

Project Randomize

VoIP Pilot Implementation at MIT

John Cloutier

Jennifer Peng



CP & Associates

Project Report
15.568
Spring 2005

Prof. C. Gibson

CP & Associates
84 Massachusetts Avenue, Cambridge, MA 02139

May 12, 2005

Ms. Allison Dolan
Director of Telephony and Shared Services
MIT Information Services and Technology
77 Massachusetts Avenue
Cambridge, MA 02139

Dear Allison,

We would first like to express our gratitude for the opportunity to work with you on this project. Jennifer and I along with Chuck hope that this can serve as a model for future collaboration between IS&T and undergraduates. It has been a great learning experience for us as we hope it can be for future students.

Attached is the final version of our report. We have compiled all the relevant data collected during our investigation along with our recommendations for future action on the issue of VoIP at MIT. We hope you find it informative and will be able to use it as you make decisions on campus telephony needs.

As we discussed during our presentation of this project, we are strongly recommending IS&T begin a pilot program using several different commercially available VoIP solutions. The individual packages should be distributed to students as they arrive on campus in the fall. We feel that this type of a trial would minimize the network impact of VoIP while allowing you to collect data about which type of system and features will be most useful. If there is any way we can assist in this deployment either in a PR capacity or as student representatives, we would welcome the opportunity. John will be at MIT over the summer and would love to help plan and execute this pilot for the fall.

Thank you again for you guidance and support.

Sincerely yours,

John Cloutier and Jennifer Peng
CP & Associates

TABLE OF CONTENTS

Executive Summary	3
Project Scope and Methodology	5
Within Scope	
Not Considered	
Findings.....	6
Dartmouth University	
University of North Carolina	
Massachusetts Institute of Technology Administrators	
Massachusetts Institute of Technology Students	
Analysis and Conclusions	11
Recommendations and Next Steps.....	13
Summary Message and Observations	15
Acknowledgements.....	17
Appendix A: MIT Student Survey Data	18
Appendix B: Presentation Slides.....	38
Appendix C: The Tech Articles	48

EXECUTIVE SUMMARY

Overview:

As the internet continues to expand all over the world and access in homes and businesses becomes faster and more reliable, new technologies emerge that take advantage of cheap global connectivity. One such technology is voice over IP which uses the internet to place phone calls. As a world leader in science and technology it has been suggested that MIT should begin to implement these new devices.

Project Summary:

Project Randomize was initiated to investigate possible motivations for using VoIP at MIT as well as to evaluate installations at other schools and gauge student and administration interest. During our investigation we spoke to various administrators in IS&T as well as surveyed undergraduate students about their phone use. Based on the responses we received, we are able to make a recommendation for further study of the subject of VoIP at MIT in the form of a pilot targeted at students. In his capacity as Undergraduate Association President, John Cloutier will be assisting Allison Dolan the Director of Telephony and Shared Services for IS&T to finalize the details for the pilot over the summer for deployment during the first few weeks of the fall term.

The pilot will serve to explore the different types of VoIP phones and features available while minimizing the effect on MIT's existing network infrastructure. Marketing this pilot to undergraduates will help IS&T address the recent additional phone charges that have been mandated by providing an alternative for students who can't afford the fee. This topic has already received a lot of attention in The Tech student newspaper which recently ran a story describing our recommended pilot to undergraduates (See Appendix G).

The other recommendation we are making is to ensure efforts are made to improve communication between the various groups involved. Network and telephony departments must work together for this hybrid technology installation to proceed. Without this cooperation, we feel VoIP cannot go further at MIT.

Scope:

The technology itself was not a primary focus of our investigation as this type of study would not add value to the project for IS&T. Cost was not considered either as IS&T is already in the best position to evaluate the expense of such a program. Rather we took the approach of an objective third party gathering information to help IS&T make the best decision about how to dive into VoIP.

Project Evaluation:

Although Project Randomize was hindered by the loss a group member and difficulty contacting IT resources at other schools (and here at MIT), the final analysis has proven to be quite valuable. The insight we were able to provide to IS&T will likely result in a 100 student pilot deployment in the fall. Although Jennifer will be graduating, John will continue to work with Allison on bringing VoIP to MIT.

PROJECT SCOPE AND METHODOLOGY

The primary goal of this project is to collect information from various sources in order to provide IS&T with some insight into what the MIT community wants and how other schools have addressed the same issues.

WITHIN SCOPE

Other Schools:

We did phone interviews with several network administrators at the University of North Carolina and Dartmouth. They provided us with a description of their current status and future plans for VoIP. They were also able to share with us some of the road blocks they faced when installing VoIP and gave their perspective on the human impact of this new technology.

MIT:

Our data collection at MIT took two forms. First, we interviewed several people from IS&T with different areas of expertise (networks, telephony, VoIP) to gauge the current status of network infrastructure, VoIP deployments and departmental interest and interactions. Second, we distributed a student survey which addressed general telephone usage as well as interest in VoIP. This survey was designed to gauge student reactions to IS&T's new \$17/month phone fee to be implemented in Fall 2005. Over 75 responses were received and tabulated.

The final recommendation includes an analysis of these data along with several 'next steps' for further action. Central to the project was evaluating existing network infrastructure and upgrade plans in order to determine what kind of pilot would be feasible. Along with the technological requirements we looked at departmental interaction and processes for campus computing that might affect the success of VoIP.

NOT CONSIDERED

Several aspects of a VoIP installation were not considered in the project because our team would not have been able to provide any additional insight IS&T does not already have. Both network and telephony groups have already done investigations of the technology available for VoIP. In each case, they have been in contact with manufacturers who sell the needed hardware and are very knowledgeable about how VoIP works both theoretically and in practice. For this reason we did not look to investigate the actual technology nor did we consider cost as an issue. IS&T is much better suited to make decisions about what to spend and for which products.

FINDINGS

DARTMOUTH

Our telephone interview with Larry Levine at Dartmouth University gave us a first hand experience with VoIP which was used to make the call. Dartmouth recently underwent a major upgrade to its telephone and data systems. The analog telephone switch they had been using reached the end of its life span which gave them the opportunity to replace it with a VoIP product. Dartmouth elected to provide brand new VoIP telephones to every staff member at the expense of the IT department. One of the main drawbacks to these types of phones is that they are quite expensive so departments aren't eager to invest in replacing all their old handsets.

In order to make this installation possible, Dartmouth had to do a major upgrade to its data network infrastructure. They increased bandwidth to slower areas and added uninterruptible power supplies to ensure the network stayed up even during a power outage.

In addition to network upgrades, Dartmouth also realized the importance of calculating the human impact VoIP would have on users. They found that in many cases, increasing the number of available features was detrimental because it confused users by giving them too much to learn and too many options from which to choose. Training staff to use the new phone system was not a trivial issue. Many users at Dartmouth were used to doing things a certain way and had difficulty transitioning to the new technology. Even if VoIP phones allowed people to check their voice mail with a single button, if people were used to dialing a string of digits to call a VM operator, the new method would cause more frustration during the learning process.

The VoIP implementation for Dartmouth students is somewhat different. Unlike MIT, Dartmouth does not provide telephones in student housing and could not expect students to buy expensive VoIP phones with their own money. Instead they installed phone switches that were integrated to the campus wide VoIP network on one side and allowed users to attach regular analog phones on their side. This part of the project is therefore invisible to end users.

UNIVERSITY OF NORTH CAROLINA

We also spoke with James Oberlin and Tyler Johnson from the University of North Carolina about what they are doing with VoIP. Unlike the Dartmouth project, UNC has chosen to deploy VoIP to individual buildings and departments as a complete telephony solution. The first was WUNC, the campus radio station and the next will be two new IT buildings which are currently under construction.

