

Non Directed Utilization of a Hand Held Device: How Does a First Year University Engineering Student Use an iTouch?

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ABSTRACT

Handheld computer technology has been available for decades. The college student today has been exposed to various types of handheld computing devices for most of their lives yet there is little known about how a college student utilizes this type of technology tool as a learning advantage to an anytime or place scenario. This study looks at how one incoming class of freshman engineering students at a mid-sized university in Western Pennsylvania utilized Apple iTouch PDA/Mobile computing devices they had been given upon their enrollment at the university. Survey questions resulted in no significant trend in usage. Personal use and curriculum use resulted in an even split. There was a strong indication of expected future usage.

Keywords: iTouch, Mobile Computing, Communication Technology, Social Networks, Instant Messaging, Twitter, Enrollment Incentive

1. INTRODUCTION

The Technology world has always experienced an inexorable march of progress that has devised devices that constantly push the limits of smaller, faster, and more powerful. Over forty years ago, Gordon Moore predicted that the number of transistors that can be placed inexpensively on an integrated circuit has doubled approximately every two years (Moore, 1965). This prediction came to be known as Moore's law and a benchmark for computing power. Today it is undeniable that this march of advancement has produced systems which are available to everyday consumers that allow for tasks to be accomplished in ways unthinkable just a short time ago.

"Over the next decade, the raw materials-- technology, computers, disc space, bandwidth-- will get cheaper and more powerful at a very rapid rate. Our job is to figure out how to layer invention on top of those raw materials to make things that actually matter to people (Bezos, 2005)." This is a quote from Jeff Bezos, the founder and CEO of Amazon.com that was published in 2005 just as his company was beginning to lay the ground work for a seismic shift from just selling books online to becoming one of the leading developers of Cloud Computing. Mr. Bezos sought to take those resources he found available and utilize them in a very productive and beneficial fashion. This lead to Cloud/Hosted services, not just for Amazon, but also for the millions who now utilize

the services. This is not always the case with innovative ideas. Much of the most popular and profitable applications utilizing this wellspring of new found mobile power and connectivity are considered by many to be frivolous or simply entertainment (Jones, Johnson, and Bently, 2004). While companies like Amazon and Apple have leveraged the new channels of delivery to great success, traditional outlets of primary content such as newspapers, magazines, and book publishers have been attempting for decades to find ways to leverage many different delivery methods in meaningful and money making ways with little or no success.

The history of content delivery through technology can be traced from cave drawings, through Johannes Gutenberg and movable type, Guglielmo Marconi and radio, Thomas Edison and moving pictures, Philo Farnsworth and television, to DARPA and the Internet of today. This is not even including so many of the other technologies too numerous to itemize but significant nonetheless, such as Alexander Graham Bell and the Telephone, or even Samuel Morse and the Telegraph. There is always something new, a different way of getting a message from point A to point B. Technology Acceptance Models (TAM) can begin to explain and predict how some devices become ingrained into everyday use while others fade away to obscurity. The TAM's are based upon the argument that the individual impact of perceived usefulness and ease of use of technology will influence the attitude of an individual when using a particular technology and will have an impact on behavioral intent and continued use of computer technology (Davis, Bagozzi, Warshaw, 1989). The current environment has proven this notion time and again as the introductory market of gadgets proves that in a battle for survival and adoption, designers and manufacturers must push the envelope of development, while also driving ease of use for the general consumer. The product that can make a person feel like an instant expert when first touching the device is the product that is going to thrive. It becomes, in and of itself, a resource. It becomes one of the raw materials that Mr. Bezos speaks of that can be used as a conduit, or as a tool – a pathway to other things.

An Apple iTouch is a mobile computing device that is capable of many different tasks. As a basic computing system, it certainly fits a definition of allowing for input through a touch screen interface, and WiFi networking. It allows for gigabytes worth of storage internally, and

through networking infinitely more with Cloud storage. Processing allows for many different applications to be run, anything from games, internet browsers, movies and music, to productivity software such as word processors and spreadsheets. Output of these applications can be displayed through the screen interface or sent as files through networking. The iTouch is by definition a computing device in every sense. While other Apple products such as the iPhone and iPad, might have captured the public fancy and become best sellers, the iTouch is still a very viable computing platform. The iTouch has a much smaller price tag yet runs the same iOS4 as it's other Apple mobile brethren.

