

Adoption and Negotiation of Technology in the Lives of Berkeley Freshman

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Introduction

Below I present the findings from a study about how Berkeley Freshman use technology to support their social networks. The Berkeley freshman class is made up of students from a variety of backgrounds. Their experiences using information and communication technologies vary widely. Once they come to Berkeley, these students maintain existing and create new social networks, all supported by a variety of technologies. They may be exposed to new technologies or new uses of old technologies through their university interactions and environment. Our goal is to understand how Berkeley freshmen, specifically 18-year-olds, from a variety of backgrounds use information and communication technologies to support their social networks including adopting technology, sustaining relationships, negotiating technology in their lives, and educational technology uses.

Motivation

A literature review about youths and technologies in informal learning environments for the MacArthur foundation this summer noted the lack of ethnographic research about young people. Professor Peter Lyman noted that there is a lack in ethnographic research about what young people are doing with technology. British researcher Sonia Livingstone wrote in her review of literature about children's use of the internet that:

Broadly speaking, North American research... is particularly strong on quantitative research, conducting rather few qualitative projects. Such research has strengths in producing reliable and representative data to identify statistical frequencies, differences and patterns of use, but it rarely explores a topic theoretically or in depth (Livingstone, 2003).

Our research over the summer has confirmed this fact. Many articles about American youths and technology are only focused on access and gathering statistics about what kids are doing online without asking WHY.

Additionally, while there is qualitative about how American youths use a variety of technologies, and there is some qualitative research about how youths use individual technologies, there is not much ethnographic research about youths and their interactions with multiple technologies.

Megan Finn wrote an appendix to the MacArthur Foundation report reviewing the literature regarding the "digital divide" as it relates to kids' "access" to technology, noting that while there is quantitative data regarding the notion of physical access to technology, there is little understanding of what technology access really means. Following on the literature of Clark, and Ba et al, Megan hypothesized that access encompasses a social network of technology users in addition to the physical connection. Based on much technology adoption literature and the work on low attainment youths, we want to understand the importance of having one's social network online in enticing students to adopt technologies.

We aim to help fill this gap in the research by trying to understand how Berkeley's Freshmen backgrounds influence how they use technology, particular to support their social development. We hope that this research will give us a list of questions to further pursue. This research will also be used as part of a much larger project that will eventually be looking at how to design technologies to better support learning with technology for youths

Summary

This paper describes some of the major findings from our research on how Berkeley Freshman use and have used technology within their social networks.

First I will describes the Methods that we used to study these phenomena. This study was a multi-method study such that we could see basic trends through the survey data, and examine questions about students' motivations for technology use and history of technology use through the interviews. In some ways the interviews allowed us to validate or explain trends in more depth.

Next I will examine four themes that we found from our data. The first three themes describe aspects of the adoption of technology. The first theme examines adoption as a function of cost, specifically adoption of computers and the internet. This section also describes students first experiences with computers in their homes.

After we describe adoption as a function or cost, we explore other motivations for adopting technologies. The second theme describes students motivations for adopting certain technologies and technology practices. By adoption of technology, we mean that students (or their families) acquire a technology. By adoption of technology practices, we mean that students adopt a way of using a technology. We examine primarily social motivations for technology adoption, as this explains why many students adopt technologies. We examine the motivations for adopting six technologies and technology practices associated with those technologies: chat rooms, IM, email, mobile phones, blogs, and Facebook.

After we describe why students adopt technologies, we describe the third theme – patterns of adoption. Most students adopt a technology as a result of an interaction with a person in their social network. This section explores the social structures and roles within a social network that influence technology adoption, particularly families and peer groups. We introduce the idea of a techne-mentor, an individual in the students' social network who influences students' adoption of technology. The students informally learn about technology from the techne-mentors. Sometimes students themselves are techne-mentors.

The last theme explores how students negotiate the role of technology in their lives. Students feel conflicted about issues such as privacy in the online world, and the “always on” culture, and their feelings influence their technology practices. Furthermore, some students describe technology with negative words such as “distracting,” “waste of time,” or even “addictive.”

We conclude with a discussion of some of the lessons learned from this project and we offer topics for further research

Methods

We wanted to provide a better understanding of Berkeley Freshmen communication technology use though qualitative and quantitative methods. Two primary sources of data were collected. First, we had participants complete a survey to gather a broad view about how they use these technologies. We generated a list of technologies students use from our six survey pre-test subjects. The final version of the survey asked questions covering when the students began using technologies, how often they use them, who taught them how to use those technologies, and if they had ever done a set of technology related activities. The survey takers were recruited by

email in two groups. The first group was recruited from former students of Megan Finn's who in turn recruited their own friends to take the survey, henceforth called the snowball group – we had 160 respondents from this group. The second group was recruited from a random list of 500 freshmen provided to us by U.C. Berkeley's Office of Student Life, which we will refer to as the random group – we had 80 respondents from this group of students. At different points of analysis, we used different sets of data for different purposes. As a reward for taking the survey, we gave an iPod to one randomly selected student, and \$20 gift certificates for dinner to four other students.

After completing the survey portion of our research, we invited all 80 freshmen from the random group who completed the survey to participate in a 90 minute interview. The interview was pre-tested on four 22-24 year olds. We selected the interviewees on a first come, first serve basis, via email. This introduces a self-selection bias into our data. Students who we interviewed were those who were willing to be interviewed about their technology practices, who were willing to respond to a survey, and the people that respond to email promptly. This might bias our data in that we interviewed students who are particularly heavy email users.

We interviewed 22 freshmen students. Students were paid \$30 for participating in the interviews. The purpose of the interview was to detail further their communication technology habits, feelings, communications, and history. The interviewers had the survey responses of the interviewees prior to the interview, thus they had a lot of background information on the interviewees going into the interview. The interview was largely open ended, guided by technologies that the students said were important to them. While most questions asked for more detail about a student's use and adoption of specific technologies, some questions were aimed at better understanding the larger context in which the students use these technologies, such as "If you needed to get in touch with your parents, how would you do that?" We were particularly interested in students giving us narrative information about their technology use, as opposed to documentary information. The narrative information helped expose students feelings and attitudes towards technology.

Based on the previous research in the area, we knew that to understand more about why students used technology and what they actually did with it, we would have to be multi-method. While traditional ethnographic observation yields more accurate pictures of what people are actually doing, observation has a few limitations that for the purposes of this study made it an impractical option. First, we were interested in student's stories in how they use information and communication technologies, and how they came to use these technology. We wanted the students to tell their stories about technology use and adoption to us in their own words. We realize that this introduces the recall problem in that students may not accurately remember their childhood. Additionally, it introduces a self-reporting problem. People often have trouble accurately describing their actions. One way that we tried to mitigate this problem was to have survey results for each interviewee in addition to the interviews in order to confirm some of what we heard. Second, most of the information and communication technology we were interested in was either personal communication software on a computer, or mobile devices. It would have been hard to observe the students using these technologies without having to sit in their dorm rooms, or follow them around campus. Third, we wanted to get data about students from a variety of backgrounds, and this study had to be designed, executed and analyzed in 16 weeks. We wouldn't have had enough time to complete an observation study of this many students given that we would have had to follow each of them around individually.

Because we had survey results for all of the students that we interviewed, we were able to connect information from the survey about student's backgrounds, to more rich information from the interviews. This also allowed us to validate some of our survey data, and make observations that we might not have been able to make (see the section titled "Adoption as a function of cost?"). This multi-method approach allowed us to see some trends from the students from the surveys, and to understand students in more depth from the interviews. We will likely duplicate this method in projects which will expand on this work.

In this document, we present the stories of many of the students who we interviewed. All of the students are referred to only by pseudonyms we have assigned to them.

Theme 1: Adoption as a Function of Cost?

Below we present one case where we examined the adoption of the technology as a function of the cost of that technology: the computer, and in Appendix A we include a case study of the phone. Not coincidentally, the computer connected to the internet and the mobile phone were some of the only technologies that we studied that actually cost something. Technologies such as IM, email, blogging and social networking software require internet connections but no investment as long as students had an internet connection.

We found very little information that substantiated a "digital divide" theory in the population when we looked at the age of adoption of technologies versus the age that students adopted technology. Our survey asked students to state when they first got a technology in the following age ranges: 0-5; 6-10; 11-13; 14-17; after 18; or never. Based on our pretest survey we chose those age ranges because they roughly correspond to pre-elementary school, elementary school, middle school, high school, and post high school. If these age ranges were smaller, we might have seen a stronger correlation between age of adoption and income level. After our interviews, we feel more confident that the survey reflects trends accurately. We also acknowledge that asking students about their parent's household income is difficult because many students do not know this, or are not sure. In fact about 25% of the students said that they didn't know their parent's income. To help mitigate this problem we asked about household income using the same income ranges that the Berkeley application did, so we hoped that students would remember the income range that they filled in on their application.

Computers and the Internet

Based on our survey data from students born in 1985 and 1986, there was no correlation between reported family income and how old the students were when they first got computers or the internet. Because we had survey results for all of the students that we interviewed, we were able to connect information from the survey about student's backgrounds, to narratives about when and why students got computers. While having a computer didn't depend on the parent's income, the reasons for getting a computer in higher income families was more frequently for parent's work, while in lower income families, parents got computers and the internet for the kids.

Most students remember getting a new computer as being an exciting event for their family. "I remember we got our get a brand new computer when I was in third grade. I think it was a Dell and, i was pretty excited because we could kind of had an old one.... I remember when we got it my brothers and I were crowding around it, and my dad was trying to work" (Sandra).

What we found in the interviews confirmed the trends that we saw in the survey. "I got a computer when I was five. We didn't have that much money... we lived in a little apartment and with a twin bed, and my dad insisted on getting computer" (Kim). It seemed like many students felt that their parents adopted computers so that they could keep up with other kids. "I got a computer in 5th grade -- I think they were teaching us how to use it in school. My dad though it was a really good thing if I had one. I used it mostly for word processing because I didn't really know how to use anything else" (Eliza).

Joe recounted how his mother was frugal about many technologies, however some, like computers were deemed important for their children's future: "Because both of my parents finished fifth grade, they realized given a new opportunity, they should make the most of the opportunity and allow me to stay on par with other kids. So my mom was said, 'if you really need it then we can get it'" (Joe).

Likewise, other students recalled that while they didn't have much technology around the house, they did have a computer. "My family just barely got a DVD player a year ago and we don't have a cable TV at home. Computers, we always had, because my brother is a computer geek. We always had a computer. Our very first one was very old, it had a black screen with DOS prompt" (Erin).

