

Wireless Content on the University of Wisconsin-Stout Campus

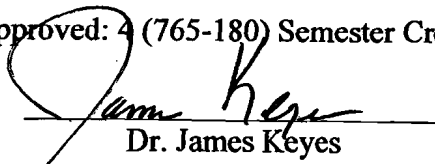
by

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A handwritten signature in black ink, appearing to read "James Keyes", is written over a horizontal line. The signature is stylized and cursive.

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ABSTRACT

UW-Stout provides wireless internet access to all users in academic buildings throughout campus. The wireless internet access throughout campus provides many educational opportunities and learning benefits for faculty, staff and students. UW-Stout does not block content from users on the wireless network, but restricts bandwidth to programs that have been known offenders of federal copyright laws.

The University of Wisconsin-Stout has a successful laptop implementation in place since 2001 where students were required to buy laptops based on their academic major and moved to issuing laptops to all undergraduate students registered for three or more credits in 2002.

The literature review provided an information background on laptops in a higher education classroom setting, benefits to students who have laptops and negatives of laptops in the classroom. The goal of the literature review is to provide a well rounded discussion and

review of benefits of laptops in the classroom and the distractions laptops create while being utilized.

The data collected did reveal a significant amount of non-academic content being accessed on the wireless network and also revealed that students utilized the course management tool, D2L as the number one destination for academic content. The data also revealed that a significant number of users utilize an instant messaging program while utilizing the wireless network in academic buildings at UW-Stout.

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Chapter I

Introduction

As laptop computers become more and more common in higher education institutions, universities are trying to find ways to incorporate the laptop into the classroom and have them to engage student learning. With the addition of wireless internet connected laptops in the classroom as a learning tool, instructors and students are faced with new challenges.

Wireless networks are no longer experimental. They have been built into school classrooms and libraries where students can wander virtually anywhere on campus and be connected. (Olsen, 2002)

UW-Stout's goals include utilizing technology to create a student-centered environment where active learning is the core approach to acquiring concepts, processes and attitudes that become lifelong habits in each student's life. Through the e-Scholar Program, UW-Stout plans to continue to improve the quality and promote excellence of teaching and learning at undergraduate and graduate levels (e-Scholar, 2007). With laptops issued to each student at UW-Stout, students now have access to an unlimited amount of information anywhere a wireless internet connection exists. With this access, students can easily use the laptops for purposes in addition to the designated learning tool they were intended to be used for in the classroom. This problem exists in the classroom setting where students can peruse the internet and instant message with friends while they should be using the laptop for taking notes and working on class activities.

This is a relatively new situation on the UW-Stout campus. "Students enrolled in three or more credits receive a laptop, and the cost is included in the tuition for attending UW-Stout" (UW-Stout, 2007). Ten years ago, it was rare for a student to have a laptop computer.

Many students likely had desktop computers at home or in their dorm rooms. As technology has progressed, laptops have become a daily necessity and many instructors require students to bring the laptops to class. As the internet continues to grow and faster connections emerge on campus, students are bombarded with multiple opportunities for distractions. With multiple instant messaging programs, various versions of web-based emails and sites that offer streaming videos, students can easily sit in class and not engage in the content being presented. Of all the content on the wireless network, how much of it is academic based and how much is non-academic based? Of all the connected users in this study, how many students utilize an instant messaging program and if so, what programs are being utilized? Knowing what students are being distracted with, such as particular websites, instant messaging applications and file sharing programs, faculty and staff can come up with new approaches to help ease and control distractions and help with the creation of policies that pertain to laptops in the classroom without giving up a valuable learning tool.

Statement of the Problem

Within a wireless campus, what online content is being accessed and obtained, and what percentage of users are utilizing an instant messaging program on wireless internet accessible laptops in an academic classroom setting? Determining the type of content being accessed and how many students use an instant messaging program during class can help faculty and staff better understand what actions can be taken to help improve student engagement and implement network guidelines and policies.

Purpose of the Study

The purpose of this case study is to determine what content is being viewed and accessed by students on the wireless network at UW-Stout during academic hours within academic buildings. With these findings, UW-Stout can assess the content being accessed by students and provide more opportunities for faculty, staff and students to help ease distractions and provide an online experience that is rewarding to all who utilize it in various forms.

Assumptions of the Study

Assumptions of this study include; students utilizing the wireless internet access during class for academic reasons, instructors and staff encourage laptop usage in the classroom, information obtained about network content will be easily understandable for first-time viewers, data collected represents “normal” wireless activity, and data on wireless activity includes all users.

Definition of Terms

Engagement

Emotional involvement or commitment (Merriam-Webster, 2006)

Wireless Network

Any type of network that is wireless, the term is most commonly use to refer to a telecommunications network whose interconnections between nodes is implemented without the use of wires, such as a computer network (Wikipedia, 2007)

Internet Protocol (IP) Address

An IP address is a 32-bit number that identifies each sender or receiver of information that is sent in packets across the Internet. When you request an HTML page or send e-mail,

the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator (URL) you requested or in the e-mail address you are sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received. An IP address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network. On the Internet itself - that is, between the routers that move packets from one point to another along the route - only the network part of the address is looked at. (Wikipedia 2007)

Millennial Generation

Students born in or after 1982 described as having a focus on social interactions and 'connectedness' with friends, family and colleagues. (Strauss, 2000)

Limitations of the Study

Limitations of this study include that this is a case study so only one organization is being reviewed. The results may not demonstrate any type of cause-effect analysis. Wireless content was gathered during a four week period of time. Results may not show the entire scope of content being accessed on the wireless network throughout the entire academic year. This case study is limited to UW-Stout during February 12, 2007 through March 9, 2007. The case study will not cover who is responsible for student engagement in classrooms that have wireless connections at UW-Stout.