The motivation for UNC's pilots was not a business one but rather meant to enable academic collaboration and to further investigate the technology. They stressed the issue that conventional circuit based telephony business models do not work for VoIP. As a result, they are not attempting to sell VoIP as a solution to cut departmental expenses, but rather to explore new possibilities in communication technology.

Another aspect of VoIP that is being considered is wireless and cellular phones. The idea is that no one would want to have a phone that is hardwired to their office phone jack if they could use a wireless phone much like their 802.11b laptop or PDA. However for this to work, wireless coverage on campus would need to be much more robust. People would not accept a phone that

could only be used indoors for example. For this reason, wireless VoIP at UNC is still years away.

MIT ADMINISTRATORS

Jeff Schiller – Network Manager

We spoke with Jeff Schiller to get an idea of the existing network topography and plans for future upgrades. VoIP requires a more robust network than other types of data traffic, so ensuring a quality network is in place is of primary importance. According to Jeff, much of MIT's network is too old to handle VoIP. However, whenever buildings are constructed or renovations completed, the new network that is installed should be sufficient to handle voice traffic. However, there are several other important factors to consider in this process.

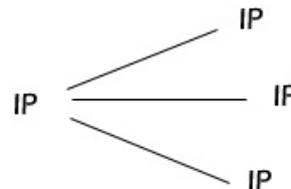
The Department of Facilities and IS&T don't always agree on the best ways to deploy a network installation or upgrade. In the past, funding would flow at the discretion of Facilities and often would not be enough for IS&T to fund a strong enough network. While this funding problem seems to have been addressed by taking network allocations away from Facilities, other difficulties such as agreeing on the size and location of data closets still exist.

The telephony staff and network staff come from very different backgrounds. The circuit based telephone model is based on providing a metered service. In other words, people are charged based on how much they use the service. Contrasted with that is the internet model which provides relatively inexpensive (often free) transmission of an unlimited amount of data. Analog phone networks also have a huge amount of sunk infrastructure that makes adapting to new technology more difficult and time consuming. IP network on the other hand are always rapidly changing and growing in what might be considered by telephonists to be a very unstable environment. Standards that exist today might be ancient history in a few years.

Figure 1

Figure 2

Phone ————— Phone



These differences have even influenced how hardware for VoIP systems is designed. Lucent makes VoIP products from the perspective of and with experience in telephone systems whereas Cisco takes an IP network approach to its designs. These differences can lead the two groups to selecting different ways to solve the same problem. Since VoIP is very much a hybrid technology, they will be forced to work together in order to implement any pilot project.

The final issue that Jeff raised was that VoIP is still a techie toy and is not yet marketable to departments as a communication solution. Once the technology and standards develop a bit more and a workable business model can be created, VoIP will become a legitimate alternative to analog telephony.

MIT STUDENTS

The 20 question survey produced a great deal of information about student reactions to the \$17/month phone plan, their cell phone to dorm phone usage and feelings towards VoIP technology. List below are several of the main findings from the data. The complete list of findings can be found in Appendix A: MIT Student Survey Data.

Profile of Surveyed Students

There were 75 student responses, of which 27 male, 47 female and 1 transgender. The class distribution was pretty even with 17% Class of 2005; 27% Class of 2006; 25% Class of 2007; 29% Class of 2008; 2% Graduate Students. All the undergraduate dorms except Senior Haus were surveyed. Apparently, the e-mail survey was never forwarded to Senior Haus. The one graduate student response lived in Tang.

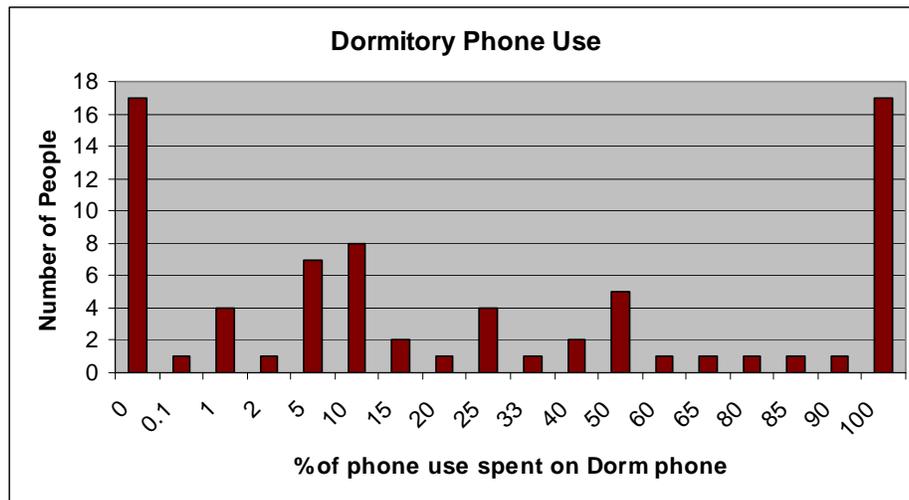
Percentage of Cell Phone Users

The myth that everyone has a cell phone is partially true. 79% of the surveyed students owned cell phones while 21% did not.

Dormitory Phone Use

As shown in Figure 3, an equal portion of students use their dormitory phones for either 0% or 100% of their phone calls. The majority of those surveyed students use their dormitory phones for less than 50% of their calls however, an interesting point is that there is a small, core group of students who rely mostly on their dorm phones. They spend about 60% to 100% of their calls on dorm phones.

Figure 3



Reactions to \$17/month fee

Our results found three main types of reactions to the \$17/month phone plan fee: Indifferent, Outraged and Understanding.

The Indifferent group, 70% of the respondents, had a range in emotion from anger to frustration, but in the end were unaffected by the \$17/month fee. The Indifferent were typically heavy cell phone users that were unfazed by the elimination of the current dormitory phone privileges. They could continue using their cell phones as is or upgrade their cell phone plans to incorporate more minutes. One person even commented that it would be less expensive to pay overage charges each month than to pay this \$17/month fee. Those who did not own cell phones felt that purchasing a calling card would meet their minimal phone use.

The Outraged group, 23% of the respondents, was extremely affected by the \$17/month fee. The Outraged individuals did not own cell phones, couldn't afford cell phones or didn't use the phone enough to pay \$17/month for dormitory phone use. Many of these individuals use the current MIT dormitory phone service to receive phone calls from their parents. We found that these individuals tended to live in the Massachusetts area and therefore were able to use the 617 area code to their advantage. Several students commented that phone service was a basic necessity that other universities offered and were appalled at the fact it would be taken away.

The Understanding group, 7% of the respondents, felt this was a practical decision by the IS&T department. These students understood that very few students use their dorm phones anymore and that it would provide cost savings for MIT.

Purchase the Plan?

Of the students surveyed, 16% said they would purchase the new phone plan. These students commented on how they felt forced to purchase the plan because they had no other choice. The 79% that said they would not purchase the plan felt they didn't need their dorm phone, the service was too expensive or they couldn't afford it. The 5% of the students who were still deciding were trying to determine if they should just upgrade their cell phone, buy a cell phone, get a calling card or just buy the service. Basically there were no students who were enthusiastic about the \$17/month phone plan.

Feelings towards VoIP Technology

The second half of the survey listed various qualities about VoIP technology and how it would affect the students' lives. The survey explained qualities such as how voicemails could be saved as audio files or how phone calls could be made from laptops. The students were also allowed to rate how "cool" the feature was and how much value it added to their lives. Overall there was apathy and indifference to the features of VoIP technology. None of the listed features had a statistically significant approval of any feature.