However, all access was not equal access. Many students had dial-up access at home in high school, while others had broadband access, and this influenced their use of the computer because they had to tie up the phone line to use the computer. It also influenced the use of some applications. "I didn't use [downloading applications] often because we had a dial-up connection. It was 30 minutes per song so I only downloaded it if I really, really wanted it" (Erin). This seemed to make a significant difference in computer use with respect to downloading, especially multi-media files. "Back home I didn't really have like fast internet until maybe like a year before I left. So I never really got the chance to download as much as some of my friends were doing" (Raj)

Some families had one computer that everybody shared which often greatly limited the ways that a student would use a computer, "Sharing the computer was a moderately big deal... I could only IM between eleven and midnight. We had one main computer and a laptop that doesn't really work that well" (Angus). Families had multiple computers, but still had to deal with sharing because they had slower, older computers.

We got a computer when I was in fifth grade, and it was really slow by the time I was in seventh grade. By eighth grade I started needing to do more stuff on the computer. So we got two [computers] and I guess by tenth grade my little brother wanted a computer too and so by then we had three. Especially now that the computers are getting older and they are getting slow, there is still fight over like the one computer or like when you go back home (Eliza).

There was a perception that wealthier families had more computers. "People at my school were very, very, very rich. They would say, 'Yeah I have three or four computers at home'" and I am like, 'Wow'" (Kim). Students from lower income families sometimes had hand-me-down computers. "My brother brought home a computer from school, the school library was getting rid of it. It had a stack of floppy disks that had games on them. You could only get like one or two in the work because you needed the path name" (Luke).

Students from higher income families often had their own computers for their school work.

I think the computer was more for the parents when they used it for managing things like, I guess they used excel a lot.... [The computer] was in my parent's room. We

got a new one so that we could just work in our room in ninth grade, for study of course. So then, so then we had a computer in our rooms and me and my sister didn't need to compete for the office (Danielle).

Students from higher income households often had a computer in the house as a result of their parent's work.

We've always had a computer. Yeah, ever since I can remember we have had a computer because my dad worked for Mitsumi which was a technology based company so he had a computer. I remember playing on the keyboard, like he would disconnect the keyboard and I was three...I would think it was so cool (Jenny).

Moreover, several of the students grew up in households where one of the parents worked in technology and grew up with a lot of technology in their houses.

My parents have always been really into technology. My mom used to work for AT&T as a computer specialist in the late 70s. So we have always been around technology. I was the first kid to get computer... so at home we have six or seven computers and 3 laptops, and we have like 3 phone lines and we have DSL and back in New Zealand we were the first people to get a T1 line (Eve).

Meanwhile, lower-income families often bought computers or the internet specifically for their kids, where other families got the internet for the parent's work. "We got AOL because my mom's boyfriend was saying how everyone is using internet and we should learn how to use it, and it is a good thing to know" (Eliza). Sometimes parents would not even be the people who were aware of the internet, but needed suggestions from their children to get online. "I got the internet at home in, I think I was in seventh or eighth grade.... It was probably on my prompting, I probably told them I needed it for school research and they obliged." (Luke).

We speculate that this might not be a national trend. Perhaps students at Berkeley come from homes which place a very high value on education.

Theme 2: Motivations for Adoption

Students adopted technologies and technology practices for a wide variety of reasons, but most often the motivation for adopting a technology and a technology practice was social. There were a wide variety of social reasons, but most of them were enduring social behaviors that were not specific to an interaction with a technology. Many students cited social pressure as a reason for technology adoption. Other students indicated that there were certain status issues attached to adopting a technology. Other technologies were social imperatives for students to use in order to participate in their social networks. Some technologies were adopted in order to keep in touch with family. Still other reasons for adopting technologies were for practical reasons of coordinating with parents and friends. Other times, technologies were seen as trends, and students felt compelled to adopt the technology in order to keep up with their peers. Students had other reasons for adopting technologies as well. Some students were attracted to the novelty of a technology, other students started using technology just because they were curious about it.

In this section we distinguish between the "adoption of a technology" and the "adoption of a technology practice." By adoption of technology, we mean that students (or their families) acquire a technology. By adoption of technology practices, we mean that students adopt a way of using a technology. Usually when students are motivated to adopt a technology, they are also adopting a technology practice. But sometimes, a new technology practice will be adopted by a

student.

Sometimes, when technology adoption is mandated for students, either by an authority like schools forcing email adoption, or parents buying students mobile phones, there is often prescribed technology practice for the technology that is not a social technology practice that students choose to adopt. Oftentimes, without some technology practice that the students themselves have chosen, the technology does not, at least initially, seem beneficial to the students. When students adopt a technology because of social pressure, there is usually an associated technology practice that they adopt. If the social pressure students are motivated by dissipates, and if the students are only adopting the technology because of social pressure, the student might discontinue a technology practice.

However, whatever the reason for a student to adopt a technology, if the students adopted a technology practice, then the students had to see value in the technology on some level, and often this value was social. For students, the most important aspect of technology adoption is not the adoption of a technology, it is often having a valued technology practice. Valued technology practices generally involved developing or joining a group of people who shared the student's technology practice. This section describes motivations for adopting six different technologies and the motivations for adopting practices of using: Chat rooms, Instant Messenger, Email, Mobile phones, Blogging, and Facebook.

Chat Rooms

Chat rooms are defined on wikipedia as “an online forum where people can chat online (talk by broadcasting messages to people on the same forum in real time).” Many students used chat rooms from an early age. Although there are many different chat room clients that students used (such as Yahoo, ICQ and AOL), we generalize the term “chat room” and do not distinguish between different chat room clients, because students did very little.

We were quite surprised by how many students adopted chat rooms when they first got the internet. A few female students that we interviewed would go on to chat rooms for “boy bands.” Some students first got the internet, and were explored it's various features which included chat rooms. Students had a wide variety of interactions in the chat rooms. Some student were excited by contact initially with strangers, but ultimately irritated or bored after the initial novelty passed. Students who used chat rooms as a social tool with their current friends had more positive experiences with the technology.

Many students were quite embarrassed by their use of chat rooms and regarded talking to people they didn't know as silly or a waste of time, and sheepishly admitted that they had used chat rooms. “Their was a period of time in fifth or sixth grade that I actually got on the chat rooms. I was in the chat rooms for maybe four months or something and then after I decided this is a waste of my time, why would I want and talk to people that I'll never meet in my life?” (Ben).

Other students were somewhat flattered by the attention they received in the chat rooms, and enjoyed the social contact. For Sandra, her use of chat rooms was not only somewhat embarrassing, but she thought that talking to strangers was quite dangerous, in retrospect.

It was really bad, coz I used to go to the chat rooms and talk to complete strangers.... I can't believe that I put myself in that kind of danger.... I thought, 'Wow, that person likes me and emails me all the time.'... I actually revealed my true identity.... It was kind of cool to try to meet all of these people and email back and forth with them... [At first] I emailed the chat room people. I can't remember what else I used

email for (Sandra)

In some ways, chat rooms were a “gateway” to technology for Sandra. Chat rooms gave her a social network to initially email with. Through her adoption of chat rooms, Sandra adopted a technology practice with email.

Some students met people in chat rooms, and thought it was a way for them to expand their perspectives.

I remember right when I got online... in the sixth grade. I used to go on into chat rooms a lot just because they were new and I wasn't used to it. So I used to go into ones for music I liked... I thought, 'Oh, cool, I meet people from Missouri and people from the other side of the country.' But then it gets old... and it's not cool (laughter)... It got boring after a while plus getting messages from random people who wouldn't leave you alone, and mass emails (Joan).

Apparently, it wasn't cool for students to use chat rooms. While Joan liked meeting people “from all over the country,” she didn't enjoy getting emails from strangers or getting put on mass email lists. Students like Ben, Sandra and Joan found chat rooms as they explored the internet on their own, and seemed to join chat rooms initially out of curiosity and desire for social contact. It seemed that many students used chat rooms before they found their friends online and started using AIM to communicate with them. “And first, I didn't really know a lot of people online. So I just go in the chat room, but I was bored... Probably eighth or ninth [grade was] when I started using it [IM] more heavily with people from school.... I had this friend who I met through a chat room and we still sort of email” (Eliza).

Students like Eliza and Joan found chat rooms “boring” perhaps because they didn't enjoy them after the initial novelty wore off. Most student's use of chat rooms coincided with getting online at home for the first time, and was part of their introduction to the online world.

One can imagine how exciting it was for the young students to talk to other people online for the first time.

One of my best friends was the first person whom I knew with internet. We would go over there and like chat online. I then said, 'mom I want AOL' and then we did eventually [get the internet]. We would go into chat rooms that she [my friend] would show us.... We would go to music chat rooms and argue about which bands are better (Cat).

Students like Cat would go into chat rooms when they were co-located with their friends at someone's house. Chat rooms were not just a social activity with strangers, but a social activity with her peers.

Other students would go into chat rooms to talk to their friends.

No one does it any more book but, I would stay at chat rooms.... I did when I first did it like in middle school we would chat with our friends. Just because it was a feature and you could use it. It's also a social thing because if you are invited to chats then you are cool. Because in the chat room you say, 'should we invite this person?' someone says, 'no' -- we were mean middle schoolers (Erin).

In Erin's case, chat rooms were a social status tools in middle school. Getting into chat rooms with certain people was equated with being “cool.”

Chat rooms were a more appealing medium for students such as Erin and Cat, who used chat rooms in social contexts with more known parties. However, chat rooms for the most part, were not ultimately adopted as anything beyond a novelty or a tool to explore the online world. Chat

rooms did not have an enduring social value for the students because of the contact from strangers, whereas with IM, it was generally easier for the students to control who contacted them.

Instant Messenger (IM)

Instant messenger, or IM, as defined by wikipedia as “a client which allows instant text communication between two or more people through a network such as the Internet... Instant messaging differs from email in that conversations happen in realtime. Also, most services offer a 'presence awareness' feature, indicating whether people on one's list of contacts are currently online and available to chat.” Contact information for an individual is in the form of a screen name. On their chat client, students have a list of potential contacts, and this list is sometimes referred to as a “buddy list.”

Every student we spoke to adopted instant messenger at some point during their teen years, to different degrees, and all the students had used AOL Instant Messenger (AIM). Some adopted instant messenger because it was a novelty, but most adopted instant messenger to talk to a specific group of people – peers, family, or gaming friends. Instant messenger is appealing because it is perceived as a private medium for conversation. Many students now see AIM as a social imperative. Just having the technology is not enough in some social groups, students are also expected to use certain language on instant messenger. For some students, instant messenger was simply a communication medium, for others it was a way for them to express themselves. One student that we talked to was a relatively early adopter of IM compared to most of the students we talked to. He gave us his perspective on the adoption of IM by him and his peers.

