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Online Tutoring: Creation of a Free Tutoring Service for Trigonometry Students

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ONLINE TUTORING: CREATION OF A FREE TUTORING SERVICE FOR

TRIGONOMETRY STUDENTS

by

STEPHANIE A. MICALLEF

A Capstone Experience/Thesis

submitted in partial fulfillment of the requirements of

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2009

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STEPHANIE A. MICALLEF

Under the Direction of Jane Brantley

ABSTRACT

In this write-up, I discuss the process and results of creating an online tutoring service for
college trigonometry students. The online tutoring service I created included emails,
discussion board, and weekly live tutoring sessions. I discuss advantages, disadvantages,
improvements, and implications of online tutoring tools and services for the high school
classroom.

INDEX WORDS: Live tutoring, Online service, Trigonometry, Online help, Virtual
Classroom, High school

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TABLE OF CONTENTS

An Introduction to Online Tutoring

Online tutoring is a process whereby a student, the tutee, seeks help or assistance from another individual, the tutor, via the Internet. Any form of communication between the tutor and the tutee through the Internet is online tutoring. This includes email, discussion board, chat, instant message, web cam, wikis, and virtual classroom. Although not all students use online tutoring, it is a growing service, becoming increasingly more popular. Two questions about online tutoring may come to mind: (1) Do students enjoy communicating and receiving help through the Internet? (2) Is Online Tutoring as beneficial and effective as face-to-face tutoring?

According to a recent study conducted by CyberSentinel, teenagers spend on average thirty-one hours per week online. At least three of these hours were spent looking for information to help teenagers with their homework (Telegraph Media Group Limited, 2009). This study shows that teenagers are comfortable finding and receiving scholastic help through the Internet. It also shows that students are willing to spend time on a computer to help improve their grades. Students not only spend a long time on the Internet per week, but they also enjoy spending time on the computer. Teenagers dedicate approximately three and a half hours per week talking through instant messages or chat rooms (Telegraph Media Group Limited, 2009). Since teenagers are choosing to chat via the Internet, they are comfortable communicating through a computer. This form of communication is essential for online tutoring.

Currently there are several tutoring services dedicated to helping individuals, usually for a fee. The tutors can be from a different state as the student or even from a

different country. When tutoring from a different state, the distance between the tutor and the tutee does not cause any difficulties. For example, the Boston Public Library paired ten eighth graders with ten college students from different colleges. The eighth graders went to the library for tutoring while the college students stayed in their dorm rooms. The eighth graders loved the individualized attention and their grades improved (Glick, 2000).

However, tutoring from another country may cause a problem. Some United States online tutoring companies have subcontracted with companies in India (Gewertz, 2005). In many cases, students do not seem to mind connecting with an overseas tutor. Even though the cultural differences are present, students are eager to receive help and improve their grades. The Indian tutors are screened and educated in both British English and American English. However, they are not perfect with their English communication and when tutoring students in English, there may be a problem (Rai, 2005). Overseas tutors are also not taught state curricula and standards and are not in contact with the students' teachers. Online tutoring from other countries does work, but it may not be the most effective method (Gewertz, 2005).

According to three studies conducted by The Open University, UK, students enjoy the convenience factor of online tutoring (Price, Richardson, & and Jelfs, 2007). Receiving help in the convenience of their own homes is a positive attribute of online tutoring. The studies also showed that students preferred and performed better with human interaction instead of finding information on the Internet themselves. Even though students with face-to-face tutoring performed better than students tutored through the Internet, online tutoring was still effective (Price, Richardson, & and Jelfs, 2007).

Therefore, when face-to-face tutoring is either not possible or not convenient for the tutee and/or tutor, online tutoring is both beneficial and effective for the student.

This project is to determine whether online tutoring is beneficial and enjoyable to college students in a college trigonometry course. To determine this, one college trigonometry class will be offered online tutoring for the full course semester. The tutoring service will include emails, discussion board, and live tutoring sessions.

Project Design

Western Kentucky University's Teacher Education program requires education majors to observe several classes taught in public schools. In Fall 2008, I observed a pre-calculus teacher at Greenwood High School. On one of my observation days, the teacher mentioned to me that he has offered tutoring sessions the night before each test. He always held these sessions at a local bookstore. The reason for this location was because the bookstore had late weeknight hours, was located in a safe part of Bowling Green, and was well lit inside as well as outside. However, fewer students chose to attend the sessions each year. The teacher commented to me, "I wish I could use the Internet to reach these students. I think they would be more willing to participate if I did."

Before starting his lesson, the teacher polled his students by asking, "How many of you would have participated in the tutoring session on Thursday night if I was able to do it in a chat room instead of at a bookstore?" Slightly over half the students raised their hands. "Just what I thought," he said to me, "I need to figure out how." That is when I decided to explore online tutoring. As a Mathematics Secondary Education major and Western Kentucky University (WKU) college mathematics tutor, I decided for my Capstone Experience/Thesis to create an online tutoring service for trigonometry that included live tutoring for students at WKU. The service would help the students better understand the subject and possibly improve their performance on homework assignments and/or tests. I also hoped by completing this project other teachers, including those at a level other than college, will attempt to reach their students in this same or a similar way.

Objective

The objectives of the project were (1) to build an online tutoring environment convenient to Trigonometry students and (2) to study the effectiveness of this online tutoring.

Goal

The goal of the project was to determine the feasibility of online tutoring of college trigonometry students. By using an online tutoring service that includes live tutoring sessions, students will be able to access the tutor at times convenient to the students. This goal will be accomplished by completing the following steps:

1. Create structured weekly live tutoring sessions.

2. Create a chat room that allows live tutoring to take place through text chatting and virtual handwriting as well as other means of contacting the tutor or the instructor (e-mail and discussion boards).

3. Demonstrate live tutoring in the classroom, where to find it, how to use it, and explain the special features of the program.

4. Administer a survey at the end of the semester to evaluate the online tutoring service.

Timeline

In Spring 2008 I brainstormed my idea and how I would execute it with WKU mathematics instructor, Mrs. Jane Brantley. In April 2008 I attended a Blackboard training seminar to learn about the new features offered by the latest version of

Blackboard including Virtual Classroom, a live tutoring tool. After receiving approval

from the Human Subjects Review Board the following summer, I was ready to start

online tutoring in Fall 2008. I spoke to Mrs. Brantley's trigonometry class about online

tutoring on the first day of the semester, August 26, 2008. Online tutoring started the

following Monday, September 1, 2008 and was available until the class had their final

exam on Thursday, December 11, 2008. After that date, I began to analyze and reflect on

the effectiveness of the experience.

Class Demographics

The trigonometry class consists of twenty-three students enrolled in the class. One

of the students audited the class, but he still actively participated in online tutoring

including live tutoring sessions. Out of the twenty-three students, all except five took

Math 116, College Algebra, at WKU. All students had access to computers with high-

speed Internet twenty-four hours everyday.

Challenges

The biggest challenge I encountered was time management on the part of the tutor.

In order to guarantee online tutoring was as effective as possible, I needed to be available

to students as much as possible. Finding the time to check email and Blackboard multiple

times during the day, every day of the week was a challenge. I averaged checking my e-

mail four times a day and Blackboard three times a day. Checking both email and

Blackboard increased right before tests and the final exam. Live Tutoring, a Backboard

Virtual Classroom feature, was available at least two hours twice a week. I devoted

approximately ten hours a week solely to tutoring. Knowing I was helping students and hearing praises from them was motivation enough for me to continue working.

Another challenge I faced was the creation of my own website. My initial intention was to create a website with access to a discussion board and live tutoring without having to log into Blackboard first. WKU granted me a personal website domain for this purpose. Unfortunately, I was restricted on the domain and was not allowed to create or add anything on my website that could be "active" with other students, including discussion boards. Therefore, I decided to create a classroom webpage through WKU's Blackboard service in cooperation with Mrs. Brantley. Blackboard allowed the services to remain free for both students and me. Blackboard technology is currently available for all education levels; however, because of the expense of the subscription, not all high schools may choose to use Blackboard's services. Therefore, I completed a template of a website with SeaMonkey that could be implemented on High School teacher websites. This template code can be found at http://www.wku.edu/~stephanie.micallef/ and copied by right clicking on the screen and selecting the "View Page Source" option.