Methodology

The design for this research was a qualitative research design using a case study approach. It was the goal of the researcher to determine what content was being accessed on the wireless network at UW-Stout during core academic hours.

Summary

This chapter laid out the statement of the problem, the purpose of the study and assumptions of the study. This chapter also defined terms used in the paper, and included limitations of the study and the methodology for the research.

Chapter II

Literature Review

Introduction

According to Young (2006) “Laptop computers equipped with wireless network accessibility are increasingly common in college and university settings. Their presence has brought about significant changes in the way instruction is planned and delivered” (p. 27).

Wambach (2001) states:

What makes it different is not individual possession of a computer, but rather the availability of computers for classroom instruction. But what will ultimately determine the degree of success a 1-to-1 initiative has the quality of professional and curriculum development a school provides to support teachers in integrating computers into instruction. (p.58)

Brown (1998) states:

During the 1990’s, notebook computers became the most popular on campuses with new universal computer requirements. Eleven institutions, beginning with George Fox University in 1991, started issuing notebook computers to successive freshmen classes. In this way, a campus becomes a notebook university over a period of several years. Wake Forest University, West Virginia Wesleyan University and Seton Hall University all follow this model. (p.2)

Brown (1998) also states:

In 1993, the University of Minnesota-Crookston was the first institution to distribute the same model of notebook computers to all students and faculty. Three or four years passed before Valley City State University and Mayville State University in North Dakota, Waldorf College of Iowa, and Clayton College and Floyd College in Georgia joined the ranks of notebook campuses. (p.2)

Laptops at UW-Stout

Introduction

In 2000, the University of Wisconsin-Stout (UW-Stout) began a pilot program that introduced laptops to students who were part of the Graphic Communications Management and Technical Communications Management academic majors on campus. Students in those majors were required to buy a Macintosh laptop from the University Bookstore.

During the pilot program, UW-Stout also had several people that formed teams and visited other college campuses in the region to observe their programs and how they operated. During 2001, information was gathered from other universities that had a laptop program in place, committees were then formed to determine curricular and budget implications of students having laptops at UW-Stout. Over the next several years, UW-Stout developed an implementation plan to distribute laptops to more and more students eventually including all undergraduate students registered for three or more credits would be issued a laptop.

UW-Stout Laptop Implementation Timeline

In 2002 about 1250 freshmen at UW-Stout were issued a laptop. This was the first large group of students who were issued a laptop based on class standing status. Beginning the fall semester of 2003, all freshmen, sophomores and re-entry students with less than 59 earned credits were issued a laptop. The following year, all freshmen, sophomore, junior and re-entry students totaling about 3,900 students were issued a laptop. About 5,900 students which included freshmen, sophomore, junior, senior, special students, all re-entry/transfer students, and continuing education students were issued a laptop for the fall 2005 semester. At this time, graduate and customized tuition students are not eligible for the laptop program. According to Joan Wahl (personal communication, April 13, 2007) stated that "UW-Stout has approximately 6,392 students with laptops as of April, 13, 2007." This number was an approximation, since it fluctuates on a daily basis as students transfer to and from UW-Stout.

Advantages of Laptops at UW-Stout

Several positive aspects of the laptops on campus were found on the UW Stout e-Scholar website (2007) which states:

Pass rates and withdrawals from targeted classes designated by the Provost's council as appropriate courses for analysis include; Chemistry-115, Math-120, Biology-122 and Psychology-110 have improved since the e-Scholar program implementation.

Before the use of laptops in 2000/2001, 82.6% of students passed with a C- or better in the Provost's designated courses for analysis and 84.0% students with laptops passed with a C- or better in the same designated classes in 2002/2003.

Faculty indicates that students seem more active, independent and willing to challenge themselves to find answers.

Students use their laptops more than originally expected for school work, taking notes, research and accessing the web; as a learning tool; for personal use and entertainment; and for email and keeping in touch with one another.

From the moment students that live on-campus get up in the morning to the time their head hits the pillow at night, they can be connected to the internet via the laptops. Students can be up late after the library and computer labs have closed busy doing research for a paper due the following morning. Students can be checking e-mail from friends and family hundreds of miles away while sitting at a picnic table in the warm September sun or legally downloading the latest album from their favorite band while waiting for class to start. The laptop can be used for more than just academic purposes, the laptop can be used in times of crisis according to Chancellor Sorenson (UW-Stout, 2007) he states: "We also should realize that students at UW-Stout carry with them a very important piece of equipment in the event of a crisis at UW-Stout: their laptop."

Disadvantages of Laptops at UW-Stout

With access to the internet in most classrooms, students can easily be tempted and distracted from normal classroom functions to use the laptop for various other activities. Very little information is published on the content students are accessing while using the laptops during class. According to an anonymous UW-Stout professor (personal communication, February 13, 2007) he states:

“I see students checking email, using instant messenger programs, and playing online video games while sitting in class. I think it is very distracting to other students who are trying to concentrate on the coursework being taught. Laptops can also distract other students sitting nearby listening to the clicking sound of the keyboard as fellow classmates chat via instant messenger programs or being distracted by another student playing a game on the laptop. The game may be muted so no sound is being heard, but the graphics on the screen are still just as distracting to others that can view it.”