This unenthusiastic attitude for VoIP may be attributed to the students' lack of knowledge for VoIP technology. They do not realize VoIP's benefits and ease of use. Furthermore, students require and expect very little from their phone service. The variety of services offered by VoIP is not as enticing as if presented to a business person or technology guru. Students are satisfied with their cell phone service because they only need the ability to call their family and friends.

Telemarketers

Surprisingly, telemarketers are a huge nuisance to students across the campus. They call students in the early morning and early evening. One student respondent said he like the new proposed phone plan because it eliminated the ability to receive incoming non-MIT calls. On the other hand, students were frustrated because paying for the \$17/month fee would be equivalent to paying to receive telemarketer calls.

Problems with Current Dorm Phone Service

There were also a number of complaints about the current MIT dormitory phone service. One student from MacGregor does not have a telephone jack in his room . This same student, as well as a student from New House, didn't have their proper dormitory phone number listed in the MIT directory. When people tried to call them, the phone of the person down the hall would ring. There were also issues in New House where one student's dorm phone didn't work for several months. Now she doesn't even have her dorm phone plugged in.

ANALYSIS AND CONCLUSIONS

SCALE OF PILOT

Large Implementation

It is unlikely that a large scale VoIP implementation could be completed in the near future. This refers to both installing VoIP as the primary voice communication solution in an entire building or department as well as replacing the legacy voice switch with a VoIP capable switch. Much of MIT's existing network infrastructure is not robust enough to handle the needs of VoIP. Although they are slowly being upgraded, the costs involved in speeding up these repairs combined with those of staff transition far outweigh any benefit VoIP might provide to interested departments.

It is similarly not reasonable to discard the 5E only a few years into its decade long life span. Dartmouth was able to take advantage of the fact that its legacy switch was end the end of its depreciation to replace it with a VoIP switch. MIT should maintain its current process for upgrading the phone system and begin planning a replacement two years prior to the 5E's demise in 2009. In the time between now and then, every effort should be made to investigate the kind of VoIP features that could be integrated into the new phone system in 2011.

Small Implementation

During this period of further study, a small pilot should be undertaken to explore the types of phones and features that might be of value to MIT in the future. To help address the issue of the \$17 per month dorm phone charge, this pilot could be deployed to students who would otherwise have difficulty affording phone service. The non-mission critical nature of residential voice service as compared to administration voice service is another benefit of a student program. It is also vital that this program have only a minimal impact on existing network infrastructure and not require any type of construction or upgrades to be done. For this reason, commercially available 'VoIP in a box' solutions would work best.

CULTURAL DIFFERENCES

It has become quite clear during the course of our investigation that telephone and IP networks are quite different. One is not inherently better or worse than the other (contrary to what some might want us to think), but these differences become important when the hybrid technology of VoIP requires the two to be joined. Phones are circuit (one to one) based, IP networks are packet based (one to many). Phone use is metered, internet use is unlimited. The two work in different ways and break in different ways. These differences must be taken into account when choosing a VoIP solution so that phone service and network functionality are both protected.

DEPARTMENTAL COOPERATION

In much the same way as the two types of service fundamentally differ, often it can seem that the two departments within IS&T are coming from different places. If something goes wrong, the two groups will approach a solution from very different points of view. This could become an obstacle for collaboration, but should instead be thought of as an opportunity to gather several different perspectives in order to find the best overall solution.

Some of the issues with Facilities/IS&T cooperation have been addressed and so too must be the internal IS&T feelings. Everything from the planning of the new system to choosing hardware to administrating a joint telephony/network project must be approached as a collaboration. Only when this is achieved will VoIP at MIT be possible.

RECOMMENDATIONS AND NEXT STEPS

VOIP PILOT IN STUDENT DORMITORIES

Implementing a VoIP pilot in student dormitories in Fall 2005 will be the most feasible and effective thing solution in addressing this \$17/month phone plan issue. It is to the benefit of the MIT administration to extend a possible alternative to the fee. If students feel the administration is cold heartedly implementing initiatives and taking away services, there will be tension between the two. This VoIP pilot will allow students see that the administration is working with students.

Test Multiple Technologies

It is recommended that IS&T utilizes the commercial VoIP products out in the market. The telephony department can deploy the three types of VoIP phone technologies: analog phone with telephony adaptor, VoIP phone and soft phone. Distribute the phones randomly to students and survey their satisfaction with the technology.

Pilot Participants

IS&T can extend the survey to any type of MIT student. It can be limited to only undergraduates in undergraduate dorms, undergraduates in any dorm or graduate students in dormitories. The selection of the participant pool should not produce any radically different results. However we recommend working with the undergraduate population since you have the direct assistance of the incoming UA president, John Cloutier.

Time Period

The ideal time period to target students is Orientation and the first week of classes. Students tend to become busier and less responsive to surveys as the semester progresses. Therefore, it would be wise to distribute the follow-up survey either in the middle of the semester or the beginning of the spring semester.

Advertising & Publicity

It is most effective to advertise to students through e-mails and The Tech. Send quick and informative e-mails to students through their dormitory e-mail lists. Many dorms have a more official e-mailing list as well as an informal e-mailing list. Send your pilot advertisements through the former to receive a better response. Call the Tech to get another article written about the pilot. A front page headline is more effective than any Tech advertisement, poster or spam. Several articles have been written about the phone charge issue and on May 10, 2005 The Tech ran a story about this project and our recommended pilot (See Appendix G).

Another way to get information about the VoIP pilot is to arrange an information booth in the Student Center. This booth could even be a central location for equipment pick up, if you choose to have students install the equipment themselves. The Student Center has more traffic than Lobby 10, which is another popular location for information booths.

Help Desk

In order to not bias the VoIP pilot, IS&T needs to create a convenient and accessible “help desk.” This “help desk” should be available 24 hours a day, 7 days a week to answer VoIP

phone problems. IS&T will not want the pilot survey results to be filled with complaints about unanswered questions. The pilot should try to simulate a well run VoIP system.

Contact Persons

Work with the Undergraduate Association, Graduate Student Council and dormitory house managers to effectively execute this pilot. These three groups have the most power and contact with the potential pilot participants. Refer to the following links for contact information for each group.

“OUTRAGED” STUDENTS

Project Randomize obtained preliminary information about the various student responses. We strongly recommend IS&T or next semester’s 15.568 class to further investigate this “outraged” group. Many of these students are international or local Massachusetts students. Determine this group’s actual phone use to see if VoIP technology or a revised phone plan is the best solution. Most students are indifferent or unaffected by the \$17/month plan so it is important to make sure IS&T is not ignoring these “outraged” students’ needs.

ADMINISTRATION INTEREST IN VOIP

The project’s findings discovered that students were not too impressed by the technological advantages of VoIP technology, but the administration might have a more positive reaction. Currently, Dennis Baron of the IS&T department has been introducing VoIP technology to a handful of professors who find it very intriguing and useful. IS&T could deploy a pilot among the administrators and professors to determine their level of interest. Even if this pilot doesn’t spawn an immediate implementation, it can serve as a gateway for educating the administration and faculty about VoIP until MIT is ready to fully implement in 2011.

SUMMARY MESSAGE AND OBSERVATIONS

Project Randomize has taught us many valuable lessons about IT project management and dealing with real world complications.

