Integrating a Multi-Platform Web Application into the Supplemental Instruction Program

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Abstract

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Nearly every college student now owns either a smartphone or a laptop, sometimes both. With so much technology now used across college campuses, it is time for university programs to embrace the technology and start addressing students' technological needs. The Supplemental Instruction (SI) program offers few online resources to students. To provide online resources, the SI web application was developed for students to access from their smartphone's and laptops. The web application provides study guides and worksheets to help students succeed in historically difficult university courses. Using three different surveys, Google Analytics, and data provided by the SI program, the impact of implementing a web application into the SI program was evaluated. The results show that students used SI more than in previous quarters, as well as achieved higher grades during the quarter in which the web application was implemented.

Approved: _____

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Chapter 1: Introduction

Introduction

What is estimated to encompass 85% of the United States population (Smith, 2010) and 72.6% of the world's population ('Over 5 billion,' 2010)? The answer should come to no surprise, cell phones. Nearly everyone has one and everyone uses one. This includes college students to an even greater degree. A recent study found that 96% of 18-29 year olds in the United States own a cell phone of some type (Smith, 2010).

With 97% of college students now owning a cell phone, it seemed logical to assimilate mobile technology into the educational system (Wilen-Daugenti, 2008). In a typical day the average teenager watches almost 4.5 hours of television, spends over 2 hours listening to music and an additional hour and a half on the computer as seen in Figure 1.

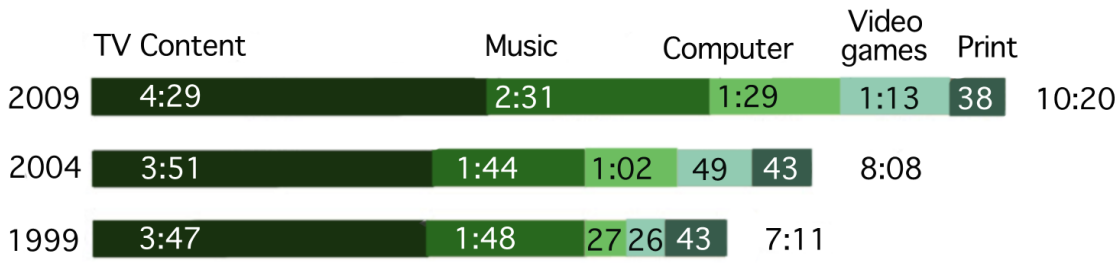

Figure 1: The typical day for a teenager and their technology use. From (Kaiser Family Foundation, 2010, retrieved December 1, 2010, from: http://www.kff.org/entmedia/mh012010pkg.cfm)

The amount of time shown doesn't even include the hour and half that teenagers spend daily texting or the half an hour they spend talking on the phone (Lewin, 2010).

This is an incredible amount of time that is just the average that a teenager spends each day. Advertising companies have taken notice and have begun adapting their marketing schemes to fit teen's schedules. Why hasn't the educational system begun to assimilate their curriculum into that same schedule?

In the not so distant past, having a website was a huge accomplishment. With the power of the Internet at the fingertips of millions of people, creating and maintaining a website is now quite easy to do. Users can now access websites via multiple devices and platforms. Accessing websites and the Internet isn't restricted to a massive piece of metal and wires known as a desktop computer anymore, and accessing the Internet isn't even reserved for laptops. With the modernization of the smartphone and tablet computers the Internet is literally at your fingertips in almost any nook and cranny throughout the world. With the rapid expansion of the Internet, access users of Verizon® will be able to obtain cell phone reception at the deepest depths of the sea 'Can you hear me now? Good!'

With the increased popularity of the smartphone, Blackberry®, HTC®, Droid® and the iPhone®, today's students have mobile access to the Internet at any given moment. With mobile access so readily available many websites have started to evolve. These evolving websites are in the form of mobile websites and web applications. The same concept can be seen by the widely popular app store established by Apple®. The app store by Apple® is an elaborate online market place that users can access to purchase and download apps for their Apple® products, like the iPhone®, iPod® or iPad®. Mobile access is quickly redefining how the Internet is developed and utilized. From this

point forward the following are recognized as registered trademarks, Verizon®, Blackberry®, HTC®, Droid®, Apple®, iPhone®, iPod®, iPad®.

Statement of Problem

As of 2007, there were more than two and a half million students enrolling in an undergraduate program across the country for the first time (Knapp, Kelly-Reid, & Ginder, 2009). Combined with the two and a half million first year students there are an additional 13 million students returning to an undergraduate program (Knapp, Kelly-Reid, & Ginder, 2009). With over 16 million students enrolling in fall courses each year, colleges and universities across the country open doors to thousands of classrooms (Knapp, Kelly-Reid, & Ginder, 2009). Each classroom provides new and challenging experiences for students.

When students first enter into difficult courses, they realize that additional academic support may be needed in order to succeed. Waiting in the shadows to assist these student's in need of academic support is the Supplemental Instruction (SI) program. Originating at the University of Missouri-Kansas City, SI has become a support system with a sole purpose of assisting students in succeeding academically (Etter, Burmeister, & Elder, 2001).

The foundation of SI was traditionally built around an academic support system for undergraduate students taking historically difficult courses. The SI program defines a difficult course by examining the end-of-quarter grade reports, in particular the D/F or Withdrew Failing (DFWF) results (Etter, Burmeister, & Elder, 2001). Once a course has shown a reoccurring trend of DFWF results, additional academic support can be

implemented. This is where the SI program has stepped in and has shown results. Studies have shown that students who attend more than 10 SI sessions throughout the course will score, on average, at least ½ to one full letter grade higher (SI data, 2011).

While helping students succeed in difficult classes is a major objective of the SI program, there are other areas that the program can address. Coming to SI can be an uphill battle with students. It is appealing to hear an SI leader say a better course grade can be achieved by coming to SI but the act of attending SI can be the issue. A majority of the students attending SI are either freshman or sophomore students, many of which have recently discovered the true freedom of college. Once the students have found the freedom, it is more difficult to induce interest and enthusiasm in academics especially outside of the normal times of classes. Traditionally, the goal for SI attendance is 10% of the course's total enrolled students (SI data, 2011).

"Attracting only one out of every ten people to attend SI is under-shooting its potential" (A. Remnant, personal communication, February, 1, 2011). A more realistic and achievable goal for the SI program is around 20%. Having 20% of the registered students attending would provide students greater opportunities to succeed in difficult courses and the SI program with a sufficient amount of data to improve the program and continue the SI mission.

One way to entice students into an educational environment is to appeal to their interest. This is an idea that many traditional teachers recognize as a successful teaching technique to engage students. With 100% of students surveyed saying they have a cell phone and 97% of students saying they have a laptop, there appear to be common tools

among the students attending SI, see Figure 2. The survey was conducted with students that attended SI, a total of 200 students were surveyed.

Percent of student's that…	Yes	No
own a cell phone	100%	0%
own a laptop	97%	3%

Figure 2: Percentage of technology owned by surveyed students.
Note. Total of 200 students surveyed for both questions in the pilot survey.

Appealing to the student at a large Midwestern University is based around presenting information through mediums that are interesting and convenient. This study will examine the potential of implementing a web-based application into the SI program to improve student's academic performance.

Purpose of Study

Currently no web application exists at the large Midwestern University that addresses the SI program or its virtual needs. With nearly 100% of the large Midwestern University campus now connected to the Internet via cell phone or laptop, a new delivery method of technology has the potential to be implemented into the SI program using a web application as a stepping-stone to a more complete virtual world.

Increasing student retention and achieving academic success is a goal of any university or college. The large Midwestern University has taken steps to help improve retention and academic success in the form of SI. While it isn't required for students to attend SI, the program is still provided to students in traditionally more difficult courses.

Students that do attend SI, typically, receive 1/3 to one full letter grade better than those students that do not attend (Etter, Burmeister, & Elder, 2001, p. 360). With such an incredible statistic to support the SI program, steps need to be taken to increase awareness and accessibility for students across the Athens campus. The implementation of a mobile SI program, as a web application may be an ideal fit with proper investigation, development and integration. See Appendix A for screen shots of the OU Mobile SI web app.

Research Question

This study's research will be guided by the following research question:

- How does the use of a web application impact academic performance and attendance in Psychology 101 courses?

Significance of the Study

Looking back over the years since SI was created, there is an undeniable fact that students that attend SI more than 12 times a quarter will academically perform better ('SI data,' 2011). While the goal of SI is to get 10% of the total enrolled students to attend, this study is attempting to push that 10% to a much higher level.

Merging the SI department into the technology era is long overdue. With the proven success of the SI model, it is truly incredible to imagine the possibilities. While introducing a web application may not be the total key to the success of the SI program it is a small piece in the big picture of helping students succeed at this large Midwestern University.

The results of this study will provide increased academic success for students, as well as credibility to the SI program, as well as provide a framework for more extensive web applications to be built. Other SI programs can observe the outcomes from this study and begin to implement their own web applications.

Scope of the Study

Outlining and determining the learning outcomes of this study were developed using two instructional design models, the ADDIE model and the Morrison, Ross, and Kemp model. The ADDIE model is an instructional design model that is focused around a well-structured design, development and evaluation process. The Morrison, Ross, and Kemp model follows nine steps that help develop a program originally designed for eLearning but has transitioned to mLearning. eLearning is defined as a form of education via electronic mediums such as the Internet, networks or computers (eLearning, 2009). New technologies have transitioned eLearning towards the mLearning platform. mLearning is a form of education commonly associated with mobile devices. mLearning is a combination of handheld technology mixed in with wireless and mobile phones to better facilitate teaching and learning (‘What is mobile,’ 2011). Combining the two models allows for an instructional design model for an mLearning study in which a web app, designed by the researcher, will be used to enhance the academic performance of students at a large Midwestern University.

The Web App

The web app will be built using a website called Weebly.com. Weebly allows users to drag-and-drop different tools into a website template. The site offers a wide

variety of options from template colors to customizable HTML codes. The web app will have multiple pages built in with a plethora of functions for the student's convenience. Some of the notable functions available to the students are YouTube videos, practice test, poll questions, discussion forums and emailing.

The web app was designed specifically for the Psychology 101 course taught by a large Midwestern University professor during winter quarter of the 2010-11 school year. The course has 380 potential spots available for registered students and offers an SI session two nights a week for a total of three hours weekly. The control group in this research has 380 potential spots available.

A web app is similar to an iPhone/iPod or Android app. The main difference between a web app and a 'native' iPhone/iPod app is that a native app can be run at any time with or without an internet connection. A web app needs to be connected to the Internet, be it 3G or Wi-Fi.

Currently the SI program utilizes small amounts of technology. After surveying past SI students it is evident that most students have either a cell phone or a laptop. In most cases the students have both. Since most students have these popular forms of technology it presents an opportunity for the SI program to tap into the new technology.

Limitations of the Study

Conducting research on the use of a web app for improving learning presents many potential limitations, which include:

1. The control group uses historical data from collected from the 2009-10 Winter Quarter Psychology 101 course that was covered by SI.

2. The pool of participants was limited to the one SI section of psychology 101 with a total of 356 possible students. The control group data was collected from a Psychology 101 course from the 2009-2010 Winter Quarter. The Psychology 101 course had the same professor and same SI leader throughout the 2009-10 Winter Quarter. Again, the goal of SI is to pull 10% of the class, so that would present 36 students to survey. Currently, Psychology 101 draws more than 10% of the students coming in at 31.89%. Being able to survey 10% of the students presented a limitation due to the percentage of students attending SI. While there was 31.89% of students attending SI, the research proposes surveying 10% of the original 380 students, so realistically the research goal was to survey 10% of the 31.89% of students that attend SI, so approximately 1/3rd of the students that attended SI;
3. The research was conducted during the time period of January 2011 through March 2011;
4. The accuracy of the research outcomes was based on the items identified by the participants in the pilot survey, first, and second sample surveys;
5. The research was conducted around the usage of mobile devices, such as cell phones and laptop; these devices may not have been available to all participants;
6. Wireless Internet was a main component to the success of the research; although it was available across the campus some students may not have had access.

Definition of Terms

The terms listed below will aide in the understanding of terminology used throughout this research.

2G: Second generation mobile phone technology. It is limited in its ability to transfer data such as email (Wagner, 2008).

3G: Third generation mobile phone technology. Provides the ability to transfer data across a wide-range wireless network. Allows for video calls and broadband wireless data (Wagner, 2008).