Network and e-mail availability in class may create problems such as excessive online chatting and computer game playing. (Kontos, 1998) Some students at universities with laptop requirements have complained of “laptop noise.” They find the clicking and clacking of multiple laptops in classrooms and libraries disruptive. (Gates, 1998)

The UW-Stout Data Network

According to Michael Dodor – I.S. Supervisor / Network Specialist at UW-Stout (personal communication, February 6, 2007) states that “Telecommunications and Networking (T&N) does not block content from students, but limits bandwidth to programs such as file sharing applications that could create network congestion and problems and be a violation of copyright laws and the Acceptable Network Usage Agreement set forth by Telecommunications and Networking. Telecommunications and Networking is constantly changing network policy to match the needs of the campus.” Dodor also states: “Peer-to-Peer (P2P) is the biggest offender on campus when it comes to network usage and congestion. Streaming video such as YouTube.com and streaming music from various websites have very little or no effect on network resources at UW-Stout.”

Laptops on College Campuses

By April 2002, approximately 140 institutions in the US, Canada, Japan, Amsterdam, the UK and Australia had embarked on campus-wide technology programs using laptop or notebook computers (Brown, 2002). “ ‘Wow! I wish they had this when I was in school.’ According to Bob Nelson, vice chancellor, Student Affairs, at the University of Minnesota-Crookston, this is the common reaction of parents whose children are enrolled in this pioneering laptop university. This reaction is certainly shared by many parents of students in one of the dozens of laptop schools in the world“(Kontos, 1998).

Introduction

Some colleges and universities have mandated that each student own and bring a laptop computer with a wireless connection to the Internet. (Campbell, 2003). The new laptop wireless environment is proving to be a savings for the school and a convenience for the student. Now that students have access to computers and the internet, they do not have to go to a remote corner of campus to a computer lab. (Campbell) Students can now be connected all across campus. All of these and many other situations are made possible with the wireless network provided to students on a laptop campus. The wireless connection is a valuable addition to the arsenal of tools students have to help in their education. “The motto today is ‘access to information anytime, anyplace,’ and laptops appear to address the issue” (Kontos, 1998).

Laptop Hardware and Software Issues

All students can work on the same hardware and software supported by the laptops that the university has chosen. Some more reasons for considering laptop programs as a viable alternative to desktop computer labs at colleges and universities are the rapid advances in technology and the frequent upgrades of costly equipment that make desktop computer labs expensive to maintain. (Kontos, 1998) “The e-Scholar Program ensures that students and faculty have a standard set of tools - both hardware and software - that meet a majority of their wireless computing needs, thus producing a wireless laptop campus environment. The digital culture at UW-Stout is emerging as a dynamic agent for changing ways we learn. All of our students are provided with the tools that they will need to be technology literate in this environment” (e-Scholar, 2007). A student computer requirement can also mean standardization on hardware and software, which can translate into less complex support from an IT management perspective. Finally, it can also facilitate the negotiation of site licenses that provide significant savings. (Gates, 1998)

Valuable Learning Tool

When students were asked to describe the best thing about having a laptop, students included that it helped them learn computer skills, helped with school assignments, provided access to the Internet, and it helped the students become more organized. Laptop students are highly appreciative of having laptop computers and were taking advantage of its resources for performing and a variety of learning activities both at school and at home. (Lowther, 2001) Students can also get real-time access to instructors and fellow classmates and work collaboratively on an assignment. Students gain the knowledge and skills to work together in

a digital age. "With classrooms, residence halls, offices and other buildings wired for online access, the laptop becomes a focus for teaching, learning, research and communications." (Kontos, 1998) Students now use computers to complete assignments, to communicate with faculty and other students, and to research subject matter using online databases and Web resources. Students critique each other's work and communicate with experts at remote sites by means of online chat sessions. Many textbooks now come with companion tutorials which are computer-based. (Gates, 1998)

Employers now expect students to have a greater knowledge of computer applications and capabilities than ever before. As students enter the workforce upon graduation, many of them will use computer applications for everyday work processes. Young (1997) states: "Employers are demanding that students' fresh out of college have computer skills necessary for everyday uses in the work world" (p.27). Having students already comfortable with computer processes helps employers with reduced training costs and better productivity for workers. "The laptop environment promotes communication and provides learning tools that can be used in class, in the library, at home, at co-op sites and even abroad" (e-Scholar, 2007). Students can share notes with classmates at the touch of a button and download PowerPoint slides to review before an exam on content they may have missed before. As classes dismiss at the end of the day, students and instructors are able to stay in touch with internet connections. Demb, Erickson, and Hawkins-Wilding (2004) state that laptops usable in campus settings outside classroom or library contexts, laptops offer students more opportunities to work on academic projects individually, to support group projects, or simply to explore class work with fellow students "out on the lawn."

Negative Effects of Laptops in the Classroom

“Network and e-mail readily available in the classroom may create problems such as excessive online chatting and computer game playing” (Kontos, 2002).

Schwartz (2003) states the following:

One professor at a law school in Texas became so upset by the level of student distraction in 2001 that he took a ladder to school, climbed up to reach the wireless transmitter in his classroom – and disconnected it. The students protested. The administration told him to plug it back in. But the point was made, he said, and he regained the attention of the class. (p. 2)

With unlimited access to the internet, students can also access any content they want during class. Without regulations or policies on content, students can access sites that may contain questionable materials such as pornography, games and online gambling that other student’s find offensive. Students may find this very distracting and take away from their learning experience. According to Chapter 17 - Student Non-Academic Disciplinary Procedures of the Wisconsin Administrative Code which defines non-academic misconduct as:

“obstructing or interfering with a student engaged in attending class or participating in university-run or university-authorized activities; or knowingly disrupting access to university computing resources or misusing university computing resources.” (p. 4)

Laptop Etiquette

According to the e-Scholar (2007) website, UW-Stout has adopted a Laptop and Electronic Communication Guidelines which provides guidelines for laptop etiquette in classrooms in the list below:

Classroom Etiquette

During class, students should use laptops as a learning tool. Students should:

- During class, students should not check e-mail, browse the Internet, instant message, play games, or perform other off-task activities.
- Engage in class activity actively. This includes making eye contact, paying attention and staying on task. The computer should not become a barrier to one-on-one interaction, but instead should help facilitate the exchange of idea and engagement in the classroom contact.
- Use laptops for specific classroom tasks as assigned by the instructor including taking notes, conducting research required for activities, and other assignments.
- Demonstrate sensitivity to others. Students should not display screen images, including wallpapers and screensavers, which might be distracting or offensive to other members of the class.