Plan for Uncertainty

Our team definitely learned the difficulties uncertainty can bring to a project. First we had to deal with being the smallest group, with only three people. Then Jose Barraza's unexpected medical leave led to a drastic re-scoping of our project. In the midst of trying to catch up and meet deliverable deadlines, John Cloutier was unexpectedly injured on a Spring Break trip to Ireland. Throughout the project, we had to work around everyone's busy schedules, including John's UA Presidency campaign. We had more challenges than any of the other two groups combined, but we were able to work well with each other and stay focused on the project. We've learned that being a solid team is the most important aspect of a project.

It is always difficult to accept that a project is being hindered by unforeseen events. In the beginning, we felt that this type of information gathering project didn't really have too many opportunities for unforeseen problems getting in the way. Since then we've seen that even seemingly simple projects like ours can be turned into chaos. The article *Managing Project Uncertainty: from variation to chaos* stresses the importance of identifying foreseen uncertainties and creating a contingency plan. In retrospect, losing a member of a team is a foreseen circumstance; however temporarily losing a team member as a result of a Spring Break trip is unforeseen. In one class discussion, after explaining our project's unforeseen circumstances, Tyco CEO Dana Deasy stressed the importance of thinking of any possible unforeseen uncertainty for a project. After Project Randomize we will always follow his valuable advice for future projects.

Project Randomize was primarily an information gathering project. We didn't have a budget or any concrete system changes to implement. As such we were relying solely on help from other people to learn about VoIP, computer infrastructure and programs at other schools. When our group had difficulties arranging the interviews with other universities, Professor Gibson offered to try to contact these individuals for us, seeing that a Professor would get more attention and respect than an undergraduate student. This reinforced the importance of having a backup plan. Our original project proposal had listed going to Professor Gibson as a solution if we encountered problems. If we had not created or utilized our backup plan, we would have been at a formidable roadblock.

Human Acceptance of Technology

From our interview with Dartmouth, we learned that humans play a key role in the success of an IT project. Similar to the First National City Bank case where the employees actually revolted and sabotaged the new machinery the first day of the implementation, Dartmouth had complications as well. The VoIP phone users were used to the habits and operations of the traditional phones. When the VoIP phones did not respond the way the users expected them to, they became extremely frustrated with the new technology and complained. For example, the users expected to have a dial tone when they picked up a VoIP phone, but their VoIP phones naturally don't have dial tones. The Dartmouth Computing Services department had to address these human issues before the culture accepted the technology.

The module *Implementation and Change: "Technology is the least of our problems"* was very relevant to our VoIP project because a huge hurdle is trying to convince and educate the MIT administration and students about the benefits of this technology. Allison informed us that it is unclear where and how VoIP could be best implemented on campus. Similar to the First National City Bank case, a successful implementation of VoIP would require converting a massive group of people to a new technology.

Another way to expedite human acceptance of technology is to make technology easy, as mentioned in the *Make It Simple* article. If they implement VoIP technology, the IS&T department needs to make sure it passes "the mom test," which basically says that widely accepted technology should be so user friendly that even your grandmother could operate it. Technology gurus get too wrapped up in the "coolness" of a technology and forget to win over the mainstream crowd. Keeping technology simple is critical to a successful IT implementation.

Cooperation and Support from Departments

In our research we discovered the fundamental differences between telephony and network services. VoIP technology requires the cooperation between these two groups because if something goes wrong, the two groups will approach a solution from very different points of view. This situation has taught us that cooperation between all groups involved in an IT project is crucial to success.

In the heated debate following the announcement of the \$17/month phone plan, Allison warned us to tread carefully when speaking to administrators at MIT to not give them the wrong impression of our project's motives or make them feel threatened. The concerns here were similar to those of the *Administrative Data Project* Case in which technological progress was hindered by a deeply ingrained school culture of very autonomous departments that didn't work together. The success of their project was directly dependant on getting other people on the bandwagon and supporting the change.

Additionally, in the *AIRNow* Case Chet Wayland was able to garner the support and work of people that weren't being compensated for their efforts. IT project managers should follow Chet Wayland's lead and try to mobilize various groups of people to work towards one goal.

ACKNOWLEDGEMENTS

We would like to offer special thanks to those without whom this project would never have been possible. Your hard work and willingness to offer assistance is greatly appreciated.

ALLISON DOLAN

Director, Telephony and IS&T Shared Services

PROFESSOR CYRUS GIBSON

Sloan School of Management Science

EVAN MAMAS

Teaching Assistant, 15.568

15.568 CLASS

Practical Information Technology Management

STEVE WINIG

Sr. Project Manager & Special Assistant. to IS&T VP

LARRY LEVINE, DARTMOUTH

Computing Services, Dartmouth University

JAMES OBERLIN, UNIVERSITY OF NORTH CAROLINA

Executive Director, Academic Technology and Networks

TYLER JOHNSON, UNIVERSITY OF NORTH CAROLINA

Director, Telecommunications Research and Development

JEFF SCHILLER

Network Manager, IS&T

KAREN NILSSON

Associate Dean and Director of Housing

DENNIS BARON

Senior Strategist, Integrated Communication

APPENDIX A: MIT STUDENT SURVEY DATA

Distributed Survey

Survey for Students

Gender:

Year:

Cell Phone

1. Do you own a cell phone? Y N
2. How many calls do you make each week?
3. What is the average length of a local phone call?
4. If you pay more for roaming outside your local calling area, how many roaming cell phone calls do you make each week?
5. What is the average length of a long distance phone call?
6. Who do you primarily call on your cell phone and how much of your calling time is spent on that person?

Example:

Mother 80%

Boyfriend 20%

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

7. What is your cell phone plan?
-# of Weekday minutes?
-# of Nighttime & Weekend minutes?
-# of anytime minutes?
8. What is the price of your monthly cell phone rate?
9. How much do you typically pay in overage charges for overused minutes?
10. List any complaints you have about cell phone service here at MIT.

Dorm Phone

11. What dormitory do you live in?
12. How many local (617 area code) phone calls do you make each week using your room phone?

VoIP technology allows users to make telephone calls over a data network, instead of a traditional phone line.

23. If MIT were to implement VoIP technology, there are several advantages and disadvantages. Rank the importance and value of each factor. Please comment on each factor.

With a VOIP system I can use my laptop/computer to answer an incoming call and as a result I do not have to be in my room waiting for that important call.

Importance: 1 2 3 4 5 6 7
None Very Important

Value Added: 1 2 3 4 5 6 7
None Very Valuable

Your Comment: _____

I can go home for the weekend and still receive calls on my laptop!

Importance: 1 2 3 4 5 6 7
None Very Important

Value Added: 1 2 3 4 5 6 7
None Very Valuable

Your Comment: _____

I can have more sophisticated call management services: save messages as audio files, selectively redirect incoming calls and so on.

Importance: 1 2 3 4 5 6 7
None Very Important

Value Added: 1 2 3 4 5 6 7
None Very Valuable

Your Comment: _____

I may be able to use my PDA or smartphone to call people from anywhere on campus that has wireless access.

Importance: 1 2 3 4 5 6 7
None Very Important

Value Added: 1 2 3 4 5 6 7
None Very Valuable

Your Comment: _____

With a VOIP system, calls can be forwarded to my cell phone when I'm not at my computer.