[I first IMed with] two or three friends; one of my friends would always be online... I used IM because it was kind of a novelty. Within a period of a one and a half years I was talking with a lot more friends. That amazed me because I didn't think that instant messaging was going to pick up... I could just see this medium as probably the most nerdy thing in the world.... 'wow all these other people are actually catching on,' and all of a sudden I would be getting IMs from people that I didn't know were in my classes and that was exciting, surprising, and kind of scary.... by eighth grade people would meet someone and want to get to know them a little bit more and say, 'oh, do you have a screen name?' I thought, 'What kind of question is that?' But it works out just as well 'cause it's an easy correspondence thing (Ben).

Although it is obvious because of the nature of IM as a communication technology, students started using IM mainly to socialize, and connect with their peers.

We describe below situations that influenced students to adopt instant messenger. The first section describes why students were motivated to adopt different instant messenger clients. The second section describes adopting instant messenger because it provided a private space to communicate. The following three sections describe students' motivation for the adoption of technology practices with instant messenger as they were exposed to social norms with instant messenger.

Shifting social groups, shifting IM clients

Students adopted certain IM clients, or shifted to new IM clients, because of which instant

messenger client their friends were on. While some technical features were important to students, having their friends on the same client as them was vitally important to them. Students originally adopted a variety of instant messaging clients such as ICQ, IRC, MSN, and Yahoo, but ultimately, all the students we talked to had AIM. It is important to note that if you are on one application, such as AIM, you may not speak to a person who is on a different instant messenger client, thus the chat clients are not compatible. Recently, there are clients that allow you to sign into multiple accounts on multiple clients through the same interface, such as Gaim or Trillian.

Students transferred from client to client based not based on which clients enabled them to talk to their social networks. "I think I got ICQ... in seventh grade when you meet more people [starting] middle school, when you exchange ICQ names... It seemed AIM was better... [on ICQ] you identify people by their numbers... More friends were on AIM, after a while it was like what ICQ was" (Sandra).

One student adopted ICQ to communicate with people playing a game. "I played Earth 2025 and it's one of those online games where you form clans... I joined this clan where everyone has gotta have ICQ. This is the standard for that game. So I started using that" (Kim).

Students in different countries adopted different instant messaging clients because there was a different standard abroad or different clients were available. "In New Zealand people use IRC as their instant messenger, they never really use MSN or AOL (which is obviously America online), so I used IRC back in New Zealand." (Eve). Interestingly, Eve and Raj both spent part of their childhood in New Zealand, and though Eve believed that no one used MSN, Raj uses MSN with his friends in New Zealand. Perhaps this occurred because they had different groups of friends with different de facto instant messenger client standards.

I had never ever used AIM before I came to the US.... The moment I came to US and I said, 'What's your screen name for MSN?' and everybody said, 'What!?? We only use AIM here in the U.S.' Go with the flow. I need to get close to my friends and I am not gonna be like that fighting rebel (which I tried for couple of weeks, but it didn't work)... I find myself logging onto that [AIM] more than MSN these days. AIM is strictly my friends in the U.S, but I have lots of friends from New Zealand who have also come to study in U.S... And they have also started using AIM too (Raj).

When Raj came to the US, he was compelled to get AIM in order to communicate with his American peers, as were the other Kiwis in the States. Raj felt like AIM was a tool to get to know his peers.

Anita said that when she arrived at Berkeley without AIM, no one could believe it. She described AIM as being a social imperative that she couldn't avoid. "It was just surprising, because they said, 'What are you doing? everyone has it [AIM]'... It was, like in junior high when everyone had a pair of shoes" (Anita). Given that some people we spoke to came to Berkeley with no AIM, and that there were students who stopped using AIM, it was interesting that some students perceived AIM as being pervasive and having saturated the Berkeley community. "I think everybody in the world nowadays [is on IM]... I wouldn't say like in Africa, but in the US especially in California.... I think that everyone has a screen name, especially email and stuff" (Erin).

Unlike most students who adopt instant messenger to talk to their peers, Sarah began using MSN instant messenger to communicate with relatives in China.

I mainly used MSN for talk to people internationally. My family and all my

relatives are in China and so we use web cams and mikes and MSN to talk to them or Yahoo because it's international and AIM isn't. I have a lot of friends who are international students or they have moved away to another country.... Not everybody has MSN, so my friend got me to get an AIM account. I talked to all my friends, all through high school on AIM. (Sarah).

As Sarah needed to talk to peers, she adopted different instant messenger clients.

Students adopt clients based on who the client will allow them to talk to within their social network. Students shift between IM clients as their social network demands.

Private space

Some students adopted AIM when it first came out and adopted it because instant messenger provided a private space for them. "It [AIM] also was more private because no one can hear you" (Joan).

Other students found that AIM was important at Berkeley because it was a private way to communicate with friends so that no one could overhear them.

On the phone you are usually around other people or you are walking somewhere and so there is always people around. My girl friend has a huge crush on this guy, but it's not something that I would talk to her about on the phone, but when you are chatting, it's only the two of you who can see it (Anita).

Because students live in crowded spaces, and they had mobile phones that they use everywhere, they don't see phones as a private way of having a conversation. IM is student's private means of talking to each other.

Instant messenger was adopted by students because it facilitated private communication in spaces where verbal communication was not private. In some ways this also represented an adoption of a social practice of using AIM as a private space to communicate. AIM is a technology where students can have intimate conversation.

AIM Lingo

Different technologies had different norms for how they were expected to be used. A part of adopting a technology was adopting a technology practice, or, in the case of AIM lingo, a social norm in order to use the technology. Another student said that in her school, AIM was intriguing because it was new, and there was also status associated with using the application, and even in how students used the application. "I guess people used that [AIM] because it was probably cool because it was... a new way to communicate.... you could... talk to people and use abbreviations and cool little things. The more you abbreviated, the cooler you were" (Joan). As many students we spoke to alluded to, adopting IM is not just a matter of having the technology, or using the technology, but adopting instant messaging lingo as well.

One student who had lived abroad for part of high school, and who didn't use AIM her senior year gave some insight into the AIM lingo: "On AIM there are happy face things and there is different AIM lingo... You don't write 'never mind,' you write 'nm' ...or 'brb (be right back). There is a million different things, that and I am only right now really trying to pick it up

because I never used it [AIM] that much... I have been out of the loop” (Anita). Obviously some of the abbreviations are more efficient, but Anita felt compelled to learn the AIM lingo in order to be “in the loop.”

Other students acknowledged the language used on AIM, but explicitly tried to avoid using it. “I think it’s kind of silly.... I think “LOL for Laugh Out Loud” seems strange... I prefer to type out all words” (Luke). The ways of using AIM could be highly individualistic, and expressive about students' views about social norms.

Personal expression

Additionally, AIM was a way for students to express themselves within their peer groups. Students were motivated to adopt a technology practice where they could personalized aspects of AIM, thus expressing their identity. Students especially adopted screen names to reflect their personalities. Some students described how they had changed their screen name multiple times to reflect their different phases. Other students, such as Joe, were not as impressed by how students adopted different screen names.

Depending on their [people at school] mood for the moment they made their screen name.... Lakerspride, GoLakersgirl and then like they’d go through their whole crazy rock music mood.... It was so unnecessary because you go on AIM to try and keep in contact with people. Every single time you change your screen names, you got to either send off mass messages to people saying, ‘Oh, I have a new screen name. AGAIN’. ... But I have had the same screen name ever since eighth grade (Joe).

Even an away message in AIM was meant to express moods. “When I put my away message up, they are always meant for something. They are meant for people to read and they're meant to get a reaction out of people in a certain way. Even when I am like sorta sad I put, something to that effect that so people know and react to it” (Kim). Students adopted the practice of personalizing their AIM in different ways to express themselves.

New social contexts

Students adopt instant messaging for a variety of reasons, at different periods of their lives – their technology practice was by no means static once they adopted instant messenger. In different social contexts students often adopt certain practices with instant messenger.

Many students adopted AIM because it was a highly important aspect of their social lives. Before students had cars, and could meet in a physical space, many students adopted IM so they could meet each other in the virtual space. "It [IM] was when you are young and before you get a car and are mobile. Those weird days when you want to be social but you can’t really go anywhere... So the internet is a meeting ground after school or in the evening" (Luke). Before students had cars, they had a social practice of meeting each other online, to compensate for meeting in person.

For some students, their instant messenger habits changed because many students went from having a family computer to getting their own computer at Berkeley. "I think all my habits changed when I came to college. I used to not use the internet that much. I couldn’t leave away

messages up at home because my parents come on and just sign me off" (Jenny). Jenny adopted a new practice of leaving herself signed onto AIM because she was away at college with her own computer.

Students' technology practices changed frequently when they moved to a situation where their peers had a different set of norms with using instant messenger. Anita used French AIM to communicate with her classmates when she was in high school in Paris. They used AIM as a tool to do work in dispersed locations, unlike how she had been using AIM in America, as a purely social tool.

Once I moved to Paris, it [AIM] was to get work done. Because we'd all be traveling constantly. We'd have projects and assignments to do so we'd just go on the computer, wherever we were, open up the chat room and you can all talk to each other at the same time. And then we had web camera. We had something that worked like conference calls (Anita).

It seemed that students at Anita's school in Paris had adopted AIM as a collaborative tool, unlike in America where AIM was used primarily as a social tool. Because of the new norms at high school in Paris, Anita adopted new technology practices.

Students usage of AIM varied greatly over time, especially when the students came to Berkeley and they found themselves in front of the computer more. "We would chat mostly on the weekends [in high school] -- what you do when you are bored, go online.... Whereas now it's just like you are just online all time. [If] something comes up you talk to somebody if not then you don't. If you are feeling bored then go online" (Cat).

While students like Cat have started to adopt AIM into their routines more since they have come to Berkeley, other students like Danielle have stopped using AIM as much as they did in high school. (We spoke to many students who at one point used AIM, but had either slowed or completely stopped using the technology. This is discussed in the section regarding the negotiation of technology in student's lives.) However, students are often on AIM without actually chatting with other students. "[In high school] I would chat, but not that much, then a lot more than I would do now.... I go on once a day but then actual chatting, twice or three times a week" (Danielle).

Email

Wikipedia defines email as, "Electronic mail, abbreviated email, is a method of composing, sending and receiving messages over electronic communication systems."

Most students found email to be fairly useless when they first adopted it, in other words, they adopted the technology, but they did not adopt a practice with the technology, at least not initially. Some found email to be a novel, or convenient, a way to overcome their shyness, or a replacement for passing notes at school. However, much emailing prior to the college application process was restricted to chain letters. Here at Berkeley, email has become a way to get involved socially with groups on campus, as well as a necessity for classes and contact with professors. In short, many students had not adopted email into their socio-technical system of use until they came to Berkeley.