Campbell (2003) describes etiquette rules from various professors used at Clemson University in the list below:

- Every cell phone, beeper, laptop volume control, pager, personal digital assistant, should be set to *mute* or *off* before coming to class. If any of these devices rings, beeps or play in class, you will be marked *absent*.
- Bring your laptop to class every day.
- Laptop batteries should be fully charged before coming to class.
- Laptops may not be opened until told to do so.
- Bring your laptop in *sleep* mode to avoid long boot up times.
- If you engage in unauthorized communication or entertainment (surfing, instant messaging, chat room chatting, DVD viewing, music playing, game playing, etc.) during a quiz, you will receive a grade of 0 for the quiz. A second offense will result in a formal written charge of academic dishonesty.
- If you engage in unauthorized communication or entertainment during lecture, you will be marked *absent*.
- If you forget to bring your laptop and a quiz or exercise is given that requires a laptop, you will receive a grade of 0 for that quiz or exercise.
- Do not shutdown your laptop unless the professor grants permission.

Electronic Cheating

New forms of cheating are now being uncovered with wireless connections on laptops and in classrooms. “More students will use cell phones, personal digital assistants, and Internet-connected laptops to cheat during exams” (Read 2004).

Students who take exams or quizzes online that require an open internet connection can also be exchanging answers with other classmates via instant messaging programs or emails. Instructors would need to have a clear view of a student's computer screen to know if he or she was using other forms of communication to possibly cheat on an exam. In large classrooms, this can be a daunting task for instructors to keep track of the student's online activity during an exam. Students can also be copying questions from the exam and saving them for future use or email them to friends or classmates who have not taken the exam yet so they know what content may be included on the exam. Network availability during exams may increase the chance of cheating. (Kontos, 1998). In some laptop universities, online examinations are now replacing more traditional tests. The availability of the university network during examinations may increase cheating or technical problems. (Thomas, 2004)

With access to off-campus email accounts, students could easily transfer data between each other with no electronic trail on university servers or having any fear that administrators would be able to check contents sent in emails should a student be questioned for cheating or sharing data during an exam. In both of these cases, using traditional paper exams may be the easiest way to reduce or eliminate the chances of students cheating or sharing exam content with others. This idea does take away from the idea of being a paperless campus, but may be the easiest way to determine if students really do know the content. With these advancements

have also come the inevitable drawbacks. With ubiquitous connections to the outside world, students have even more resources to share information, knowledge, and work with each other. These same connections also allow students to access unprecedented means for plagiarism and cheating. (Lecher, 2005)

Misuse of computers for the purpose of cheating or plagiarism in courses is covered in Chapter 14 - Student Academic Disciplinary Procedures which defines academic misconduct as:

“an act in which a student: seeks to claim credit for the work or efforts of another without authorization or citation; uses unauthorized materials or fabricated data in any academic exercise; forges or falsifies academic documents or records; intentionally impedes or damages the academic work of others; engages in conduct aimed at making false representation of students academic performance or assists other students in any of these acts.” (UW-System 14.04, Page 33)

Read (2004) has a list of ways to help reduce online forms of cheating.

- Ban electronic equipment during exams.
- Create multiple versions of the test.
- Embrace wireless technology, but control it.

Social Computing vs. Academic Computing in the Classroom

Instructors feel the pressure of laptops in the classroom from the perspective of molding their traditional class content to accommodate the new technology. Instructors also

face the task of trying to keep students on task while giving a lecture or presentation. Students with wireless technology can connect to the wireless network on campus and access the internet, email and instant messaging. Students can be multitasking between taking notes for class and doing some online shopping. In many traditional style classrooms where students face instructors in the front of the room, students now hide behind laptop screens and instructors are unaware of the content being viewed on student's laptops. Phillips (2006) states "students do not need to be online to benefit from factors such as speedier note-taking" (p.20). Instructors may have an easier time keeping students focused and on-task knowing that students are not surfing the internet or chatting with friends via email. Students have plenty of time outside the classroom to catch up on email and check the latest sports scores. While in the classroom, students should be focused on the content being instructed to them. The laptops can make jotting down notes faster and easier to read when its time to review for a test.

On the other hand, instructors want students to have internet access on their laptops. Instructors can set up problems that need to be solved by students by checking out websites of particular organizations to find answers to those problems. Not only does this type of teaching keep students on task, it is also allowing students to get answers to real world problems those organizations face every day. Students may need to look up gross sales for a particular organization for a finance class or may be asked to check prices on equipment for a project simulation. Carlson (2001) states: "With wireless access, students can sit in groups and work collaboratively exchanging notes, work and ideas over the wireless connection." (p.47)

Summary

This chapter covered the topic of laptops on the UW-Stout campus and the implementation timeline of laptops to students. With the implementation timeline, this chapter also covered the advantages of laptops at UW-Stout, disadvantages of laptops on the UW-Stout campus, and the data network on campus. Another section of this chapter covered laptops in general on college campuses. This was broken down into parts about hardware/software issues, laptops as a valuable learning tool, negative effects of laptops in the classroom, laptop etiquette, classroom etiquette and electronic cheating. The final topic in this chapter covered the idea of social computing vs. academic computing in the classroom.

