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Unwired: Student Use of Technology in the Ubiquitous Computing World

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Keywords: technology, ubiquitous computing and communication, student use, student attitude, wireless, mandatory laptop requirement, online addictions, Internet

This paper is part of the group that was selected for inclusion in the journal based on preliminary ratings in the top 30% of papers submitted, and a second review placing it in the top 15% by persons unconnected with the conference or the journal, and whose names are withheld to preserve their anonymity.

EDSIG activities include the publication of ISEDJ, the organization and execution of the annual ISECON conference held each fall, the publication of the Journal of Information Systems Education (JISE), and the designation and honoring of an IS Educator of the Year. • The Foundation for Information Technology Education has been the key sponsor of ISECON over the years. • The Association for Information Technology Professionals (AITP) provides the corporate umbrella under which EDSIG operates.

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ABSTRACT

This study examines how college students use technology in their everyday life on a campus with ubiquitous computing and communication. The primary areas of focus will include how effectively technology is being used in and out of the classroom, how the students use the technology in every facet of their lives, and how dependent these students have become on technology, all taken from the student's point of view. This study is particularly important because the campus being studied has a universal wireless network connection and has a mandatory laptop program in effect for half of the current student body.

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1. INTRODUCTION

In 2003, the college where this study was conducted instituted a computer notebook program requiring all incoming freshman to purchase a laptop computer. The College's ultimate goal was for all undergraduate students to own their own laptop for use in any classroom or anywhere on campus while connected to a campus wide mandatory wireless computer network. The laptop initiative is currently half way to completion with 50% of the student body required to own a laptop. By the end of 2007, all students will possess a wireless laptop system.

This college, where the research is being conducted, is at a truly unique point in regards to its student body and campus. This campus is a part of a small faction of all college campuses that have a universal wireless connection throughout all areas. Furthermore, what makes this moment even more significant is that half of the current student body had a laptop purchase prerequisite in place as part of their admissions requirements. This factor creates a perfect sample to see the effects of ubiquitous technology on students with different computer devices. This sample will help highlight trends to see if students are more apt to use more diverse technological devices if they have access to certain computer devices (laptop computer, desktop computer, PDA etc). This study will also show the differences of technology use between students with or without laptop computers of their own. Finally, this study will assist in the enhancement of the current understanding of how students are utilizing their technology both positively and negatively in the higher education environment. The information collected can be used by other medium to large sized universities as secondary research to aid in answering questions or issues pertaining to the use of wireless connection, laptop requirements and student use of technology in relation to their own unique campus.

2. LITERATURE REVIEW

Currently, there is a wealth of information pertaining to the pros and cons for the adop-

tion of laptop programs at colleges and universities throughout the United States and Canada, but information regarding the use and student opinions concerning computers and ubiquitous technology is sparse. A study conducted at Ohio State University pertaining to students' opinions of a laptop requirement on college campuses found a similar lack of information. "While some institutions have conducted in house evaluations, systematic research that describes student experience with laptop computers, particularly regarding their opinions about the value in academic and social context, is scarce" (Demb, Erickson, and Hawkins Wilding, 2004). This study focused on student opinions solely based on the quality of their experience with the school issued laptop and did not examine its social and societal role.

A study published in the *Journal of College Student Development* found a similar lack of knowledge surrounding the effects and usage of ubiquitous technology on a college campus. The study, entitled "The Relationship between Computer and Information Technology Use, Selected learning and Personal Development Outcomes, and Other College Experiences", explains the current understanding: "Although research findings to date are generally promising, a substantial gap remains in our understanding of the effects of computer and information technology on student learning and other educational outcomes. For example, little evidence is available beyond student performance in individual classes to determine the effects of different forms of technology on various aspects of the college experience including the acquisition of a range of desired outcomes of college or the most efficacious design and use of these new technologies" (Kuh and Hu, 2001). This study also highlights the importance of student technology studies on individual college campuses. "Some evidence suggests that the effects of computing and information technology use may not be uniform for different types of institutions or students. Institutional affluence, student ability, socioeconomic status (SES), and accessibility and use of computing and information technology appear to be highly correlated" (Kuh and Hu, 2001).