Initially, most students had very little use for email. Some students got email so that they would be able to get onto AIM. "I got email first, because you have to have an email to get an AIM" (Erin). Most students connected to the internet through AOL initially, and AOL required them to have an email address to be able to log in, and use instant messenger with their own screen name.

“As far as I am concerned from where I was from, most kids did have an email account, but they used it mainly for their AIM service more than email” (Joe).

When students initially adopted email they did not find email to be terribly useful. “I got my first e-mail address in fifth grade and I didn’t use it much. I think I sent [email to] my grandmother in Illinois.... She checked her email once a week, so I was disappointed when she didn’t respond until a week and a half later” (Ben). Ben was disappointed about the lack of instantaneous contact with email. Many students used email to communicate with family members at first. “I just wrote some totally random and non-important messages to my family members for the first time.... I didn’t see what the big deal about email was.... I had to go through the dial-up process. It just didn’t feel very convenient” (Joe). But as Ben and Joe started using email more, they found that they would sometimes rather email their peers than talk to them.

The first time I used email it wasn’t even actually my account.... We have a family email. But then you know a couple of years later I started getting my real actual email account and other people had their email accounts as well. And I thought that’s when I might have changed a little bit with the contact information through email.... I was starting to use email because I might have been too afraid to talk in person.... So I guess that’s when I started using it more often to introduce myself and then hopefully talk to them in person, more of an icebreaker kind of thing for me (Joe).

When Joe got his own private account he found that he used email more. Joe found that socially it was easier to overcome his shyness by emailing people to get to know them. Meanwhile Ben found that email was a convenient conversation medium. “By the time I was in seventh grade, I became so comfortable with it [email] that it was easier to send an e-mail than call somebody” (Ben).

At least a quarter of the students that we spoke to were introduced to email in a formal educational settings. “I think I got email maybe in sixth grade.... I think that school wanted us to have one just because it was convenient to send us worksheets” (Eve). They adopted email as a result of an institutional mandate. Initially, the institutions also forced them to adopt a certain technology practice with email, such as a medium for getting worksheets. However, these initial technology practices were in the context of a specific class, and were rarely lasting for many students.

Email was a novelty for students, and so they used it because it was new. “The novelty of it [email]... It was cool and then it wore off.... every once in a while I would email friends random things. The chain mail was a big thing when we were in middle school. That’s about all it came in handy for -- other than that, nothing” (Laura).

Some students said that the major use of email when they initially used it was for chain letters. But, other students adopted email as a form of communicating instead of writing letters. "At first I communicated with my friends that were in my classrooms. I would send them emails and it would say, ‘I’m your secret admirer.’ But they knew who I was because it says ‘Eve’ at the top. I did all the stupid chain letters and forwards little kids do.... I sent email to my friends in the States when I lived in New Zealand. I would email my friends once every week... 20 page epics" (Eve). For students like Eve, email replaced notes and letters that she would have written to her friends, and she adopted email to communicate with friends who she didn’t get to see for long periods of time.

Initially many students didn’t find email terribly useful, but students’ use of email changed over

time. Many students adopted email into their routines because they needed it for practical purposes like college applications. "I think it was eleventh grade you start using a lot of emails because colleges, you have SATs and college applications then that was like mass emails sent to you everyday" (Danielle). Thus, students started to adopt the technology practice of email as a business communication tool before Berkeley, but once at Berkeley, their adoption of email as a business communication tool flourished.

Students found that their email usage changed dramatically at Berkeley where they used email to communicate for their business purposes, such as about financial aid and professors. "Elementary school [email] is more like just with parents you know for fun.... And high school I would email to friends to lookup places we should go on a weekend. Here [at Berkeley] I am an officer [for a club]... and we post maybe 100 emails per week" (Angus). Email at Berkeley is also a way to become part of social groups, and is a better way of communicating with people, like professors and GSIs. Thus, students also adopted the technology practice of using email to communicate with organized social groups.

The social contact on email help to make checking email "more fun."

Before I came to Berkeley I'd barely get mail and, it's not as fun to check email on AOL. But then I got calmail and then you can email all the time and then you subscribe to all the lists.... This place [Berkeley] is really technologically... Email is everything here.... I feel like sometimes I can email someone like my GSIs will get in touch me faster than if I would call (Jenny).

Most students said that their email use went up dramatically when they started at Berkeley, and became more of a social imperative, as well as important for communicating about classes. .

Mobile phones

Many student initially adopted phones because their parents bought it for them for safety purposes, and coordination purposes. Parents facilitated mobile phone adoption for their children, and gave them a prescribed technology practice for the phone. As mobile phone diffusion became more ubiquitous, it became a social necessity for students, and students started adopting their own technology practices with the phones. Still, some students don't have mobile phone, and have tried to come up with a variety of coping strategies to replace having a mobile phone. Appendix A describes mobile phone adoption as a function of the cost of the phone.

In the following sections, we discuss parental motivations for buying technology for students, and the student's motivations for using mobile phones. Oftentimes parents first buy mobile phones for students for specific purposes, and the students don't find the phones to be useful until they find their own purposes for using the mobile phones.

Parental motivations

Many parents paid for mobile phones for their kid's because they deemed it necessary for safety reasons and emergency purposes. Some students got their phones in case of emergencies. "I got my mobile phone in high school after 9/11. My parents are like 'you need a cell phone'" (Angus). Often, there was an emergency situation that led to parent's concern.

Freshman year of high school I got my phone because I was living in Seattle at the time and during school we had this big 6.9 earthquake... after that my parents freaked, 'you're gonna have a cell phone just for emergency purposes'... I never really used it for anything. It just kind of sat there (Kim).

Some students who were given phones for emergency purposes found that they didn't use their phones. Many students reflected Kim's feelings, and didn't see a purpose of having a phone and not using it (thought this was obviously the purpose of the phone). "It would mostly just sit in the car; I don't remember that well of using it at all. So, I guess for emergencies" (Betsy). One student actually insinuated that students used the excuse of safety to persuade their parents to buy them a phone, when they really wanted the phone just to talk to their friends (Ben), but many students insisted that they barely used the phone, at least when they initially got the phone.

Some parent's insistence on their children having a mobile phone seemed quite ridiculous to the students.

Because it was so strictly banned at the school we'd get a detention... I didn't even know why my parents gave me one because it just doesn't make sense. I could never use it. I just used the pay phone at school even if I had cell phone in my backpack... My parents wanted me to have one still... I suppose if I ever got somehow off the school property. I had an emergency where there was no pay phone, or I didn't have money for the phone" (Amy).

Amy's parents gave her a phone, but there was no technology practice for the phone, thus she never used it.

While some parents brought their children phones for emergency purposes, other parents bought students phones to, as the students perceived, keep tabs on the students. These students often didn't want to adopt a mobile phone at all. "I got my first mobile phone second year high school. I remember not wanting one, I guess it's, you can call your friends -- that's always a plus. I think my parents got it for me, because they wanted to check where I was" (James). James' feeling that the mobile phone is a device for parents to "check up" on their kids was echoed by several other students. Eliza noted that many students had phones, "Probably just so their parents could keep on check" (Eliza). The students who saw the phone as a tracking device somewhat resented their parents for "For some reason my mom just decided to hand to me [a mobile phone] thinking that I would have a life and go out. The phone is basically with me so they can find me, but technically speaking I am very predictable in where I am.... Tracking device, that's the phone" (Danielle).

While some students saw the phone as something that was restrictive, other students saw their parent's ability to keep track of them as being a social benefit.

My sister is the Vice President of a cellular phone company, so she gets free accounts. My parents really were protective.... the only way they would let me go places with my friends, walking around the mall, was if I had a cell phone and then I could like check in every hour, literally. So, the cell phone was a huge tool and social advancer. I got one in seventh grade" (Joan).

While other students were reticent to adopt the technology practice of using the phone to "check in" with their parents, Joan felt that this technology practice gave her more freedom.

The students who got phone for emergency purposes (which they perceived as not being particularly useful) or the students who got mobile phone so their parents could track them, didn't particularly want a mobile phone. However, many other students badly wanted mobile phones. Some of the students who adopted mobile phones at a younger age used it for the technology practice of coordinating rides with their parents. It seemed to be particularly useful for students who were involved in after school activities.

I was involved in a lot of sports and activities and stuff. And my dad was said, 'do you want one [mobile phone]?' What eighth grader is going to say no?...So I got

one and so it was really useful because if I got out of practice early they could come and pick me up... I couldn't drive, and in LA there is no public transportation so, you are dependent on your parents (Anita).

Even students like Laura who got their phones their senior year of high school found their phones mainly useful to get rides home from their parents. "I am the younger sister, of course I don't need it. Finally my mom just said, 'oh add her to the plan to the cell phone plan' I primarily got it so whenever I need it to be picked up I could be picked up... they did not have to wait around" (Laura). Getting rides from parents seemed to be the most useful attribute of a mobile phone that the students talked about. "In tenth grade I got a cell phone. Not many kids had them then... and I didn't really need it. I would just call my mom to pick me up" (Cat).

Parents were the facilitators of mobile phone adoption, at least early on for students, and there were not many technology practices for which the students found the phones useful. The technology practices used most widely by the students were those that were prescribed by the parents' motivation in buying them a mobile phone.

Students' motivations

In some communities, mobile phones moved beyond the role of ride wrangling to an important social tool as students got their licenses and own cars. Student's adopted their own technology practices with mobile phones.

I would say like people got them in tenth grade, people started using them in eleventh grade when they felt some autonomy because... almost everyone almost got their driver's license.... they're at school and their friends wanna hang out that night so they'd be calling each other up and networking like that (Ben).

As student became part of the American driving culture, and therefore more locomotive and independent, mobile phones became more important to students. In addition to the adoption of mobile phones for aiding parents and their children in coordination of activities, there was also factors where students were motivated by social pressure to have a phone.

Furthermore, the phone was used far more as it became a status item for many students showing off the strength or breadth of their social network.

And then the mobile phone became the whole symbol of coolness because of your connections of friends on your cell phone. I didn't connect to that because I didn't have one. But I also thought the cell phone has it's good side, some people you don't want to talk their parents when you go home so you just call their cell phone it made things easier (Joe).

For Joe, being able to directly call friends at home, instead of having to call his friend's parents house phone was a large benefit of having friends with a mobile phone. Perhaps students with mobile phones were able to be more social because they essentially had a private phone line.

Initially, it seems that many students adopted a phone for the "cool" factor, but because it saturated the student population so thoroughly, it moved from being a status symbol, to being a "necessity." "One person influenced the other and then everyone was influenced. Because I think at first it [having a mobile phone] was a coolness thing, but then so many people got it that it's not the cool thing at all. Just a necessity" (Jenny). Eve initially resisted getting a mobile phone because she thought it was too trend, however she ended up getting one and feeling very dependent on it. "I think I have succumbed to the culture, I mean I have personalized ring

tones.... I don't know what I would do without it I guess" (Eve). In some ways, Eve felt better about succumbing to the phone culture because she was able to somewhat personalize the phone with her own ring tones.