Importance: 1 2 3 4 5 6 7
None Very Important

Value Added: 1 2 3 4 5 6 7
None Very Valuable

Your Comment: _____

Collected Data

Gender

Gender	Frequency
Male	27
Female	47
Transgender	1

Class

Class Year	Frequency
2005	13
2006	20
2007	19
2008	22
G	1

Dormitory

Dormitory	Frequency
Baker	10
Bexley	4
Burton Conner	8
East Campus	6
Fraternity	2
MacGregor	11
McCormick	10
New	11
Next	4
Random	1
Sidney Pacific	3
Simmons	4
Tang	1

1. Do you own a cell phone?

	Frequency
Yes	59
No	16

2. What percentage of your phone calls are made on your cell phone?

Percent	Frequency
0	17
10	2
15	1
35	1
40	1
50	5
60	2
66	1
75	4
80	1
85	2
90	9
95	6
98	1
99	4
99.9	1
100	17

3. What percentage of your phone calls are made on your dorm phone?

Percent	Frequency
0	17
0.1	1
1	4
2	1
5	7
10	8
15	2
20	1
25	4
33	1
40	2
50	5
60	1
65	1
80	1
85	1
90	1
100	17

4. How much do you typically pay in overage charges for overused minutes?

Overage charges	Frequency
n/a	17
0	44
2	1
3	1
10	3
Lots... over \$100 sometimes These past few months they've been higher than usual... like \$150	1
I don't know.	7

5. List any complaints you have about cell phone service here at MIT.

Response	Frequency
n/a	12
None	17
Generally good coverage	2
Bad reception	55
Of the 55 bad reception complaints, the most problematic areas were	
Infinite corridor	12
Many locations in MIT	11
Student center	9
Cement buildings	4
Classrooms	4
Bottom floor of student center	2
Underground labs	2
Eastern end of infinite corridor	1
McCormick	1
Building 68	1
Kresge Auditorium	1
10-250	1

Other comments:

- For such a technology-based campus, the cell phone reception is surprisingly poor, even when you're outdoors. Everywhere else in Boston is almost better.
- I barely get reception on half of campus, and I get no reception on the other half. And I'm locked into the deal with the cell phone company for another year, so I end up using my dorm phone a lot.
- I guess I don't get reception everywhere, but it's no worse than anywhere outside MIT.
- I LIVE IN SIMMONS AND RECEPTION SUCKS! You walk out in the hall, it goes away. in past years, if I moved in my chair I lost a phone call.
- Overage charges are extremely high and reception isn't always great.
- None of my friends' phones get enough reception in my room and so I won't be able to call anyone from my room even if I have a cell phone
- Spotty in some buildings. Also cell phone service in general is not of the quality of a landline.
- There is bad reception in many dorms and most buildings on campus. Also, it is expensive
- There is very little signal in East Campus, near Bldgs 18, 56, 66, so in order to actually use my cellphone to call home, which I do almost every day, I have to walk to the EC courtyard or walk on Mem Drive. I prefer to use my room phone to make most of my calls.
- There should be student discounts for Verizon and other cell phone services.
- They don't let you turn off service for a month.

6. List any complaints you have about dorm phone service here at MIT.

Response	Frequency
None	39
Telemarketers	6
\$17 fee	3
None, I don't use the phone	2
None, the service is good	4

Other comments:

- \$17/month is more than I am willing to pay for just local service and incoming long distance, but \$40/month is more than I am willing to pay for a cell phone. I see \$10/month as about what I would pay for local phone. I also dislike rolling incoming long distance into the package to "induce students to sign up," since it feels like extortion -- I essentially *have* to sign up or buy a cell if my family wants to call me.
- Bad, I don't need it.
- I do not have a working dorm telephone connection. I have a telephone, however no jack to plug it into. My phone number listed in the directory is actually the number of the person who lives in the next room over.
- I don't know anything about it really, and I really wish I knew how everything worked out as far as what I might need to do to be able to make long distance calls or receive voice mail, but I don't know where to look for that info.
- I don't want to pay next year. The service offered now meets my needs well
- I get quite a lot of calls from solicitors, especially credit card companies. I also frequently come home to messages on my machine that aren't messages, but just someone hanging up. I don't know where these people get my phone number, because I don't give it out freely... I don't know if there's anything MIT can do about it; maybe it's a lost cause. I also don't like the fact that if I didn't have a calling card, there would be absolutely no way to call long distance. It's very frustrating once in a while when my card number temporarily malfunctions, and I have no option-- not even an expensive one, not even an emergency "Plan B"-- for reaching my family (in CA) right away.
- I lost my dial tone for a few days last semester, and it took a while for the people to come to fix it. Since it's the only phone service I had access to, it was somewhat concerning.
- I think the dorm phones are ok, though I wish caller ID were more available or cheaper.
- I'm upset that we'll have to pay for it next year. A phone should come with the (high) cost of living in a dorm.
- There could be better displayed info about how to use the phone (example, dial 9-1-617...)
- Personally, my phone didn't work the first month I was here so my roommates and I gave up and just used our cell phones. Our dorm phone isn't even plugged in at this point.
- There is no operator to help you when you need help.
- They only provide local calls but most calls I need to make are outside of the 617 area code.
- We (myself +roommates) never started using it because the number we were told was ours was actually a couple rooms down. Plus, we all had our own cell phones. But there was one drawback to only using our

Project Randomize: VoIP Pilot Implementation at MIT

cell phones--friends who did not own a cell phone could not call us because we all had long distance numbers.

- Well my hometown is in the 978 area code, and the dorm phones only cover 617 and 781 area codes. It's useful that I can call in those area codes, but it's annoying that I live about a mile away from the 781 area code line and I can't call home from my dorm phone; it's useless to buy phone service when I live that close, so I have no choice but to use my cell phone to call home.
- You don't list the dorm phone numbers on the MIT search people page
- You have to dial 9-1-617 for local phone calls. The ringer on the phones given is super annoying. It makes me want to throw something.

7. What are your thoughts about the planned \$17/month fee for standard phone (local calling, voice mail) in the dorm room next fall?

Student responses were consolidated and organized into the following general categories.

I think it's a ridiculous or terrible idea.

- I think it's an awful idea. At the very least we should be getting free local calls. Don't we already pay enough in tuition... and dorming fees... and housing tax? I don't use my phone that often - just to order in food, or call someone else on campus. Don't take that away... then I WILL start going over my minutes on my cell phone. And what about the people who don't have a cell phone? It is unreasonable to add on this charge.
- I think it's rather outrageous for IS&T to charge residents *more* money than they do already when the dormitory network is in such lousy condition. It is only 10 megabits, and often a poor quality connection. I regularly see packet loss.
- I wouldn't like to have to pay so much money. Besides, it is safer for me and for all students to be able to use the phone in case of an emergency.
- I don't think that we should have to pay for phone service. Many comparable colleges do not make their students pay for phone service. It is bad enough that we already have to pay for cable service if we choose to have it(which many comparable colleges also do not make their students pay for). Many students already pay at least \$50 per month for cell phone service; now we have to pay an extra \$17 for dorm phone service?
- Students should be guaranteed local phone service. Basic expectation that MIT should be able to fulfill without extra charge. Cell phones still are not universal.
- I think it's ridiculous. MIT should provide free local phone service with housing, just as it provides other utilities such as water, electricity, and internet access. Phone service has been free for years, I see no reason why MIT should decide to change that.
- Terrible idea. I use the local phones a lot. A lot of people get 617 area code cell phones just so we can use dorm phones to make these types of calls. I use the local phone to make phone calls about internships and jobs.
- AWFUL. Not only is it scalping but it's unreasonable considering how much we're paying for MIT as it is.
- I think it's a bad idea. Having a dorm phone is important. For example if you have a phone interview or if

Project Randomize: VoIP Pilot Implementation at MIT

you have to conduct any kind of business. It's not always appropriate to give everyone your cell phone. Also I'm an officer in student groups so when I talk to corporate reps I give them my dorm phone number and not my cell phone. I think this looks more professional because you don't always have to keep worrying about bad reception.