Another study, conducted at the University of Minnesota and the University of Wisconsin, examined what electronic devices students possess at several different college campuses. This study found that at least a third of the student body possesses three or more electronic devices. This study found that "there is little variation in technology ownership by age, class year, grade point average, part time or full time status, on campus and off campus status..."(Kvavik and Caruso, 2005), but did find that male students are far more likely to own more informational electronic devices than female students. This study examined total time usage, student computer skill level, impact of skill level on preference for technology in course, need for training, and several other topics.

To begin a study of student use of technology, it is vital to define a typical student and what characteristics they possess. This definition was found in a study by Gardner and Eng (2005) entitled "What Students Want: Generation Y and the Changing Function of the Academic Library". This study explains that "the majority of college students are now part of a new generation born in or after 1982 and often labeled "Generation Y", but also sometimes referred to as the Net Generation, the Digital Generation, the Echo Boom Generation or the Millennial's." (Gardner and Eng, 2005). This study expounds how Generation Y is vastly different than the generations of the past. The Millennial's are thought to be unique because they are more ambitious and optimistic than Generation X, are the most ethnically diverse, and favor different values and learning styles than their predecessors. Furthermore, Millennial's stand out because they are the largest child generation in American history and are believed to be the most technologically savvy. Gardner and Eng (2005) state that Millennials share certain attributes regarding their use and expectations of technology and services. Millennials have great expectations, expect customization, are technological veterans and utilize new communication modes.

Claire Raines discusses how Millennials are a different breed of humans in her scholarly article "Managing Millennials". Raines believes there are eight key trends of the 90s and 00s (that) have had a profound effect on their (Millennials) generational personality (Raines, 2002). These trends include the shift from the latchkey kids and both working parents to a sharp and intense focus on

children and family; the emphasis for rigidly structured schedules for children; the presence of multiculturalism and the world being at their figure tips. Converse to the multicultural trend and that of past recent generations, the Millennials are a generation deeply effected by terrorism. Millennials witnessed the bombing and devastation of the Murrah Federal building in Oklahoma City. They watched in horror as s two Columbine High School Students killed and wounded their classmates, and as school shooting became a three-year trend. Their catalyzing generational event—the one that binds them as a generation, the catastrophic moment they all witnessed during their first, most formative years—is, of course, the terrorist attacks on September 11, 2001 (Raines, 2002). From these moments of terror emerged another key generational trend: the rebirth of heroism and patriotism. Emerging from the rubble of these cataclysmic events was the resurrection of the American hero in the form of the policeman, fireman, and mayor that were long lost since the time before the Vietnam and Watergate era.

Millennial's View on Technology in Academia

With this basic understanding of some pertinent psychographics of the millennial college student, it is important to then examine what other researchers have uncovered regarding how millennial students view technology's role in the classroom. Kvavik and Caruso (2005) investigated this topic in the study "Convenience, Communications, and Control: How Students Use technology". This study spanned 13 colleges and universities and incorporated over 4000 participants. Of those over 4000 participants, 95 percent were included in the millennial generation. This study cultivated many topics of key interest that disunite popular belief. One was the erroneous demand for greater use of technology in teaching and learning in the classroom. In actuality, what researchers found was a moderate preference for technology and mixed feelings about technology in the classroom, even from the most skilled students. Additionally, this work uncovered a false confidence in the IT intelligence and learning abilities in the millennial generation. Students appear to be slower in developing adequate skills in using information technology in support of their academic activities,

which limits technology's current value (Kvavik and Caruso, 2005). The attributes of today's students are more readily observable in nonacademic contexts than in the academic setting despite having enabling technologies readily accessible in both spheres. Although this study demonstrates ambiguous student perspectives, another study on web browsing, mobile computing and academic performance depicts a correlation between the presence of laptop computers in a classroom environment for varying periods of time and the quality of the final grade. Longer browsing sessions led to decreased academic performance and the prolonged inattention to the instructor and/or in class activities (Grace-Martin and Gay, 2005). In addition, it appeared that students were utilizing their computers during class for non-academic related activities, which also adversely affected their final grades. These non-academic uses are termed social computing and are believed to be one of the primary uses of the wireless laptops during class. A possible solution introduced would boost productivity by limiting network access in certain contexts or the use of specific purpose computing devices (Grace-Martin and Gay, 2005).