For some students groups, just having a phone was not enough, but students had to have the latest and greatest phones.

It's a thing you can observe especially younger teenagers it [the mobile phone] becomes status things... one of my friends is the phone horror princess. That's what people called her in high school. She would buy a new phone every couple of months.... It was just insane to me because it would be like 500-600 dollars (Eve).

Students felt pressure from their peers to get a phone, and often felt left out not having one. "My brother [who is one year older] got it [a mobile phone] for a graduation present and then everyone in the family had one except for me. Sad! All my other friends had it too. I complained about how I can never get a hold of them... They finally gave me a cell phone" (Sandra). Siblings were an influence on the perceived usefulness of mobile phones for some students. "By the time I was in twelfth grade there was nobody that didn't have a cell phone... except for my brothers who decided not to pay for it until, they saw how useful it was for me" (Ben). Ben found adopted a technology practice for his phone, namely to connect to his peers, and it was useful to him that he influenced his brothers to get one.

However, James' brother wanted a phone because James had one, but James actually tried to talk his brother out of getting a mobile phone because James saw it as a tracking device for his parents to keep tabs on him. James never found a use for his phone beyond the technology practice that his parents prescribed, so he tried to discourage his brother from getting a phone. "Because he thought it was exciting that I had one [mobile phone]. Even I told him it wasn't. Like mom and dad are just gonna call all the time. He said no, get him games on it or something. He has his mind made up" (James).

Creative workarounds

In Appendix A, I describe students who didn't adopt mobile phones because of their cost. Students developed a variety of coping strategies to deal with lack of a mobile phone such as using land lines at their parent's house, when they were in high school, or using land lines in the dorms, now that they are in college. To some extent, buying your own mobile phone when your parents won't was another coping strategy. Other students tried to use AIM in the place of a mobile phone. Raj's parents noticed that he was a "phonaholic" and decided that he needed a break from his mobile phone for a semester, so he relied on a landline and AIM.

It still was really hard... the first question when I made new friends was, 'what's your number, can we call you?' I was like, 'I can give you my dorm phone number...' And they were like, 'yeah what's your cell phone number' and they thought that I was trying to shut them down. But they slowly realized that I was just a silly foreign kid. I pretty much struggled the first semester. Actually, I don't think that it was that big of a struggle... I used AIM a lot more in that respect if I ever needed to get in touch (Raj).

Joe tried to cope at school without a phone, and use AIM, but was less successful. The culture of life at Berkeley also seems to demand a mobile phone, to a certain extent.

The first month [at Berkeley] kids would ask for my number to call me and do

things. They would call me to do things, and I could not keep in contact with them. I'm not going to ask for a screen name because all kids have their cell phones with them, not a pen. I thought it was so inconvenient. I felt kind of isolated without a cell phone and I got to have some way of contacting me, so it became a necessity (Joe).

Many students used the word necessity to describe their mobile phones. Some students who may not have initially had a mobile phones, eventually ended up feeling very dependant on them. "I had my car before I had a cell phone. I didn't even have a cell phone until the end of my senior year, which is pretty late. Once I got it, like, I told myself I don't really need to rely on it, but I actually do. It's a crutch" (Erin). One student, Luke, doesn't have a mobile phone, but is considering getting one.

Right now a lot of my friends that I've made are in the dorms on my floor, so they are right there when I need them. The year's almost over, and I think I'm gonna want to get in touch with a lot of those people next year. [I want a mobile phone] to get their numbers and get my number to them and that sort of thing" (Luke).

Blogs

Wikipedia defines web logs, or blogs for short, as a web application which contains periodic time-stamped posts on a common webpage. These posts are often by not necessarily in reverse chronological order. The students we interviewed used a variety of different blog applications such as Xanga, LiveJournal, and mySpace. These applications require one to have an account with the application, and an accompanying screen name in order to have a personal blog. All of these applications have features where one can add other users of the application as "friends" and post entries to only those who are friends. These applications also allow commenting on posts, but you usually must have an account with the application to comment. This is called "privatizing" a post.

Based on the data from our interviews, students found out about social software such as blogs and social networking services, specifically Facebook, from other students. While these technologies seem to offer some benefits to the students (since many of them use them very regularly), the selling point for using the technology rarely had to do with the technology's uses. Frequently students cited that the technology was a social requirement that they were either enticed to join by their peers, or outwardly forced to join. Many said that they would not use a technology because they didn't have time for it, but when they were bored, the technology was something that occupied their time. While students have a variety of uses for blogs, student's reasons for getting a blog seemed to be frequently motivated by social pressure. Thus, in adopting the technology, students rarely adopted what they thought was a useful technology practice along with the blog. Some students were able to find a useful technical practice for the blog, but others were not.

Some students seem to feel that they don't need a blog despite the social pressure. "Most people blog, but I feel like it is just kind of a useless waste of time, and I don't feel like I need to update the whole world on what I am doing. It's not that interesting anyway, I just talk to them if they wanted to talk to" (Sarah). Additionally, many students don't want to expend the effort to set up a blog. "I don't have a blog because I don't want to set one up. You have to sign up with Xanga for myplace or whatever just to blog. And I don't want to go through all the questions and stuff" (Eliza).

Many students overcame the minimal effort required to set up a blog because their friends set up a blog for them. "My best friend entirely made it [my blog account] for me because I used to always sign on her name and check everyone's blog" (Jenny). Or, student's friends insist that they set up a blog. "I first heard about mySpace at the start of senior year. I felt like it was completely stupid until a month before I graduated this girl literally forced me to open a mySpace and I was like okay I'll open one for you" (Joe). While many students we talked to were being coerced by their peers into starting blogs, Cat tried to get a friends online. One woman, Cat, set up a Xanga for her friend. "I got one [friend] on and she made like three entries and then she quit. She couldn't keep up with it. She was lazy...she said, 'I just rather talked to people in person when I want to like telling them something'" (Cat). One student didn't want to persuade her friends to do Live Journal because

It was back in the day when it you could pay money, or you could get one if a friend gave you a code. So, my friend gave me a code and I just start using it at the end of junior year.... LiveJournal is kind of an elitist thing... we're kind of like a cult.... you are really cool if you could do it [get the code] (Eve).

She felt the need to protect something that she felt gave her status. Eve was a somewhat early adopter of blogs, and saw being on Live Journal as an activity that made her special.

In other cases, students opened their own blog account just because everyone else had a blog. "I started Xanga in my senior year (a little later than everyone else), just because everyone else had it, but I don't update like daily like a lot of people" (Erin). Though often times begrudgingly, many students open blog accounts to interact with their peers. "I got on LiveJournal third or fourth year in high school. That was because my friends were pestering me. They have had it for years" (James).

While many students didn't have the time to set up a blog, many, like Angus, set up blogs out of boredom, and having free time. "In high school everyone was talking about LiveJournal. One of my good friends had them and said 'you should join' and I said 'okay.' It was something to do" (Angus). Most students heard about blogs perhaps because they were a trend peers spoke of. Blogs were a trend that seemed time consuming to people not using them.

One of my good friends in high school had one and she was always said, 'you should make one too'...and I thought, 'I won't be able to write in it.'... She used to write in [her blog] everyday. In the summer, I was bored and thought, 'okay I guess I will make one.' It's a good way for people to keep up with what everyone was doing without having to retell everything to every single person (Cat).

Although Cat was not initially motivated by the ability to broadcast her status, it is part of the technology practice that keeps her using a blog, and is perhaps the reason that she so badly wanted her friend to have a blog that she set one up for her. While many students didn't necessarily like writing in blogs, many students did like being able to read about their friends' lives on blogs. Blogs essentially functioned for these students as mass emails to people in ones social network.

In many other cases the blogging software forced people to join if they wanted to participate in their friend's online worlds.

I first didn't wanted to get Xanga. My friends used it, so I set up an account just to read their Xanga because you can't comments on their Xangas unless you're a member yourself. And so I got a membership and I would comment on their Xangas and then they got mad and they're like, hey don't comment on ours because you are not writing in yours, so I would put up totally meaningless pictures (Sandra).

Sandra was enticed into joining by her friends who insisted that she reciprocate their blogging

efforts. Furthermore, Xanga was a trend. "It just seemed like the phase that everyone went through... if you ask some one how their day went, they will say, 'just check my Xanga'" (Sandra). The penetration of Xanga was so high amongst her friends was so great that it almost was a social necessity that she read and participate on Xanga. But, since Sandra has been at Berkeley, Sandra stopped using blogs altogether because she believed that it didn't enrich her life – she found no technology practice for blogs that was useful to her.

I stopped using it [Xanga] because I just it's kind of pointless now.... Most people will say, 'oh today I ate a hot dog it was a yummy I feel like eating hot dogs again.' Some people will only put down 'oh what's the meaning of life? I am hurt because this person doesn't love me.'... Some of them are pretty pathetic.... My other friend who was in college earlier... she would write her entries like three times a day and she didn't do well in her classes. So I learned from her not to slack off and that's why decided to delete Xanga. I don't even put real meaningful posts and so I was like it is pointless, I just deleted everything (Sandra).

While Sandra is a rather extreme example of someone purging blogs from their lives, it does raise the question of whether blogging was a trend that became a social imperative for a few months for some students, or whether blogs have more enduring social qualities, or other features that will attract these students to use them for a longer period of time.

It appeared that peer groups might have a tacit understanding about what technologies they would and would not adopt. "It [using blogs] depends on circles of friends too, my roommate is really into blogs and she will update it several times a day. She spends hours on it a day but then within my circle of friends, we don't really do that. Just personal preference, some of my friends are into it, but most don't use it" (Sarah).

One student adopted blogs into his routine because blogs are interesting for the fact that a student's blog can provide a type of memory. "It's kind of interesting to look back and like what stuff you do in the past [on blogs].... It was a few dances I learned. I can't remember much about it anymore but if I read back then I was like 'oh yeah that sounds like a cool.'" (Angus).

However, the blog-o-sphere was not a safe social ground for everyone. Erin told us about a situation where a male at their school was attacking female students by saying thing about them and putting up dirty pictures (it is described more thoroughly in the section about privacy).

I read people people who used to go to church. I really don't keep in contact with them but I still want to know how they are doing and that is the easiest way... so, besides that, yeah, this is like, I have like few friends who are still using it but I feel like a couple like stopped. They were the ones being attacked by the guy. (Erin).

For Erin, she has adopted the technology practice of using the blog to keep in touch with friends who she no longer sees often.