The last challenge I had to overcome was difficulties with the Internet. Online tutoring depends on an excellent Internet connection in order to be most effective. In an attempt to avoid connection problems, I would log on to Live Tutoring at least five minutes before each session to guarantee the fastest connection possible for me and fix any connection errors in advance. There was one time when my computer would not connect and I ran across the street to use a friend's Internet instead. I was fortunate to encounter this problem only once. Another potential problem with the Internet is the possibility of faulty connections. With a faulty or weak connection, it is easy to get

kicked off Live Tutoring during sessions. This only happened to me once during a session and I was able to immediately log back on. Students participating in the sessions, however, were less fortunate. After being kicked off, one student was not able to reconnect for an hour. During another session, a different student was completely unable to establish a connection. When these situations occurred, I immediately emailed the student in order to be of assistance to him or her.

Online Tutoring

Currently there exist mathematics websites designed to help students. However, some of these websites provide generic math descriptions with a few common examples or one specific example that may not be applicable to a student's question. For example, "Ask Dr. Math" allows viewers to skim through questions and answers from previous students. There are thousands of questions to skim through without a promise of finding the one a student has. A student may email Dr. Math, but Dr. Math may choose to not respond. In particular, Dr. Math will not reply if he feels a question similar enough has already been addressed on the website. "Wikipedia" and "Wolfram Math World" give exact mathematics vocabulary definitions and some general examples but do not offer a way for a student to look up a specific question or ask a question.

The service I provided was geared specifically to Mrs. Brantley's trigonometry class and allowed students to ask their own questions with quick responses. I offered to the trigonometry students three forms of online tutoring. The first type was unlimited e-mail access, the second type was Discussion Board through Blackboard, and the third type was Live Tutoring through Virtual Classroom.

Email

Throughout the entire semester, all students were encouraged to email me at anytime or on any day, including weekends. Through email students could receive help and assistance or feedback on homework, class notes, study guides, quizzes, exams, and general concepts in trigonometry or selected mathematical topics, particularly algebra. I

decided to use Google Mail (Gmail) as the main vehicle of email contact. Unlike WKU's

email system, Gmail allows pictures and diagrams to be inserted directly into the email.

For mathematics, this makes it easier to add square roots and other math related symbols.

Therefore, I asked the students to email me at purplecowsam@gmail.com. They were

reminded several times throughout the semester about my email address. If students did

email me at my WKU account, I forwarded the message to my Gmail account and
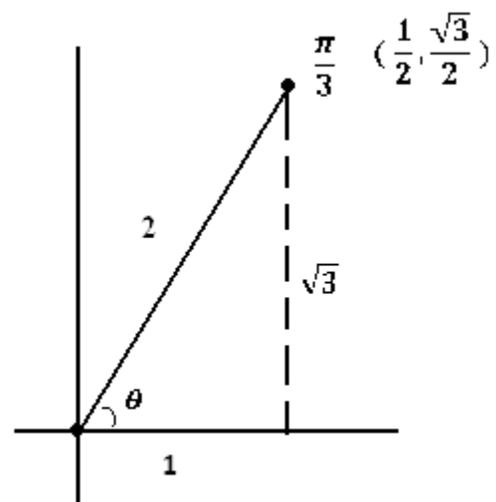
responded to them there.

Sometimes students would ask multiple or complex questions in an email so that

answers required more than a simple one-line solution. When this happened, as it often

did, I chose not to answer with email tools. Instead, I would work the problems with

Microsoft Word 2007's Math Equation Editor. The equation editor eliminated the time it

normally would have taken to create fractions, square roots, or lengthy equations. The

draw feature of Microsoft Word 2007 also

enabled me to quickly draw and label diagrams

in color. An example of a diagram created with

Microsoft Word 2007 is shown to the right.

Step-by-step instructions for solving the

problems and explanations of why certain steps

were necessary were included with the

illustrations. The word document was exported

into a PDF file and then attached to the email.

Diagram from Practice Quiz 1
September 8, 2008

Attaching the file as a PDF enabled students to

easily print off documents and keep them in their notes. All students had access to Adobe

Acrobat Reader, the tool needed to read PDFs, but not all students had access to

Microsoft Word 2007. Therefore, I found that by using a PDF file, I did not have to

worry about students being unable to read the file or only being able to read part of it.

Complete examples of emails and PDFs attached to emails can be found in Appendix A.

Usually I was able to respond to emails within a few hours. The longest time a

student had to wait for a response was seven hours. Receiving help in less than a third of

the day is both convenient and time saving for students. It also allows them to ask a

second question and receive a response on the same day. Several students found emails to

be useful and helpful.

Emailing is practical for all levels of teaching. It is simple to use and quick at

delivering messages. All versions of Microsoft Word include some form of Equation

Editor. Other programs such as Paint can be used to construct diagrams for students.

Adobe Acrobat Reader is free to download and use and is compatible with both PCs and

Macs.

Discussion Board

Blackboard's Discussion Board was available to students twice during the semester.

The first time started a week before the second exam and lasted until test day. The second

time began twelve days before the final exam and lasted until test day. In this study, the

discussion board was used as a tool for students to see questions their peers had. The idea

behind the discussion board was for students and their peers to receive help on the same

or similar problems before emailing me. If multiple students had the exact same question,

it would only need to be answered once. Posting anonymously was enabled in case

students did not wish their peers, the tutor, or the classroom instructor to know who asked the question. Some students posted questions anonymously while other students did not. Mrs. Brantley assisted me in answering questions with as little lapse time between question and answer as possible. The longest time lapse was twelve and a half hours while the shortest time lapse was forty-five minutes.

Unfortunately for this semester, the discussion board was not widely used by the students. Only three students chose to ask questions on the thread before the second exam while none chose to participate in the thread before the final exam. I think the main reason for lack of participation in the boards is because students preferred to interact with me and their peers during Live Tutoring sessions. Since students could ask questions and receive answers instantaneously four hours a week with Live Tutoring, perhaps asking questions on a discussion board was not necessary. If Live Tutoring sessions were not available to students, then I believe the discussion board would have been more popular. A complete set of questions and answers can be found in Appendix B. Below is a screen shot of the second exam discussion board thread.

Exam 2 Discussion Board Thread

Live Tutoring

Starting the second week of the semester and continuing until the final exam, Live Tutoring was available to all students. With the exception of Fall Break, Thanksgiving, and finals week, Live Tutoring was offered to students twice a week. Since the trigonometry class met at 8:00 a.m. only on Tuesdays and Thursdays, Live Tutoring sessions were scheduled on Monday and Wednesday nights. Monday night sessions were from 8:45 to 10:45 while Wednesday night sessions were from 6:45 to 8:45 or 7:00 to 9:00. During the week of Fall Break, Live Tutoring was only available Monday night during normal hours. There were no Live Tutoring sessions during the week of Thanksgiving, and Live Tutoring was only available Wednesday night from 7:00 to 9:00 during finals week. As expected, the sessions were more popular among students when there was a test or quiz during the following class period or when a homework assignment was due the following morning. Sessions were scheduled on Monday and Wednesday nights because many college students wait until the night before a test, quiz, or assignment is due to study, review, or complete homework. I selected a later time at night because I assumed most students would be available during those hours. None of the students complained about the times or days of the tutoring sessions.

Live Tutoring was the name I chose to call the sessions. The name of the applet used is called Virtual Classroom and was made available to the students free through Blackboard. After students logged onto Blackboard and selected the class page, they simply had to click on the "Join" button to participate in the session. I sent out an e-mail, posted an announcement, and posted a document I made on "How to Access Live Tutoring" before the first tutoring session began. Since some students still had difficulties

with the applet, on September 2, 2008 I gave a demonstration on how to access Live

Tutoring at the beginning of Mrs. Brantley's class. The demonstration included

explaining how to turn off popup blockers since Virtual Classroom is a popup, how to

download the latest free version of Java necessary for the applet to run, and where to

click to get started. After logging on I also demonstrated the program itself. A copy of the

document "How to Access Live Tutoring" can be found in Appendix C.