Since the mid 1990's, more and more colleges and universities have been utilizing technology giveaways as part of incentive programs for student recruitment (Finn and Inman, 2004). What began as a laptop for computer science majors has branched into notebook computers for all incoming freshmen at some institutions. With the release of the Apple iPad, more than a few schools were very quick and willing to use the newest and shiniest gadget as a symbol of their commitment to being current with technology (Young, 2010). It is an easy sell and essentially a no brainer of a promotion for a school's recruitment department. The problems is, though, are these devices just so many 'pull over fleeces' or 'carry all tote bags' free with your subscription? Or can they be utilized to become a part of the curriculum and *matter* when it comes time to be in the classroom?

This study will look at how one incoming class of freshman engineering students at a mid-sized university in Western Pennsylvania utilized Apple iTouch PDA/Mobile computing devices they had been given upon their enrollment at the university. These devices were handed out to the students with no strings attached. They became the property of the student and were not to be returned to the university at the end of the term, or upon graduation. The devices were also not integrated in the curriculum of the courses the students were enrolled in. No special steps were taken to utilize the iTouch in the classroom specifically; eBook editions were not mandated for any course. The use, or non-use, of the iTouch was completely up to the student.

The purpose of this study is to determine, given the opportunity to have such a powerful and mobile piece of computing in their hands, what did a group of engineering students use their iTouch for?

2. LITERATURE REVIEW

The current generation of college student has been exposed to handheld computing devices most of their lives. These devices range from the handheld video game to the more sophisticated applications available on the iPhone. With student familiarity with handheld computing devices it would seem that the natural next step would be to utilizing this type of tool as a teaching, learning advantage to extending the classroom curriculum to an anytime or place scenario (Jones and Johnson, 2003; Yuen and Yuen, 2003). That natural next step does not seem to have materialized.

Although some modular computing devices existed through the 1970s and 1980s, the field of hand held computing was successfully pioneered commercially seventeen years ago in 1993 by the introduction of Apple's MessagePad. A few years later, PalmPilots popularized the technology and the acronym PDA (Personal Digital Assistant) became common. Yet after almost two decades, incorporating the wireless-enabled handheld computing device for classroom use has been minimal with only the fields of medicine and law utilizing this type of tool in their curriculum (Olsen, 2002; Shields & Pofatak, 2002).

Medical schools and nursing programs were quick to adopt the handheld devices because many medical software packages were made especially for PDA's and widely available. In one example, Robert Morris University had implemented the distribution of PDA's to all incoming freshman for more than ten years. The students are using the devices to check medical references, compare interactions of prescription drugs, and also to share notes. Carlson conducted a study on the effectiveness of legal-study materials on PDA's at Stanford University (Carlson, 2002). However, Computer Information Systems education, where handheld computing would be expected to be found, has only referred to handheld computing in course topic coverage and as a platform for systems deployment (Jones, 2000; Mull and Lutes, 2001).

The focus of research literature on the use of handheld computing in an academic environment has primarily been reported in educational trade publications and on Internet/web published testimonials on vendor sites. Some research in the usage of handhelds has centered on use as required in specific curricula. This approach is limited in that it

ignores the individual choice in usage by the student (Jones, 2002; Johnson & Rudd, 2003; George, et.al. 2010). This study explores the usage and non usage by a group of Engineering freshman students that were given a free iTouch device at the beginning of their freshman year.

This investigative study into the uses of Apple iTouch mobile computing devices utilized a survey as the research instrument to gather information from current first year engineering students of a single academic institution. It is the goal of this study to identify if these personal choice usage trends can lead to a better integration of mobile computing devices into the University environment.