I understand IS&T's point of view and reasoning

- At first I was upset by it, but I do think it's reasonable as long as we can still use it for inter-dorm and MIT calling.
- I don't like it. Phone service should come with the room. However, I do like the option they give us of not having one instead of incorporating it into the cost of the room.
- Probably a prudent way to save money. I really like having the dorm phone, but a lot of people probably don't use theirs and it was probably a smart decision
- If they then subtract that \$17/month from the overall house bill (i.e. making it so those who use it come out even, those who don't save \$) then it's ok
- I am actually glad because now I won't get outside calls. I am glad that the phone will only be for on campus calling cause I don't use it for local calling or voice mail. Now I won't get telemarketer calls.
- Good, any dorm subsidies are bad.

I won't be using my dorm phone.

- As long as it's not mandatory I wouldn't mind because I don't use my dorm phone
- Doesn't affect me, as I use my cell phone as my primary (and only!) phone

I'm frustrated because I will need to use my dorm phone.

- It's awful, because I intend to be in a grad dorm next term.
- I'm really frustrated, because I need to be able to make phone calls from some other place than my cell phone like when my cell phone is dead, or when I need to call someplace and I can't go outside to get reception cause my cell doesn't work inside my dorm. I feel like \$17 is way too much for those services.
- That really sucks. I don't have voice-mail or anything, and I don't talk on my dorm phone- or any phone for that matter, more than about 5 minutes a day. So it's really mean to make me have to pay, when I only use my dorm phone on a need-to basis, and it's also the only dependable phone access I have.
- I don't want to pay it. I'm also especially annoyed that we can't receive calls from the outside for free.
- I think it really sucks. I use my dorm phone way more than my cellphone, and now on top of the phone card expense I'll have the \$17/month charge? I don't spend \$17 on the phone card I use over three months! Someone in the administration should have cut something else out of the budget.
- I'm adamantly against it, I need my dorm phone to make all local calls because my cell phone sometimes doesn't get reception in my room, and it saves me minutes. Also, some of my friends don't have cell phones at they'd have no way of contacting me if we couldn't call local numbers on dorm phones.
- I hate it. I resent that the administration just assumes that everyone on campus has a cell phone.

Project Randomize: VoIP Pilot Implementation at MIT

- I don't use the voice mail, but I feel that the local calling should be standard, I don't use the phone very often so paying \$17/month would be pointless for my usage.
- I think it is a horrible idea for those people w/o cell phones. I can't buy a cell phone, and even if i could, I ideologically would refuse to buy such a device due to its destruction and rude side affects.

I do not like this plan because I mainly use my dorm phone for parental contact.

- The dorm phone is convenient because, in conjunction with a phone card, I can call family and friends in the US and overseas.
- Would be very sad. It is wonderful to have free local calling and incoming calls from home -- without the static we get on the cell phone.
- It's not cool, because it's my only local number, and it allows for my parents to call me without using up my cell phone minutes.
- I use my phone MAYBE 1-2 hours a month. But, that service is necessary for my parents to call me, and for me to use my phone card. Also, if the activation fee is initiated, will I be charged when I switch rooms in the dorm? Because for summer housing I'll live in a different room.
- Hate the idea. It would be okay if it didn't allow me to call out, but to have to pay it just to receive calls. I need to get in touch with my parents, and it forced me to buy a cell phone plan, which is much more worth the cost, which is not much more than \$17 and can go anywhere.
- Very unhappy. I use my dorm phone by having my parents call me on it.

The \$17/month plan is too expensive.

- I think it's a little steep and inconvenient for those who do use the phones here on campus as their only phone.
- I like having the dorm room and my cell phone...I give most companies that I interviewed at my dorm number, it makes it easier to separate work and friends, and it also ensures that my connection does not cut-out in the middle of a call with a potential employer. The dorm room service is more reliable in the sense that the signal will not fade and the quality of the sound is better. However, I don't think I would pay the new \$17 fee if i had the choice.
- \$17 per month is too much money. I definitely don't make that many local calls. I suppose if you didn't charge it separately it would otherwise just end up hidden in our Bursar's bill, though, wouldn't it?
- Too expensive, should at least be able to receive local calls for free. Certain delivery places need a 617 number, and charging \$17/month for those deliveries isn't worth it
- Exceptionally high. Definitely would not pay more than \$6/month

Everyone has a cell phone and won't use the plan.

- They'll just use the Bexley desk phone, and charge MIT instead.
- I don't think it should be issued. I know I would rather go over on my cell minutes than pay the \$17 dollar fee bc it would be cheaper. However, this is bad because I use my dorm phone a lot. especially to make local calls and to 800 numbers.

Random comments & questions

- My room phone doesn't work.
- Better than charging me for rent. What about emergencies? Will I be able to get it should I need it in the middle of term for Boston Area contacts?
- If your cell phone doesn't work and your family needs to reach you in an emergency, they won't be able to call your room phone. Also how can you call fraternities or FSILGs off-campus?

8. Would you purchase the plan? Why or why not?

Response	Frequency
Yes	12

Common comments	Frequency
No other choice	5

Other comments:

- I am kinda forced to purchase this plan. I do not use my cell phone service freely for fear of high overage charges. Therefore, any local calls that I need to make, I use my room phone, and so I will need this plan.
- I mainly use the phone to make long distance calls back home on weekends, so I do not have a need for a cell phone. Getting a cell phone will turn out to be more expensive (than \$17) for such long-dist usage.
- I would have to for emergency situations at home. But I'd be angry about it.
- My location choices for placing cell phone calls are very limited, so I would still pay for the plan. Against my will, but I would have to.
- Only by necessity. Phone service is a basic utility, and I don't have/want a cell phone.
- The plan is still cheaper than a cell phone. If companies offer a significant discount for MIT students, I might get a cell phone instead.

Response	Frequency
No	59

Common comments	Frequency
Don't use dorm phone	21
\$17 fee too expensive	6
Buy a cell phone	3
Increase use of my cell phone	3
\$17 fee too expensive for benefits	2
I can't afford it	2
Upgrade my cell phone plan	2

Other comments:

- I do not make local phone calls, nor do I need voicemail.
- I don't use the phone enough for it to be worth \$17, but if I have to choose I would rather get a cell phone and have the ability to make local AND long distance calls without having to get a long distance carrier and paying \$17/month only for local calls.
- I don't want to get telemarketer calls and I use my cell phone for everything else.
- I have a cell phone. However, this fee may deter some people (who don't have cell phones) to not purchase the standard package at all due to financial circumstances. I have heard a few comments about this and feel this plan is very bad and dangerous for the overall well-being and safety of students.
- I might just end up using my prepaid calling card. It would be cheaper.
- I would still want to make local calls from a phone that is not my cell phone, but I would not purchase the plan in protest of its inanity.
- My friends have non-local #s, so the plan would be useless for me.
- I only use dorm phones for campus calls
- Perhaps if I were applying for internships or things in the Boston area.
- We would probably put the money towards a second cell phone (so that my husband and I each had one to use).
- The plan is not mandatory.
- Going over on cell minutes would be cheaper.

Response	Frequency
Maybe	3

Other comments:

- I would consider it or a cell. If I *could* make outgoing calls on my phone card without the plan, I might get by without it and just use the phone card for everything, since I make sufficiently less than \$17/month worth of phone calls at \$0.05/minute. My family would not be incredibly happy about not being able to contact me by phone, but we would work something out.
- I may just use my cell phone more.
- Debatable. Again, cell phone is more worth the cost.