There are many features within Virtual Classroom. The first feature I used is a chat

option designed similar to a chat room. Everyone logged into the session can

communicate with each other by typing a response and either pressing "enter" on the

keyboard or clicking the "send" button with the mouse to send the message. Send and

receive times are instantaneous. As soon as a message was sent, both tutor and students

could immediately view it on their own screen. The only lag time in Live Tutoring is

typing. Most people, including myself, do not type as fast as they can speak. Therefore,

everyone participating had to be patient and wait for a person to finish typing a response.

The lag time, however, proved to be beneficial. In an attempt to reduce response times,

long messages were broken apart and sent to students line by line. When working out a

problem that took multiple steps, it was better to send the messages by steps and wait for

a returned response before sending the next step. This process gave the students an

opportunity to think about their responses without pressure of other students, a tutor, or

the instructor being present in the same room. Another benefit from the lag time was

sometimes students could catch their own mistakes; this happened a few times. For

example, when a student incorrectly typed mathematical steps he or she used to solve a

problem, before I had time to type a corrected message, the student had already figured

out where he or she went wrong. Most likely if I was tutoring the same student in person I would have pointed out the error before the student noticed it. I personally think the students learned more when they caught their own mistakes. This has taught me to wait and pause more before I speak when I teach or tutor in person. The chat room also allowed students to collaborate with each other. Since I did not attend class everyday, students who had been absent were able to catch up on announcements, such as due dates and homework assignments, they had missed.

Virtual Classroom has another feature called Breakouts that I used during one session. The Breakouts tool allowed me to select certain students to switch into a different room. The Breakout room opened into a different popup; therefore, the student could participate in both rooms. The reason I used the Breakouts feature is because I had three students participating in the same session with one student further along than the other two. I did not want the third student to be forced to wait on the other two to catch up with him or her. Therefore, I decided to pull the third student into the other room in order to help all three of them at the same time with different questions. Placing a student into an additional room means that I have to keep an eye on the two rooms and it slows down my response time. Overall, however, I think it was the best and most beneficial solution under the given circumstance and my response time did not slow down to make a noticeable difference between the two rooms. The third student was grateful that I pulled him out because he felt that the session did not waste his time.

Another feature of Virtual Classroom used was the private message option. The private message feature is similar to instant messaging. Only the person sending and the person receiving can see the message. I found this tool to be most beneficial with shy

students who did not want to ask a question in front of their peers. Instead, they could send a message just to me and I could respond individually to them just as quickly as I could with the chat feature. Although only a few students sent me a private message, I could see this feature potentially used more in high school. In high school, students are sometimes judged more severely by their peers, which could possibly prevent particularly shy students from using the chat feature. However, if a student sent me a private message, then he or she would not have to be concerned with the opinions of his or her peers.

Ask Question is another feature of Virtual Classroom used during my sessions. Just like emails, a student could send me a question that went into my "question inbox." This tool was useful when there were different students asking a variety of questions during the session. It allows the moderator of the session to answer each question in the order received. When I answered a question, both the student's question and my answer fed into the chat screen making both visible for all students to read. I used the Ask Question feature earlier in the semester when students had different types of questions. Later in the semester, however, students had the same types of questions and, therefore, the question tool was not necessary. The students also became more comfortable with the applet and the sessions and took turns asking questions patiently. If the majority of the class participated in the sessions, I think I would have had to use the Ask Question feature frequently to keep everything under control and organized.

A great feature of the Virtual Classroom I used during each session was the Whiteboard. The Whiteboard feature works similarly to Paint, Active Board, and Smart Boart. It provides a pen, straight line, shapes, mouse, and text tool. It also allows the use of various colors for diagrams. Unlike Paint, however, the Whiteboard feature also

included an Equation Editor. With the Equation Editor, it was easy to type fractions, exponents, square roots, and other mathematical terms quickly. When I was using the Whiteboard, students were able to see line by line what I was constructing. The students were also able to draw their own diagrams and type their own equations. This was very convenient for online tutoring because I could essentially see what a student drew on his or her paper. For example, in order to solve some word problems, it was important that a figure was drawn correctly to aid in solving the problem. Some students were able to perform the mathematics correctly, but had set the problem up incorrectly. With Whiteboard, I was able to see what the students drew and then construct my own diagram. The Whiteboard tool also enabled me to have multiple Whiteboard pages in a single session. That is, I was able to turn to a new page without clearing the screen and then go back to previous pages if necessary. When tutoring mathematics, I found the
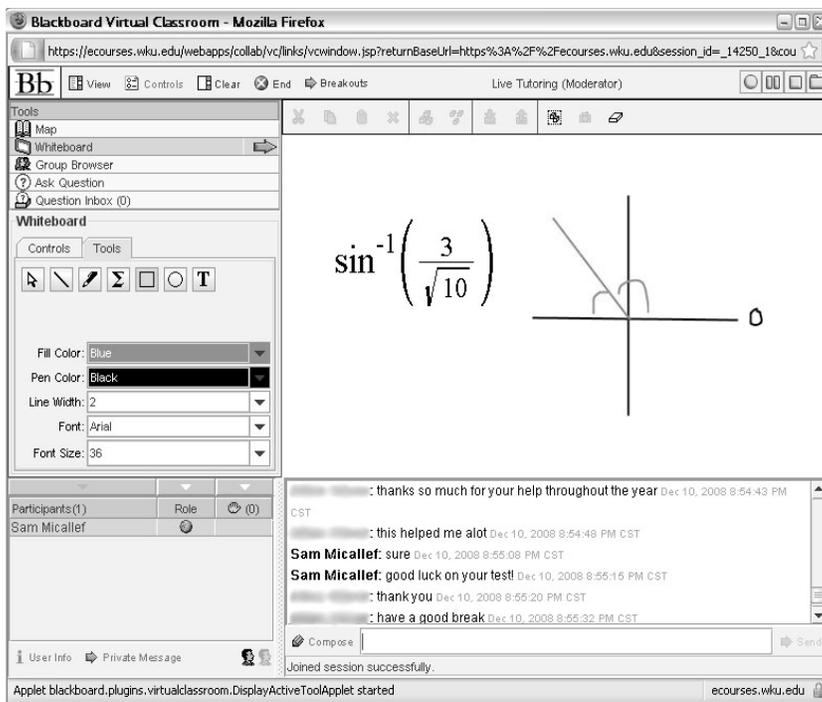
Screenshot of Live Tutoring session
December 10, 2008

Whiteboard tool essential. To the left is a screenshot of the end of a Virtual Classroom session. The student names have been blurred to protect their privacy. Examples of dialogues from various sessions can be found in Appendix C.

The final feature of Virtual Classroom used was the Recording Tool. The Recording Tool enabled me to record complete dialogues from a single session, take screenshots of the whiteboard, and save conversations to Blackboard for later viewing. While students entering the session at any time could see what had been discussed, the Recording Tool allowed students who could not participate in the session view what was discussed during the session. I could also take a snapshot of the Whiteboard during the session that would be saved with the dialogue. Recording sessions and their snapshots would remain saved throughout the entire semester on the class webpage. I could not document if students used the recordings or not, but I think the recordings could be useful, especially before chapter and final exams.

Implications to the High School Classroom

Although my online tutoring services were directed to a college trigonometry class, I strongly feel that a similar service can be offered to high school students. I enjoyed online tutoring and I hope to implement it to my own classes when I become a high school teacher. Email, discussion board, and Live Tutoring can all be adjusted to meet various content needs. Email is the easiest form of online communication at the high school level. Many high schools give students a free email account as long as they are enrolled at the school. Other free email domains including Yahoo Mail, Gmail, and Hotmail are readily available. Students can email the teacher during school (before and after classes), at home, in the public library, or other locations where Internet is provided. Replying to an email quickly is also easy for a high school teacher. Documents and diagrams can be attached to emails to help clarify messages and steps. The teacher does

not have to align his or her schedule to match the students' emails. Emails can be saved as documentation and referred to later. Students should receive parental consent before being allowed to email their teacher.

In the high school classrooms, I believe a discussion board could be a useful tool for students. When the teacher is unavailable, students at various locations can collaborate and work through problems together as long as they have Internet access. The teacher can supervise what is being discussed and easily analyze areas where students have misconceptions or are struggling. With bigger classes, a teacher can answer the same questions once instead of multiple times. Questions and answers can remain visible to the class for the entire semester; this can be extremely useful when reviewing for the final.