3. METHODOLOGY

University X, a private suburban school has a student population of approximately 5,000 Undergraduate and Graduate students that represent 29 states and 36 foreign countries. Approximately 1,000 of those students are resident, living on campus. For the academic year including Fall 2009, Spring 2010, University X had 22 first year students enrolled in the Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) program who plan to major in one of the fields offered by the School of Engineering, mathematics, and Science.

A survey was developed to gather information on how much students were using the devices, whether they were using them for personal or course work, and what their common activities were. (See Appendix A).

The survey was designed and administered through a web service, ESurveyPro.com. The survey was evaluated for time and clarity through administration to four test subjects.

E-mail invitations were sent to all 22 individuals as determined through their inclusion within University X's enrollment as first year students in the University X Engineering school. The invitations were sent April 20th, 2010 with one follow up reminder sent one week later on April 27th, 2010. At the completion of two weeks, 10 surveys had been returned though the web collection service

4. RESULTS

Of the 22 students who received iTouch devices, 10 (45%) responded to the survey through ESurveyPro.com, an online survey service. In Question 1, all ten of these respondents replied

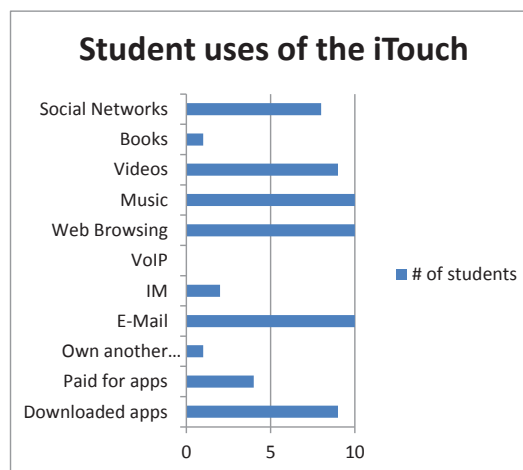
that they had used the device. When asked in Question 2 how often they use the iPod, four responded at least once a week, three that they used the device two to three times a week, and three responded that they used the iPod multiple times a day. One of the ten respondents responded to the Question 3 that they had used the iPod only for personal use. The remaining 9 all responded that they had used the device for both personal and course activities. When asked if their use had been more personal or course related in Question 4, three fell into the more personal category; three fell into the more course work category, while 4 determined that they had used the device about equal for both course and personal use.

Question 5 asked the students if they had any other mobile device capable of accessing the internet. Two of the student did have such a device, while the other 8 answered that they did not. Question 6 began a series of questions inquiring into various areas of use for the iPod. For Question 6, nine of the students responded that they had downloaded an application at some point. Only one student had not downloaded any applications. In Question 7, five of those having downloaded applications only had done so with free applications. Four of the students had paid. The tenth corresponds to the lone subject who had not downloaded any applications. Question 8 provided an opportunity for the participants to supply five of their most used applications, with five doing so. Facebook appeared 4 times, a general "Games" showed twice. Others submitted include Angry Birds, Wapedia, IMDB, Weather, Pittsburgh Penguins Mobile, Table of the elements, Unit Converter, and a dictionary. Facebook was named by 2 in Question 9 asking what the favorite application was. Angry Birds and Wapedia also received a vote each.

In other more general use category questions, all ten survey participants responded to Question 10 that they had performed a search of the internet through the iPod. Nine of the ten responded to Question 11 that they had played a game. Question 12 saw all ten replied that they had played music with the device. In Question 13, nine of the ten had viewed a video with the mobile. In response to Question 14, only one student had read a book through the iPod.

In terms of communication, Question 15 asked if the students had used the iPod for sending E-mail, Instant Messages, or Tweets. Eight responded that they had sent E-mail. Two used

the device to send both E-mail and Instant Messages. One user reported that they had not sent any messages through the device. Question 16 asked if the iPod had been used to utilize any Voice over Internet protocol (VoIP) applications, such as Skype. Only one of the ten responses indicated that the mobile device had been used with a VoIP program. Question 17 asked if the users had updated any social networking profiles through the iPod. Eight of the response said that they had updated a profile, with two responding that they had not.