Response	Frequency
No answer	1

9. If your dormitory started offering free long distance service, would your cell phone usage change?

Response	Frequency
Yes	40
No	35

10. What is your knowledge level of VoIP technology?

1	2	3	4	5	6	7
Not at all						Understand Completely
Average						2.51
Standard Deviation						2.24

11. With a VoIP system I can use my laptop/computer to answer an incoming call (voicemail) and as a result I do not have to be in my room waiting for that important call.

Coolness:	1	2	3	4	5	6	7
Not Cool						Very Cool	
Average						5.01	
Standard Deviation						1.79	

Value Added:	1	2	3	4	5	6	7
None						Very Valuable	
Average						3.91	
Standard Deviation						2.01	

Comments:

- Not that impressive to people who have cell phones.
- I wouldn't use this feature
- Extremely neat feature that would definitely be convenient and useful
- I don't wait in my room anyway. I use my cell.
- But does that mean you wouldn't be able to answer your phone if your computer wasn't on? That would suck
- Wouldn't do much more for me than what I already have

Project Randomize: VoIP Pilot Implementation at MIT

- I don't know if it would be that useful because my experience with over the internet telephone calls has been somewhat delayed, and my microphone isn't that great, so I worry that I'd have to speak loudly or something.
- I could implement this today using a \$20 answering machine. I do not have one, and view its lack as a feature.
- I don't usually bring my laptop with me everywhere because it's too big. A cell phone already serves this purpose for me.
- Totally necessary when I order food for delivery and don't want to hang out in my room while it takes upwards of 2 hrs to arrive, and my cell phone won't receive the call when it does come. ESSENTIAL!!!!
- I don't have a laptop? I'd be in my room anyways.
- But you can't access the Internet everywhere, but you can use your cell phone anywhere.
- My answering machine does the same thing...for free
- Very convenient for people who spend lots of time on-campus
- For an important call I typically want to be in a quite and isolate place so this feature may be good to some but not really for me
- It would certainly be an asset, but the costs would have to be evaluated.
- This would be very helpful to those who don't have a cell phone, like myself!
- Don't need it

12. I can have more features such as caller id, call waiting, call waiting caller id, call forwarding, etc.

Coolness:

Average	4.83
Standard Deviation	1.94

Value Added:

Average	4.52
Standard Deviation	2.12

Comments:

- I don't have to answer telemarketer calls to my dorm phone.
- These features are nice, but they don't really matter that much to me.
- I have all that on my cell phone.
- I can have these today if I pay for them. I don't have them. I don't want them.
- Eh. Why would I want more ways for people to be able to contact me?
- My cell phone already has most of those features... I wouldn't really use call forwarding that much...
- Most of these seem like features that are pretty much standard nowadays.
- I'd like this because I can screen calls before answering, especially for the people who have roommates, this is a good feature
- It's always useful to know what calls were missed.
- Also available on normal phones. I don't use these features... but maybe I would

13. I can save voice messages as audio files on my computer.

Coolness:

Average	4.97
Standard Deviation	1.90

Value Added:

Average	3.78
Standard Deviation	1.93

Comments:

- I wouldn't use this feature
- I can give out my dorm number to businesses and know that if they call with something important, my computer will save the voicemail. My current dorm phone doesn't have an answering machine.
- Why would you need something like that?
- It's not exactly new technology, but it's easier to do with VoIP, and once the message is a standard digital file the possibilities are limitless.
- It sounds neat, but I probably wouldn't use it.
- I already have an answering machine
- Pretty Damn Cool
- Useful, except files will take up a lot of space
- My calls aren't that important.

14. I can have email alerts for new voicemail.

Coolness:

Average	4.51
Standard Deviation	1.92

Value Added:

Average	3.87
Standard Deviation	2.04

Comments:

- Convenient way to check for new messages.
- More importantly, I can do speech->text->e-mail on the message file.
- I don't really care if someone just called me.
- My cell phone beeps anyways when I get a new voicemail
- I'm soooo bad about remembering to check voicemail; I often get really important messages too late. This would be a lifesaver for me.
- That'd be kind of cool I think
- This feature centralizes all incoming email and voice messages!
- Nice, but my calls aren't so urgent to make knick knacks like this so valuable
- I already have too much email as it is

15. I can auto-forward, which means that if the phone is ever down or isn't answered, it's auto-routed to another number.

Coolness:

Average	4.68
Standard Deviation	1.82

Value Added:

Average	4.25
Standard Deviation	2.21

Comments:

- Great way not to lose any calls or msgs because a phone is busy or off the hook.
- Maybe I don't want to be reached.
- Can give out dorm phone number, but still receive it on my cell if I'm expecting an important call.
- Already have on cell phone
- What's wrong with a plain old phone, I don't want all these stupid bells and whistles
- Can you have an away message (or answering machine) with this system? That would be cool and valuable.
- Don't think I would use this either...
- This is one of those features that you wouldn't think you'd use until one day it hit you out of the blue some emergency where you NEEDED this to happen. Very interesting. I would definitely use this when expecting important calls.
- MIT Service does this
- Very useful, get to actually talk to people when they call rather than leaving messages.
- I am not an intrepid business traveler (yet) so I do not have more than one phone number.
- Nice standard feature
- This is a useful feature, but it depends on how many people have cells phones, and how many telemarketers will be calling the dorm phone number...

16. I have the ability to manage of all my calling features, settings and accounts online.

Coolness:

Average	4.56
Standard Deviation	1.95

Value Added:

Average	4.08
Standard Deviation	1.98

Comments:

- Extremely Convenient
- I don't think it's that important to be able to do that anywhere in the world.
- Can do the same with cell phones.
- Online capabilities are always attractive because everything is moving online these days...
- Sounds okay

- This would be good. I don't think people really pay attention to their phone bill. I think this would help people customize, let them get what they want out of it.
- Not necessary, but convenient for students who travel.
- Very worthwhile

17. I can utilize computer dialing. Basically I highlight any number on my computer, hit F6 and it sets up the call from my phone to the other person's phone.

Coolness:

Average	4.76
Standard Deviation	1.81

Value Added:

Average	3.85
Standard Deviation	2.04

Comments:

- Also extremely convenient
- It'll save me about 5 seconds, and well, those seconds matter.
- It's really not that hard to hand dial a number :)
- Being able to make calls directly from Google Local would be useful.
- Seems useful...
- Actually, if you can just call through your computer and save the whole conversation as an audio file, that'd be sweet.
- Anytime I people search someone, calling them would require less effort.
- Nice utility, but not worth paying extra for

18. I may be able to use my PDA or smartphone to call people from anywhere on campus that has wireless access.

Coolness:

Average	4.45
Standard Deviation	2.15

Value Added:

Average	3.37
Standard Deviation	2.10

Comments:

- Not many people have PDAs or smartphones.
- Don't own a PDA or smartphone.
- If and only if there is wireless
- I can't afford a PDA or smartphone
- Smartphones are expensive, not-very-well-tested, and hard to find. PDAs are useless and expensive.
- Right now, where there is wireless, there is usually a cell phone connection anyways.
- Cell phones are so ubiquitous it seems almost unnecessary.