Other students we spoke to (interestingly both gamers) opened blogs early in high school, far earlier than other students, probably because they were very technically savvy and spent a lot of time online. Both Ben and Kim said that they wanted to put their thoughts online, and that was their motivation for starting a blog. Their interest in blogs was also somewhat technical. For example, Ben created his own blog software, but in the end decided not to maintain it because the effort of learning about all the new features in web programming was too great. He then switched to Live Journal which didn't require his effort to maintain. Another student chose a blog on the basis of it's ability to be customized. "I first started a blog in the beginning at high school. A friend showed me how to set up Diaryland. Back then there was really like nobody was using it, but then LiveJournal and Xanga got popular, then more people started using it... I

liked Diaryland because it was more customizable” (Kim).

As these quotes allude to, the use of blogs is not binary. Students used blogs to a varying degree. “I know some people ... they do it [blog] like once or twice a month and I know some people will write every day so... I'm somewhere in the middle” (Cat). Interestingly, many students reported that their roommates or people that they knew were always on blogs, but we never talked to anyone that admitted to blogging everyday.

Most of the students who had blogs, had been blogging for a year or two. It seemed that because many students who had blogs got them because of social pressure, they didn't see a tremendous amount of value for having the blogs, other than because of the trend. So, the blogs had value to the students because it was a trend, but because there was not a technology practice that the students were motivated to adopt along with the blog, many didn't find them useful. Other students seemed to like to blog because it provided them with a broadcast medium to keep friends abreast of their activities. We look forward to seeing who adopts blogs over the coming years, and whether young people continue to adopt blogs because it is a trend, and what the influence of blogs will be in students' lives in the future.

Facebook

Wikipedia says that Thefacebook, or as it is referred to by students at Berkeley, Facebook, is a social networking website similar to sites like Friendster, but specifically targeted at college and university students. Students at Berkeley have accounts on Facebook where they are allowed to list personal information such as their contact information, pictures of themselves and their classes. Students can link to each other by “friending” each other. One student sends a request, via Facebook, that asks another student if they would like to be their friend. If the student accepts the request, then the students show up in each other’s friend networks. In addition to personal information, Facebook displays all of the friends of an individual. Students are only allow to browse the social networks of those that they are friends with, or other students at Berkeley.

Almost all of the students that we spoke to had adopted Facebook. Many students adopted Facebook out of boredom and social imperative. For some students Facebook is useful for meeting people, but for most students Facebook is a way to quantify their social networks and see how they are connected to other people. Since some students didn't adopt Facebook because they saw an actual use for it, but because they were pressured into joining, the students didn't necessarily adopt a valued technology practice with Facebook. Without a technology practice associated with Facebook, there is a question of whether there is any enduring value to it.

First week of school me and my suitemates got internet access and we didn't have any research to do... and would do Facebook.... I added people I have known for at least a year or two in friendship in high school., my suitemates, and people who have requested my friendship either from classes or because of ethnicity (Amy).

Some students were required to get on Facebook because of their obligations to student groups, and because student groups desired to use Facebook for communication purposes. “I've always heard about it, but, I never had a reason to get on it. Then I got into hall association, the student government for your residential area. They said that we can just have a Facebook group and talk to each other over that” (Anita). Another student was forced to start a Facebook account by his RA: “Before school even started, my RA wrote each one of us a letter saying, 'all of you who are my residents have to open a Facebook account and you have to add me as a buddy’” (Joe).

However, the overwhelming number of students adopted Facebook because of their friends. "Someone was using it [Facebook] and they just tell me to check it out, so I signed up for it" (Sarah). For some students using Facebook was just an extension of their use of a different social networking service like friendster (Erin). They simply saw Facebook as the next new thing. "Over the summer when I first came to Berkeley my friend who goes to NYU said, 'hey join Facebook'... Facebook is the newest thing, I guess and then so everyone here has it" (Erin). Erin sees having a Facebook account as being crucial at Berkeley.

As with joining blogs, many students are drafted into Facebook by their friends, regardless of their feelings about it. "I have Facebook, I don't use it that much, my friend signed me up for it" (Betsy).

Many students voluntarily get Facebook accounts because, even if they are not totally comfortable with some of the information that Facebook reveals. Sandra had people repeatedly telling her to join Facebook and finally succumbed to the pressure. "I thought, 'Oh well, I'll just see what it's like.' I don't use Facebook often. It's like Xanga where it is kind of revealing, 'I'm in relationship with so and so, here my interests, books I like and all of my classes too'" (Sandra). Sandra is not unusual to find out about Facebook from friends at other schools, however, she was more resistant than most students to joining Facebook. Facebook seems to be a social imperative on some level for students. "I heard about it [Facebook] in high school. My friends' sister at Stanford told her about it and said, 'All you guys when you make your college emails... make sure you join this thing.' At first it sounded like some sort of weird dating service" (Cat).

One student described why she would never join Facebook. "It's an elitist thing. Everyone's really into it - I always do everything contrary. So if everyone's into it, automatically I can't do it because I'd be succumbing to mainstream culture. Sometimes I am a little tempted... To me it just shows 'look how many friends I have, I am so cool'" (Eve). Eve avoids Facebook because she doesn't want to adopt the technology practice of quantifying her social network. Another student we spoke to was very resistant to Facebook because of its trendy nature, "I am afraid to get on Facebook. I have my account, but I wrote nothing on it. I have an account to spy on people but I don't wanna have an account on there. It's too trendy" (Kim). While Eve sees Facebook mainly as a way of showing off, Kim like the voyeuristic use of Facebook, but doesn't want to join it because it is too trendy. Kim ultimately does use Facebook for some of the same technical practices as her peers.

Although many students are initially resistant Facebook, many of them find technical practices for it that entices them to not only start an account, but to adopt it into their routines by signing on regularly. They like it because they can see how many friends they have in common.

I thought Facebook was kind of stupid at first, and then one of my best friends said, 'you have to get it.' Well it seems kind of pointless and weird, but kind of cool because like you do get to see everyone's network. Through Facebook you can realize how many friends you have in common (Laura).

It seems that one of the useful technical practices with Facebook is seeing who is in a student's class, and how you are connected to people, without actually having to ask them. "I use the Facebook mostly because it's a good way of keeping track of how many friends you have, and to see who is a friend with who... I am in chem4B now, and I can meet someone in my dorm who happens to be in chem. 4B as well" (Raj). Students also find it useful to connect with people that they may have lost touch with, "I had an account and I never really used it. And then a friend who I haven't talked to in maybe five years ... contacted me on Facebook one day. I was like, 'wow this is really useful.' After that, I look for people I hadn't seen for a while" (Anita).

While many students were resistant to joining Facebook, some students enthusiastically joined Facebook and see it as a beneficial social tool.

I had a friend who heard about it [Facebook] and said, 'here, look this site...' So I logged on it, entered in myself. I was on it beginning of summer... [I would link to] random people. I'd just poke them and said, 'hi.' There is an option that says 'poke this person' which sends them a message saying you have been poked by this person... I would search for people who were out of state, or people who might be in my classes or my major and say 'Hello, who are you?'... I am really good friends with a few of them... I have about a 100 people from Berkeley then people from my high school I have got 150. And I know about 80% of the people at Berkeley pretty well (Angus).

For Angus, Facebook was a useful tool for him to help quantify his social network, and find peers that he might relate to being out of state students or in his major. It will be interesting to see if students find that they use Facebook much after Freshmen year when their social network stabilizes and the novelty of the tool wears off.

It will be interesting to see if students adopt an enduring technical practice with Facebook for their four years at Berkeley, or if it is a trend, adopted because of social pressure in students' first year, that they won't use in the future.

Theme 3: Techne-Mentors as Adoption facilitators

Theme two focused on motivations for adoption of technology, or technology practices, and this section is dedicated to explaining the patterns around technology adoption – when students adopted technology, who might have introduced it to them, and under what circumstances. We specifically focus on the idea that many students' adoption patterns were influenced by their social networks.

Through our interviews with students, we identified three different aspects of technology adoption:

1. *Adoption of technology.* How do students first hear about and come to us the technologies they adopt?
2. *Adoption of technology practices.* How do students adopt a technology practice?
3. *Support for technology adoption.* How do student ensure that when they adopt a technology that they can keep using it? This can also of technology support, but it enables adoption.

All of the different aspects of technology adoption were most often facilitated by someone in the student's social network. We named the person in a students network who enables all three aspects of technology adoption a "techne-mentor," and the process of finding that role is described below¹.

Everet Rogers spends a considerable time in his seminal book *The Diffusion of Innovations* talking about opinion leaders and the role that they play in influencing their communities' adoption of innovations. "Opinion leadership is the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency" (Rogers 1995). In many of the interviews we conducted with the students, they acknowledged the role of something like an opinion leader in their lives, or we recognized the students themselves to resemble an opinion leader.

¹ Also please see "The Techne-mentor" by Megan Finn

There were two problems with the idea of an opinion leader, at least as described by Rogers. First, an opinion leader generally influences a larger community of people. “The most striking characteristics of opinion leaders is their unique and influential position in their system's communication structure: They are at the center of interpersonal communication networks” (Rogers 1995). Based on the data set of our interviewees, people who influenced technology adoption in our study acted like opinion leaders only appeared to influence a few people in their close social network. Opinion leaders generally influence adoption of technology or adoption of a technology practice, but rarely did they overtly support adoption directly because of the intensive time commitment involved in helping people. Thus, we are addressing opinion leadership on a micro-level.

Second, the opinion leader, as described by Rogers, is a somewhat static position within a specific social network. “Opinion Leaders are members of the social system in which they exert their influence” (Rogers 1995). We saw again and again in our interviews that someone might not be an opinion leader in the context of one part of their social network, such as their family, but as they learned from their brother, they could go forth and be an opinion leader to their friends. The people who influenced technology adoption in our study were like opinion leaders, but the role was not permanent, and much more fluid, depending on the social context.

We will refer to these micro-level opinion leaders as “techne-mentors.” Technology is partially derived from the Greek word, *techne*, which means craftsmanship. *Mentor* is a figure in the *Odyssey* who advised both Odysseus and Telemachus, and is the source of the modern use of the word, mentor. Interestingly, Athena came in the form of Mentor to advise Odysseus. “Techne-mentor” describes the role of someone who influences technology adoption that is played in a specific context, but techne-mentor is not a permanent role.

Students went to the techne-mentors for help when a technology wasn't working. The techne-mentors influenced students to adopt a technology, or adopt a certain practice with a technology. The relationship of a student to a techne-mentor was a complex one. Sometimes a student would have one person who was a techne-mentor in their lives, and that student would pass on the information about a technology to another group within their social network, acting as a techne-mentor. The role of techne-mentor depended on a student's social context. There is a constant flow of information about technology between students' different social networks, all of which makes the role of techne-mentor fluid and context dependent. Sometimes the students themselves were techne-mentors to the people in their lives, and learned about technology from a reference website.