4G: Fourth generation mobile phone technology. Provides users with a comprehensive IP (Internet Protocol) solution. Allows for voice, data, and streaming multimedia functionality on a higher data transfer rates than 3G (Wagner, 2008).

eLearning (Electronic Learning): Form of education via electronic mediums such as the Internet, networks or computers (eLearning, 2009).

Frequency Distribution Report (FDR): A statistical breakdown of values and the frequencies in which the values have occurred. In relation to SI it breaks down the grades in comparison to attendance (SI data, 2011).

Generation Y: Generation born between 1982 and 2002. Commonly associated with being tech-savvy. Also known as Echo Boomers, the Millennials, or the Net Generation (Generation Y, 2009).

mLearning (Mobile Learning): Form of education commonly associated with mobile devices. The combination of handheld technology mixed in with wireless and mobile phones to better facilitate teaching and learning (‘What is mobile,’ 2011).

Supplemental Instruction (SI): Academic support model developed in 1973 by Dr. Deanna Martin at the University of Missouri-Kansas City. The program focuses on historically difficult courses and is built around formulating academic success (SI data, 2011).

Web Application (App): A collection of HTML pages, JavaScript, and other resources that can be combined and cross published and seamlessly run across multiple platforms (Chaffee, 2000).

Summary

The purpose of this research was to develop a web application that could be implemented into the SI program to help increase student's attendance and academic performance. This research will provide a framework for an instructional design model that will allow for future web applications to be developed by academic advancement programs across the country similar to the Academic Advancement Center at a large Midwestern University through which the SI program is managed.

Chapter 2: Literature Review

Literature Overview

Educators today face an incredible gap between students' exposure to technology and the availability of technology in their classroom. That same idea applies to the SI program and the SI leaders that manage the sessions. Although SI leaders are not teachers, they provide an educational environment that promotes collaborative learning (essentially a teacher). The gap between the students' exposure and the availability of technology is a multi-dimensional machine. One facet is the rapid development of Internet technologies, hardware and software programs. Accessibility no longer seems to be an issue with technology, the issue has moved towards variety and cost ("Over 5 billion," 2010). With the rising cost of technologies, students and teachers aren't able to purchase, and master all of the technologies available. However, one of the most popular forms of technology to make a major splash in the educational world of the 21st century is the handheld device (Murray, 2010).

Handheld devices such as Blackberries, PDA's, Tablet Computers and mobile phones have slowly become a focal part of mobile learning (mLearning) in education. Keegan (2007) defines mLearning as the provision of education and training on mobile devices: Personal Digital Assistants (PDAs), smartphone's and mobile phones. While mobile phones are far from being cutting edge, the newest line of mobile phones, smartphone's, have become widely popular. "Smartphone's now carry email client, Web browser, GPS functionality, desktop synchronization tools, as well as organizer-type functions such as diary, contacts, notepad and voice recorder" (Charlesworth, 2009, p.

32). The use of mobile phones in education is a relatively new idea with an enormous potential for learning and growth. As a newer idea, there are still many aspects of mobile phones in education that must be tested and explored.

Using technology in an educational environment for experimental purposes requires a respect and recognition of the ubiquitous use of technology by students. The current generation of students relies on technology to adapt to their trends and learning styles (McKinney, Dyck, & Luber, 2009, p.623). Providing learning materials that are accessible via mobile technologies is imperative in the delivery of content to today's students. This literature review discusses: 1) defining and the framework design of mLearning, 2) pilots and initiatives for mLearning, 3) mLearning across the globe, and 4) the availability and usage of mLearning mediums.

Defining and Designing Framework for mLearning

Constructivist theory suggests that individuals are unique learners with unique needs and backgrounds (Fosnot, 2005). It is the same idea of constructivism that supports both eLearning as well as mLearning. Constructivism is a learner-centered model that transitions the student from the receiver of knowledge to creator and explorer of knowledge. Entrenching the student into a learning environment in which they manage their own learning is constructivism at its finest (Fosnot, 2005). A mixture of constructivism and collaborative learning provides an environment where students take their learning in their own hands. It is in this framework that the SI model thrives. Vygotsky believed that social interaction and cultural influences have a dramatic effect on an individual and how learning occurs (Fosnot, 2005). Vygotsky's idea supports the

interactive needs and desires of the digital generation. McKinney states, "The current generation of college students has never known a time before cell phones and personal computers. They are eager to use technology to enhance their learning" (McKinney, Dyck, & Luber, 2009, p. 623). It is the idea that students have never known a time before cell phones that has driven this research (Generation Y, 2009).

Constructivism

Constructivism is a theory about knowledge and learning; it describes both what 'knowing' is and how one 'comes to know' (Fosnot, 2005). It is in this theory of constructivism that learning becomes self-regulated and learners must determine what is a new idea and what existing models they have. Today's generation has grown up with technology as a way of life. Technology has always been preset so the constructive nature has been a much smaller gap than say the baby boomer generation (Generation Y, 2009). While technology may have been available to the baby boomer generation, the extensiveness and potential of the technology hardly rivals the 3D televisions and motion censored video games that are available today. "Following Dewey, we could describe technology as any tool that serves the purpose of enquiry, enabling people to address problems in context and to clarify and transform them into new understanding" (Sharples, Taylor, & Vavuloa, 2005, p. 7). Regardless of age or generation, technology is a medium of inquiry for all that utilizes and learns from using it (Sharples, Taylor, & Vavuloa, 2005, p. 7).

Social Constructivism

Vygotsky believed that mental activity is the result of social learning (Fosnot,

2005). Social signs and culture help create schema, which are important in grasping social meaning (Fosnot, 2005). It is those same social signs that provide children and adults with the cultural influences needed to help create structured meanings. Vygotsky suggests language is the key tools used to create and organized new learning (Fosnot, 2005). The idea of language being used to form new meanings is easily connected with the new generation of technologies. As new technology is invented, an evolving language will need to be learned. The new and evolving languages will be used to mold future generations of technology users. With the rise of popular social networking sites and the widespread use of the smartphone, a new online language has taken hold and seems to be the language Vygotsky referenced as tool for developing schema (Fosnot, 2005). This online language has become a social tool for communication and represents an "evolution of the English language" (Varnhagen, McFall, Pugh, Routledge, Sumida-MacDonald, & Kwong, 2010, p. 721). The online language now appears in non-technology oriented situations, such as face-to-face interaction (Kemp, 2010).

Students are now fully diverged into a society where the phrases 'text me', 'tweet that' and 'Facebook me' are ways of communicating. Even a large percentage of older generations are joining today's youth in the use of social media sites like Twitter and Facebook. According to the Pew Research Center, social media usage has doubled from 22% to 42% of the baby boomer generation using social media sites (Madden, 2010). Although the age clarification of baby boomer is significantly different than today's Generation Y, the development of web-based technologies is a new experience that has to be developed and accepted through self-regulated learning (Armour, 2005).

Initiatives for mLearning

The idea of mLearning is not a new concept. The term mLearning is defined as the combination of handheld technology mixed in with wireless and mobile phones to better facilitate teaching and learning. The general concept of learning from a different location can be traced back as early as 1852 (Casey, 2008). Smartphone's have facilitated a world of mobile learning but the original pilot programs to mLearning stems back much further to distance education.

Original mLearning Devices: History of Distance Education

The English World Dictionary (2009) defines distance education as students working from home that requires little face-to-face interaction with a teacher and materials are provided remotely (Distance Learning, 2009). The idea of distance education is far from a new idea. Starting in the United States as early as 1852, with a stenograph course for women to earn a certificate in steno graphing (Casey, 2008). Distance education was formally started at the tertiary education level in 1892 at the University of Chicago (Holmberg, 2005). Students would submit their assignments either by hand or via the United States Postal Service if outside of walking distance. With the dawn of radio and television the world of distance education expanded even more. In 1921, the first educational broadcasting licenses were issued to the University of Salt Lake City, the University of Wisconsin, and the University of Minnesota (Casey, 2008). As of 1923 about 10% of colleges and universities across the United States had an educational radio broadcast license (Casey, 2008). Even with the possibility of

educational programs via the radio, as of 1940 only one university offered a distance education program that a student could earn credit for completing (Casey, 2008).

The availability of the television opened another door for distance education. Starting in 1934, with the University of Iowa, television based distance education began (Jefferies, 2008). To supplement the growing market of television-based distance education the Federal Communication Commission (FCC) created the Instructional Television Fixed Service (ITFS) (Jefferies, 2008). The ITFS consisted of 20 television channels that were available to educational institutions (Jefferies, 2008). The channels were available for a low-cost and served on a fixed-range. In 1963, California State University became the first university to broadcast through the ITFS program (Casey, 2008).

Distance education has continued to evolve as technology changed. Shortly after the ITFS program launched, the University of Wisconsin, funded by the Carnegie Corporation, began a study to find the best use of new technology (Jefferies, 2008). Out of the Carnegie funded study, the Articulated Instructional Media (AIM) project was developed (Casey, 2008). The AIM project became the base for developing major educational programs across the world such as The British Open University and the German FernUniversität. Both universities still serve as major academic programs in England and Germany (Casey, 2008). Since the development of the AIM project, both the Internet and global satellite communication has become more popular. The foundation of the AIM project has evolved into the world of eLearning and now mLearning.

Modern-Day mLearning Initiatives

With increased popularity and accessibility the world of mLearning has moved to the forefront of the education world. As a result of the popularity and accessibility many universities and companies across the globe have started mLearning programs. Much of the original mLearning pilots have been developed around Personal Digital Assistants (PDAs), cell phones and mp3 players. As technology has developed, new mediums such as tablet PCs, smartphone's and the iPod have become the focus of pilot programs. Perhaps the most substantial agent in this swing towards mLearning is Apple and the invention and evolution of the iPod, iPhone, and iPad. Stemming from the Apple iPod, iPhone, and iPad is iTunes® and the iTunes® University, which serves as an online directory for podcast and video podcast (McKinney, Dyck, & Luber, 2009). There are other aspects of the mLearning design and many universities have formed pilot programs that will continue to mold the mLearning concept.

University Initiatives

Outside the world of Apple products there are many other pieces of technology that have facilitated mLearning pilots. One of the largest contributors to mLearning pilots is the PDA. Examples of PDA pilot programs are:

- The School of Computer Science at Carnegie Mellon piloted a program called Pebbles PDA to determine how best to integrate PDAs and personal computers into a successful educational environment (University of Iowa, 2002).
- All first-year undergraduate students at The University of South Dakota are required to own a Palm PDA (University of Iowa, 2002).

- The Penn State Abington branch campus had students use a PDA to take notes, take quizzes, and complete course-related content using a program called AvantGo (University of Iowa, 2002).
- Harvard Medical School piloted a PDA program to provide announcements, course content, and important dates (University of Iowa, 2002).
- East Carolina University piloted a program called the Handsprings to Learning Program that provided course content for six different course offerings (University of Iowa, 2002).

Other universities have programs investigating the uses of other mLearning mediums. Some examples of other mLearning pilot programs using eReaders are:

- Princeton University piloted a program using the Kindle® DX eReader to test for improved classroom experience from using an eReader (*E-reader pilot program*, 2009).
- Fairleigh Dickinson University (FDU) in New Jersey piloted an eReader program in which students could checkout one of three eReaders (Sony Reader®, Amazon Kindle®, and iPod Touch) for up to a week with a one-week renewal option ('E-reader pilot program,' 2010).
- Penn State University recently implemented the Sony Reader into their library system to test for the utility of eBooks in the tertiary educational environment ('Sony reader project,' 2010).

Apple Initiatives

One of the largest agents in the mLearning market is Apple. Home of the widely popular iPod, iPhone and iPad, Apple has grown into a technology powerhouse (‘Welcome to the,’ 2010). Apple sits near the top of technology pyramid among other technology giants like Microsoft® and Hewlett-Packard® (HP). Led by CEO and founder, Steve Jobs, Apple has pushed forward cutting-edge technology in the form of the iPod, iPhone and iPad. Each of the Apple products has played an important role in the mLearning movements. Each product offers unique functionality and characteristics such as iTunes®, HD video, face-time and the vast app store (‘Welcome to the,’ 2010). While Apple offers cutting-edge hardware, the company also offers software. The Apple software line is led by iTunes®, which allows users to purchase, download and play nearly endless amounts of music, movies and applications (‘Welcome to the,’ 2010). Each Apple product brings it own unique characteristics to the educational table.

There are many pilot programs that have been tested using Apple products and with new technology being released the pilot programs will continue to grow. These are a few examples of Apple pilot programs:

- South Huntington Library, NY, became one of the first public libraries to circulate iPod shuffles with preloaded audio books for students (Stephens, 2005).
- Baylor University Fine Arts Library, Waco, Texas has circulated 12 iPod classics preloaded with all of the sheet music and audio tracks for the entire course (Stephens, 2005).