Chapter III

Methodology

Introduction

This study is designed to determine the type of online content being accessed by students on the wireless network in academic buildings at UW-Stout. The data reviewed in chapter 2 revealed that laptops do increase student learning and engagement, but very little data is available to see what students are viewing for online content on the laptops during class. This research will look at online content based on academic and non-academic content plus a combined look at both the non-academic and academic content to show overall standings. Students also use many forms of instant messaging to keep in contact with their peers. This research will also look at how many students are utilizing an instant messaging (IM) program and what programs are being utilized the most during the same time period.

Case Study Approach

The researcher has chosen to use a case study approach for this particular research. The case study is one of several types of research. "Case studies are the preferred strategy when "how" or "why" questions are being posed." (Yin, 2003) A case study in this research will provide an examination of wireless content at UW-Stout. The examination is of the wireless content in academic buildings during academic hours and will result in recommendations and further research by UW-Stout.

Case studies include an in-depth, longitudinal view of one instance or one event or one organization. There is a systematic view of events, collection of data, analyzing of data, and reporting the results. The researcher can gain a heightened view of why an event happened as

it did and what might be important to view in the future. Case studies tend to generate rather than test hypotheses (Case, 2007).

Research Design and Analysis

The researcher developed a case study to determine what wireless internet content is being accessed by students in academic buildings during core academic hours of particular days. There are several tools that can be used when collecting qualitative information. Some of these tools include surveys, focus groups, observations, questionnaires, and interviews. The tool that the researcher chose for this case study was observation. Observations will be made of the wireless network content in academic buildings on the UW-Stout campus. The data from this research will give UW-Stout faculty and staff a better understanding of student online behaviors during class.

Population and Sample

Michael Dodor (personal communication, February 6, 2007) of UW-Stout states that an average of 2,200 users are connected to the wireless network in the selected academic buildings between the hours of eight a.m. and five p.m. weekdays. The population for this research will be the entire 2,200 connected wireless users on the wireless network in the selected academic buildings.

Data Collection Procedures

Selection of Academic Buildings

Academic buildings for this study were chosen based on the amount of connected users on an average weekday. For this study, buildings that were chosen had to have academic classes take place in them, plus have more than 650 connected users on average on any particular weekday. Buildings such as Bowman Hall and the Sports and Fitness Center hold

academic classes, but the buildings fall below the 650 connected user limit. Buildings selected for this study were the following based on the average of 650 or more connected users; Harvey Hall, Home Economics, Jarvis Hall-Science Wing, Vocational Rehabilitation, Communications Technologies, Applied Arts, Micheels Hall, Fryklund Hall and Jarvis Hall-Technology Wing.

Determination of Core Academic Hours

Core academic hours for this study were found to be between the hours of eight a.m. and five p.m., weekdays. Data for this study about how many academic classes are held each semester and what days and times those classes are held was obtained from Registrations and Records at UW-Stout. Data that was provided was a listing of all courses for the spring 2007 semester. Data will then be sorted and categorized into several sets using the program Microsoft Excel 2007. With Microsoft Excel 2007, the researcher was able to segregate data based on class locations, days of the week classes were held and the times during the day the classes are held. Data showed that 86% of the classes on the UW-Stout campus occurred between the hours of eight a.m. and five p.m. weekdays and in the academic buildings selected for this study.

Collection of Wireless Content Information

Data was gathered from the wireless network at UW-Stout from the Telecommunications and Networking department using an appliance called Packeteer. Packeteer is an appliance that monitors every network packet of data coming in and going out of UW-Stout. Dodor (2007) states that the Packeteer appliance is much like a bouncer at a bar, it checks the identification of the patrons (packets) and determines if the data is authorized to enter the establishment or if you will be denied because you do not fit the

requirements to get in. Packeteer pulls the source and destination data of each packet to determine where packet came from and where it is going. Packeteer also checks the signature of the data packet which determines the content of the data. Determining the content of the data will determine whether the content is of academic or non-academic status. Each packet of data contains a unique set of numbers that identifies where the packet came from and is going. The Domain Name Server (DNS) is an application that turns that unique set of numbers on the packet into names which can be identified as specific websites. The DNS pulls the IP addresses of the packets, pulls the data from the packet and then classifies the data based on the content it holds. Packeteer monitored network data using the wireless connection in selected academic buildings during the hours of eight a.m. and five p.m. weekdays. This data will provide an accurate synopsis of the content visited during the time period of the study.

Length of Study

This study was conducted for four consecutive weeks beginning on Monday, February 12, 2007 and ending on Friday, March 9, 2007. The purpose of this timeline was to obtain four consecutive weeks without any holidays or vacation days in students schedules. At the end of each week of the study, results will be obtained and at the end of the study, the results from each week will combined to show an average based on four consecutive weeks of wireless activity.

Limitations

Limitations of this study include only the selected academic buildings on the UW-Stout campus. Non-academic buildings such as; Library Learning Center, Memorial Student Center, and residence halls will not be included in the research. Academic buildings such as;

Bowman Hall, and Millennium Hall will not be included in the research, since these buildings do not hold a vast majority of academic classes in them. Wired connections within the selected academic buildings will not be tracked since many of the wired connections are used by faculty and staff in the buildings. Data will not be collected from specific users, since this would be a violation of the UW-Stout privacy policy.

Example of Data Analysis/Collection Tool

Figure 1 is an example of the Packeteer data collection and analysis tool. The figure shows several buildings on campus. Data from buildings not included in this research will be removed.

Table 1.