In many cases, the idea of techne-mentors is about adoption patterns, but it is also a story about informal learning in social networks. The techne-mentors were an integral part of informal learning about technology for a student – they informally taught students information that would allow them to be techne-mentors in another social context. In informal settings, the techne-mentor can take on the role of a teacher about technology. Please refer to Appendix C for more information on what the survey revealed about who students learned to use technology from.

Within families

This section describes the role of a techne-mentor, and informal learning within families. Student's families have an immeasurable influence on students' adoption of technology, whether it is from imitating influential older siblings, or parents' judgment about which technology to have around the house. The parent's technical frame, even if they were non-adopters of certain technologies, was important in influencing their children's view of the technology. This section

covers the role of a student's siblings, fathers, and gender in relation to adoption of technology within a family. We observed that most students seemed to have a techne-mentor within their families, and frequently it was one of the kids, but sometimes it was the student's father. In some families, the students had a relative who was in the technology industry who acted as a techne-mentor. Oftentimes students used information that they picked up from siblings and parents and disseminated it amongst their social network

Jenny's sister not only helped her and her family adopt technologies, but she also provided Jenny a social group to talk to online, and enabled her to adopt the practice of using IM.

[My sister] knows more about computers than I do. I don't know why, but whenever we get an update for AOL, she would do it... I would ask her if I ever had a problem with Microsoft Word, [or to help me] make a paper with something cool... Yeah, I have pretty much learned everything I know about computers from her... Cell phone, SMS is same thing probably.... she definitely got me into instant messaging... we used to instant message when she was in college... one night she showed me how you set up everything and I had six buddies (Jenny).

Sometimes older siblings were not only opinion leaders, but they played a protective role as well, guiding students about how to use technology. "I have two older brothers and they're both more interested in computers than I am.... I think my brothers found ICQ first and started talking with their friends. They realized I was talking to complete strangers [on ICQ] so they got me hooked up with ICQ and I started talking to their friends" (Sandra). Sandra's brother's guided her to adopt the practice of instant messaging with friends, avoiding chat rooms filled with strangers. Because of Sandra's brother's expertise, she was able to help her friends with technology and be a techne-mentor amongst her friends. "I hooked up a couple of my friends with AIM. One of my friends got AOL, and I helped her choose a screen name. She would ask, 'how do I add a buddy or how do I look up this person?' I got all the help from my brothers and passed on information" (Sandra). When students were younger, families played an important part of their social network.

Students not only learned from getting advice from their siblings, but watching them as well.

From me it [IM] spread to my brother. He's a younger brother so he pretty much does everything I do. Or I like to think so. After a couple of years, I got my parents on it [IM] because I was going away [to Berkeley]. It's an easy way to keep in touch with them... [my brother] discovered from me things like chat programs, websites.... More like that kind of stuff that he always pick up from me... He was never interested in any of the constructive work that I did on the computer. So we never really learned from each other apart from if he saw me using something like MSN then he went and created an account for himself (Raj).

Raj explicitly taught his parents, but his sibling learned by watching him. Raj was even a little disparaging that his brother didn't try to pick up more of the "constructive" activities, like creating websites, Raj took part in.

Joan directed her siblings how to use technology more explicitly. "Oh, I would teach them [my siblings]. Not so much in middle school but in high school, they're usually, 'do you know how to use Photoshop?' I'll say, 'Yeah, do this'... Or, 'Do you know to how to get rid of this spyware?' ... for my brother at least, my sister has her own tech guy" (Joan). While Joan was the techne-mentor for her brother, her sister had her own 'tech guy.' It seems that everyone had some sort of techne-mentor in Joan's family.

Interestingly, it seemed very important that students had at least one techne-mentor in the household. If one techne-mentor moved out, another family member would take over.

My sister is a more of a technology person. She would figure out what was wrong on computer. So I am sure we had viruses, I just don't know about it.... Whenever we have some new program, we would just leave it to her to figure it out. When we got an answering machine, she sat with the manual and figured it out how to use it.... I was young.... Times were changing and I now know more about computers than she does. This summer I am going to set up the wireless router and disconnect the phone line and connect it to DSL line. I have friends who have built their own computers, so if I am having a problem I can just ask them... In the past, when we have something new that needs to be programmed, 'okay, sis can do it.' I don't know if it because I was younger and they never trusted me but I never was the one to do the programming (Laura).

Part of the reason that Laura was able to take over as the techne-mentor was that she had a social network of friends that are going to be able to support her as the opinion leader within her family. Laura's situation also suggests that the role of techne-mentor was so fluid that someone had to be the family techne-mentor.

Most of the time, older siblings were the techne-mentor rather than the younger sibling. Like Raj, when Angus left for school, he had to get his family to adopt IM so that they could talk to him.

Before I left last fall [for Berkeley] I had to show them [my parents] the ropes on computer stuff they needed... My sister uses it [AIM] and both my sisters and brother just got an account. So yeah, I got all them on it [AIM]... I showed my parents how to defragment the computer. .. When I went back for winter break, I installed a wireless card on my sister's computer.... it turned out that my dad had completely uninstalled the wireless card" (Angus).

Angus had to teach his parents a little bit about the computer so they could function without their techne-mentor in the house. It seems that Angus' father tried to take over as techne-mentor, but was unsuccessful.

Frequently in families with male and female children close in age, the male child was often considered the most proficient at technology. Of the female interviewees we spoke to, Sarah, Anita, Eve, Amy and Sandra all alluded to having "expert" male siblings who were "quite brilliant with the computer" (Amy). However, as this section suggests, female students were quite capable of being techne-mentors for their families. Perhaps it was assumed that male children would take on the role of techne-mentor.

Some families were completely dependent on the children to be the technology techne-mentors because their parents didn't understand how to use technology, so the students would have to teach them. "My mom doesn't know how to navigate the computer.... [she has] my brother's [computer]. She is trying to learn how to type and how to turn on the computer...but she is still learning" (Eliza). Not only were parents frequently not opinion leaders in families, sometimes the students had admittedly little or no supervision of their online activities.

For example, early on, Ben's dad taught him about how to use technology.

I mean as soon as the two people on my class were using e-mail I wanted to figure it out. So I went home and asked my dad about it, and I kind of figured it out from there and also taught people how to use it... He [dad] just told me some things, like AOL - that was the program that we used. And we signed on to that, and he showed

me an e-mail and he explained that when you send an e-mail to someone's e-mail address, then they'll get it instantly because it travels over cable lines, information lines. So, that was kind of exciting for me, actually. WOW, some one gets it immediately. That was cool (Ben).

Ben was able to learn from his dad, and disperse his knowledge within his social network. However, Ben's parents got divorced and his father moved out and Ben had "a bit more freedom."

My dad moved out... and I guess it shows a little shift – my dad basically stopped knowing what we were doing on the computers in seventh grade... we were making all these images in photoshop... I could sign onto different newsgroups and my dad wouldn't be afraid about us getting viruses because he wasn't there (Ben).

Oftentimes the little parent supervision was a function of the parent's familiarity with technology. Raj remembers learning about email from his father. "I remember my dad used to use it [email] back in India... he had one in his office hooked up to one of the 28.8K dialup things.... He could send messages to his best friend across the road. It was a big thing, sending via email. I didn't use it at that age, I just saw him doing it" (Raj). However, as Raj starting using more sophisticated technology, his parents stopped understanding what he was doing. "They [my parents] never really considered the idea that I was building a website" (Raj).

Other parents were far more cautious with their children and would not allow their kids to use the internet alone. "I couldn't use it [the internet] per se but my siblings could. The Internet access was there in late fifth grade but I wasn't allowed to use it on my own.... It was always they type the password and sit there while I am using the Internet" (Joe).

On the other hand, when there was an adult in the family who was in the computer business, they would almost always be the techne-mentor in the family whom many family members would defer to for technology advice. "My uncle works in a computer engineering company. He'd have cool gadgets that he'd bring... My uncle came over and cleaned out our computers again and said, 'you guys have to stop downloading this stuff, it's gonna kill your computer'" (Cat). Cat's family called her uncle for help when their computer didn't work. Because of her uncle's advice, Cat doesn't download anything anymore because her uncle found that her family's computer was getting viruses from Cat's downloads.

Some students' parents taught them about technology. "My dad works in computers so he introduced us to... everything technology related.... We have a lot of technology around the house... I have had many, many computers and laptops and digital gadgets just because of my dad" (Sarah). In fact, Sarah's dad had a family FTP server where they could post family pictures and documents. Sarah attributes her technical savvy to her dad's teachings and the availability of technology around the house.

Techne-mentor parents influenced their children's technology adoption, sometimes not by explicitly showing them how to use a technology, but by having a lot of technology around the house. Anita developed a curiosity about technology watching her father dismantle and assemble computers and other projects.

I remember when I was little out of all our computers there was always one that would be apart. Dad would take a computer apart and put it back together just for the hell of it.... He [dad] used to make smart cards, and we had them around the house. I always knew how to decode them.... If I had a question I would ask [my dad] (Anita).

Sometimes parents didn't have the knowhow to help the students, and others they did. Sometimes students themselves were teaching the parents. However, even if families were not able to show students how to use technologies, they still influenced how their kids valued technologies. Despite the fact that many parents were not familiar with technology, all of them tacitly endorsed the computer on some level by buying one for their kids.

Peer leaders

While families played an important role in helping students discover, adopt and use technology, for many students their peers played an equally important role. Families tend to influence more about the values of a technology, and early on, the adoption of technology, but later on, it seemed that student's peers were more responsible for the adoption of technical practices. While some peers were the techne-mentor in the lives of some students, other students were influenced by their peers as a group. In the previous section I introduced the idea that many students had family members that were opinion leaders, and that allowed them to be opinion leaders amongst their peers, and vice versa. While it was easier to identify the techne-mentor in families, because of the static nature of families, it was more difficult to identify techne-mentors amongst peers, because of the volatility of peer groups during teen years. The influence of friends was harder to identify because friends change. A friend plays a role in the life of one of the students for a limited time. The role of evolving friend networks in technology adoption is a topic that demands further research.

Students social networks were instrumental to their adoption of technology. Especially as students got older, their peer networks started being very influential, in addition to their family networks. Sandra learned about hotmail from her brothers, but it wasn't until her friends adopted hotmail that she started using hotmail. "My brothers would say, 'Try hotmail, it's free and easy to use and everyone using it.' So, also I think I used RocketMail for a long time and then I switched to yahoo and then all my other friends used hotmail so I started using hotmail" (Sandra).