Many high school students are interested in technology. If all students have ready access to a computer with Internet, then Live Tutoring would offer online assistance to students while using technology that interests students. The teacher could poll the class to see which times are more convenient and fit best into the majority of students' schedules. If necessary, multiple sessions could be held if all interested students' schedules do not align. I think online tutoring would be most helpful in reviewing before exams and helping students remain current with the material. Since tutoring online requires commitment from the teacher, it may be best to only offer it a set number of times throughout the semester. Students should receive parental consent before being allowed to access Live Tutoring.

Certain features of Virtual Classroom can also be helpful in a high school tutoring session. For example, the Ask Question feature would be a great way for teachers to

organize the sessions and make sure all students participating have an equal opportunity to ask a question. Private messages allow shy students the opportunity to speak up and ask for help or feedback without feeling uncomfortable. The largest number of students I tutored in a single session was five. High school tutoring sessions may at times have more students participating. Therefore, the Breakouts feature could provide a better way to address multiple questions at a single time and to split students into groups of equal levels of ability or with similar questions. The Whiteboard would be a great visual tool for tutoring, and although I allowed students to write and draw on it, settings can be adjusted so that only the moderator may mark on the screen. Finally, the last feature of Virtual Classroom I think would benefit high school tutoring sessions is the Recording tool. In the high school classroom, I think recorded tutoring sessions would be beneficial for students who are unable to attend the tutoring sessions, students who were absent from class, and students who wish to review before quizzes and exams.

After seeing common questions on emails, discussion board, and Live Tutoring, the teacher may find it beneficial to re-discuss certain concepts in the classroom or correct common misconceptions. For the high school classroom, biweekly sessions may not be necessary. The teacher could determine the frequency of the sessions by assessing student learning and considering the popularity of Live Tutoring. It may be more favorable to limit the sessions to review before exams only.

Survey

At the end of Spring 2008 semester I created the *Math 117 Online Help Survey*. I spoke with Mrs. Jane Brantley about the questions she thought should be included in the survey. Dr. Wanda Weidemann helped edit the survey and Mrs. Brantley administered the survey at the end of the Fall 2008 semester.

Mrs. Brantley e-mailed all students enrolled in the trigonometry class the survey on December 5, 2008 and asked students to complete it and to turn it in no later than the morning of the final exam date, December 11. She also printed extra copies for students to fill out on the exam day if students forgot to bring the survey to class with them. Nineteen students were present for the final exam and I received nineteen responses to the survey. Unfortunately not all students enrolled in the course took the final exam and therefore I did not receive a response from every student, including students who participated in online tutoring. Overall, the survey results showed that more than one-third of students used online help and all of the students who did receive online help from tutoring sessions, e-mailing, discussion boards, etc. found it helpful. Furthermore, the seven students who participated in online tutoring and responded to the survey all expected to receive an A in the course.

The survey contained a total of eight questions. Although all questions contained a multiple choice selection, half of the questions also offered room for students to write in their own responses. In particular, I asked for descriptions of how online tutoring was helpful (or not) and reasons why online tutoring was not used by certain students. I was pleased that none of the students found the help disadvantageous and that all the students

who participated enjoyed the online tutoring. Two students said they chose not to use the tutoring service because they did not need the help. Other students mentioned that they did not use the online help because the hours did not fit into their schedules. I found this response surprising because when I asked the students if my Live Tutoring times were convenient, none of the students expressed concern. The response was also surprising to me because the discussion board and emails did not have a time frame on them. Students could email me or post a question on the discussion board at any time on any day of the week. I reminded students weekly to email me or use discussion board if Live Tutoring was not convenient for them. To fix this problem in the future, before each tutoring session I will ask students to identify times that would be most convenient for them. This way I can pick times that best align with the majority of the students' schedules. I will also stress email and discussion board frequently. The complete survey results can be found in Appendix D.

Conclusion

I am thankful I had the opportunity to work with and help students through online tutoring and I have learned from this experience. When I started my online tutoring service, I did not know what to expect from students, how smoothly the program would run, or how effective I would be as a tutor. However, after all the thank you messages and notes I received, I knew my project was a success, and I enjoyed my role and experience. Online tutoring is, in my opinion, easy to adapt to individual classroom needs. Not every class is identical and online tutoring can be adjusted to match the students' specific needs for each class.

Advantages and Disadvantages

One of the biggest advantages to online tutoring is the convenience it offers. The service allows the students to work on their own individual schedules; they do not have to worry about online tutoring interfering with other planned activities. Students can also receive help in their own homes or other selected location. For the teacher, online tutoring can also be efficient in the sense that it is quick, easy, and can assess student learning. If the teacher held a study session in a public location, he or she may need to request permission, organize supplies, and make sure all students leave safely. Students may need to find transportation to the location as well. With Live Tutoring, location and transportation are no longer an issue or concern.

Another advantage is the organizational aspect. Similar to a textbook, Discussion Board keeps topics organized by relevance and allows participants to easily find related

subjects. Unlike a textbook, however, Discussion Board is organized to follow the structure of the class while a book may not be written in the same order the teacher would like to follow. Live Tutoring can also be organized with the Ask Question tool, allowing each student an equal opportunity to ask a question. With the Breakout feature, the teacher can tutor two different groups of students at the same time and, in a way, "be in two places at once." The Recording Tool offers the opportunity to read previous tutoring sessions. Students who missed a tutoring session or forgot content discussed during a session, can easily go back and look up previous topics. Unlike traditional study sessions, Live Tutoring enables complete conversations and diagrams from the Whiteboard to be saved for later viewing.

Unfortunately, there are some disadvantages to online tutoring. First, to have full access to online tutoring students need a computer, Internet access, and an email account. For my project this was not an issue since WKU offers all students computer, Internet, and email access. Many other schools give free email accounts to current students as well and allow students to use computers with Internet during, before, and after classes. At home, however, some students may not own a computer or may only have partial or temporary access to a computer with the Internet. If this is the case, then some students are denied the opportunity to receive full help from online tutoring their peers are receiving. Another disadvantage for online tutoring is that it is dependent on the Internet. Without an Internet connection, communication between parties cannot occur. Email and Discussion Board only need temporary Internet connections; however, for Live Tutoring to work properly, a strong Internet connection is necessary. Poor Internet connections can cause delays between times messages were sent and when they were received and can

also lead to dropped connections where the participant is kicked off. Poor Internet connections can put some students at a disadvantage. Therefore, it may be necessary that the teacher check with students before hosting Live Tutoring sessions to make sure all students have an equal opportunity to participate.

What I Have Learned

The experience of online tutoring has helped me to grow professionally as a future high school mathematics teacher. I have learned how to become a better, more effective tutor and teacher, and I have learned about the various technology tools available to me to enhance student learning. Prior to this project I had practice in tutoring and teaching mathematics. However, tutoring online has taught me about the benefits of "wait time." As I previously mentioned, lag time allows students the opportunity to catch their own mistakes. When individually helping students one-on-one or when teaching an entire class, I know now the importance of including "wait time" before I give out the correct answer or point to mistakes. I will attempt to practice waiting in my semester of student teaching.

Before my project began, I knew little about creating my own website, a little about hosting my own discussion board, plenty about emailing and chatting, and nothing about Virtual Classroom. The WKU Blackboard Seminar I attended in April 2008 taught me how to use Virtual Classroom effectively and gave me tips on hosting my own discussion board as well as tips for creating my own website. Practicing Virtual Classroom with the trigonometry students, however, was the best way for me to learn about the program. By trial and error, I learned how to fix students' technical problems as well as my own if

they occurred. I also learned which features students preferred using, and I can use that information when I am teaching my own classes in the near future. After everything I have learned from the two semesters, I am eager to continue using online tutoring and to encourage others to do so as well.

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Appendix A

Selected Emails

Below are a few examples of emails I received throughout the semester and the responses I gave, including attachments if necessary. All student names have been removed to protect the privacy of the students.

Email Example 1

The following email addressed trigonometric functions of an angle. The student's problem, however, was not with trigonometry, but instead with algebraic properties.

From: Student MM
To: Sam Micallef
Date: Wednesday, September 3, 2008 at 5:22p.m.
Subject: Trig Help

"Hey Sam,
I am in Brantley's 8 am TR class. I have to work during tutoring hours tonight so I just figured I would email you my question. I cannot figure out what to do on page 167 numbers 7 and 9. The problems are find cos, sin, tan, etc. for (-4, 10) and (-3.5, 6.8). I found what r is, but I don't know what to do with the square roots as r. My answers are not getting anywhere close to the back of the books answers."