- Abilene Christian University in Texas has piloted a program in which all incoming freshman will be issued either an iPhone or iPod Touch and must decide which they would prefer ('iPhones the Latest,' 2008).
- Oklahoma Christian University will offer students the choice of an iPhone or iPod touch and will also offer receive a MacBook ('iPhones the latest,' 2008).
- iPodagogy Project provided iPod classics to twenty-five students to investigate the potential of video podcast to support learning and teaching (Murray, 2010).
- The iPod Touch Project combined the efforts of three different schools; a small, regional school; a large school with a significant population growth; and a school with a significant English as a Second Language (ESL). The project was designed to test student engagement and to stimulate interest in the curriculum for both student and teacher (Murray, 2010).
- The Global Mobile Learning Project was a collaborative effort by three schools in Singapore, Australia and the USA. The study had students from each school interact via an iPod Touch by sending and downloading presentations created from across the globe (Murray, 2010).

Use of Mobile Devices in Different Countries

The increased popularity of mobile technologies has also had an expansive impact on the availability and accessibility of the same technology. Many countries have seen an incredible increase in the number of cell phones being used. Countries such as Saudi Arabia, Portugal, Czech Republic, Austria, and the United Arab Emirates each have at least a penetration of 140% amongst their populations (The World Factbook, 2009). That

140% represents the entire population owning a cell phone plus an additional 40% of the population that has another cell phone. While this statistics doesn't mean that each and every person owns a cell phone it simply represents a country that has a technology driven society. Cell phone penetration is rapidly expanding and in Western Europe the average penetration is at 130% and Eastern Europe is not far behind at 123% ('Over 5 billion,' 2010). While the European market sits well over the 100% penetration, Africa has seen a penetration of 52%. At the end of 2008, the world surpassed four billion mobile phone users and that number is expected to exceed six billion by the end of 2012 ('Over 5 billion,' 2010). By the end of 2010, there will be an estimated 5.3 billion mobile phone subscriptions ('Over 5 billion,' 2010).

With the incredible growth of cell phones there has been a similar growth in the availability of 3G and 4G access. Countries are rapidly transitioning from 2G to 3G platforms. As of 2010, 143 countries offer 3G services compared to only 95 in 2007. Of the estimated 5.3 billion mobile users worldwide there is approximately 940 million 3G subscriptions ('The world in,' 2010). Recently, there has been a transition towards a 4G platform in a few countries including Sweden, Norway, Ukraine and the United States ('The world in,' 2010).

As the mobile phones become more available so do the functions the mobile phone offers. One of the most popular functions of the mobile phone is the Short Message Service (SMS) or commonly referred to as text messaging ('The world in,' 2010). SMS allows users to do more than simply send text, it also allows for sending pictures and videos. SMS messaging has become a global tool. Global SMS messaging

has tripled from an estimated 1.8 trillion in 2007 to an incredible 6.1 trillion in 2010 (‘The world in,’ 2010). To dumb down the math, that is approximately 200,000 SMS messages being sent every second worldwide. The SMS messaging market has generated incredible amounts of money. Using the average cost of a single SMS message in the United States at $.07, the SMS business generates about $812,000 every minute or $14,000 every second (‘The world in,’ 2010). The SMS function has become an important part of the general population. With the improved platforms (3G & 4G) the SMS market will continue to expand towards 7 or 8 trillion annual messages (‘The world in,’ 2010).

Complimenting Education

Mobile technologies have slowly become an integral part of the education system. Ranging from the eReader to mobile phones, schools are implementing these key pieces of technology into the classroom (Murray, 2010). There have been quite a few pilot programs of mobile technologies like the eReader, iPod and iPhone (Murray, 2010). These programs are laying the groundwork for future technologies. While the pieces of technology are important to the educational advancements there is a plethora of software programs that are needed to ensure the success of mobile technologies. There are two markets to investigate when searching for useful educational software, major market software and open source software (OSS). Each of these styles of software offers a variety of tools and functionality. One of the major differences between the two selections is that OSS typically provides users with a free alternative to the major market software (‘The open source,’ 2010). OSS provides cheap or free alternatives for

educational settings to allow students and teachers to have open access to useful programs (‘The open source,’ 2010). Many mobile technologies recognize OSS and allow users to work with the programs on the mobile device.

The following is a list of software that could be useful in an educational setting. The list includes the program, a brief description, its availability on a mobile device and the cost of the program. Not all of the programs listed below were used in the Mobile SI web application. While each of them offers useful functions, not all of them were needed in the Mobile SI web application. Keep in mind that these are not all of the software programs that could be useful; there is a plethora of other programs available. Not all software programs are listed because there are so many. The software list is as follows:

- DropBox: Universal online storage space that allows users to access content on any internet-ready device. Serves as a digital USB jump drive. Dropbox is available on iPad, iPhone, and iPod Touch. Users receive 2GB of storage to start and additional storage is available at zero cost with only minimal registration (‘Dropbox iPhone app,’ 2010).
- PingChat: Similar to an online chat session. PingChat serves as an online chat window that users on the Android, Blackberry or iPhone can access. Users of any of the listed smartphone’s can access and use together. PingChat is a free program that only has to be downloaded from the respected application store (‘Pingchat!,’ 2010).
- Twitter: Widely popular site that allows users to post short messages about nearly anything. Users can post thoughts or questions for followers to read, respond or

re-tweet. Twitter is free software that only needs to be registered. Twitter is accessible via all smartphone's and can be updated through many applications ('Twitter,' 2010).

- YouTube: YouTube is an online video database that allows users to post and view videos on almost endless topics. The site provides users with an easy-to-use search engine to find what the user seeks. YouTube doesn't have a registration fee but does require the user to register with the site if they would like to post videos themselves ('YouTube,' 2010).
- Meebo: Similar to PingChat, Meebo is a chat room program that allows multiple users to access the chat. Meebo provides users a location to post questions to the host, similar to a discussion board. The users can post questions and the host can access the chat at anytime to view the questions posted. Meebo is available on the Android, Blackberry, and iPhone. Meebo is a free program and requires only a little bit of registration ('Meebo for iPhone,' 2010).
- BlackBoard: Blackboard serves as a virtual classroom that allows users to access useful information like grades, assignments, class email, syllabus, and announcements. Blackboard offers teachers and students an online location to communicate important information without having to exchange emails or phone calls. Blackboard Mobile is available on the Android, Blackberry, iPhone and iPad. The program is free but does require you to log in with a valid university id, which also means that the users university must be on the Blackboard Mobile program ('Blackboard mobile learn,' 2010).

Instructional Design

Originally an idea used for military training during and following World War II, the instructional design process was used to maximize training efforts (Leigh, 1998). During the initial development of the instructional design process, psychologists were studying how humans learn. Combined with the psychologist work, audiovisual specialists created materials that could be used for training based on the psychologists' findings.

Instructional design is the systematic construction of instructional materials used to ensure a quality product is developed and delivered (Leigh, 1998). It is an entire process from the analysis of the problem to identifying learning goals and outcomes and continues through the delivery and evaluation stages to ensure success. The instructional design process has developed successful products without rigorous timelines to follow. The instructional design process is developed around finding the most efficient method for delivering important and comprehensive information. The development of instructional design follows theories and methodologies. The theories and methodologies that have helped mold instructional design have been developed by well-known theorist such as B.F. Skinner, Benjamin Bloom, Lev Vygotsky, Jean Piaget and Robert M. Gagné (Kemp, 1985).

Two different instructional design models, both of which were used for this research project will be discussed. The two different models were used together in a way to create a more personalized instructional design model. Since mLearning is a relatively new concept there isn't a clear instructional design model that should be followed. Each

of the instructional design models provides its own unique benefits that the other model may not focus on as much.

ADDIE Model

The ADDIE model is one of the simplest models of instructional design having only five planning steps. The well-known term ADDIE stands for Analysis, Design, Development, Implementation, and Evaluation (Figure 3) (Molenda, 2003). Although the ADDIE design is only five steps, each of the steps is critical as they focus on a different aspect of the learner and their individual abilities.

The Analysis stage focuses on determining the objectives and learning goals (Molenda, 2003). It is also in the analysis stage that important aspects of the planning process take place such as learner characteristics. The learner characteristics are an important part of the design process because of the implications the characteristics can hold. Important implications can be see such as socioeconomic levels, age, gender, education levels and previous experiences. Each aspect of the learner is equally important to the initial design process.

The Design stage is more focused on content (Molenda, 2003). It is in this phase the planner designs lessons and materials needed to create a lesson. In this phase it is important to take into consideration the learner characteristics found in the analysis stage. The Development stage is where the planner begins to build concrete objects that will be used in the learning process (Molenda, 2003). Using knowledge from the analysis and design stage, the planner can develop useful tools to assist in learning. It is in this phase

that the planner must observe the learners to check for understanding of the information being presented, not in the form of an assessment, but more of a check-up.

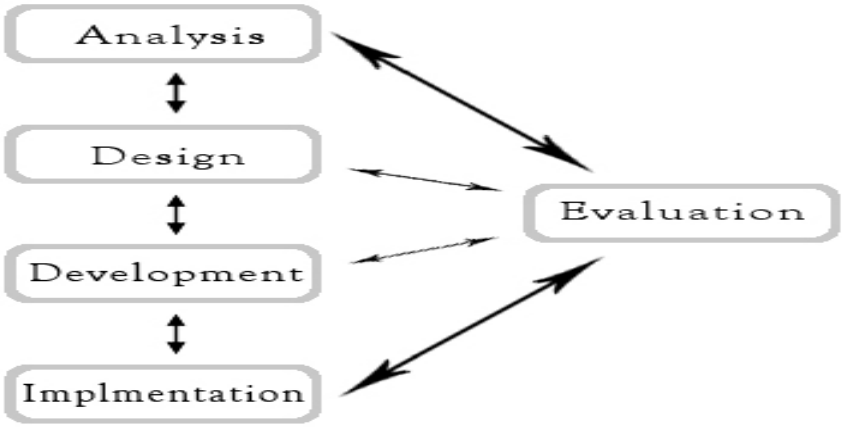

Figure 3: The ADDIE Model. Recreated Model (The ADDIE Model)

The Implementation stage is when the design is put to the test (Molenda, 2003). It is in this phase that the design is used in a live environment with active learners. This stage could be the first time the planner discovers a problem in the design. Being flexible throughout the Implementation stage is critical. At this point the planner can make revisions to the design to create a successful design.

The final stage of the ADDIE model is the Evaluation stage (Molenda, 2003). Although it is the last stage it very well may be the most important. Evaluating helps to determine the efficiency and impact of the design. Evaluating the design can be completed by a formative or summative evaluation. Either form of evaluation can provide

the planner with sufficient information to improve the design. Even though evaluation is listed as the final stage it should be ongoing throughout the entirety of the design process.

Morrison, Ross, and Kemp Model

The Morrison, Ross, and Kemp (MRK) Model revolve around nine elements that are designed to create a fluid process. The nine elements together form a circle that is designed to represent a continual evaluation, revision and implementation. While the MRK model is built on nine elements there is a core of four fundamental components: learners, objectives, methods, and evaluations (Morrison, Ross, & Kemp, 2010). Each of the four fundamental components is a critical cog in many instructional design models.

Compiled on nine elements, the MRK model is structured as a circle with two main topics encompassing the whole model. Figure 4 shows the model and the nine elements full encompassed. This style of instructional design is considered to be non-linear. It is considered non-linear because of the circle design and no clear-cut starting or ending point (Morrison, Ross, & Kemp, 2010). Another way of identifying the non-linear approach of the model is the use of the word element. The use of the word elements indicates a unique unit that can be completed; other models use the word stages or phases, which imply an order. The non-linear design is an ideal model for an eLearning or mLearning design because of the flexibility for design and development. The non-linear ideal allows the developer to begin the process on any element depending on preference.