Millennial's Socio-economic Status, Gender and Use

The effects of certain demographics on the use of technology in the academic sense are another possible determinant of the positive or negative outcome of IT in higher education. Many past studies have explored these phenomena in detail with varying results, but the range in the data was not influential in every study. One such study, conducted by Kuh and Hu (2004), found that students who benefit most from using C&IT (computers and information technology) are those who use it more frequently and in more advanced ways. Women and students from lower SES (socio-economic status) backgrounds use C&IT less frequently and benefit less from its usage. The effect sizes associated with these differences are trivial.

3. METHODOLOGY

Commencement of the study was marked by the execution of a focus group consisting of 12 college students ranging in age of 18 to 25. Each student received payment of 20 dollars for their time and input. Participant

selection was based on several simple screener questions. Any student who could pass the simple screener was given the option to be a paid participant in the focus group. The screener served as an essential safeguarding tool used to protect the focus group's validity from any hidden bias that could adversely affect the experiment's outcome. The screener excluded any student who works or has worked for the College's Information Technology Department. The focus group was conducted in the College's focus group facilities and all proceedings were recorded both on video and on audiotapes. Sixteen questions were drafted for discussion several days before the scheduled date and time of the focus group, but multiple probing questions arose during the session due to participant commentary. The focus group concluded after approximate 1 hour 45 minute time frame. Tapes were then reviewed several times in order to locate key topics for survey questions.

The survey was constructed with 54 multiple-choice questions derived as a product of the data originating from the 12 student focus group. It was then decided that the survey would be administered both as an online version and as a hard copy version to ensure a proper sample. The hardcopy version would be executed to summer session students in a variety of fields of study. The electronic version would be created with the assistance of the College's IT Department and sent out once through the college's student email to all registered undergraduate and graduate students. The completed electronic surveys were stored in an online database until the sampling period concluded. Before the survey could be given to any student, it was first brought before the Institutional Review Board for approval. Having satisfied the IRB's commitment to student anonymity and safety, it was approved for usage. Following total survey data collected from the hard copy and electronic versions, each individual survey was entered into SPSS software.

4. RESEARCH QUESTIONS

The study conducted is directly concerned with use and opinion of computers and technology by students on this wireless campus based on several main areas:

- Time spent on the computer

- Frequency of checking/receiving/deleting email
- Types of programs used in and outside of class
- File sharing
- IT services
- How common is the use of the blog
- The role of AIM, Facebook and MySpace
- Differences between laptop users and desktop users
- Devices most commonly used with computer
- Most common academic uses
- Online addictions
- Online dating
- Gender and age differences

5. RESEARCH SETTING AND SUBJECTS

The College is a public liberal arts college located in Massachusetts. The student body is comprised of approximately 10,000 undergraduate and graduate students and consists of 95% in-state students and a female to male ratio of about 3:2 (Figures provided by Collegeboard.com). The College is considered one of the premier colleges in regards to campus technology. Most recently, the college was announced to be in the top ten most unwired colleges in 2005 (Center for Digital Education, Intel Corporation, 2005).

6. SAMPLING STRATEGY

The survey was administered one of two ways: hardcopy and electronically. The hardcopy version was administered with the permission of summer session professors ten minutes before the regularly scheduled class period. The sampling strategy for the hardcopy version was based on a few different factors. The first factor concerned the level and discipline of study. To ensure a proper sample of students, the researchers were very selective on which classes they administered the survey. Students in these classes were given the option of completing the survey and had the right of refusal any time before or during the survey. For the electronic version, an email was sent to all

registered students requesting they complete the survey with the opportunity of winning a fifty dollar gift certificate.