From: Sam Micallef
To: Student MM
Date: Wednesday, September 3, 2008 at 7:02p.m.
Subject: Re: Trig Help

"Hey Student MM,

I am attaching a file with an example to help you. If it is still unclear with what you need to do, then please don't hesitate to e-mail me back. If you show me what you have done, I might be able to help you better next time because I could find where you went wrong. Let me know if you can't open or read the file.

Thanks,
Sam Micallef"

Attached File Sect. 1.4 - 7 & 9 help.pdf

First, make sure you know the definitions of trigonometric functions of any angle. These can be found on page 160 of your textbook.

Recall that, $r = \sqrt{x^2 + y^2}$

The value of r can still be under the radical. Take the following example:

Let $(x, y) = (-3, 3)$. This means that $r = \sqrt{(-3)^2 + 3^2} = \sqrt{9 + 9} = \sqrt{18}$

The $\sqrt{18}$ can be reduced. Don't forget to do this step. To reduce a number under a radical, you need to find the positive factors of the number. In this example, 18 can be broken down as $18 = 2 * 3 * 3$

Since we have two 3's, that means that there is a perfect square that divides 18 (in this case the perfect square is $3 * 3 = 9$). We can always pull a perfect square out from under a square root. This would leave us with $3\sqrt{2}$

Or another way to think of it is: $\sqrt{18} = \sqrt{2 * 9} = \sqrt{2} * \sqrt{9} = \sqrt{2} * 3 = 3\sqrt{2}$

So now we know that $r = 3\sqrt{2}$

Knowing r, we can find the six trigonometric functions of the angle. First, let's find $\sin\theta$

Recall that, $\sin\theta = \frac{y}{r}$

This means that $\sin\theta = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}}$

However, in mathematics, it is not "proper" to leave radicals in the denominator. So our next step is to rationalize. If you remember from Algebra, to rationalize a fraction multiply both the top and bottom by the denominator.

That is, $\frac{1}{\sqrt{2}} * \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{4}} = \frac{\sqrt{2}}{2}$

Therefore, $\sin\theta = \frac{\sqrt{2}}{2}$

Similarly, we can also find $\cos\theta$

Recall that $\cos\theta = \frac{x}{r}$

This means that $\cos\theta = \frac{-3}{3\sqrt{2}} = \frac{-1}{\sqrt{2}}$

And rationalizing the answer gives us: $\frac{-\sqrt{2}}{2}$

Therefore, $\cos\theta = \frac{-\sqrt{2}}{2}$

The other four trigonometric functions work similarly."

Email Example 2

The following email addressed a common problem of not being able to properly log on to

Live Tutoring. The student's problem was the combination of outdated Internet browser

and pop-up blocker turned on (which blocks Live Tutoring from opening).

From: Student SN
To: Sam Micallef
Date: Monday, September 15, 2008 at 8:41a.m.
Subject: Live Tutoring – Session 5

"Hey Sam,

This is Student SN, and I'm in Mrs. Brantley's 8 o'clock Tuesday/Thursday class and I tried getting on the live chat the last time and it wasn't letting me. I don't have Firefox I only have Internet Explorer. How do I solve this problem?

Thanks,
Student SN"

From: Sam Micallef
To: Student SN
Date: Monday, September 15, 2008 at 9:40a.m.
Subject: Re: Love Tutoring – Session 5

"Hi Student SN,

Sorry to hear that you are having trouble logging on! Before you can access live tutoring, make sure you have the latest Internet Explorer (version 7.0) or Mozilla Firefox, both can be downloaded for free through Blackboard's homepage. Then, you need to make sure you have pop-up blocker disabled. You can disable pop-up blocker by going to your Internet options or by clicking on Tools and then selecting Pop-Up Blocker to off. If you have Google Toolbar installed, you'll need to make sure that Google isn't blocking your pop-ups as well. And finally, make sure you have the latest version of Java. You can download Java for free through Blackboard as well. If for some reason this still does not work for you, then please call the IT Help Desk at (270)745-7000. They will make sure you get on. And of

course, you are always welcome to e-mail any questions you may have to me at purplecowsam@gmail.com.

Good Luck!
Sam Micallef"

Email Example 3

The following email addressed trigonometry identities. The student's problem was

figuring out how to start identities and recognizing patterns when working them.

From: Student JH
To: Sam Micallef
Date: Wednesday, September 24, 2008 at 2:05p.m.
Subject: Live Tutoring – Session 8

"Hi Sam,

Like usual, I won't be able to do the tutoring session tonight. However, is there anything else I can do to get better at identities? They're easy once I get started; it's just hard for me to see where to start and what I need to do. Any tips?

I appreciate it,
Student JH"

From: Sam Micallef
To: Student JH
Date: Wednesday, September 24, 2008 at 5:24 p.m.
Subject: Re: Live Tutoring – Session 8

"Hey Student JH,

The best way to get better at identities is to practice them since each one is different. Work out the ones off the worksheet and from the book. And don't limit yourself to the ones Mrs. Brantley recommended, do as many as you need.

Other ways to help:
1. Learn your formulas (such as the Pythagorean identities).
2. Work from only one side of the equation, not both. That way you know what goal you need to meet.
3. Pick the side that looks more complicated (such as more terms or fractions). It's easier to simplify than it is to expand.
4. Don't forget to use algebra tricks to help you. These include rationalizing the denominator, combining or separating fractions, and factoring.

Hope that helps! If you ever get stuck on a specific problem, feel free to e-mail me and I'll help you work through it.

Let me know if you need anything else,
Sam Micallef"

Email Example 4

The following email addressed solving inverse trigonometry function. The student's

problem was figuring out what to do with an inverse function as an angle measurement

and setting up a triangle to help him or her solve the problem.

From: Student TC
To: Sam Micallef
Date: Thursday, November 13, 2008 at 7:11p.m.
Subject: help…again

"Hey Sam,
I have another question on the review sheet again. The problem was sin(2arccos(-u/2)). I knew how to do it except for one part...it uses 2arccos which threw me. Help please!"

From: Sam Micallef
To: Student TC
Date: Thursday, November 13, 2008 at 8:04p.m.
Subject: Re: help…again

"Hi Student TC,

I have attached a document to help you on this problem. If you need me to go into detail further, let me know. Or if you cannot open the attachment, let me know that too. Hope this helps and good luck studying!

Thanks,
Sam Micallef"

Attached File Help with Review of Inverse Trig Functions.pdf

"Hey Student TC,

 Hope you find this useful. Let me know if you need anything else.

Thanks,
Sam

$$\sin\left(2\arccos\left(\frac{-2}{u}\right)\right)$$

This problem can also be rewritten as,

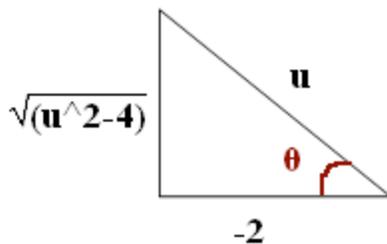$$\sin\left(2\cos^{-1}\left(\frac{-2}{u}\right)\right)$$

Looking at the whole equation, it is sin of a value times 2. Seeing the 2 should make you think about your double-angle formulas. Treating $\cos^{-1}\left(\frac{-2}{u}\right)$ as the angle, we can use the double-angle formulas to obtain the following,

$$2\sin\left(\cos^{-1}\left(\frac{-2}{u}\right)\right)\cos\left(\cos^{-1}\left(\frac{-2}{u}\right)\right)$$

Now inverse functions tell us what an angle, say θ, equals.
That is, $\theta = \cos^{-1}\left(\frac{-2}{u}\right)$. It is easier to draw a triangle:

The third leg is found by the Pythagorean Theorem.
Since we called $\theta = \cos^{-1}\left(\frac{-2}{u}\right)$, then we have the following:

$$2\sin\theta\cos\theta$$

Use the triangle to find the values of $\sin\theta$ and $\cos\theta$.