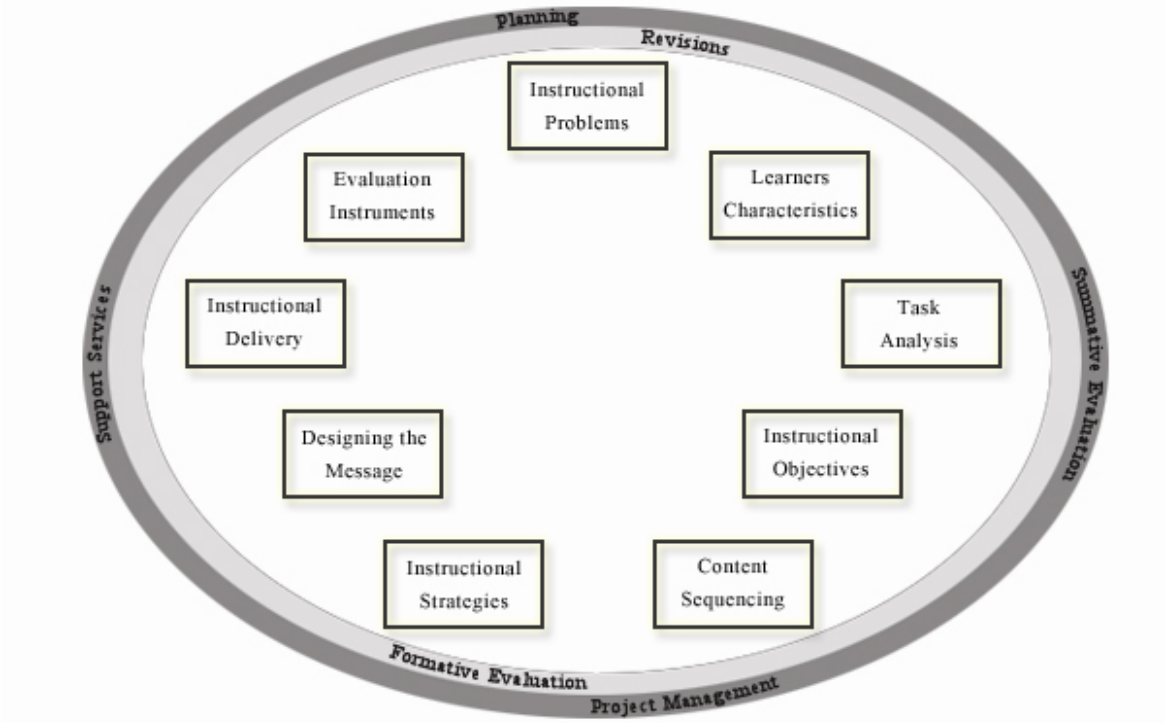

Figure 4: The Morrison-Ross-Kemp Model. Recreated Model (The Morrison-Ross-Kemp Model)

Within the MRK model are nine unique elements. Forming an oval shape the nine elements are: (a) identifying the instructional problems, (b) examination of learner characteristics, (c) task analysis of goals and objectives, (d) specifying instructional objectives, (e) sequencing content into a logical order, (f) designing instructional strategies that follow the objectives, (g) designing the message, (h) developing instruction, (i) developing evaluation tools (Morrison, Ross, & Kemp, 2010). Each of the elements plays an important role in the development of a successful design.

Encompassing the non-linear MRK model are two additional levels. The first, innermost level is revision and evaluation. The revision aspect of the MRK model is an

on-going topic to address. With the ability to begin the design process at any time it is important to make revision as the process moves along. The evaluation aspect of the level includes confirmative, formative and summative evaluation (Morrison, Ross, & Kemp, 2010). Each style of evaluation provides the developer with important information to make revisions as needed. The outermost level of the MRK model focuses on the managerial aspects of the instructional design process. The outermost level looks into the support services, project management, planning, and implementation issues (Morrison, Ross, & Kemp, 2010). Each aspect of the MRK model is critical to the success of the design.

Summary

The idea of learning in a remote location is no new idea. With roots tracing back to the mid 1800's in the United States, the world of distance education has evolved into the modern world of eLearning and mLearning. The evolution of eLearning to mLearning has rapidly taken place over the last few years. Behind the development of mobile technologies such as the iPod, iPhone and iPad the world of mLearning will continue to grow and further develop.

Chapter 3: Methodology

Research Methodology

This chapter presents the research design that was used in the data collection and analysis of the SI web application. The data was collected through a variety of surveys to gauge student's thoughts and progress throughout the quarter. The collected data was compared to historical data recorded from a Psychology 101 course during 2009-10 Winter Quarter (Figure 5). The methodology will provide a descriptive analysis of the research.

Research Question

The following research question was explored:

- How does the use of a web application impact academic performance and attendance in Psychology 101 courses?

Comparison of two winter quarter samples…	Number of students enrolled in Psychology 101	Number of students attending SI	% A's & B's	GPA for students attending SI
2009 -10 Students	376	176	51.20%	2.17
2010 – 11 Students	356	162	57.99%	2.23

Figure 5: Overview of samples from two Psychology 101 courses.
Note. 2009-10 Sample is considered historical data.

Sample

The sample for this research included 23% of individuals attending SI that were registered for Psychology 101 during winter quarter of the 2010-11 school year. The

sample consisted of individuals that attended SI with the web application introduced, registered for Psychology 101, and were willing to take part in the research. Over the past five quarters, dating back to fall quarter of the 2009-10 school year, an average of 31.89% of the students enrolled in Psychology 101 attended SI. That far exceeds the target percentage of 10%, thus providing a plausible sample target for this research. In a recent researcher designed survey, 79.5% of students that attended SI said they would use an SI specific web application, an additional 15% said they maybe would use the SI web application (Figure 6). Upon reviewing the SI term report, the SI Psychology 101 program was highlighted as the appropriate course.

Percent of student's that…	**Yes**	**No**	**Maybe**
would use a mobile SI web app.	79.5%	5.5%	15%

Figure 6: Percentage of students that would use a mobile SI web app
Note. Total of 200 students surveyed for question.

Location

A majority of the research conducted took place in Morton Hall in room 216 or 235. Room 216 was the primary location for the research; room 235 was reserved for larger SI sessions that had larger attendance. The formal research for the SI web app took place starting Monday, January 3, 2011, and continued till Friday, March 4, 2011. The 60 days provided the students using the web app ample amount of time to utilize and evaluate the web app.

Data Collection Process

The research process was broken down into three different surveys over the course of the research. The pilot survey examined the SI program and the students that took part in the program. The first sample survey was used at the start of winter quarter of the 2010-11 school year in the Psychology 101 SI sessions. The second sample survey was used at the conclusion of the quarter to monitor thoughts and opinions on the web application and its impact throughout the quarter. The three surveys together covered students from two different quarters and provided information to ensure a well-developed and useful web application.

The Pilot Survey

The research process started with the development of the first of three surveys. The pilot survey was developed through reviewing literature concerning mLearning tools in higher education. The pilot survey gauged general views on a web application and its use in the SI program (See Appendix B). For the pilot survey, the researcher administered the survey to 200 students that were attending SI. Participants in the survey were only required to be attending SI and be willing to take part in the survey. The 200 individual students were from the following subgroups:

1. Student attending the large Midwestern University.
    a. Graduate
    b. Undergraduate
    c. Other
2. Students willing to participate in the survey.

    a. Each student given opportunity to not answer survey.

3. Students that own a cell phone.
    a. Smartphone
    b. Non-Smartphone
    c. No Cell Phone
4. Students that own a laptop or desktop.
    a. Laptop
    b. Desktop
    c. Both
    d. Neither

The qualifications identified will outline the individuals that will take part in the study. The qualifications listed were only a guideline for selecting individuals to participate; no student was turned away from taking the survey. Outlined with four qualifications the survey results were compiled into a large pool, not as individuals. The survey was anonymous, so no name association was used. There was also not any discrimination on students in any particular SI session. The survey results were intended to provide guidance and a foundation of knowledge on students that attend SI. The results were used to only gauge student's thoughts and feelings towards the implementation of a web application and the student's intent to use such a program.

Pilot Survey Procedure

To recruit participants for this study, the researcher attended each of the SI sessions, made an announcement, and asked for volunteers. In total, there were 200

students that participated in the pilot survey. The students were informed as to what the information is being used for and how their answers will assist in the development and implementation of the web application. At the start of each SI session, the researcher provided an overview of the web application and allowed potential participants to ask questions and field comments. At the conclusion of the explanation, the researcher informed the students that the survey was completely voluntary and it was anonymous. At that time, the students had the opportunity to decline the survey and the survey was administered. The survey given to the students consisted of a half sheet of paper; double-sided and eleven questions. The students were given as much time as needed to complete the survey. At the conclusion of the survey, the researcher walked around to each student and collected the surveys. The researcher individually thanked the student for their time in filling out the survey. The final results of the pilot survey can be seen in Chapter 4.

The First Sample Survey

This part of the research process began with the development of the first sample survey. The first sample survey was developed around the functionality of the web application. Functionality is an important aspect when dealing with an mLearning tool and determining student's thoughts and concerns is critical. For the survey, the researcher surveyed the students attending SI for Psychology 101 that were introduced to the web application. The class had a maximum of 380 available seats in the course that was instructed by a Midwestern University professor. Following the SI model, the targeted attendance rate was 10%, however, the Psychology 101 SI course had averaged 31.89% attendance. The researcher aimed to survey 20% of the students attending SI in

Psychology 101 course with the web application, which would provide 34 responses if 32% of the enrolled students in Psychology 101 attended SI. Due to the designated sample, Psychology 101 with the Midwestern University professor, there was no need to determine criteria for participating in the survey. If the student was registered in Psychology 101 with the Midwestern University professor and was willing to participate then the student was eligible to take part in the research.

Like the pilot survey, the first sample survey was completely anonymous. The purpose of the study was not to single out students performance, it was to investigate the impact of a web application on the students attending SI for Psychology 101. While grade averages were assessed at the conclusion of the quarter to determine if an impact was made, there were no individual grades needed. The purpose of the first sample survey was to provide the researcher with an understanding of the student's position on technology (See Appendix C).

The survey will provide the researcher with data about the student's availability to technology and will assist in the continual development of the web application. Each question will investigate a different piece of technology that will be used for the optimal output of the web application. For example, the MP3 player will be important for using podcast; while many iPod can play videos not all MP3 players have that capability. Having access to the Internet via the cell or smartphone will allow the student's to access important YouTube videos. If students do not have the necessary technology, they will still be able to access all of the content via a computer.

First Sample Survey Procedure

To begin the survey process the researcher attended the first day of class for the Psychology 101 class taught by the Midwestern University professor with the web application introduced. During the first day of class the researcher made an announcement to the student's informing them of the web application and the research being conducted on their class. It was hoped that by announcing the web application mixed with the potential for academic success more students would attend the available SI sessions for Psychology 101. After announcing the web application to the class, the researcher attended the Psychology 101 SI sessions for the first two weeks to administer the first sample survey.

To recruit participants for the first sample survey the researcher began each of the SI sessions with a welcoming and an explanation of the web application. The researcher also explained to the students that there would a first sample survey administered to them at the end of the quarter to conclude the research. After explaining the research and fielding questions, all volunteers were administered a survey. The students were provided with ample time to complete the survey. At the conclusion of the surveys, the researcher collected each survey and thanked the students individually for their participation.

The Second Sample Survey

This aspect of the research process started with the development of the second sample survey. The second sample survey was given to the students attending SI for the Psychology 101 course that had been introduced to the web application. The sample for the first and second sample surveys was the same pool of students. The second sample

survey was used as an evaluation tool of the web application and the research in general. At that point in the research, the students had been using the web application for ten weeks and the major issues were resolved. Although comments were welcomed throughout the process, this survey provided a space for student's to provide comments on the functionality of the web application and suggestions for improvements.

Since the first sample survey was anonymous, the second sample survey was opened up to any student attending SI for Psychology 101 with the web application introduced. Although it was open to any student attending SI for Psychology 101 with the web application, a good majority of the students that took part in the first sample survey were regular attendees of the SI session and were recognizable. Similar to the first sample survey, there was no criteria for the survey participants. As long as the student was registered in Psychology 101 with the Midwestern University professor and attends the SI session with the web application they were eligible to participate.

One thing that differed from the first sample survey was the series of survey questions given to the participating student's. The purpose of the second sample survey was not only to gauge the student's thoughts of the web application but also monitor their academic performance (See Appendix D).

The survey provided the researcher with important data about the student's thoughts about the web application and the perceived academic performance in the Psychology 101 course. While the information was anonymous and could not be attached to any particular student, the information about anticipated grade before and after the course was important. The anticipated grade results were critical because of the

implications it held on the student's actual academic performance, which was aided by the SI web application. Each of the questions revealed important information about the impact of the web application on the student's academic performance. Although the survey was anonymous, the student's responses were compared to the actual academic performance of the student's that attended SI throughout the quarter. The students reported expected grade averaged out to a 2.6 GPA (B-), while the SI program data reported the average grade for students attending the same SI sessions with the web application was a 2.3 GPA (C+). Not only did the results benefit the research it provided insight and suggestions for moving forward as the SI program implements the web application across the entire program.