7. DEFINITIONS

Aim: (**A**OL **I**nstant **M**essenger) America Online's Instant Messenger service which supports text chat, photo sharing, online gaming and PC to PC voice. An AIM list of Instant Messenger participants is called a "Buddy List." PCMag (2006)

Blog: (We**BLOG**): A Web site that contains dated entries in reverse chronological order (most recent first) about a particular topic. Functioning as an online newsletter, blogs can be written by one person or a group of contributors. Entries contain commentary and links to other Web sites, and images as well as a search facility may also be included. A blog with video clip entries instead of text is a "video Weblog". PCMag (2006)

Mp3 Player: digital music player that supports the MP3 format, which was the audio format that started a revolution in online music, downloads and distribution. All portable music players support MP3 along with one or more other audio formats. CD players, whether shelf units or portable, may also play back MP3 files (PCMag, 2006).

8. LIMITATIONS

The limitations of this study concern the environment and timeframe in which the study was conducted. First, the students involved may not be representative of other colleges and universities. This can be attributed to such things as demographics, college policies, socio-economic status, proximity and other uncontrollable variables. Second, the data collection for the study was completed during summer sessions and this could signify an abnormal sample compared to the more traditional college terms. Finally, due to the period the survey was conducted, there is virtually no representation of the incoming freshman class. This void of new students is derived from the placement of new student orientation dates and their lack of any substantial knowledge regarding their new campus's technological environment.

9. KEY FINDINGS:

Laptop Ownership

Of the 565 survey participants, an overwhelming 97.7% reported ownership of their own computer. Of the students who reported computer ownership, 48.1% owned a laptop, 18.1% owned a desktop, and 32.4% owned a combination of both a laptop and desktop. This means that 76.5% of those students who own a computer have at least a laptop computer and 32.4% have a secondary desktop computer.

Computer Types and Grade Point Averages

From the data collected there emerges no remarkable difference in grade point averages in relation to what type of computer the student owns. There is at most a 5.1% range between the types of computer owned inside the grade point averages with no real trend regarding the computer type throughout all of the data. This suggests that although there is more functionality and freedom in regards to laptop computers that students can take advantage of, these attributes do not translate into a higher grade point average.

There is, however, a strong correlation between owning a computer and quality of the student's grade point average. Of the students who reported a grade point average of under a 2.0, less than 80% said that they owned a computer. All other grade point averages reported that at least 98.3% of respondents owned their own computer. This is a very important trend concerning the beneficial nature of computers in higher education, but it is vitally important to find true causation of this trend. These findings do not prove the that academic success is directly attributed to computer ownership but could logically be attributed to the perceived value, tendency and more frequent utilization of student's who perform at a higher level academically.

Laptop Presence in the Classroom

With a vast majority of the student population having access to a laptop computer for use in the classroom setting, this study is in an excellent position to examine how students are utilizing their wireless capabilities, if at all. The data shows that nearly half of students who own a laptop or a combination

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of a laptop and a desktop never bring their computer to class. Furthermore, only 6.3% of laptop owners and 8.7% of combination owners reported "always" bringing their laptop to class.

Figure 1: Student Use of Laptop Computer in Classroom
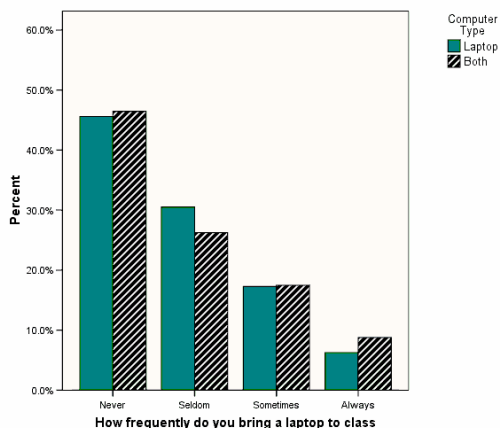
Note Taking: Further question of the laptop computers role in the academic environment arose with the results concerning in-class use. Of the students who expressed always bringing their laptop computer to class, 48.5% revealed always taking notes with the laptop and 27.3% said they sometimes take notes with their laptop in class. Equally as interesting are students who stated sometimes bringing their laptops. Of these students only 2.4% reported always using their laptops to take notes, but these students articulated that 58.5% "sometimes" takes notes in class using their laptop.