Packeteer Program Example

Traffic Class Name	Class Hits	Policy Hits	Current (bps)	1 Min (bps)	Peak (bps)	Pkt Exch (ms)
Outbound_Wireless						
Applied_Arts	6351122	N/A	649k	356k	10.3M	662
Comm_Tech	1859490	N/A	954k	501k	3.0M	524
Fryklund_Hall	1508124	N/A	275k	455k	2.8M	570
Home_Economics	7125180	N/A	2.5M	2.7M	10.4M	750
Harvey_Hall	10761502	N/A	3.3M	3.8M	8.6M	603
Micheels_Hall	19008399	N/A	515k	538k	2.6M	665
Voc_Rehab	2834726	N/A	52k	95k	5.4M	615
Tech_Wing	1998220	N/A	616k	545k	3.6M	531
Science_Wing	5387750	N/A	819k	866k	7.7M	579

Table 1 shows the building names in column one under the Traffic Class Name heading. Column two shows the Class Hits. Class hits are logged as data is sent out from users laptop computer to the main server requesting information. Column three is where the policy hits are triggered by student activity. Policy hits do not apply to this study, so an "N/A" is displayed in that column. Column four is the current bits per second (bps) are the speeds

that data is being transferred. Column five shows the bps rate average speed every minute.

Column six shows the peak bps during the entire period selected. Column seven displays the amount of packets that are exchanged between the main server and the users laptop. Data in column seven is displayed in milliseconds (ms).

Chapter IV

Results and Findings

UW-Stout provides internet access on campus as a service to all students, faculty and staff. This service includes wired and wireless connections. All academic buildings on the UW-Stout campus have a wireless connection that students can utilize for educational opportunities. This wireless connection helps eliminate the need for extra cords students would need carry with them to connect to a wired connection. The lightly restricted wireless connection also provides opportunities for students to access non-academic content during class. This study observes the content being transmitted and accessed on the wireless network in selected academic buildings during core academic hours of the day.

The results of this study are being categorized based on five different observations that were found in the study. This study was broken down into four – one week time periods. Each week's time frame started on Monday and ended on Friday. Observations were taken from eight a.m. to five p.m. each weekday. Weekend observations were not included in this study. Devising these categories is mostly an intuitive process; however, it is systematically informed based on the purpose of the study.

Observation One - Wireless Network Building Usage

Observation one was based on 2,200 connected users in each selected building during the research period. Nine buildings were selected for this research study. Each building selected was monitored each week for four consecutive weeks. Each week a new monitoring segment was started. After the four weeks had passed, averages were taken of the four weeks to determine the

amount of network traffic and connected users in each building. The researcher found that the buildings with more classes being held in them had more network traffic, policy hits and connected users.

Table 2.

Four-Week Average – Building Usage Statistics

Building	Building IP Address	Percentage of Users in Each Building
Harvey Hall	144.13.15.0	17.75%
Jarvis Hall-Science Wing	144.13.58.0	13.5%
Home Economics	144.13.74.0	13%
Applied Arts	144.13.34.0	10.75%
Micheels Hall	144.13.59.0	5%
Jarvis Hall-Technology Wing	144.13.17.0	5%
Communications Technologies	144.13.240.0	4.75%
Fryklund Hall	144.13.55.0	4%
Vocational Rehabilitation	144.13.57.0	3%

The percentage of users is based on the entire campus wireless network including buildings and areas not designated for the study. Given this information, the researcher was able to observe the percentage of users in the buildings designated for the study.

Classes Held in Each Building Used During Research

Table 3 shows the number and corresponding percentages of the classes conducted in the buildings used for the research between the hours of eight a.m. and five p.m. This information was acquired from Registration and Records Department at UW-Stout.

Table 3.

Classes Held in Each Building Used During Research

Building	Number of Classes Held for Spring 2007 Semester	Percentage based 1,224 classes.
Harvey Hall	285	23.3%
Home Economics	285	23.3%
Applied Arts	146	12%
Jarvis Hall-Science Wing	116	9.5%
Vocational Rehabilitation	115	9%
Micheels Hall	94	8%
Fryklund Hall	68	5.5%
Communications Technologies	65	5.3%
Jarvis Hall-Technology Wing	50	4.1%
Total	1224	100%

Table 3 shows that the two buildings of Harvey Hall and Home Economics have over 250 scheduled classes in them during the spring 2007 semester. Three other buildings that include Applied Arts, Jarvis Hall-Science Wing and Vocational Rehabilitation have over 100 classes

scheduled in them. This data was important to the researcher that it may show how having more or less students in a particular building can relate to the total amount of network traffic being accessed on the wireless network.

Observation Two - Top Academic Destinations

Observation two was based on academic destinations that connected users accessed during the time frame of the research. This observation was broken down into the top ten academic destinations for each week of the research period. Academic network traffic was monitored and to be recorded as an academic destination, the web address had to have a web address suffix of .edu.

Table 4.

Four-Week Average – Top Academic Sites Accessed

Destination	IP Address	Percentage of Users
uwstout.courses.wisconsin.edu	128.104.236.22	26.25%
mytime.wisc.edu	128.104.1.198	<1%
extendlms.ics.uwex.edu	128.104.44.50	<1%
webmail.uwec.edu	137.28.1.173	<1%
www.uwec.edu	137.28.1.85	<1%
metalib.wisconsin.edu	128.104.22.44	<1%
sfx.wisconsin.edu	128.104.22.20	<1%
mariancollege.edu	205.213.146.254	<1%

Table 4 shows that connected users using the wireless network accessed the class management system on the address of uwstout.courses.wisconsin.edu. The class management system on the UW-Stout campus is Desire2Learn (D2L). D2L accounted for over a quarter of the network content accessed on the wireless network based on the average of 1,350 connected users. The remainder of the table is organized by IP Addresses. The IP Address was used since

the remainder of the sites fell below a measurable threshold for the Packeteer program and was unable to list items based on hits.