Second Sample Survey Procedure

To begin the second sample survey the researcher attended the Psychology 101 SI sessions with the web application for the final two weeks of the quarter. Over the course of the final two weeks the researcher administered the second sample survey to the same group of students that participated in the first sample survey. The idea behind providing two weeks to survey the student's was the fact that not all the student's attended all of the SI sessions. By spreading the time out over two weeks more students were available to the researcher. It was to the benefit of the researcher to provide two weeks to survey the student's so as to make contact with students that may have been using the web application but not attending as many of the SI session early in the quarter.

Un-Official Surveying and Monitoring

While there will be formal surveys taking place at the start and conclusion of the

winter quarter there will be other forms of evaluation taking place. Throughout the course of the quarter, the researcher will be attending the Psychology 101 SI sessions and talking with students. By talking with the students during the SI sessions, the researcher can receive critical feedback from the students. The feedback the student's provide can immediately be addressed and any areas of concern can be corrected. Being flexible throughout the quarter will be important in maintaining the student's involvement in the web application research. If no changes are made to the web application then the students may become uninterested and thus the web application is useless.

Another form of constantly surveying and monitoring the web application is by adding a contact form to the web application. The same contact form will be accessible via computer. The contact form will provide students the opportunity to give the researcher direct comments and concerns about the web application. The contact form will send an email directly to the researcher so that immediate attention can be given to any concerns or additions that the student's would like to see implemented.

Materials

Either the researcher, the SI leader or the participating student's will provide all of the materials used throughout the research. The researcher will provide the student's with the necessary materials on the web application and the web site. The student's will only need to use their current piece of technology. The main ways of accessing the content of the web application is via a Smartphone. While not all students have a Smartphone, an additional web site is available for the student's to access the same information. One additional source of materials is the SI leader of the Psychology 101 session. The SI

Leader has agreed to provide original documents and content to be posted on the web application.

SI Leader Web Application Training

The researcher has had extensive meetings with the leader of the Psychology 101 SI session. The meetings covered important information about the web application and research process. The leader was provided with an outline of the process and given authority to post and update any information on the web application and web site. The leader consented to posting original documents and materials to the web application and web site.

Summary

Conducting research of any type presented issues and concerns. The research on the web app and its impact on the SI program was an interesting adventure. The design of the web app went much deeper than what the user saw on the outside. The web app contained a well thought out instructional design method along with a carefully designed interface for maximum usability. Regardless of the design of the web app, the over arching purpose of the research was to create a better learning environment for the students.

Chapter 4: Results and Discussion

This chapter presents the results from the web application and its impact on the SI program. The results shown have been collected through a variety of resources such as surveys, collected SI data, Google Analytics, and Quiz Revolution tracking software. Each program and medium of research will be discussed below.

The Surveys

The first medium of research used was a survey that was administered to each of the students attending the SI sessions. For the pilot survey, there was a more lenient criterion for completing the survey. In order to complete the survey the student only had to attend SI. It wasn't until the first and second sample surveys were administered that the requirement to be enrolled in Psychology 101, attending SI, and having the web application available were implemented.

The Pilot Survey

The pilot survey was used to determine the population for whom the web application was specifically designed. The questions used in the survey were designed around identifying particular attributes of the population of students attending SI. Some of the attributes the research was investigating in particular were whether participants owned a cell phone, laptop, tablet PC, or other web-accessible device. There were no strict requirements or criteria for the sample that participated in the pilot survey. There were only two real criteria enforced for the pilot survey, in order to complete the survey: 1) the student had to be attending SI and 2) be willing to participate in the survey. The sample taken in this survey consisted of 200 students that were attending a variety of SI

courses. The sample from this survey is not the same sample that was used with the first and second sample surveys, the samples use in the first and second sample surveys were students that were exposed to the web application.

The information collected from the pilot survey showed that 100% of the students that attend SI own a cell phone (Figure 7). Of that population of 200 students, 46.5% indicated they own a smartphone. In addition to the students that identified they owned a smartphone, there was a small population that indicated they may own a smartphone, but were unsure because of internet access and additional data plan features that all students phones may not have.

Percent of student's that…	Yes	No	Maybe
Own a cell phone	100.0%	0.0%	0.0%
Own a smartphone	46.5%	51.0%	2.5%

Figure 7: Percentage of students that own cell phones and smartphones
Note. Total of 200 students surveyed for question.

The web application was designed around general access to the Internet; it was not completely restricted to mobile phone access, as not all students have access to the Internet via smartphone. The pilot survey identified the number of students owning a computer of any nature, be it laptop or desktop (Figure 8). The pilot survey investigated the ownership of the recently popular tablet PC. Over the 200 students surveyed for the pilot survey, only 1.5% (3 students) responded that they owned a Tablet PC of any type.

After identifying what mediums of technology the students owned, the researcher examined the student's usage of the Internet. There were two parts of the pilot survey that

investigated the perceived usage of the Internet by the students, the first being the amount of internet access via the cell phone and the second being overall internet usage.

Number of student's that own…	Yes	% of Students
Laptop	180	90%
Desktop	4	2%
Both	14	7%
Neither	2	1%

Figure 8: Number of students that own laptops and desktops.
Note. Total of 200 students surveyed for question.

With 46.5% (93 students) of the students attending SI owning a Smartphone the percentage of students accessing the Internet via their phone was quite similar with 48% (96 students) of students indicating they access the Internet via their phone. There is a small gap between the numbers of students owning Smartphone's and the number of students accessing the Internet via their phone. The gap between the numbers could be a result of students not correctly identifying their cell phone as a Smartphone or the

Usage of the Internet via cell phone	Number of Students	% of Students
Never	104	52%
Few times a week	15	7.5%
Once a day	18	9%
Multiple times a day	63	31.5%

Figure 9: Usage of the Internet via cell phones.
Note. Total of 200 students surveyed for question.

possibility that their cell phone has access to the Internet in some fashion but is not considered a Smartphone. For the students that indicated they access the Internet via their cell phone 31.5% of the students specified they access the Internet multiple times a day (Figure 8). The pilot survey examined the overall usage of the Internet. Similar to the amount of access via the phone, the majority of the responses indicated the students utilize the Internet multiple times a day (62%). Figure 10 shows that there is an additional 73 students (36.5%) that indicated they utilize the Internet 'All the time'.

Overall Internet Usage	Number of Students	% of Students
Never	0	0.0%
Few times a week	2	2.0%
Once a day	1	0.5%
Multiple times a day	124	62.0%
All the time	73	36.5%

Figure 10: Overall Usage of the Internet.
Note. Total of 200 students surveyed for question.

The First Sample Survey

The design of the first sample survey was to test the sample population for whom the web application would be implemented. The questions used in the first sample survey were designed to identify the population of students attending the SI for Psychology 101 course with the web application available. The researcher was able to administer the surveys over the course of the first two weeks of the winter quarter, so as to reach as many students as possible attending the Psychology 101 SI sessions. In order to complete the survey the student had to be attending the Psychology 101 SI session and be willing

to participate in the survey. In total, there were 162 students that attended SI for the Psychology 101 course with the web application during the winter quarter 2010-11.

The researcher administered the first sample survey during the first two weeks of winter quarter. Both the researcher and the Psychology 101 SI leader administered the surveys in an attempt to survey as many of the students attending SI as possible. Of the 162 students that attended SI for the Psychology 101 course with web application, 44 students (27%) participated in the first sample survey.

The first sample survey sought to identify the student's perceptions of the Psychology 101 course and their goals for academic achievement. Prior to taking the course, 19 students (43%) indicated they expected to earn the letter grade of an A in Psychology 101 by the end of the winter quarter (Figure 10).

Expected Psychology 101 Final Grade…	Number of Students	% of Students
A	19	43.0%
B	22	50.0%
C	3	7.0%

Figure 11: Students expected final course grade in Psychology 101.
Note. Total of 44 students surveyed for question. No students responded D or F.

The first sample survey investigated the ownership and accessibility of different technologies. Figure 12 shows the number of students that own and utilize mobile items such as cell phones and laptops. Figure 12 provides the researcher with information pertinent to the growing, short messaging services (SMS) or text messaging, market and the potential usage the technology in the web application. Text messaging was another

feature utilized in the Psychology 101 SI session to provide the students with an interactive method of answering poll questions.

Technology owned or utilized…	Number of Students	% of Students
Cell Phone	44	100%
Smartphone	20	45%
Laptop	44	100%
SMS / Text Messaging	44	100%

Figure 12: Technologies owned and utilized by students.
Note. Total of 44 students surveyed for each question.

The first sample survey tracked the student's interest in utilizing the web application. Prior to the student's participating in the first sample survey, the basis of the web application was explained, including the objectives and purposes of the research. The student's were well informed of the potential academic impact the web application could hold. It was made clear to the student's that they would not be required to utilize the web application. Figure 13 displays that 93% (41 students) of the participants indicated that they would utilize the web application throughout the quarter. There were an additional 5% (2 students) of the participants that indicated they might utilize the web application. The percentage of student's that indicated they would utilize the web application increased by 3.5% from the pilot survey to the first sample survey.

The researcher identified the student's intentions of attending SI, which would assist in gauging general interest in the SI program and potential interest or disinterest in the web application. According to SI data, students that attend SI 12 or more times

Students the would utilize the web application…	Number of Students	% of Students
Yes	41	93%
Maybe	2	5%
No	1	2%

Figure 13: Number of Students that plan on utilizing the SI web app.
Note. Total of 44 students surveyed for each question.

throughout the quarter receive, on average one half to one full letter grade better than student's that do not. Of the 44 students that participated in the first sample survey, 45% (20 students) of the participants indicated they intended on attending SI 12 or more times throughout the quarter (Figure 14).

Number of times intended on attending SI…	Number of Students	% of Students
12 or more	20	45%
8 – 11 Times	16	36%
4 – 7 Times	5	11%
1 – 3 Times	3	7%

Figure 14: Intended number of time attending SI for Psychology 101.
Note. Total of 44 students surveyed for each question.

The Second Sample Survey

The second sample survey was used to test the perceived impact of the web application on the students. The questions used in the second sample survey were designed to spotlight the impact of the web application from the perspective of the

students that utilized the web application. The student population that participated in the survey was the same sample that participated in the first sample survey. The criteria to complete the second sample survey required the students be attending SI for the Psychology 101 course that was introduced to the web application. Similar to the other pilot survey and the first sample survey, the second sample survey was administered by the researcher, completed by pencil and paper, and was administered over the final two weeks of the quarter. The second sample survey took place over a two-week span in order to receive as many responses as possible. Although the same steps were taken in the administration process, there was a decrease of in the number of participating students from the first sample survey to the second sample survey (Figure 15).

	First Sample Survey	**Second Sample Survey**
Number of student's that participated in the…	44	37

Figure 15: Number of students that participated in the 1st and 2nd sample surveys. *Note.* Same procedures were followed for both surveys; the same sample was used in both surveys.

The second sample survey inquired into the student's use and perceptions of the web application and its impact on increased academic achievement. Of the 37 students that participated in the second sample survey, 31 students, or 83.7%, responded that they utilized the web application. More than 75% (29 students) of the participants perceived an increase in their academic achievement as a result of using the web application (Figure 16).

Number of student's that…	Yes	No
Utilized the web app	31	6
Perceived increased academic achievement	29	8

Figure 16: Number of students that utilized and perceived success from web app.
Note. There were a total of 37 students surveyed for the second sample survey.

Number of times attending SI in Psychology 101…	Number of Students	% of Students
12 or more	12	32%
8 – 11 Times	13	35%
4 – 7 Times	7	19%
1 – 3 Times	5	14%

Figure 17: Number of times attending SI for Psychology 101.
Note. Total of 37 students surveyed for each question.

Of the 29 students that perceived an increase in academic achievement, all 29 felt they achieved, at least, one half a letter grade better as a result of using the web application. To relate this information into the SI model, of the students that perceived an increase in their academic achievement, (79%), the student attended SI eight or more times throughout the quarter (Figure 17). This data follows the SI program that shows when students attend SI eight or more times score between one half-letter grade to a full-letter grade better than students that do not attend as often or at all.

As the students indicated the number of times they attended SI, the second sample survey also looked at the number of times that students utilized the web application and through what devices. Figure 18 shows the number of times that students indicated they used the web application throughout the quarter.

Number of times attending SI in Psychology 101…	Number of Students	% of Students
12 or more	9	24.3%
8 – 11 Times	12	32.4%
4 – 7 Times	9	24.3%
1 – 3 Times	7	18.9%

Figure 18: Number of times utilizing the web application.
Note. Total of 37 students surveyed for each question.