Talking to Friends Online: Students were asked if they had ever have used their computer to talk to friends during class via an online communicator. Of the students who reported that they sometimes to always bring their laptop to class, 22.5% said they always talk to their friends online while in class and another 59.9% of these students said that they sometimes talked to their friends online during class.

In Class Email: Similar results were found regarding students who check and write email during class time with 35% of the students who sometimes to always bring their laptops to class reporting that they always checked and wrote email during class time. Another 62.3 % of students who sometimes to always bring their laptops to class re-ported sometimes checking and writing email during class time.

Other Class Work: Another question was posed regarding to whether or not students were performing work for other classes during class time with their laptops. Of the students who "sometimes" to always brought their laptop to class, 35.2% always completed other course work and 55.5% sometimes completed work for other classes.

Laptop Distraction: From the data collected from this study, it appears that the students who bring their laptops to class usually aren't using them for class related activities which serves as a major distraction to the user, but does it stop there? One topic that the study hoped to explore was how distracting the presence of laptops in the classroom was, if at all, to surrounding students. The data from the study revealed that 47.8% of students found the presence of laptops in the classroom to be somewhat to very distracting. When this question is cross-tabulated with what gender the student is, another interesting trend occurs. It appears that females are more than twice as likely (17.6%) to report laptop computers in the classroom to be very distracting compared to males (8.9%).

Gambling and Other Online Addictions

Students were first asked if they believed that online addictions were common on their campus (see Table 1). Students could choose any one of five answers: strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree. 55.5% of the students surveyed agreed or strongly agreed that online addictions were common on their campus. Only 7.3 % of students disagreed or strongly disagreed with that statement, and the remaining 36.6% "neither agreed nor disagreed."

Table 1: Online Addictions

Online Addictions are common on your Campus	Frequency	Percent
Strongly Disagree	9	1.6
Disagree	32	5.7
Neither Agree Nor Disagree	204	36.1
Agree	207	36.6
Strongly Agree	107	18.9

Students were then asked to pick from a list of choices that they believed to be the most

common and second most common online addiction (see Tables 2 and 3). For the most common online addiction, Facebook / MySpace topped with an astonishing 51.3%. AIM was chosen second on the list of most common addictions at 31.7%. The next question asked students what they believed to be the second most common online addiction. Similar to the first question Facebook/MySpace and AIM topped the list. AIM was the second most common online addiction with 37.2% of the overall amount followed by Facebook/MySpace with 30.1%. Music downloading appeared in the second most common online addiction question receiving 13.8%. The music-downloading variable represents the only other online addiction listed besides Facebook/MySpace and AIM to receive a double digit percentage.

Table 2 Online Addictions (First)

Most Common Online Addictions	Percent
Facebook/MySpace	51.3
AIM	31.7
Downloading Music	4.6
Gambling	4.1
Video games	2.8
Other	2.1
Pornography	1.1
Sports	0.7
Online Shopping	0.4

Table 3: Online Addictions (Second)

Second Most Common Online Addictions	Percent
AIM	37.2
Facebook/MySpace	30.1
Downloading Music	13.8
Video games	5.3
Gambling	3.4
Other	3.2
Pornography	3
Online Shopping	1.8
Sports	1.1

A question regarding student use of online gambling was also presented asking each student if they had ever gambled online. 72.9% of students said that they have never gambled online, and another 19.8% admitted to gambling online but with no real money involved. It was only 6.2% of the total sample that disclosed gambling online for real money.

Facebook/MySpace was chosen as the overall most common addiction. Several survey questions were included in our survey associated with these sites. The first question concerning Facebook/MySpace asked how often the student utilized Facebook/MySpace for academic reasons. 19.6% of students reported using Facebook/MySpace for academics somewhat frequently to very frequently.

Two other Facebook/MySpace questions were presented relevant to the social importance of these sites in regards to making and retaining friends in college and friends made during high school years. 41.9% of students agreed or strongly agreed that Facebook/MySpace is an important tool in making and retaining friends made during college. Similarly, 40% said that Facebook/MySpace was an important tool in retaining friendships previously made during high school.