Self-assessment of the importance the device has in their everyday lives was the subject of Question 18. The students were asked to rate the importance of the device in their lives from 1 (not very important) to 5 (very important). The spread was exactly even. Amongst the ten responses, each ranking of 1 through 5 received two votes each. Question 19 asked for a forecast of future use. Six responded that they expected to use the iPod about the same as they have. Three felt that they would be using the device somewhat more, while one expected to use the mobile device much more. When asked in Question 20 what they would be using the device for in the future, another even split was found. Four responded that they expected to use the iPod more for personal use, with the same number responding that they expected to use it more for course work. Two did not respond to this question.

Question 21 allowed for free comment responses. Three students supplied their personal views. One positive user said, "I Also have an iPhone. The best part about having the iPod does not have to carry around a laptop to class." The other two responses were not as glowing. One user stated, "Mine has had issues like freezing so I've had to restart it. Also the

headphone jack is broken and doesn't register that it has headphones plugged in. They're useful but faulty sometimes." The final comment also described issues, "It is not really that feasible to use for course work, other than checking emails, because you cannot write papers or anything like that."

5. DISCUSSION

Charting the use of a changing technology is difficult task, but an important one. In the case of wireless and mobile computing systems it is becoming more and more essential to garner hard facts and numbers to support decisions from both manufacturers as well as consumers. Very significant failures have been incurred by major players in the smart phone and mobile computer communities. Palm lost their chance of survival as a company and was sold to Hewlett Packard after the failure of the Palm Pre and Pixi phones to meet sales expectations in late 2009 and early 2010 (Vance and Wortham, 2010). Microsoft has pulled their latest effort in the smart phone arena, the Kin, after only three months of its arrival on the market place and some reports noting that only 500 units had been sold in that time (Buley, 2010). How could such significant companies get it so wrong?

Investment firm Morgan Stanley's unique approach of utilizing a 15 year old to create a market analysis report on how his peer group utilized and consumed various forms of media blew commonly held conventional wisdom out of the water (Robson, 2009). In his report, Mr. Robson noted such observations that whilst the vast majority of his peer group were very active on Facebook, almost none used Twitter. The common sense reason was that to use twitter to its fullest extent would require the user to expend text messages, a commodity best spent in direct communication rather than updating a site few others in their group used, if any (Robson, 2009). Another observation from this report was that very few of Mr. Robson's peer group owned smart phones due to a combination of cost of the phone, fear of loss of the phone, and the reluctance to enter into long term contact commitments for data plans. Microsoft may have been able to avoid the embarrassment of the Kin phone directly marketed to this age group had it analyzed this report more closely. Instead it has lost millions of dollars and another chance at re-entry into a burgeoning market they have been all but locked out of.

From a consumer point of view, choosing what to buy, and when, becomes a game of risk

assessment. Just as a company cannot afford a product line failure such as the Palm Pre, many individuals cannot afford to back the wrong device in their purchasing decisions. With long term contract commitments and early termination fees, the cost to an individual can be great in terms of money, but also equally great in terms of prestige and appearance. The cost to an organization such as a law firm or a school can be multiplied even more with the quantity purchased in bulk as well as expenditures that may be incurred in extra infrastructure to support the devices. Thus, for an education institution on a very strict and tight budget to advocate the purchase of any piece of technological equipment, there certainly needs to be some hard numbers that the device is going to be used, and continue to be relevant, for a certain time of life cycle to justify the risk of purchase.

In looking at the use of a wireless mobile computing device such as the iPod touch, certain patterns can begin to emerge that can help in gauging how other technologies may be used. From the results of this survey of first year university students, it is seen that at least part of Mr. Robson's observations of younger telecommunications users is true. Only one user in this group possessed a second mobile device that was capable of accessing the internet. What was also of note was that no users reported utilizing the device for VoIP usage. Though much has been made over the popularity of services such as Skype, none had utilized the free method of making telephone calls over the internet.