Since the web application was developed to work across multiple platforms and multiple mediums it is important to look at the types of devices the students used to access the web application. Figure 19 shows the different devices that students indicated they used and the number of times that device was used.

SI Program Data

The SI program has a software program that allows the SI leaders to log their attendance on a daily basis. At the conclusion of the quarter, the software program has the ability to access the students' final grades and it tabulates a report called a frequency distribution report (FDR). The FDR produces a report that doesn't reveal students names

or account numbers, rather it develops a comparative chart used to display the correlation between the number of times students attended SI and their resulting grade.

Type of device used to access the web application…	Number of Students
Smartphone	7
Laptop	30
iPod	2
None	6

Figure 19: Type of device used to access the web application.
Note. Total of 37 students surveyed for each question and students could answer for more than one option.

Over the course of the last two years, or five quarters, an FDR was produced using the data from the Psychology 101 courses that the SI program covered. Although the SI leaders have changed and the professors have rotated, the same concepts and techniques were used by the SI leaders and professors. The FDR are a useful tool for the SI program to utilize to display the academic impact of the SI program.

The results of the FDR display a correlation between the number of times students attend SI and the resulting grades. The FDR from winter quarter of the 2009 – 2010 and the FDR from winter quarter of the 2010 – 2011 school year shows a slight difference in the overall performance (Figure 20). The figure shows a 6.79% difference in the number of students earning A's and B's in the winter 2010 – 2011 students (57.99%) compared to students from the winter 2009 – 2010 students (51.20%). The three FDRs from the 2009

– 2010 school year, as well as the two FDRs from the 2010 – 2011 school year have been provided for a more extensive comparison (See Appendix E).

Comparison of two winter quarter FDR reports…	Number of Students	% A's & B's	% C's	% D's, F's & W's	Mean Final Course Grade
2009 -10 Students	291	51.20%	30.58%	18.21%	B-
2010 – 11 Students	269	57.99%	23.42%	18.59%	B-

Figure 20: Comparison of Frequency Distribution Reports.

Academic achievement with same SI leader and professor…	2009-10	2010-11
Average grade points earned	2.17	2.23

Figure 21: Comparison of overall grade points earned.
Note. Total of 178 students attended SI for Psychology 101 during winter quarter 2009-10 and a total of 162 students attended SI for Psychology 101 during winter quarter 2010-11.

The SI program data breaks down the FDR in relation to the professor. This function allows the SI program to monitor and assess the individual impacts that the SI leaders have on the students attending their sessions. On the other side of this data is the option to track the difficulty of particular courses in relation to the respected professors. For this research, the data in Figure 21 displays the academic achievement for the students attending Psychology 101 during the winter quarters of 2009-10 and the 2010-11

academic year. The data provided in Figure 21 compares the academic results of students that completed Psychology 101 with the same professor and with the same SI leader. Increasing attendance to SI sessions is something that the SI program always strives to do. When discussing a possible increase in attendance, there are two perspectives from which you can look, each of which represents an increase in attendance. One of the perspectives examines the attendance through contact hours while the other looks at the overall number of students attending SI; each perspective can represent an increase in attendance. Figure 22 shows collected data that reflects the attendance that is only relevant to the particular SI leader and professor used in the research.

Number of…	**2009-10**	**2010-11**	**Change (Hrs.)**
Contact Hours	656	1,023	+367.0
Students attending SI for Psychology 101	178	162	-16.0
Contact Hours Per Student	3.7	6.3	+2.6

Figure 22: Comparison of contact hours.
Note. Total of 178 students attended SI for Psychology 101 during winter quarter 2009-10 and a total of 162 students attended SI for Psychology 101 during winter quarter 2010-11.

The only variable in the data presented in the implementation of the web application during the winter quarter 2010-11. Of the two perspectives to examine attendance, the first is the amount of contact hours that the Psychology 101 SI leader was able to generate. The term contact hour refers to the total number of hours in which

students were exposed to their SI session. Figure 22 displays the total number of contact hours accumulated from winter quarter 2009-10 compared to winter quarter 2010-11 from the Psychology 101 SI sessions.

By using the SI program data another population of students can be identified and accounted for, that is the 'Shopper'. The term, 'Shopper' is used by the SI program to identify students that only attend SI one time throughout the quarter. The students could be coming to SI to just get a worksheet for the term review and then leave.

Student's that…	Winter 2009 -10	Winter 2010 - 11	Difference
Attended SI for Psy 101	178	162	-16
Attended SI only once 'Shopper'	57	21	-36
% of 'Shoppers'	32.02%	12.96%	-19.06%
Attended SI more than once 'Repeaters'	121	141	+20
% of 'Repeaters'	67.98%	87.04%	+19.06%

Figure 23: "Repeaters' and 'Shoppers' attending SI for Psychology 101.
Note. The data compares the students that attended SI for Psychology 101 during winter quarter 2009-10 and winter quarter 2010-11.

The students could also be quite competent in the content and just need assistance on a particular problem. In general, the biggest percentage of the 'Shoppers' attends SI on the eve of the first exam. The SI program sees a large population of 'Shoppers' throughout each quarter, but a large percentage of the 'Shoppers' visit SI throughout the first two weeks. The first four weeks will provide the students with an idea of what to expect from

the program throughout the quarter. Although the students may only come to SI once throughout the quarter, that population is still important to the success of the SI program in general. Figure 23 displays the change in the number of 'Shoppers' from winter quarter of the 2009 – 2010 compared to the 2010 – 2011 winter quarter that was exposed to the web application. As a result of a change in the number of 'Shoppers' the percentage of 'Repeaters' changed.

Google Analytics

The researcher developed the web application with embedded Google Analytics (GA) to assist in tracking the users throughout the research. This is not an IRB issue, as GA doesn't provide users with any type of tracking information. The information provided by GA doesn't include names, IP addresses or any other personal data that could be viewed as a potential IRB issue. The use of GA only provided the researcher with aggregate information to be used in the research. At the conclusion of the research, GA produces data reports that allow the user to view the usage reports from specific amounts of time. The researcher produced reports to display:

- Visitors Overview, which displays the total data collected from the web application. The visitor's overview provides information that includes the total number of visits recorded, the number of unique visitors, and total page views, as well as additional information (See Appendix F).
- Visits for all visitors, which displays the time of day in which student's visited the web application. This data provides the researcher with important information for future developments. The data shows that students access the web application

more between the hours of 3:00pm – 6:00pm (See Appendix G). The SI sessions for Psychology 101 typically started at 6:00pm.

- Mobile Devices, which displays the amount of access to the web application via mobile devices. The mobile devices data shows the different devices by which the web application was accessed, as well as the number of visitors from each device (See Appendix H). The most common device used by students visiting the web application was the iPhone with 59 visits, the second most used device was the iPod (14), with the Android (11) and iPad (4) rounding out the four most widely used devices.

Quiz Revolution

Quiz Revolution is a customizable, HTML-based embeddable quiz. Having an HTML-based quiz was important because mobile Apple products, such as the iPhone, iPad, and iPod, do not support Adobe Flash. Quiz Revolution was used to create interactive quizzes that were embedded into the Psychology 101 web application. The researcher created the quizzes and the questions were taken directly from the textbook. Prior to the students using the quizzes, the Psychology 101 SI leader would review the questions to ensure the content was relevant and important to the course content.

There were five exams that took place throughout the quarter. The Quiz Revolution practice exams were first introduced prior to the second Psychology 101 exam. The practice exams ranged from 20-27 questions and were accessible from any device that had a connection to the Internet. The practice exams were only available to the students attending SI for the Psychology 101 course with the web application. The

researcher created each of the practice exams, with all of the questions being formulated directly from the Psychology 101 textbook. Within the Quiz Revolution program, there is a section that tracks the number of users accessing the practice exams. At the conclusion of winter quarter 2010-11, a screenshot was taken of the Quiz Revolution user results (See Appendix I). There were a total of 883 practice exams that were taken by the students attending the Psychology SI session.

Discussion

This section will go through each section of the research presented and discuss the results and their impact on the research. The section will discuss additional variables that may have impacted aspects of the research.

The Surveys

Each one of the surveys used in the research was carefully designed to identify particular aspects of the SI program and the student's that attend. The questions were designed to provide the researcher with a clear idea of how the student's perceive the SI program and the potential impact it can have academically. While the questions were designed to gauge the perceived impact of the web application, the questions could also inaccurately gauge the same perceived impact. Every student that participated in the research did so willingly and answered the questions the same. While the students willingly answered the questions, there were no factors in place to hold the students accountable in their responses. The only area that this could have potentially impacted the research was in the perceived impact of the web application on their increased academic achievement.

SI Program Data

Each quarter the SI program uses highly qualified students to serve as SI leaders. Every SI leader has successfully completed the course they are facilitating with at least a B+. While every SI leader meets a certain criteria to become a leader, the same can't be said for the instructors that teach the courses the SI program covers. This isn't suggesting the teachers are poor instructors, in fact it means the opposite. Each instructor at the university setting is an incredibly intelligent instructor, having said that, each instructor has a different style when it comes to instructing. When conducting research on university courses the impact of different professors can prove to be a difficult variable to manage. For the Psychology 101 course on which this research took place the professor leading the course has seen students receive lower marks in the course (2.17 GPA) compared to other Psychology 101 professors (2.96 GPA) (See Appendix J). This is a potential factor in the outcome of the research presented.

The SI program is able to generate important pieces of data to help support its program. Each quarter data is produced to represent the final course grades for all the students that participate in each course covered by SI. The Si program never sees the individual students grades, rather the data represents the results of the entire class condensed. This data allows the SI program to view the overall impact of SI. One issue with the data that is provided from the SI program is the lack of value added data. From the SI data the students mean course grade can be viewed. While the final course grade may be a good indicator of how well the students have performed, it doesn't represent the true impact of the SI program on the students.

Google Analytics

The Google Analytics (GA) program provided a useful tool to assist the researcher in the collection of critical data. GA allowed the researcher to uncover important information that otherwise would have been an answer submitted at the student's discretion. Since this research was designed around the implementation of a web application it would be difficult for a researcher to truly gauge the use and impact. With nearly every student now owning a laptop or a smartphone, there is a need for a device to track student's mobile usage of technology. GA allowed the researcher to accurately monitor a variety of features within the web application.

When developing the web application careful thought was given to different functions available within the web application. Some of the most important features, such as the YouTube videos and the study guide pages could not be monitored for the number of students that actually utilized the features. Other features, such as the poll questions, the practice exams developed through Quiz Revolution, and the discussion forum all had ways of identifying the number of student's using the feature. GA assisted the researcher by monitoring those features that previously wouldn't have been monitored.

While GA provided the researcher with immense amounts of data there is one issue in the system. Whenever a user visited the web application, GA would make a note of the computers IP address and would add that user to the database. Every time that user would access the web application GA would recognize that user and would simply log that new visit with that returning visitor. It is here where the issue lays; GA recognizes users when they return using the same device. Since the web application didn't require

users to login, no database was created to monitor the particular user. Without a personalized login, a user could access the web application from their smartphone, laptop, desktop, and a friends' computer and all four visits would be registered as a unique visitor. Now, most people wouldn't be accessing the web application from four or five different locations, but it is possible that student's could access the web application from two locations, smartphone and laptop. With nearly every student now owning a laptop, it isn't too far away that every student will own a smartphone, which could pose potential problems with the count.

Regardless or how student's accessed the web application, GA provided crucial information to the researcher to evaluate the usage of the web application. GA allows the researcher to identify when the web application was accessed most often and when student's rarely visited. This information allowed the SI leader to know when to post new content because of an increased possibility that students would see the information.

Quiz Revolution

One of the popular features within the web application was the practice exam that was available before each of the exams. Practice exams were prepared and accessible to the students throughout the 11 weeks of the quarter. The Quiz Revolution program allowed the researcher to monitor the overall usage of the quizzes posted. One feature of Quiz Revolution that limited the data collected was the manner in which the program monitored the quizzes attempted. Each time a student would access the practice exams, Quiz revolution would mark that student down as attempting that exam. If that same student wanted to attempt the exam again, the program would again mark down that a

student attempted the exam. The program wasn't able to properly identify the number of individual students that accessed the practice exams; rather it provided a sum of the students that attempted the practice exams.