A final Facebook/MySpace question was introduced asking the participant if they have ever used Facebook/MySpace to flirt with someone they were attracted to. 50.1% of students admitted to having used Facebook/MySpace to flirt with someone they were attracted to. A notable occurrence appeared when the answers to the Facebook/MySpace flirt question were cross tabulated by the venue the survey data was completed on (i.e. online version or paper version). 59.8% of students who completed the online version divulged using Facebook/MySpace to flirt with someone they were attracted to. Only 26.7% hard copy participants admitted to flirting on Facebook/MySpace. This gap between the two versions is understandable due to the amount of surveys completed.

The breakdown of electronic to paper survey is as follows: 165 hardcopy surveys were completed coupled with the data from 400 electronic versions. There is a definite correlation between the people who completed the survey online on their own and their willingness to explore new technological dating media.

Computer Labs

A new trend in IT in higher education institutions is a focus on universal wireless laptop computing and a downsizing of traditional open access computer labs located through-

out the campus. Students were asked if they believed that computer labs were vital assets to the campus (see Table 4), and the response was an over whelming. 84.1% of the total sampled population said they agreed or strongly agreed with the statement "computer labs are a vital asset to the campus". Further break down of this figure shows that 84.4% of students who own laptops agreed or strongly agreed with this statement. 91.1% of students who own desktops agreed or strongly agreed with that statement and 82.8% of students who own both a laptop and a desktop agreed or strongly agreed. Only 3.4% of the total sample disagreed or strongly disagreed with the statement regarding computer labs.
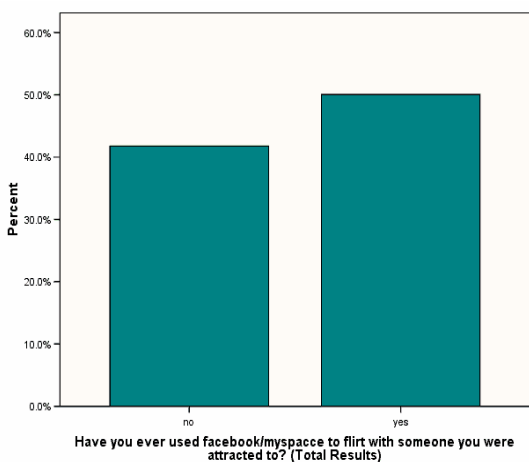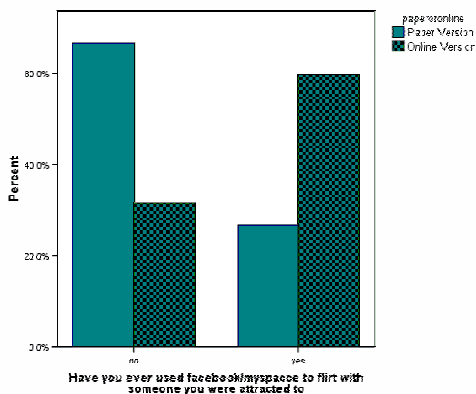
Figure 2: MySpace Flirting

Figure 3: MySpace Flirting
(Paper vs. Online Samples)

IT Satisfaction and Obstacles

Students were asked several questions regarding their satisfaction and the perceived

benefits of owning and utilizing a computer in the educational environment. The first question that appeared pertaining to this area asked the student if they felt their computer has had a positive influence on their academic performance. 84.5% of the total sample agreed or strongly agreed that owning a computer has had a positive influence on their academic performance. When this data was further examined by what type of computer they owned and their opinion on positive academic success, all three segments (laptop, desktop, both) reported they agreed or strongly agreed within a difference of 4.5% points of each total. This shows that the type of computer owned does not necessarily affect a student's perceived academic value.