As for being a significant feature in their lives, no telling trend was found. The split was exactly even for each stage of relevance from significant to irrelevant. What was important was that every respondent expected to use the device more in the future. Again there existed an even split on whether this increased use was to be for personal use or course work – but all did expect the iPod touch to become a bigger part of their lives.

Without the iPod touch being integrated into the curriculum of any specific class, there was little motivation for the students to purchase or seek out any e-book versions of their texts. Thus only one reported having read a book on the device. This could be significant when deciding to force a change from print to electronic versions of texts.

Several areas exist of further inquiry for this study and environment. The limitation of having a small sample can be overcome through the

continuation of following these students, as well as the next group of incoming first year students. It is suggested that the initial survey should also be followed by in person interviews for clarity and depth of insight into the reasoning. Also, given the brief nature of the survey, it is strongly advisable that it be administered in person rather than online. Another line of research should begin to include the instructors of the courses for these students.

It should be investigated if these professors would begin to include the use of these devices into their class plans, or even if the faculty is prepared to do so.

6. REFERENCES

- Batista, E. (2000). Palm Reading Goes Educational. *Wired News*. Retrieved July 2010: www.handheld.hice-dev.org.
- Buley, T. (2010) Report Pegs Microsoft Kin Sales at 10 per day. *Forbes.com*. Retrieved July 2010 from: <http://blogs.forbes.com/velocity/2010/07/07/report-pegs-microsoft-kin-sales-at-10-per-day/>.
- Carlson, D. (1999-2009). The Online Timeline: A capsule history of online news and information systems. Retrieved July 2010 from: <http://iml.jou.ufl.edu/carlson/timeline.shtml>.
- Carlson, D. (1999-2009). The Online Timeline: A capsule history of online news and information systems. Source referenced: "The Electronic Newspaper: Fact or Fetish," Elizabeth M. Ferrarini, "Videotex - key to the information revolution," Online Ltd, 1982, pp 45-57. Retrieved July 2010 from: http://iml.jou.ufl.edu/carlson/history/the_11.htm
- Carr, S. (2001). U. of South Dakota Will Give Freshmen Wireless Hand-Held Computers This Fall. *The Chronicle of Higher Education*. May 18, 2001.
- Davis, F. D., Bagozzi, R.P., Warshaw, P.R. (1989). User acceptance of computer technology, *Management Science*. Volume 35 pp. 982 - 1003.
- Finn, S. and Inman, J.G. (2004). Digital Unity and Digital Divide: Surveying Alumni to Study Effects Of a Campus Laptop Initiative. *ISTE (International Society for Technology in Education)*. Spring 2004: Volume 36 Number 3.
- George, L.E., Davidson, L.J., Serapiglia, C., Barla, S. & Thotakura, A. (2010, in press). Technology in nursing education. *Journal of Professional Nursing*.
- Oreskovic, A. (2010) Microsoft pulls plug on Kin phones. *Reuters*. Retrieved July 2010 from: <http://www.reuters.com/article/idUSTRE65T6N820100701>.
- Jones, C.G.; Johnson, D.W.; and Bentley, J. (2004). Role Preference: Are Handheld Computers An Educational Or Personal Technology? *Journal of Information Systems Education*; Spring 2004; 15, 1; ABI/INFORM Global pg. 41.
- Jones, C.G., Johnson, D.W. and Cold, S.J. (2002). M-education: Mobile computing enters the classroom. *Issues in Information Systems*, 3, 309-315.
- Johnson, D.W., Jones, C.G. and Cold, S.J. (2002). Handheld computers: Ready for prime-time in the college classroom? In the refereed Proceedings of the 2002 Americas Conference on Information Systems (AMCIS), Dallas, TX. Association for Information Systems.
- Johnson, D.W. and Jones, C.G. (2003). A vision for integrating handheld computers into the college classroom: An empirical study. Manuscript submitted for publication.
- Johnson, D W and D Rudd. (2003). Will Handheld Computers Succeed in College? The Proceedings of the Information Systems Education Conference 2003, v 20 (San Diego): \$4113. ISSN: 1542-7382. *Information Systems Education Journal* 1(50). ISSN: 1545-679X.
- Moore, G.E. (1965). Cramming more components onto integrated circuits. *Electronics*, Volume 38, Number 8, April 19, 1965.
- Olsen, F. (2002). "U. of California at San Diego opens tech-oriented college." *The Chronicle of Higher Education*, p. A38.
- Ressner, J. (2005) 10 Questions for Jeff Bezos. *TIME* in partnership with CNN. Retrieved July 2010 from: <http://www.time.com/time/magazine/article/0,9171,1086146,00.html>.
- Robson, M. (2009). Media & Internet: How Teenagers Consume Media. *Morgan Stanley*