Chapter 5: Conclusions and Recommendations

Review

On January 3, 2011, the Mobile SI web application was introduced to the Psychology 101 students at a large Midwestern University. The web application was designed with hopes of assisting students in the Psychology 101 course to achieve academic success. Each day the web application would have an updated Twitter feed notifying the students of important information and updated scheduling. The study guide page would be updated at least three times a week to provide the students with relevant and up-to-date content to prepare them for their exams. Each time the Psychology 101 students would have an exam, the researcher would prepare and publish a practice test via Quiz Revolution and embed the quiz within the web application. Throughout the individual SI sessions for Psychology 101 the SI leader would utilize PollEverywhere.com to post up poll questions for the students to text message in their responses. Each day the students would have access to pages upon pages of content and knowledge to help promote a positive academic environment. On March 11, 2011, the Mobile SI web application was updated for the last time during winter quarter, thus concluding the research.

Although the research may have ended, the work was just about to start with the analyzing and tabulating of data. The first piece of data to analyze came in the form of three surveys that had been created by the researcher. Each survey provided the researcher with important aspect of the population that was used during the research. The surveys looked at the amount of the student population that owned a cell phone, laptop,

or tablet PC. Other questions from the surveys looked at the population's usage of the Internet and whether the Internet usage was through a laptop or a smartphone. The surveys looked at the students' perceptions of the Psychology 101 course that was being researched. Each survey provided that researcher with important data as to what type of students used the SI program and what characteristics of the population should be focused upon in the web application. After reviewing the surveys that had been collected, the researcher began to examine the SI program data. The SI program data provided the researcher critical pieces of data, such as the frequency distribution reports, contact hours, and the mean of the academic achievement for the students participating in the research. The final piece of data was analyzed was the information collected by Google Analytics (GA). GA collected a variety of information ranging from the number of visitors to the web application, time of visits, number of unique visitors, and number of mobile devices used to access the web application. The information provided by GA allowed the researcher to determine what mediums were most useful when accessing the web application and what web pages were the most popular amongst the students attending the SI sessions using the web application. GA results showed that 94 people visited the web application via their smartphone. While the 94 people represent a small sample, it is encouraging to see that there are students that were enthusiastic about their education and utilized the web application.

Conclusions

Designing and developing a web application is no easy accomplishment. This can be seen by the immense amount of data and work provided by the researcher. Each day

the web application took on a life of its own, with constant updates and maintenance. With each new document and post that was made hundreds of people had to be considered to ensure that the information was being presented correctly and efficiently. Not only did the researcher have to work with the Internet on a daily basis, the SI leader also had to be consulted to distribute the correct information, playing an equally important role in the process were the students which were directly affected by each and every step that was taken throughout the research, and the final player in the equation was the professor of the Psychology 101 course.

With every type of research there are limitations that can come into play, this research was no different. There were a variety of limitations that could have made an impact on the outcomes and conclusions. The most important limitation to note is the use of historical data. The results of the web application were compared to a previous school year. With this historical gap in the data, other variables could have affected the research. The other limitations were the samples, which were taken throughout the research. The first pilot survey that was administered was given to a different group of students that were given the first and second sample surveys.

With all of the research completed and the data all recorded it is now possible to look back at the original research question laid out at the start:

How does the use of a web application impact academic performance and attendance in Psychology 101 courses?

A. The data suggests there was an increase in student attendance following the implementation of the SI web application. As discussed,

the concept of increase attendance can be viewed through two different lens. While the total number of students attending SI decreased a small amount, the total number of contact hours increased by 367 total hours, which averages out to 6.3 hours per student attending SI. Determining an improvement in academic performance is a difficult statement to confirm. The research showed a slight increase in the final course grades for all the students in Psychology 101, which attended SI, which utilized the web application during the winter quarter 2010-11 compared to the students that took Psychology 101 and used SI during winter quarter 2009-10 with the same professor. Following the trends in the data from the previous two questions, there seems to be a connection between the implementation of the web application and increased attendance and improved academic performance. The SI web application was merely a small variable that was placed into the Psychology 101 SI course.

Every SI leader brings a different set of skills and attributes to the SI program; the same thing can be said for each student that attends an SI session. The constructivist theory suggests that individuals are each unique leaner's with equally unique needs (Fosnot, 2005). The research conducted on the Psychology 101 course displayed the truly unique needs that students have, in particularly at the university level. Regardless of gender, academic standing, or ownership of technology, all students have unique needs that should be met by every aspect of the university experience. Although the web

application is only a small piece of technology, the application provides students with a variety of unique and varied styles of learning. Each varied and unique style allows students of all learning styles to find something beneficial within the web application, be it the YouTube videos, the Quiz Revolution practice exams, or the PollEverywhere questions.

Laptops and mobile phones have become increasingly more popular in the last few years. With every student owning a cell phone and nearly every student owning a laptop (Figure 6), developing and implementing a pilot program makes sense. The SI web application falls in line with numerous other pilot programs that have taken place across the United States at Large Universities. Programs such as the iPod Touch Project, iPodagogy Project, and the Global Mobile Learning Project all guided the SI web application in its development and implementation. Following the models of previous pilots along with the idea of "current college students have never known a time before cell phones" the SI web application came to fruition (McKinney, Dyck, & Luber, 2009, p. 623).

Recommendations

Regarding the implementation of the web application, the web application should be given more time for development and critique. The web application used in the research was developed around the results of the pilot survey and no additional input was taken in the development. Once developed, the web application was set in place and the to alter the web application in any major way was not an option. Although two

instructional design models were used throughout the research, the web application was never thoroughly evaluated and modified.

In introducing a web application to college-aged and non-traditional students, there is a need for training. The web application was designed to be as intuitive as possible; however, there were numerous features of the web application that were not utilized due to lack of application knowledge. A small training program could be presented during the first week of the SI sessions to provide the students and SI leader with an overview of the features available and how to properly access the features. To ensure that the training provided is sufficient a formal evaluation could be given to the participating students.

The final recommendation concerns the constant evolution of technology. The web application used during the research was considered to be new technology for the Supplemental Instruction program. While the technology may have been considered new to the program, the concept of the web application is evolving along with today's technology. As the technology continues to change the SI web application will need to evolve as well. Smartphones and other mobile devices are here to stay and students will continually desire additional mobile applications. The SI web application is only a small step towards bringing the SI program up-to-par with today's evolving technology.

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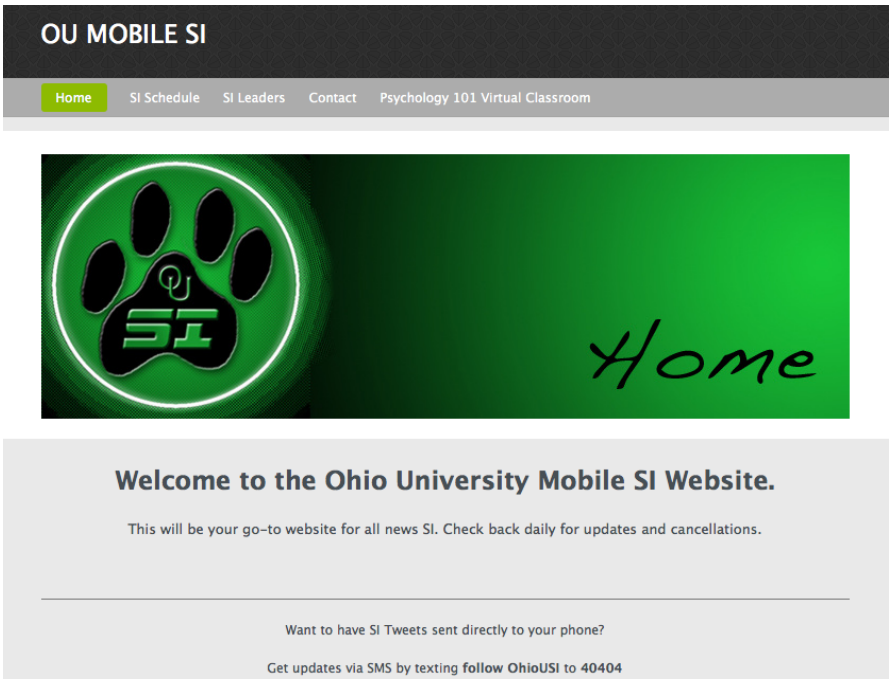
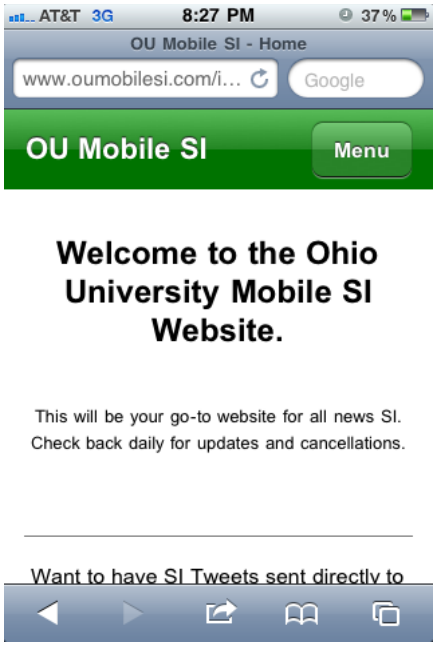
Appendix A: OU Mobile SI Screenshots



Original Screenshot of OUMobileSI.com



Original Screenshot of OUMobileSI.com - Mobile Version

Appendix B: Mobile SI Pilot Survey #1

Mobile SI Survey #1

Please circle the response that best applies to the questions below.

Gender: Male Female

Education Standing: Undergraduate Graduate Other

Do you own a cell phone? Yes No

Is your cell phone a smartphone? (Internet access) Yes No Unsure
(i.e. iPhone, Droid, etc.)

Do you access the Internet from your smartphone? Yes No

How often do you access the Internet from your smartphone?

Never Few times a week Once a day Multiple times a day

If any, what kind of computer do you own?

Laptop Desktop Both Neither

Do you own a tablet computer? (iPad, etc.) Yes No

How often do you access the Internet? (Overall Usage) – select one only

Never Few times a week Once a day Multiple times a day All the time

How often do you attend SI? (Please be honest, this is very helpful)

First time Once before 2-3 Times 4 or more times

Would you access an SI mobile website that provides study guides, podcast and videos provided by your SI leader?
(Similar to blackboard, but only SI content)

Yes No Maybe

Please list functions you would like to have on an SI mobile website? (Email, text messaging, poll questions?)

- Use back of paper if more space is needed

Appendix C: Mobile SI Survey #2

Please circle the response that best applies to the questions below.

Gender: Male Female

Education Standing: Undergraduate Graduate Other

What is your expected grade in Psychology 101 this quarter?

A B C D F

Do you own a cell phone? Yes No

Is your cell phone a smartphone? (Internet access) Yes No Unsure
(i.e. iPhone, Droid, etc.)

Does your cell/smartphone allow text messaging (SMS)? Yes No

Do you use text messaging? Yes No

If any, what kind of computer do you own? Laptop Desktop Both Neither

How often do you access the Internet? (Overall Usage via smartphone/computer) – select one only

Never Few times a week Once a day Multiple times a day All the time

How often do you plan on attending SI? (Please be honest, this is very helpful)

1-3 Times 4-7 Times 8-11 Times 12 or more times

Will you access the OU Mobile SI website that provides study guides, practice test and videos provided by your Psychology 101 SI leader? (Similar to blackboard, but only SI content)

Yes No Maybe

Please list any additional functions you would like to have on the OU Mobile SI website?
(Examples: Email, poll questions, Facebook account, Chat room)

Appendix D: Mobile SI Survey #3

Please circle the response that best applies to the questions below.

Gender: Male Female

Education Standing: Undergraduate Graduate Other

What is your expected final grade in Psychology 101 this quarter?

A B C D F

What was your expected grade in Psychology 101 at the start of this quarter?

A B C D F

Did you use the OU Mobile SI web application throughout Psychology 101?

Yes No

Do you believe that OU Mobile SI web application helped improve your Psychology 101 final grade? Yes No

How much do you believe your grade improved as a result of the OU Mobile SI web application?

None Half a letter grade A full letter grade More than a full letter grade

How many times did you attend SI throughout the quarter?

1-3 Times 4-7 Times 8-11 Times 12 or more times

How many times did you use the OU Mobile SI web application throughout the quarter?

1-3 Times 4-7 Times 8-11 Times 12 or more times

Through what device did you access the OU Mobile SI web site?

None Smartphone Computer (Laptop/Desktop) iPod Touch
Other_____

What functions of the OU Mobile SI web application did you find most useful?

Least useful?

What other functions would have like to have seen used on the web application?