Observation Three -Top Non-Academic Destinations

Observation three was based on the non-academic content that students accessed during the time frame set up for the research. These observations were broken down into the top non-academic destinations for each week of the research period with a combined average of all weeks of the observation.

Table 5.

Four-Week Average -Top Non-Academic Destinations

Destination	IP Address	Percentage Based on Average of 1350 Users
akamai-8.wiscnet.net	205.213.110.8	5.5%
akamai-7.wiscnet.net	205.213.110.7	4.5%
akamai-44.wiscnet.net	205.213.110.44	3.5%
akamai-9.wiscnet.net	205.213.110.9	2.5%
www.google.com	64.233.163.176	<1%
www.facebook.com	204.15.23.144	<1%
www.facebook.com	204.15.23.142	<1%
ad.chi.yieldmanager.com	208.67.67.11	<1%

Due to the amount of non-academic content being cached by Akamai Technologies Inc, the Akamai company took the top four spots in the results. “Akamai Technologies Inc. is a company that provides a distributed computing platform for global Internet content caching and application delivery, headquartered in Cambridge, Massachusetts.” (Wikipedia, 2007) Not all internet sites use this caching service, so these sites such as Google and Facebook showed up on in the results but below the one percent threshold. Due to the large amounts of non-academic content accessed on the wireless network, the caching service sites only accounted for about five

percent of the usage. This table does not show or represent the non-academic content accessed for academic purposes. For this study, only non-academic content was looked at as a whole. A more precise study would need to be done to determine what non-academic content was viewed for academic purposes.

Observation Four -Top Combined Academic and Non-Academic Destinations.

Observation four is a combined listing order of academic and non-academic destinations students accessed during the research period. This observation was broken down into weekly statistics with a combined average of all four weeks of the observation shown in Table 6.

Table 6.

Four-Week Average – Combined Averages of Non-Academic and Academic Content

Destination	IP Address	Percent of Users
akamai-8.wiscnet.net	205.213.110.8	5%
akamai-7.wiscnet.net	205.213.110.7	4%
akamai-44.wiscnet.net	205.213.110.44	3%
akamai-9.wiscnet.net	205.213.110.9	2%
uwstout.courses.wisconsin.edu	128.104.236.22	2%
www.google.com	64.233.163.176	<1%
www.facebook.com	204.15.23.144	<1%
www.facebook.com	204.15.23.142	<1%
www.mathxl.com	209.202.161.136	<1%

Table 6 shows that the caching service, Akamai Technologies occupied the first four spots on the list. Since many websites use Akamai for caching service, it is hard to determine what was the top non-academic sites accessed. Following Akamai, D2L was next on the list for academic content. D2L is the only academic content destination to make the list. Google, Facebook and MathXL took the remaining spots on the list. MathXL is a program that is utilized

by the Department of Mathematic, Statistics and Computer Science. This could be considered an academic destination, but since it doesn't have a .edu web suffix, it was classified as non-academic content.

Observation Five – Instant Messenger Usage Statistics

Observation five is a listing of instant messenger clients being utilized on the wireless connection during the research period. These percentages are based on the total users (2,200) utilizing an instant messenger program. This table does not designate actual messages being sent to and from a particular program, but shows how many IM programs are connected and running.

Table 7.

Instant Messenger Statistics – February 12, 2007 – March 9, 2007

	Number	Percentage based on 2200 users.
Number of Unique Addresses	2095	95.2%
Highest Number of IM Programs in Use at One Time 8:00am – 5:00pm	2005	91.1%
Lowest Number of IM Programs in Use at One Time 8:00am – 5:00pm	213	9.6%
Average Number of IM Programs in Use 8:00am – 5:00pm	1165	52.9%

Table 7 shows that at any given time during the day 53% of users are logged into an instant messaging program. The peak of users connected to an instant messaging program is 90% of the 2,200 connected users between the hours of eight a.m. and five p.m. The lowest number during the time period was less than 10% of users utilizing an instant messaging program. This low number was likely observed at the beginning of the time segment at eight a.m. each day before many students logged in for class.

Top Instant Messenger Client Programs

Table 8.

Four-Week Average – Top Instant Messenger Client Programs

Client	Percentage of All Top Instant Messenger Users
MSN Messenger	39.75%
AOL-AIM-ICQ	17.75%
Yahoo!	14.88%
IRC	13.25%
AOL	10.75%
Other	3.62%

Table 8 shows the breakdown of the instant messenger programs being utilized by users of the wireless network in the selected academic buildings. This table clearly shows that the instant messaging program preferred by students to use is MSN Messenger. MSN Messenger is an instant messaging program developed by The Microsoft Corporation. This table does not show all IM programs used by students. Programs not listed are grouped in the last row under the heading of “Other”. These programs had a lower usage rate by users on the wireless network.

Chapter V

Conclusion

The University of Wisconsin-Stout has a successful laptop initiative in place called the e-Scholar program. The e-Scholar program is more than just a laptop computer. The e-Scholar program provides a wide variety of software programs, wired and wireless internet connections throughout campus, training and computer support. The e-scholar program is continually being reviewed and tweaked to make improvements where possible. Studies have shown that having students equipped with a laptop computer in the classroom do increase student engagement and help increase grades, but not much was known about the wireless content accessed by students utilizing the wireless network.

Limitations

Limitations of this study include only the selected academic buildings on the UW-Stout campus. Non-academic buildings such as; Library Learning Center, Memorial Student Center, and residence halls will not be included in the research. Academic buildings such as; Bowman Hall, and Millennium Hall will not be included in the research, since these buildings do not hold a vast majority of academic classes in them. Wired connections within the selected academic buildings will not be tracked since many of the wired connections are used by faculty and staff in the buildings. Data will not be collected from specific users, since this would be a violation of the UW-Stout privacy policy.