- & Co. International. Morgan Stanley Research. Retrieved July 2010 from: <http://media.ft.com/cms/c3852b2e-6f9a-11de-bfc5-00144feabdc0.pdf>
- Shafer, J. (2009). How Newspapers Tried to Invent the Web But failed. Slate. Retrieved July 2010 from: <http://www.slate.com/toobar.aspx?action=print&id=2207912>.
- Shields, J. & Poftak, A. (2002). A report card on handheld computing. Technology & Learning, Vol.22, No. 7, pp. 24-36.
- Tristram, C. 2002. Handhelds of Tomorrow: Technology Review. Retrieved July 2010: <http://www.technologyreview.com/web/12807/>
- Wood, C. (2002) Technology in America: Education. PC Magazine. Retrieved: July 2010. <http://www.pcmag.com/article2/0,2817,87485,00.asp>.
- Vance, A and Wortham, J. (2010). H.P. to Pay \$1.2 Billion for Palm. The New York Times. Retrieved July 2010 from: <http://www.nytimes.com/2010/04/29/technology/29palm.html>.
- Young, J. (2001). Administrator predicts that handheld computers will be big on campus. The Chronicle of Higher Education.
- Yuen, S & Yuen, P. (2003). PDA's as educational power tools. Tech Directions, Vol. 62, No. 9, pp. 14-17.

Appendix A:**Survey Questions (*possible responses in italics*)**

1. Have you used your ITouch? *Yes / No*
2. How often have you used your ITouch? *Multiple times a day – at least once a day – 2-3 times a week – used it once and never again*
3. Have you used your ITouch for Personal use or Course related use? *Personal use – Course related use – Both*
4. If you have used your iTouch for both Personal and Course related use, which of the following applies: *More personal use – About equal use for both – More course related use*
5. Do you own any other mobile device capable of accessing the Internet? *Yes – No*
6. Have you downloaded any apps? *Yes – No*
7. If you have downloaded any apps, have you paid for any? *Never downloaded apps – Only downloaded free apps – I have paid for an app*
8. List your top 5 most used apps? (*Open*)
9. What is your favorite app? (*Open*)
10. Have you performed searches on the Internet through the ITouch? *Yes – No*
11. Have you played any games on the ITouch? *Yes – No*
12. Have used the ITouch to play music? *Yes – No*
13. Have you used the ITouch to view videos? *Yes, Online – Yes, from file – no video viewing*
14. Have you used the ITouch to read a book? *Yes - No*
15. Have you used the ITouch to send E-Mail, Instant Messaging, Tweets? *E-mail – IM's – Tweets – None*
16. Have you used the ITouch to access a VoIP phone service such as SKYPE? *Yes - No*
17. Have you used the ITouch to update a social networking profile? *Yes – No*
18. Do you feel that the ITouch is an important part of your everyday life? *(1) Not important – (3) Somewhat Important –(5) Very Important*
19. Do you plan on using the ITouch more or less during the upcoming semester? *No Use – Somewhat more – Much More*
20. If you plan on using the iPod Touch more in the upcoming semester, will it be for personal use or course work use? *Personal use – Course work use*
21. Please enter any comments you would like to make concerning the iTouch. (*Open*)
22. If you would be willing to be contacted for further questions, please include your e-mail address below: (*Open*)