Project Randomize: VoIP Pilot Implementation at MIT

Overall comments:

- Again, you would need to convince me to use this service. for anything domestic, my cell phone rates are excellent... i basically have unlimited minutes and free long distance. the only time i even considered using VOIP was to call overseas (while kyle was in spain). overall, i think i spent \$150 in calling cards... we were somewhat conservative with how long we spoke on the phone, but i still spent about \$150 total on calling cards. because of the amount of time we spent on the phone and the amount of time he was in spain, i still didn't switch. there's the switching cost to the consumer -> you have to convince me why this service is much better and much cheaper AND also convince me to take the time to setup my system and buy the components (ie: microphone) to use this service. i didn't want to go through the setup or buy a new microphone, and would rather have spent a little more on calling cards instead of going through the inconvenience of switching over.... so if you want people to use this service, that's something you need to consider!
- Too much computer stuff. phones work when electricity is out; cell phones too. that's when you need phones the most. Have a nice day.
- Basically, I don't need all these fancy features, and what I do need my answering machine and my cell phone already do...I just want my local phone number for next year...
- If we're getting a VOIP system, it should work on Linux computers as well.
- I use a VoIP to call home, and the problem I encounter is that the communication is choppy, and you can't hear an uninterrupted sentence. I guess it depends on the quality of the system.

APPENDIX B: PRESENTATION SLIDES

Project Randomize
VoIP Implementation at MIT

May 6, 2005

John Cloutier
Jennifer Peng



Allison Dolan
Director, Telephony and IS&T Shared Services

Agenda

- What is VoIP?
- Project Objectives/Overview
- Scope
- Findings
- Analysis
- Recommendations
- Management Observations
- Q&A

Agenda

- What is VoIP?**
- Project Objectives/Overview
- Scope
- Findings
- Analysis
- Recommendations
- Management Observations
- Q&A

What is VoIP

- Calls made from
 - Computer
 - Analog Phone
 - Calls received by
 - Computer
 - Analog Phone
 - Transmitted over the internet as well as analog phone trunks
-

Agenda

- What is VoIP?
 - **Project Objectives/Overview**
 - Scope
 - Findings
 - Analysis
 - Recommendations
 - Management Observations
 - Q&A
-

Project Objectives/Overview

- We're MIT, shouldn't we have VoIP?
 - Reasons to proceed with an installation
 - Obstacles that must be overcome
 - Insight from other schools with VoIP
 - Suggestion for best pilot program
-

Agenda

- What is VoIP?
 - Project Objectives/Overview
 - Scope**
 - Findings
 - Analysis
 - Recommendations
 - Management Observations
 - Q&A
-

Scope

- Considerations
 - Student/Administration need and openness
 - Perspective from other universities with VoIP
 - Departmental interaction at MIT
 - Existing infrastructure
 - Possibility of a complete VoIP system in a new/renovated building
 - Outside Scope
 - Cost
 - Investigation of the technology
-

Agenda

- What is VoIP?
 - Project Objectives/Overview
 - Scope
 - Findings**
 - Analysis
 - Recommendations
 - Management Observations
 - Q&A
-

Findings – University of North Carolina

- Pilot in WUNC radio office, 2 new IT buildings
- Looking to pilot wireless VoIP
- Not looking at VoIP because it's cheaper, but for collaboration
- Scale is a big factor
- Circuit based business model doesn't work for VoIP
- Still sociological and business issues

Source: James Oberlin, Tyler Johnson

Findings - Dartmouth

- VoIP only for administration, not students
 - Phones are too expensive
 - IS paid for phones
- Had to upgrade infrastructure
- Human reaction to VoIP was biggest obstacle
- Sometimes more variety isn't better

Source: Larry Levine, Computing Services

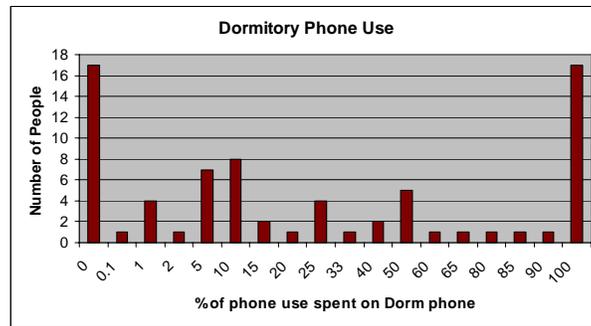
Findings - MIT

- Some scattered VoIP phones, but nothing organized
 - Much existing infrastructure is insufficient to handle VoIP
 - Departments are not interested
 - Facilities, IS&T collaboration sometimes lacking
-

Findings - Students

- 75 students
 - Male: 36%
 - Female: 64%
 - All undergraduate dorms except Senior Haus
 - Class: 17%, 27%, 25%, 29%
 - Percentage of cell phone owners
 - Yes: 79%
 - No: 21%
-

Findings - Students



Findings - Students

- Reactions to \$17/month fee
 - Indifference: 70%
 - Outraged: 23%
 - Understanding: 7%
 - Purchase the plan?
 - Yes: 16%
 - No: 79%
 - Maybe: 5%
-

Findings - Students

- Comments on VoIP features
 - Neutral
 - Lack of knowledge
 - Variety is unnecessary
-

Agenda

- What is VoIP?
 - Project Objectives/Overview
 - Scope
 - Findings
 - Analysis**
 - Recommendations
 - Management Observations
 - Q&A
-

Analysis

- Scale of installation
 - Telephone/IP networks cultural differences
 - IS&T Departmental cooperation
-

Analysis – Large Scale Installation

- Much of MIT's existing network infrastructure couldn't handle VoIP but new buildings/renovations will
- \$17M 5E phone switch investment good until 2010
- Staff transition, equipment upgrade costs far outweigh VoIP benefits in current departments
- VoIP still a techie toy, not yet marketable to departments

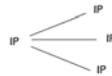
Large scale installation infeasible until 2010

Analysis – Small Scale Installation

- Several individual, commercially available solutions should be tested by students in various dorms
 - Minimal network impact, installation effort
 - Evaluate different VoIP phone types, features
 - Helps students who can't afford \$17/mo. telephone charge
-

Analysis – Cultural Differences

Phone — Phone



- Lucent technology (phone)
 - Cisco technology (network)
 - Phone/IP networks have different failure modes
 - Phone industry
 - Huge sunk infrastructure costs
 - Slow uptake of new technology
 - IP industry
 - Rapid technology advancements
 - Quick change to new technology
-

Analysis – Departmental Cooperation

- Facilities and IS&T conflict over budgets for information technology
- IS&T conflict with various departments
- Recent restructuring of IS&T
- Primary area to ensure smooth interaction is within IS&T
 - ie. telephony, network mgt.

Agenda

- What is VoIP?
- Project Objectives/Overview
- Scope
- Findings
- Analysis
- Recommendations**
- Management Observations
- Q&A

Recommendations

- Students
 - VoIP pilot in dormitories in Fall 2005
 - Test multiple technologies
 - Analog Phone with TA
 - VoIP Phone
 - Soft Phone
 - Execute during Orientation & 1st week
 - Advertise through e-mails & *Tech*
 - Work with UA, house managers

Recommendations

- Students
 - Investigate “outraged”
 - International students
 - Local students

 - Administration
 - Increase communication between network, telephony groups and facilities
 - Investigate VoIP interest
-

Agenda

- What is VoIP?
 - Project Objectives/Overview
 - Scope
 - Findings
 - Analysis
 - Recommendations
 - **Management Observations**
 - Q&A
-

Observations

- IT Project Management
 - People are important
 - Human impact of technology
 - People as resources
 - Cooperation among departments
 - Plan for uncertainty
 - Failure to meet deliverables
 - Have a backup plan
-

Agenda

- What is VoIP?
 - Project Objectives/Overview
 - Scope
 - Findings
 - Analysis
 - Recommendations
 - Management Observations
 - Q&A**
-