Summary

The University of Wisconsin-Stout e-Scholar program has approximately 6,392 students issued laptops for the spring 2007 semester. The researcher was able to gather data on the

wireless network from the Telecommunications and Networking Department at UW-Stout. Observations were gathered from the wireless network and categorized into six parts that included; building network usage, academic content, non-academic content, combined academic and non-academic content, and instant messaging program usage in each of the selected buildings on campus. Data from the research shows that non-academic content from various websites take up 4 out of the top 10 of the content accessed on the wireless network. Due to the caching service of the Akamai Company, the top results do not show specific websites that students visit. The data also showed that at any given time, a quarter of the sample population is using the course management tool, D2L. Observations of the instant messaging program revealed that at any given time, 53% of the students in this study were utilizing an instant messaging program while in class. With this data, it is clear that students are using their laptops for more than academic purposes while attending class.

At the time of this research, two documents were in place pertaining to the digital learning environment at UW-Stout. The first document is a list of suggested laptop guidelines on the e-Scholar website stating what is expected of students of while using the laptop in the classroom. If a student did not visit the e-Scholar website the student is unaware of the guidelines set up by e-Scholar program and UW-Stout. The second document is Acceptable Network Usage Agreement set forth by the Telecommunications and Networking department at UW-Stout. At the beginning of each semester, students must accept to the Acceptable Network Usage Agreement in place before students can use the wired and wireless network. This agreement states that copying software is illegal, using the network for personal gain is unacceptable and that UW-Stout can monitor the accounts of suspected violators of such actions.

As UW-Stout has become a Polytechnic University and is on the front edge with the digital learning environment for students and staff, UW-Stout could be faced with challenges of reviewing and implementing online policies for students utilizing the online wireless technology. Generally, technology out-paces the policies that are designed to regulate them. As UW-Stout expands their network capabilities and as instructors find new ways to implement the laptops into their curriculum, many are faced with the daunting task of regulating content not appropriate in the classroom. Instructors tackle many aspects of trying to keep the students attention while instructing. Some instructors have gone as far as having students turn off the laptops while an instructor is teaching. This is looked at as a step backwards for the program.

Recommendations

First, UW-Stout should review all network and laptop policies that are currently in place to determine if any of the content in current policies is out-dated and in need of changing. The Acceptable Network Usage Agreement and the laptop guidelines should be combined to form one new set of policies and guidelines pertaining to the digital learning environment at UW-Stout. Having one document will prevent confusion among students and staff about what is expected of students while using the laptops on the UW-Stout network and in the classroom.

Second, a committee with an individual from each department along with students and administration should be formed to review and look at new and proposed changes to network policies and laptop guidelines as technology progresses. Each time a review is necessary or an update is proposed, the committee would meet to review or discuss proposed changes. As UW-Stout continues to grow and expand with new technology, network policies and laptop guidelines

need to be updated on a regular basis. Updates and reviews should be conducted every two years on current policies and guidelines.

Third, as network policies and guidelines are reviewed, content that students visit while using the wireless network while in academic buildings should also be reviewed. Certain websites and applications that have no academic merit can be blocked along with instant messaging programs. Instant messaging programs are great tools that allow students to keep in touch with one another, but serve no basis for academic instruction and should be blocked from the wireless network in academic buildings on days that classes are in session. On days that classes are not being held throughout campus, the network would be open for all applications to be used. By blocking certain programs such as instant messaging programs, this would help eliminate some of the distractions students are faced with while attending class or academic functions. Areas outside of academic buildings, such as the Library Learning Center, residence halls and common public areas throughout campus would not be affected by the content restrictions.

Fourth, a critical review of this content should be performed so as to not block content that instructors may use while in class. In many cases, instructors have students use the laptops to look and review websites of companies or perform research for a study. By blocking or restricting access to certain sites may take away from a valuable learning experience for the student. At the time of this research, websites such as Facebook and MySpace.com are popular among the student body to keep in touch with each other. Many instructors say these websites serve no purpose in the academic setting of a classroom. Such websites could be included in the list of websites that could be blocked in academic buildings during the core academic hours of

the day. Such sites would need to be reviewed by the digital learning environment committee to determine the academic content of such sites.

Lastly, monitoring content on the UW-Stout wireless campus could be a full-time job for several people, but as new websites are born and fads change among students, UW-Stout should review and make changes to network policies as needed. Attempting to monitor every site students visit is nearly impossible, but working with students and staff, and making them aware of what's expected can have positive implications for everyone involved. Students can benefit from the content restrictions as a way to decrease the amount of distractions they face daily while in class. Faculty can also use the content blocks as opportunities to come up with new ways to engage students and use the wireless technology as an educational tool and not have to fight for students' attention.

The recommendations listed above are not designed to be a "big brother" watching over the student body and their online habits, but looked at as a way to help decrease distractions and increase student engagement while providing a valuable learning experience at UW-Stout. There is a time and place for non-academic activity, and these recommendations can make a clear distinction of those activities. Students are responsible for their own actions, but with the reduction of inappropriate online activity and online distractions in the classroom, students and staff can both benefit.

As Wisconsin's Polytechnic University, UW-Stout should be working together with students and faculty to come up with network policies and guidelines that everyone can easily find, understand and know what is expected of students and faculty, but also parallels the mission of UW-Stout as it continues to grow and strives to be a great university.

Recommendations for Future Research

Further research should be continued on the content accessed on the UW-Stout wireless network. Data from this research does not show how much of non-academic content on the wireless network was actually used for academic purposes. Further research would have to be conducted to make this determination. As the capabilities of the network continue to grow at UW-Stout and as new technologies emerge, research should be conducted to determine new learning trends among students along with keeping policies and guidelines current with new technology.

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