Table 4: Computer Labs

Computer Labs are a Vital Asset to a Campus	Percent
Strongly Disagree	0.7
Disagree	2.7
Neither Agree nor Disagree	11.2
Agree	27.1
Strongly Agree	57

Another question was posed referring to their satisfaction of their campus internet connection. 74.9% reported being satisfied to very satisfied with their online connection, and only 15.6% reported being dissatisfied to very dissatisfied with the campus internet connection. The question was then cross tabulated by where the student lived (on campus, off campus apartment or off campus at family home). This produced an interesting tendency in the student opinion. Students who lived on campus showed the highest percentage of satisfaction with 81.8% satisfied to very satisfied with their campus internet connection. Students who lived in an off-campus apartment showed the least level of satisfaction with only 66.7% reporting being satisfied to very satisfied with their campus internet connection. This data appears to show that students who have the most access to the campus connection also have highest levels of satisfaction.

In the survey, the students largest problems related to using technology were also explored. Students were asked what general area they felt their largest problems regarding their use of technology fell. Table 5 shows that 24.1% reported their largest problem was slow or insufficient internet

access; 18.1% reported lack of access to printing; 13.5% reported their own skill level regarding technology was their largest problem; and 11.2% reported viruses, spy ware and worms were their largest problem.

Table 5: Technology Problems

Student's Largest Problem Regarding Use of Technology	Percent
Slow or Insufficient Network Access	24.1
Lack of Access to Printing	18.1
Own Skill Level Regarding the Use and Concepts of Computers	13.5
Viruses, Spy Ware, Worms etc.	11.2
Age of Computer and Software	8
Insufficient Technical Assistance Provided by College	4.2

Device Ownership

Students were asked several questions about what types of devices they owned. These devices include an Ipod/Mp3 Player, Digital camera, PDA, and devices featuring GPS capabilities. The results of these questions are as follows: 59.8% of students reported owning an Ipod/Mp3 Player; 72% reported owning a digital camera, 13.3% own a PDA and 23% own devices with GPS capabilities. Notably, students who owned laptop computers were also about 20% more likely to own an Ipod/MP3 player than those students who own a desktop computer only.

Cell Phones and Ipod/Mp3 Player Dependence

Students were questioned on their use and dependence on 2 electronic devices: cell phones and Ipod/Mp3 players. These questions were designed to gauge the extent students depend on these devices in their daily lives. When asked the amplitude to which they agreed with the statement that they never go anywhere without their cell phone, 87.6% of students agreed or strongly agreed that they never go anywhere without their cell phones. Only 5.5% said that they disagreed or strongly disagreed with that statement. A similar question was posed asking if students agreed with this statement regarding cell phones: "I couldn't live without my cell phone". 58.9% of students agreed or strongly agreed that they could not live without their cell phone and only 19.7% disagreed or strongly disagreed with this statement. When these two cell phone questions were cross tabulated with genders, very unique trends in the results appeared. Women were almost twice as likely to answer that they strongly agree that they

couldn't live without their cell phone. Women answered strongly agree 36.9% overall that they couldn't live without their cell phone while only 19.3% of males responded strongly agree. This shows that women have grown more dependent on cellular phones as a communication device.

A complimentary set of questions were introduced in regards to Ipods/Mp3 Players. The first question requested students choose how much they agreed with the following statement: I never go anywhere without my Ipod/Mp3 player. Only 14.4% agreed or strongly agreed with this statement with the majority stating they disagreed or strongly disagreed with a total of 54.5% of the total response. Similar results were found when asked how much they agree with the following statement: I couldn't live without my Ipod/ Mp3 Player. Only 11.7% agreed or strongly agreed with that statement. Once again the majority of students disagreed or strongly disagreed with this statement receiving 61.9% of the total response.

Gender Differences

Certain questions were designed to view if the student population felt that gender affected technology use. A question asked the respondent if they believed that males were more technologically savvy than women. 20.8% of the respondents agreed or strongly agreed with that statement and conversely 47.8% disagreed or strongly disagreed with the idea that men were more technologically savvy than women. When these results were cross tabulated with the gender of the respondent, it became clear that men believe they are more technologically endowed than women with 41.6% of male respondents agreeing or strongly agreed to the belief that males were more technologically savvy than women and only 16.7% disagreed to strong disagreed with this statement. On the other hand, only 13.4% of women agreed to or strongly agreed that their gender was less technologically savvy than the other, while 59% of females disagreed or strongly disagreed with this statement.