$\sin\theta = \frac{\sqrt{u^2-4}}{u}$ and $\cos\theta = \frac{-2}{u}$

This gives us,

$$2\left(\frac{\sqrt{u^2-4}}{u}\right)\left(\frac{-2}{u}\right)$$

Perform the multiplication operation to get

$$\frac{-4\sqrt{u^2-4}}{u^2}$$

And you're done since we were not given a value for u."

Appendix B

Discussion Board Example

Although there were not many discussion board posts, the thread and posts were viewed multiple times by various students. Therefore, even though students did not ask many questions themselves, they were interested in reading other students' questions and answers. The entire thread for Exam 2 Discussion is listed below.

Author: Anonymous
Date: Tuesday, October 21, 2008 at 6:31p.m.
Subject: General Questions
Total Views: 22

"What do I need to do to get better at identities? I've practiced and practiced, looked over all our identity assignments and asked a lot of people who understand them. They're usually easy I just can never see them. Are they going to be worth a lot of points on the test?"

Author: Jane Brantley
Date: Tuesday, October 21, 2008 at 7:16p.m.
Subject: Re: General Questions
Total Views: 21

"As I said in class today, they are worth about 15 points. If you didn't, it probably would have helped if you would have come by and let me help you work through some. All I can suggest is to do what you say you have done and that is to work and rework those that have been assigned - work them without looking at answers.

Here are some suggestions: If you see an identity that is simpler right off the bat, use it.
Try to simplify the most complicated side first.
Do algebra if there is algebra to do.

If you are stuck, change everything into sines and cosines and do the algebra.

I have a little time tomorrow if you care to drop by or try the math lab. You can start one on the discussion board and I will try to lead you through a step at a time - I just don't know how the timing will work out. I never used discussion board before.

I'll sign my posts so everyone will know what comes from me.

Mrs. B"

Author: Anonymous
Date: Wednesday, October 22, 2008 at 4:55p.m.
Subject: General Questions
Total Views: 27

"For part V, do we have to do number 21 or 22? And if so, what are their answers? It wasn't on the answer key."

Author: Jane Brantley
Date: Wednesday, October 22, 2008 at 5:03p.m.
Subject: Re: General Questions
Total Views: 16

"No, do not do either one of these. I goofed with my cut and pasting.
Mrs. Brantley"

Author: Student AO
Date: Wednesday, October 22, 2008 at 11:38a.m.
Subject: General Questions
Total Views: 37

"Question about section II, problems G and H.

For G: Is there a common factor to pull out of the equation? I'm really not sure where to begin.

Question about H: What is the first step here? I guess what is throwing me is the mixture of sine and cosine functions."

Author: Jane Brantley
Date: Wednesday, October 22, 2008 at 5:34p.m.
Subject: Re: General Questions
Total Views: 15

"For G: You need to factor by grouping. There are 4 terms on one side since it is already set = 0. Group two and two. If this doesn't help, get back to me.

For H: You need to use an identity. Either convert $(\sin x)^2$ to $1-(\cos x)^2$ or convert the other one.

Get back to me if you need more.
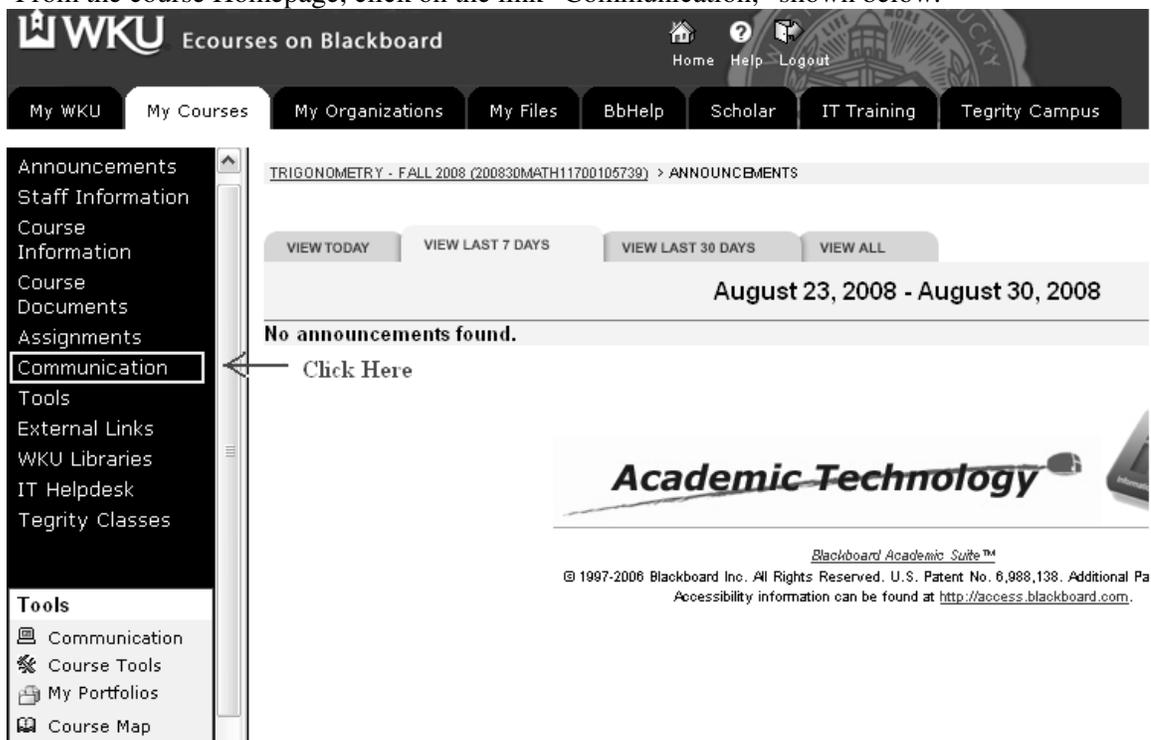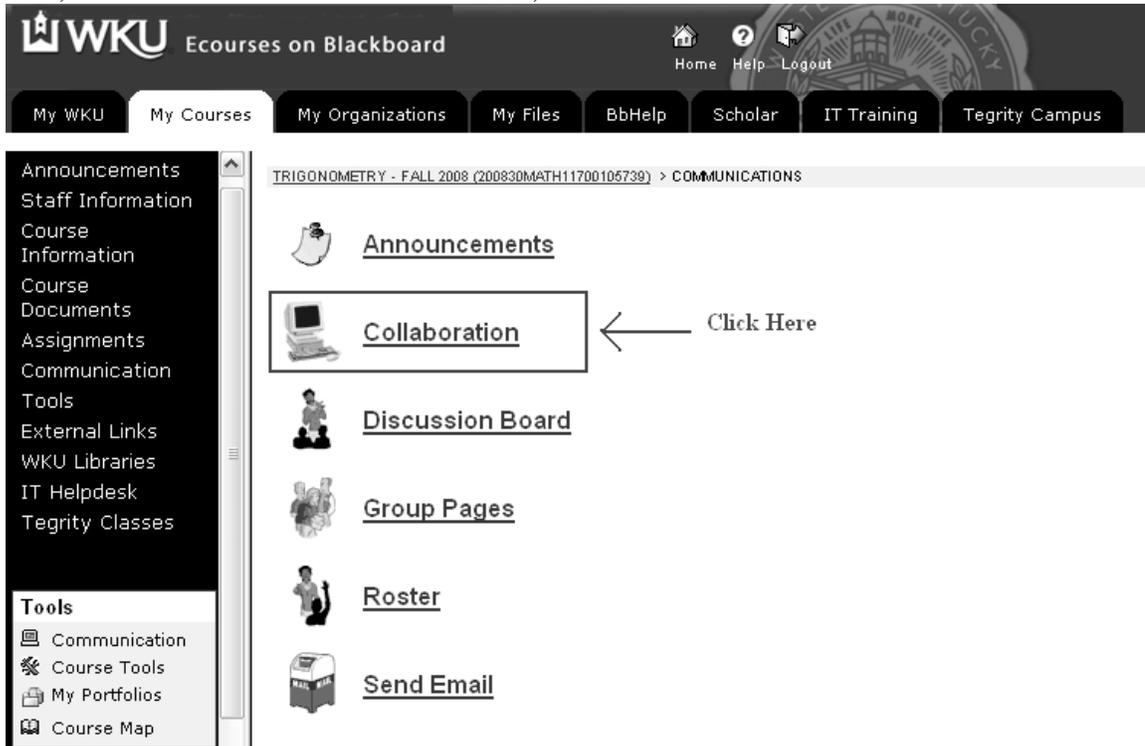
Mrs. B"

Appendix C

How to Access Live Tutoring

Below is a copy of the document I made with screenshots to show students where to find Live Tutoring and how to properly log on. I emailed this information and also posted it on Blackboard before the first Live Tutoring session began.

