase, The Economics Centre of the Learning and Teaching Support Network (LTSN), University of Bristol, UK, January 2004. <[http://www.economics.ltsn.ac.uk/showcase/myers\\_presentations.htm](http://www.economics.ltsn.ac.uk/showcase/myers_presentations.htm)>
8. "Office Hours: Teaching and Learning @ UW: A Handbook for Teaching Assistants." 2003. University of Washington. 10 Feb 2004. <<http://depts.washington.edu/cidrweb/TAHandbook/OfficeHours.html>>
9. WICHE. "Good Practices in Distance Education" Western Cooperative for Educational Telecommunications, Western Interstate commission for Higher Education (WICHE), Publication No. 2A299, Boulder, CO, April 1997.