Appendix E: Frequency Distribution Reports

Frequency Distribution Report For:
PSY 101 Fall 2010

Group	No. of Students	Pct. A's & B's	Pct. C's	Pct. D's, F's & W's	Mean Final Course Grade
No Attends	482	40.25%	25.52%	34.23%	C+
Attendees	228	38.16%	32.02%	29.82%	C+
Attend 1 - 3	147	34.01%	30.61%	35.37%	C
Attend 4 - 7	41	39.02%	29.27%	31.71%	C+
Attend 8 - 11	19	36.84%	47.37%	15.79%	C+
Attend 12 or more	21	66.67%	33.33%	0.00%	B

Frequency Distribution Report For:
PSY 101 Winter 2010

Group	No. of Students	Pct. A's & B's	Pct. C's	Pct. D's, F's & W's	Mean Final Course Grade
No Attends	485	58.35%	21.24%	20.41%	B-
Attendees	291	51.20%	30.58%	18.21%	B-
Attend 1 - 3	209	47.85%	32.06%	20.10%	C+
Attend 4 - 7	50	50.00%	30.00%	20.00%	C+
Attend 8 - 11	19	68.42%	26.32%	5.26%	B+
Attend 12 or more	13	84.62%	15.38%	0.00%	B+

Frequency Distribution Report For:
PSY 101 Spring 2010

Group	No. of Students	Pct. A's & B's	Pct. C's	Pct. D's, F's & W's	Mean Final Course Grade
No Attends	331	45.62%	29.61%	24.77%	C+
Attendees	56	48.21%	28.57%	23.21%	C+
Attend 1 - 3	48	45.83%	27.08%	27.08%	C+
Attend 4 - 7	4	50.00%	50.00%	0.00%	B-
Attend 8 - 11	4	75.00%	25.00%	0.00%	B+
Attend 12 or more	0	0.00%	0.00%	0.00%	N/A

Frequency Distribution Report For:
PSY 101 Fall 2011

Group	No. of Students	Pct. A's & B's	Pct. C's	Pct. D's, F's & W's	Mean Final Course Grade
No Attends	483	42.44%	25.47%	32.09%	C+
Attendees	251	54.18%	29.08%	16.73%	B-
Attend 1 - 3	101	45.54%	31.68%	22.77%	C+
Attend 4 - 7	67	43.28%	34.33%	22.39%	C+
Attend 8 - 11	33	66.67%	24.24%	9.09%	B
Attend 12 or more	50	78.00%	20.00%	2.00%	B+

Frequency Distribution Report For:
PSY 101 Winter 2011

Group	No. of Students	Pct. A's & B's	Pct. C's	Pct. D's, F's & W's	Mean Final Course Grade
No Attends	501	50.10%	20.56%	29.34%	C+
Attendees	269	57.99%	23.42%	18.59%	B-
Attend 1 - 3	155	60.65%	24.52%	14.84%	B-
Attend 4 - 7	53	43.40%	24.53%	32.08%	C+
Attend 8 - 11	28	64.29%	21.43%	14.29%	B-
Attend 12 or more	33	63.64%	18.18%	18.18%	B

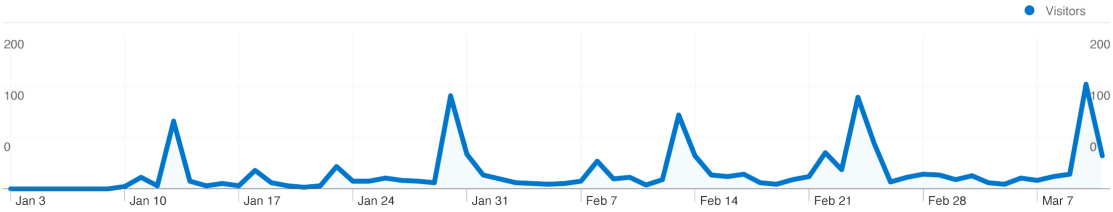
Appendix F: Overview of Visitors

www.oumobilesi.com/index.html

Visitors Overview

Jan 3, 2011 - Mar 11, 2011

Comparing to: Site



464 people visited this site

2,739 Visits

464 Absolute Unique Visitors

6,164 Pageviews

2.25 Average Pageviews

00:02:33 Time on Site

47.75% Bounce Rate

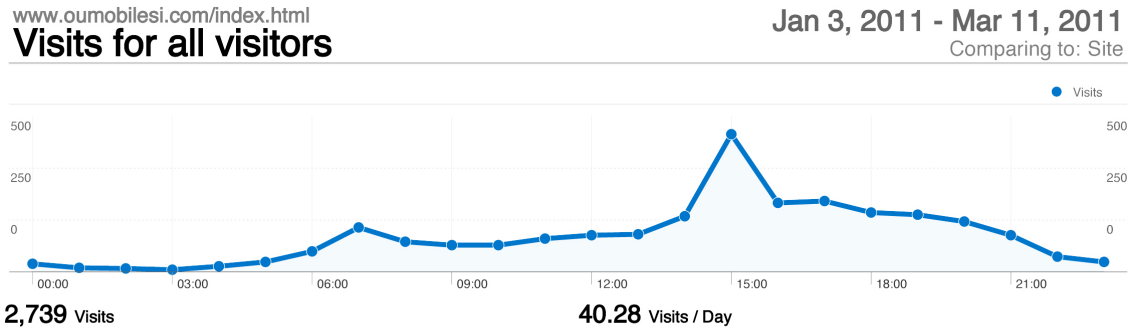
16.94% New Visits

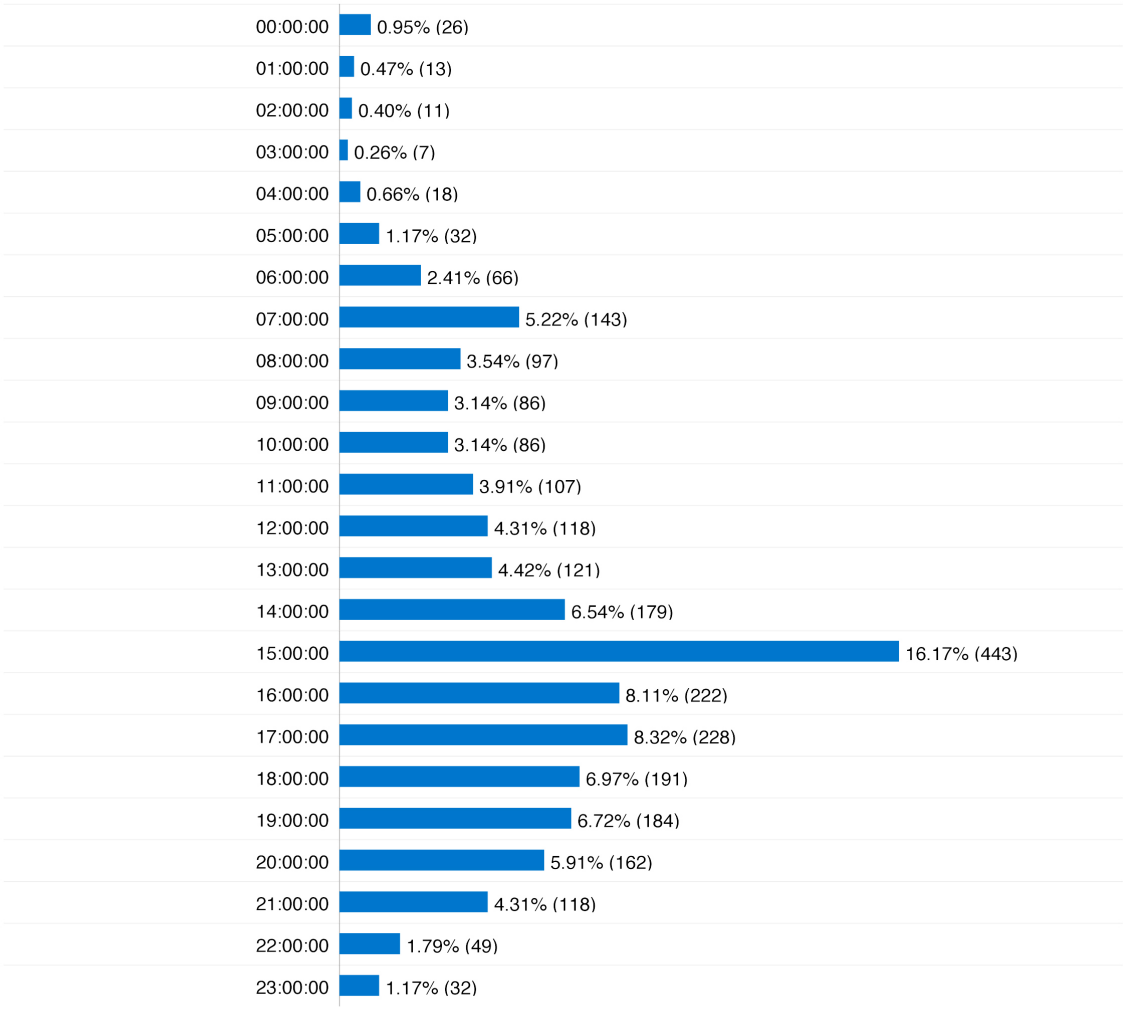
Technical Profile

Browser	Visits	% visits
Safari	1,502	54.84%
Firefox	614	22.42%
Internet Explorer	400	14.60%
Chrome	216	7.89%
BlackBerry8530	2	0.07%

Connection Speed	Visits	% visits
T1	1,600	58.42%
Unknown	1,044	38.12%
Cable	85	3.10%
DSL	10	0.37%

Appendix G: Time of Visits





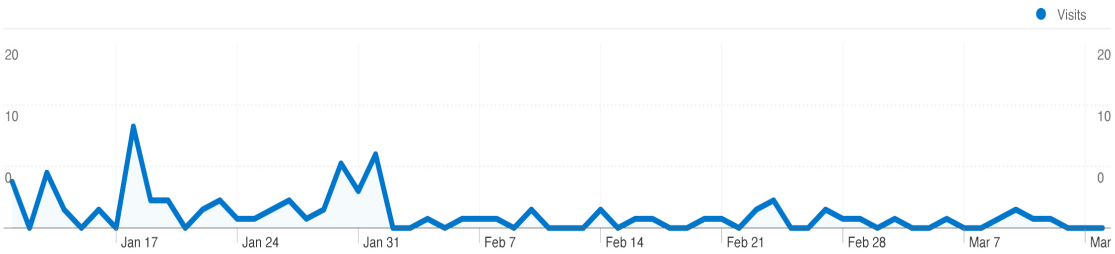
Appendix H: Mobile Devices

www.oumobilesi.com/index.html

Mobile Devices

Jan 11, 2011 - Mar 15, 2011

Comparing to: Site



These mobile devices sent 94 visits via 7 operating systems

Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
94	2.54	00:02:18	34.04%	48.94%
% of Site Total: 3.30%	Site Avg: 2.20 (15.74%)	Site Avg: 00:02:26 (-5.99%)	Site Avg: 16.23% (109.78%)	Site Avg: 49.84% (-1.82%)

Operating System	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
iPhone	59	2.02	00:01:39	16.95%	55.93%
iPod	14	2.50	00:03:59	35.71%	50.00%
Android	11	5.18	00:04:30	81.82%	45.45%
iPad	4	3.00	00:01:05	75.00%	0.00%
BlackBerry	3	3.33	00:00:55	66.67%	0.00%
Windows	2	2.00	00:00:44	100.00%	50.00%
LGE	1	2.00	00:04:16	100.00%	0.00%

1 - 7 of 7

Appendix I: Quiz Revolution Results

Title	Date Created	Participants	# Questions
Psy 101 - Exam 2	2011-01-21	228	27
Q1. The focusing of light waves from objects of different distances directly on the retina?			
Play Quiz Edit Deactivate			
Psy 101 - Exam 3	2011-02-13	95	27
Q1. The disruptive effect of new learning on the retrieval of old information.			
Play Quiz Edit Deactivate			
Psy 101 - Exam 4	2011-02-20	259	20
Q1. The knowledge that an object exists indepedent of perceptual contact with it.			
Play Quiz Edit Deactivate			
Psy 101 - Exam 5	2011-01-11	301	23
Q1. A process used by the ego to distort reality and protect a person from anxiety			
Play Quiz Edit Deactivate			

Appendix J: Professor GPA Comparison

	Grade Results from Winter Quarter 2010		
	Researched Psychology 101 Professor		Other Psychology 101 Professor
12 or More Times	3		2.67
8-11 Times	2.74		3.48
4-7 Times	2.21		3.08
1-3 Times	2.05		2.91
Overall	2.17		2.96

This displays the number of times students attended SI compared to the final grade results from two different Psychology 101 professors.