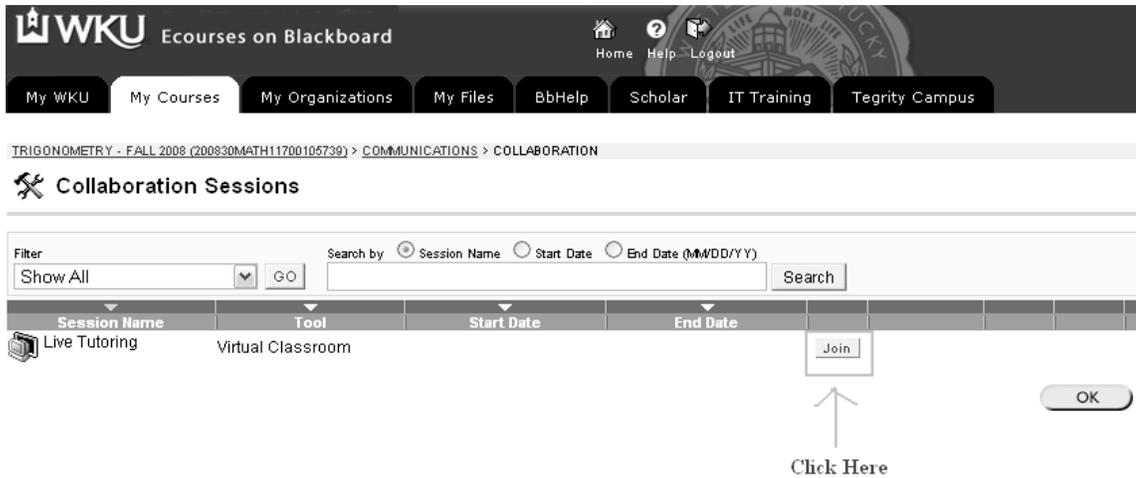"From the course Homepage, click on the link "Communication," shown below:

Next, click on the second link "Collaboration," shown below:

"Live Tutoring" should now be displayed, and to join the session, click on the button "Join," shown below:

Blackboard's Virtual Classroom, titled "Live Tutoring," will open in a new window. If Pop-Up Blocker is enabled, it may be necessary to disable it in order for the session to open properly. The latest version of Java Plug-In is also necessary in order for the session to run. The latest version of Java Plug-In can be downloaded through Blackboard by clicking on the "download the Java Plug-In" link provided after clicking on the "Join" button from the previous step.

If everything is installed properly, then the "Live Tutoring" session should look like the image displayed below:
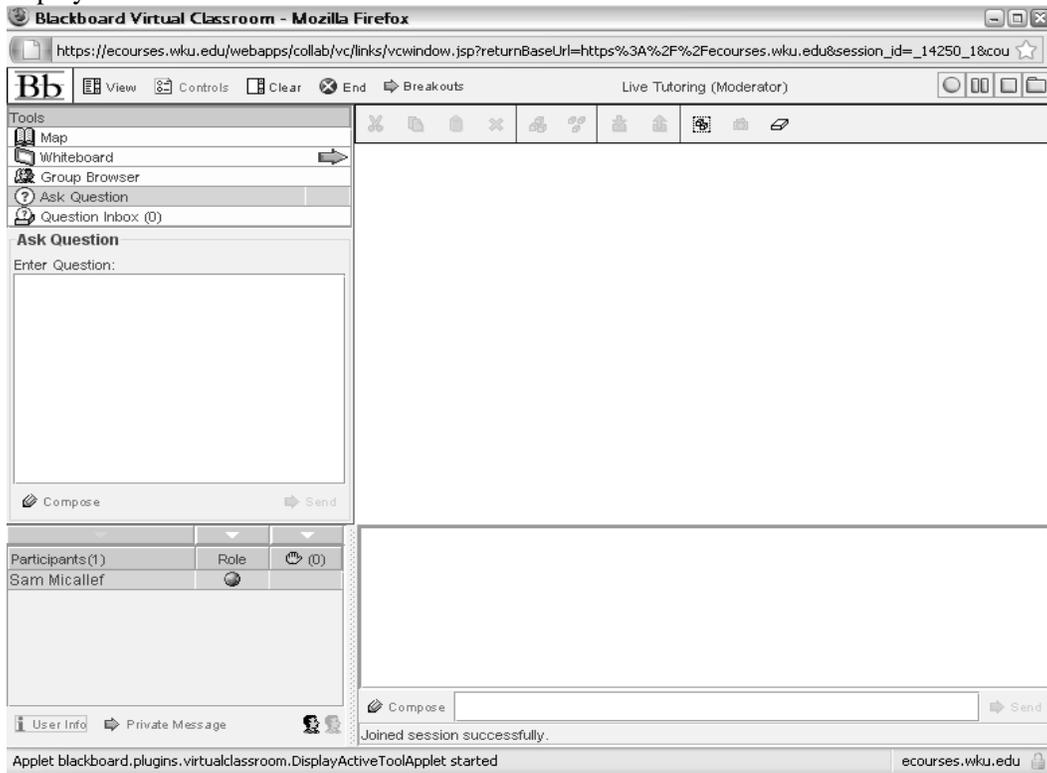
You can now ask a question, participate in discussion, or observe the session.

If you still need help finding or running the session, please call the WKU IT Helpdesk at (270) 745-7000."

Selected Live Tutoring Conversations

Below are a few selected examples of conversation excerpts from Live Tutoring sessions throughout the semester. Dialogues appear as they did in the chat screen on Virtual Classroom. All student names have been removed to protect the privacy of the students.

Live Tutoring Example 1

The following excerpt is from the third Live Tutoring session held on September 8, 2008.The student's problem involved correctly using reciprocal identities.

> Sam Micallef: ok, #4
> Sam Micallef: what's sec equal to?
> **Student PK:** x/r
> **Student PK:** i mean r/x
> Sam Micallef: yes, but that doesn't help us. look at your reciprocal identities
> **Student JH:** isn't it 1/cos?
> Sam Micallef: yup
> **Student PK:** ohhh
> Sam Micallef: ok, well we know sec = 1/cos
> **Student PK:** yup
> Sam Micallef: so what is the exact value of cos(11pi/6)? use your unit circle
> **Student PK:** square root 3/2?
> Sam Micallef: yes
> Sam Micallef: so take that value, and place it under 1
> Sam Micallef: (taking the reciprocal)
> **Student PK:** 1 over square root 3/2
> Sam Micallef: yes
> **Student PK:** ok and then divide out
> Sam Micallef: yup
> **Student PK:** ok. i got it! thanks
> Sam Micallef: you're welcome

Live Tutoring Example 2

The following excerpt is from the twelfth Live Tutoring session held on October 13, 2008. The student's problem was an algebraic problem instead of trigonometry. The student could not remember how to properly add fractions of different denominators.

> **Student AO:** #12
> Sam Micallef: ok, again we're going to work the left side since it's more complicated

Sam Micallef: we have two fractions on the left but only one term on the right
Student AO: ok
Sam Micallef: this means that we need to combine the two fractions
Sam Micallef: do you remember how to add two fractions together?
Student AO: i multiply the first numerator by the 2nds denominator and the 2nd numerator by the first denominator, right?
Sam Micallef: multiply the first top and bottom by the 2nd denominator and multiply the second top and bottom by the 1st denominator
Student AO: ok
Sam Micallef: tell me what you have now
Student AO: so it would be on the left side i have 1+ sin0 / 1 - sin^20
Student AO: then 1-sin0 / 1 - sin^20
Student AO: 0 is supposed to be theta sorry
Sam Micallef: you're fine
Sam Micallef: that's correct
Student AO: so really 2 over the denominator?
Sam Micallef: yes
Sam Micallef: and what is 1-sin^2(theta)?
Student AO: ahhh
Student AO: cos^2x
Sam Micallef: right
Student AO: got it
Student AO: thanks a lot sam
Sam Micallef: no problem
Student AO: you've been a big help
Sam Micallef: i'm glad
Sam Micallef: have a good night
Student AO: you too

Live Tutoring Example 3

The following excerpt is from the thirteenth Live Tutoring Session held on October 15,

2008. One student had a problem setting up the problem into a factorable equation while

the other student had difficulties with the domain of cos.