A second question was asked regarding gender technology differences. This particular question pertained to the differences in technology use by gender. The question was phrased as follows: "Men utilize technology differently than women." This ques-

tion was purposely posed in a vague and simplistic fashion in order to encompass the broad and personal definition of what technology circumscribes to each respondent. 53.2% of respondents agreed or strongly agreed with the idea that men utilize technology differently. Only 18% stated that they disagreed or strongly disagreed with the statement. Upon cross tabulation of the results by gender, it became clear that over 20% more males believed that men utilize technology differently than women. 70.4% of males agreed or strongly agreed with the statement while only 48.1% of females agreed or strongly agreed.

News: A question was added to the survey in regards to how students receive their news. Our data appears to show a difference in the way that men and women receive their news information. 37.4 % of men reported receiving their news through online sources, which was the most common response. The second most common male news source response was television with 33.3%. Female respondents instead chose television as their first choice with 49% followed by online news sources with 21.6%. This data may represent the male gender's willingness to explore less traditional settings to receive their news and information.

Online Sports Scores and Stats: A question was incorporated into the study pertaining to the frequency in which students checked and monitored sports scores and stats. In this area a gap between genders can clearly be seen. Males reported 55.5% check sports scores somewhat frequently to very frequently online, compared to 18.9% female respondents. Conversely, 58.1% of females said that they never check sports scores online contrasted to only 21.2% of men who reported never checking sport scores online.

Gambling: Like online sport scores and statistics, online gambling seems to be mainly affecting males. When comparing the frequency of gambling by gender, one should focus on the male gender. 17.7% of males admitted to gambling for money online and another 25.2% said that they have gambled online with no money involved. Only 2.2% of female respondents communicated the act of gambling for money, and 18% of females professed online gambling with no money involved.

10. CONCLUSION

The results of this study signify an urgent need for improvement of information technology in higher education. In regards to education, students are utilizing technology for all of the wrong reasons. With only a fraction of students bringing their laptops to class and consistently using them for non-academic reasons, it begins to question the validity of the felt need for a laptop requirement in higher education institutions. In addition, new areas of addictions have appeared with unprecedented momentum. Three need based recommendations can be derived from reviewing the data collected: the need for control, the need for proper and frequent academic use, and the need for better understanding of student use of technology with an emphasis on the role of multi-tasking.

From what can be inferred from the data, students are utilizing their computers and other technology, both inside and outside the classroom, for mainly non-academic purposes. This signifies a desperate need for administrative control and understanding over how their students are using technology in educational and social spheres. Further research is needed to explore what the current and most effective policies and procedures are to ensure proper academic and social use. It will be important to explore how willing and often faculty members are utilizing control options in their classroom environments, where already available.

This study highlights an alarmingly low amount of student usage of laptop computers in the classroom. What makes this situation even more pertinent to IT is that this study was conducted on a campus with a laptop requirement in place with a universal wireless connection. This signifies the need for proper and frequent academic use which translates to the need for further research regarding faculty's willingness to require or recommend laptop use in class and the student's willingness to utilize their laptop in a class environment.

The data collected demonstrates very powerful signs that the current understanding of student use of technology has become, in many ways, obsolete. If students are using technology for innumerable non-academic reasons, than one could assume that overall student grade point averages would suffer,

but this has not been the case. In fact, IT has improved grade points averages significantly. So the question arises: how are students performing better academically while spending substantially less amounts of time (both in and outside of class) on academics? This may attributed to the Millennial's ability of multi-tasking in ways never before used by past generations due to constant exposure to technological forces.

In summary, the research of information technology usage in institutions of higher education remains important for educators and researchers. Studies like this one serve as invaluable assets to college and university IT departments. IT departments can recognize trends highlighted by research to better serve the student body's information technology needs and distinguish patterns in usage and other areas. "The analysis of quantitative and qualitative data can be used to help develop a profile of a world-class undergraduate IT experience" (Kvavik and Caruso, 2005).

11. ACKNOWLEDGEMENT

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