Student AD: i had a question on number 4? i don't know how to start it…
Student JH: that's the one i'm working on too
Sam Micallef: ok, the first step you need to do is subtract 3 from both sides
Student JH: so we can factor it?
Sam Micallef: correct
Sam Micallef: are you both able to factor it?
Student JH: yes
Student AD: Is it I think
Sam Micallef: yes, Student AD, you're correct
Student AD: Woohoo!
Student AD: okay what do i do with the 3x?
Sam Micallef: the next thing we're going to do is set each factor equal to zero
Student AD: ok never mind

Sam Micallef: so we have 2cos(3x) + 1 = 0
Student JH: and cos(3x) - 3 = 0
Sam Micallef: correct
Student AD: oh, ok
Sam Micallef: working with 2cos(3x) + 1 = 0 first
Sam Micallef: subtract 1 from both sides and divide by 2
Student AD: k cos(3x)= -1/2
Sam Micallef: right
Sam Micallef: where does cos of an angle equal -1/2 ?
Student AD: 2pi/3 and 4pi/3
Sam Micallef: right
Sam Micallef: that means we have 3x =2pi/3 or 4pi/3
Sam Micallef: with revolutions, 2pi/3 + 2npi and 4pi/3 + 2npi
Student AD: k
Student JH: so then do we divide that by 3 to get 2pi/9 and 4pi/9?
Sam Micallef: yes, you're right
Student AD: cool
Sam Micallef: we also need to divide the + 2npi by 3 as well
Student AD: so 2npi/3
Sam Micallef: right
Sam Micallef: we want to add with a common denominator, so (3/3)*(2npi/3) = 6npi/9
Student AD: 2pi/9 + 6npi/9 and 4pi/9 + 6npi/9
Student AD: add until we reach 2pi?
Sam Micallef: correct
Sam Micallef: does that make sense to everyone?
Student AD: yeah
Sam Micallef: did you follow, Student JH?
Student JH: yes
Student JH: 2pi/9, 8pi/9, 14pi/9, 4pi/9, and 10pi/9
Sam Micallef: great
Student AD: ok. cool
Sam Micallef: so now we're going to solve the second factor
Sam Micallef: cos(3x) - 3 = 0
Sam Micallef: add 3 to both sides
Sam Micallef: and this is where we run into a problem
Student JH: yes. this is where I get stuck
Sam Micallef: cos of an angle must equal a value between -1 and 1
Student JH: right
Sam Micallef: 3 is not in this domain
Student AD: so no solution
Sam Micallef: correct
Student JH: yay
Sam Micallef: so your only answers are 2pi/9 and 4pi/9
Student AD: Gotcha
Sam Micallef: i hope that answered everyone's questions about this problem
Student AD: yup!
Student JH: yes, thanks again

Live Tutoring Example 4

The following excerpt is from the nineteenth Live Tutoring session held on November 10,

2008. The student's problem was correctly drawing a figure to match a word problem's

description.

Student AO: #3
Student AO: where y is 27 and x is 19 degrees
Student AO: handout on right trig
Student AO: is that setup right?

*Screenshot of Live Tutoring session
(Student Diagram on left, My Diagram on right)
November 10, 2008*

Sam Micallef: you're close. the rocks are on opposite sides though, not the same side
Student AO: so its 3 dimensional?
Student AO: oh ok
Sam Micallef: does my diagram make sense?
Student AO: continue though please
Student AO: yeah it does
Sam Micallef: good
Sam Micallef: so you have two right triangles
Student AO: my x and y are still the same respectively though, right?
Sam Micallef: right
Sam Micallef: let y = the base of the 27 degree (left triangle) and x = the base of the 19 degree (right triangle)
Sam Micallef: but the triangle you drew would have subtracted the two bases, where we really want to do is add the two bases
Sam Micallef: distance between two rocks = x + y
Sam Micallef: do you know how to find y or x ?
Student AO: gonna get the 15/tan19
Student AO: ?
Sam Micallef: yes, correct
Student AO: ok
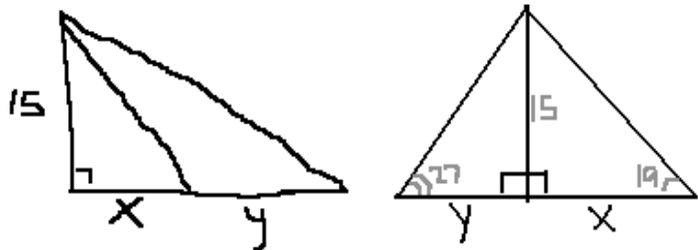**Student AO:** and y = 15/tan27
Sam Micallef: right. good
Student AO: ok
Student AO: so approx 73 ft?
Sam Micallef: correct
Student AO: ok. thanks!
Sam Micallef: you're welcome

Appendix D

Survey Responses

Below are the questions I asked and the responses I received for each question from the nineteen students who responded. I have placed in parentheses the number of students who replied with the same answer.

1. Grade:

Freshman	(5)	26%
Sophomore	(10)	53%
Junior	(3)	16%
Senior	(1)	05%

2. Required course?

Yes	(15)	79%
No	(4)	21%

3. Expected grade in course:

A	(9)	47%
B	(1)	05%
C	(5)	26%
D	(4)	21%
F	(0)	00%

4. Did you use the online help available to you?

Yes	(7)	37%
No	(12)	63%

If No, why not?
- "I had compatibility issues with the program. Luckily I never really needed it."
- "No need."
- "I was not available to use the online tutoring when it was offered."
- "I think the online help is a great idea, however, with my work schedule and other classes, I never had an opportunity to use it."
- "Did not fit my schedule."
- "No time. I wanted to, but my work schedule conflicted with the online help times."
- "I did not take the time to use it. But now I wished I would've used it."
- "I prefer speaking face-to-face instead of online."
- "I didn't have time to get online."
- "My computer could not pull it up, but I ended up working during the hours Sam was available."
- "I didn't really know how to use it. Also, most of the time I had to work during the hours she was available."
- "Times were inconvenient."

5. Did you find the online help useful?
  Yes   (7)   37%
  No   (0)   00%
  Did not use the online help   (12)   63%
  If No, why not?

6. How did you find the online help useful? (please be as specific as possible)
  Did not find it useful   (0)   00%
  Did not use the online help   (12)   63%
  - "I used the help to refresh over topics covered in class. Some weeks it would be several days after class before I could study, the tutoring really helped me to understand material."
  - "I was able to get help on homework assignments in the convenience of my own room. I also liked the one-on-one atmosphere of the online help."
  - "You could ask for help on any assignment. It was personal, one-on-one help."
  - "I used the Live Tutoring to help with homework and test/quiz reviews. It was very helpful and many times it helped me be able to fully grasp a concept covered in class."
  - "It was nice having access to someone who could help with homework without having to leave my room."
  - "I used the help in the beginning when I didn't understand problems and she helped me work through them."
  - "It helped prepare me for upcoming quizzes and tests."
  - "Even though I did not use the online tutoring, I still met with Sam in the Math Lab and she can really explain math clearly, making it easy to understand."

7. How often did you use the online help (per week)?
  0 minutes   (12)   63%
  0-30 minutes   (2)   11%
  30 minutes – 1 hour   (2)   11%
  1 – 2 hours   (2)   11%
  2 – 3 hours   (1)   05%
  More than 3 hours   (0)   00%

8. Did you use any other services besides the online help?
  Yes   (12)   63%
  No   (7)   37%
  If Yes, what did you use?
  - "Math Lab."   (5)   26%
  - "Google."
  - "Classmates and more experienced students."
  - "Went to Mrs. Brantley's office."
  - "I sought the professor in her office on a regular basis."
  - "Math Lab, Mrs. Brantley's office hours, and my classmates."
  - "Math Lab. I knew how to use the Discussion Board, but I never used it. It's hard to make math signs on the computer."
  - "Friends and the teacher."