Sometimes students draw on their family networks to show them how to do something that they might have heard about in school. "They [my friends] were just like 'oh, just set it up this way' She [my sister] said 'no, you are doing it wrong.' So I can say that my sister and friends like, showed me, told me how to do it that was my first email account" (Laura). Oftentimes students rely on older sibling's peer networks. "We got a virus... At first we didn't really know what was the problem.... One of my sister's friends said, 'Oh yeah that's the virus' Then she gave me the site to download the patch.... I removed it quite easily from my computer" (Danielle).

Many students often learned about technology for the first time from their friends, and they learned how to use a technology from their friends. "My friends had cell phones way before me... They would say, 'I got text' and of course I saw the commercials on TV. So I knew about text but I never had a cell phone. When I first used my friend's cell phone I thought, 'How do you do this?'" (Erin). It seemed that students found out about technology that was adopted later particularly from their peers, such as IM and text messaging (see Appendix B). Joe described learning about instant messaging from his peers at school.

I was sitting in class and my friends would be talking about their conversations and I knew they are not talking on the phone. And I said, 'How did you guys know that?' And they said, 'AIM.'... So they would give me their screen names, and I thought, 'okay, what do I do with this?' They showed me how to download [AIM]. It was really easy. So I just made a screen name and bam! You go online and talk with

other people, and your screen name gets spread out amongst the crowd because one person knows another person who knows another. Your buddy list grows and pretty soon you have good conversations all across your monitor. (Joe).

Joe's social network allowed him to adopt a technology practice with instant messaging that resulted in "good conversations." Most students found out about IM from their friends. Luke's story about the first time he used IM is quite typical. "[I first saw IM] Long time ago, probably in seventh or eighth grade. I think friends had it first and I saw it over there and then I got it a couple of months later" (Luke).

While most students didn't cite specific peer techne-mentors, a few students acknowledged a specific individual who influenced their adoption of technology and technology practices. Students often found other students in their network to be techne-mentors.

I found out MSN... because a friend of mine started using it. He was a tech savvy guy, I think his dad was a computer analyst for a telecommunications company.... He would have all these little gadgets. He said in high school, 'why don't you try this [MSN] and we can talk to each other back home?' Oh, I thought, 'that's a good idea'.... I found out about IRC from the same friend.... So I used it [IRC] strictly to talk to him and then he'd slowly show me tricks... I found that we never talked about anything but technology. So when I saw him get into a hardcore programming and I was like 'Why don't I try something like that?' (Raj).

Raj's friend was a techne-mentor to Raj, and it sounds as if the father of Raj's friend was the friend's techne-mentor.

Many students have a peer whom they rely on to be their techne-mentor when they have technology related problems.

I mostly rely on myself to figure it out. My roommate, even though she spends so much time on IM, is even less technological than I am. So, she has a friend who will come over and help her out and I will get tips too... Last month there was a thing where calmail was changing its security standards and you had to check things and I didn't really know what's going on but ...Her friend came over and helped her and helped me too (Betsy).

Betsy perceives her technical ability relative to people that she is close with.

Student's social networks are important sources of technical support that enable students to adopt technologies and use them. Students have a variety of ways to contact their social networks. Students talked about using instant messenger for informal learning within their social networks. In many ways then, the communication technologies themselves become tools for diffusing information to be adopted amongst their peers.

My brother had a problem with his abstract math homework. I said, 'dude, I don't know how to do this' So I just went on AIM to my friends who are good at abstract math, 'hey can you solve this problem?' So my friend solved it and I send the answer to him.... You ask anyone and everyone the questions, and amongst the 30 people some of them might have the answer. Can you imagine with your cell phone calling 30 people and asking the same question over and over again? (Anita).

Students have a range of skills that allows them to be techne-mentors when it comes to trouble shooting or passing on information about technology. Students were aware of their technical skills relative to the technical skills of their friends. "I am in the middle because I have friends don't know what's going on, don't know very simple things. Then I have friends who are like, 'oh that's easy you can just re-program it'. I have friends from both sides" (Laura).

Additionally, students are often very aware of their peer's skills and know who in their social network can be a techne-mentor in different contexts. "Internet...my roommate is definitely, is the one to go to.... But as far as like smart cards or palm pilots and stuff, I am...but that's mostly because of my dad" (Anita). Other students learned from their peers by being slightly competitive with them. Ben said that he was the "technology guy" amongst his friends. Ben was often pushed learn about technology by another one of his friends. "We were in kind of something of a 'technology race' because we both enjoy technology and not everyone in our school had gotten used to. I like being in a niche not many people understood" (Ben).

Some students were the techne-mentor within their social network and taught other students about technology. "In terms of technology, I usually know more than most [students at Berkeley] and I fix just about everybody's computers and ... how to use your cameras or how does set things up like a TV, computer, like that... (Sarah). As described above, Sarah's father taught her about technology, and she passed her knowledge on to her friends. Many students don't even wait for their peers to ask them questions about technology, they help their peers find new technology.

I know more about computers than most of my friends so.... if I see that they are using it [AIM]... [I say,] 'Your AIM starts playing a movie trailer with audio every half hour and it's just annoying.' [My friends say,] 'My god, I want to get rid of that can you help me?' and so I'll go on a downloading site and download like GAIM or DeadAIM (Joan).

Students like Joan, Sarah and Ben seem to have a passion for technology, and a strong desire to be techne-mentors to their peers.

We went to the library and used the computers; usually using the computers was playing games on the computers, but sometimes people would want to understand the actual usable, the workable, I don't know how to really say this, the productive components of a computer... And when people had questions about e-mail, then I took over, looked at it, tried to understand, and make an answer out of it...that is the way I liked doing things. Or even today, I love answering questions about how to fix something on the computer (Ben).

Joan, Sarah, and Ben had a variety of sources of information that allowed them to be techne-mentors within their peer group. Joan learned from peers at work. Ben and Sarah both learned from their fathers at some point. However, Joan and Ben also learned on their own from experimentation or references available online, in order to become techne-mentors.

Learning on their own

While the rest of this section focuses on students who learn from their social networks, primarily family and peer networks, and specifically about the role of the techne-mentor, this section aims to understand how students learn on their own. Some students spent considerable time learning about technology on their own from non-human entities, and often times they became the "techne-mentor" in parts of their social networks by being self-taught. Why did students feel the desire to open Pandora's box and learn about technology? Sometimes it was circumstantial, but other times students are driven by a curiosity.

One circumstance that many students ran into growing up was having a computer that broke. A few students started learning about computers trying to get rid of viruses on their family's computers. "I did get a virus once and had to learn how to get rid of it. The damn 'I love you' virus. Gosh, that nailed everybody.... When I started eighth grade and was using computer for basically everything... I would search on questions that were covered in textbooks" (Ben). Once

students figured out how to get rid of a virus, they would often help the people in their social networks get rid of the virus.

We got this one [virus] on AIM actually. It was on your user profile so whenever you clicked info, it would say, 'ha, ha, ha, I found the picture of insert your name here' and you would click on the link and then you would get this spyware.... it took me a day to figure it out... Then I got rid of it for all my friends. It's kind of like a little game... It was a challenge, especially the first virus... I just started getting into [computer] stuff (Joan)

Many students were often driven to learn about technology on their own, when they encountered problems with the technology, and they didn't have someone to go to who was there to support their adoption of technology. "[My laptop] is actually giving me troubles right now. It overheated yesterday because I put it on the bed and I didn't realize it was gonna overheat because I didn't realize the intake...was on the bottom... so I am just freaking out and then I went online and I figured, 'oh it can overheat, duh'" (Laura).

Oftentimes, students were just curious about how things worked, and that drove them to learn about technology. Anita's dad is an engineer and has a lot of technology around the house. "I think it was just because I was curious about it, so I was kind of just attracted to see how things work" (Anita). A lot of students learned about technology on their own by experimenting with technology. "I am usually pretty good with technology, so I just figured my mobile phone out" (Sarah).

Some students are driven to get the most they possibly could out of the technology that they owned. "I read manuals for everything... just to know what features are actually on the thing. I would like to use the most I could out of the pieces" (Danielle).

Students learned about technology from techne-mentors in their social network, but they also learned about technologies on their own.

Theme 4: Students negotiating the role of technology in their lives

Over the process of interviewing students, it became abundantly clear to us that many students were constantly negotiating the role of technology in their lives. Technology elicited a variety of emotional responses from the students, some positive and some negative. This section explores students' feelings and attitudes about technology as they try to negotiate the role of technology in their lives across a couple of different themes.

Below we explore student's various feelings and attitudes about having their information available online. Then we explore the stigma of the always on culture. Next we discuss one of the reactions to the always on culture – that students start to feel like technology can be "distracting" or a "waste of time." Lastly we explore students' powerful feelings about the addictive nature of some technologies.

PRIVACY on the web

Students expressed a variety of feelings about having their information online. Some were comfortable with having public blogs, but most were not comfortable with strangers contacting them as a result of personal public information. Many students seemed to have some delusions of privacy and safety on Facebook where students list all of their contact information, including

residence. Oftentimes students don't have privacy concerns because viewing their personal information on Facebook is limited to friends and people with a Berkeley.edu email address. Students felt less secure about their privacy on blogs, and often privatized entries.

One student told us a horrific story about female students in high school being attacked on Xanga.

My friends used to have Xanga, but a lot of them do not update any more or they closed it down. There was a drama thing in our high school where there was this stalker guy in band. He had a Xanga and talked about girls at school who were also in band... It was really disgusting stuff. Our teacher got involved ... there is so much anonymity there ... AOL couldn't get a hold of him because of privacy, I think like a while AOL said, 'we'll tell you who it is' and finally the guy he confessed himself (Erin).

Some students associated semi-public information in the online world with some positive experiences. "My mom got divorced, and was looking for someone to date.... And she found a guy through online dating service, and this guy is great. He's my mom's fiancé now" (Ben). However, Ben, like many students, is uncomfortable with totally random people contacting him. "I've just seen a lot of people message me randomly and wanna get to meet me. Dude, I don't want that. I don't like the whole public thing, I like kind of being a little bit reserved" (Ben).

It was a bit shocking how unconcerned some students were about having information about themselves on Facebook. On Facebook students are required to give their email addresses. Many students also enter their AIM contact information, as well as their phone numbers and dorm. They also have the option of posting pictures of themselves, and Facebook displays their entire friend network. Students don't seem to care about their information being available, and they don't even consider the implications of having their social network open to the Berkeley public.

The other people [on Facebook], I don't know them. I am never gonna meet them; and my pictures are just of places or other people. I suppose the only harm if they decided if they had a death wish against me and tracked me down.... I'm sure my dad would be offended if he knew I had that account. Or worried (Amy).

Amy takes comfort in the fact that she is anonymous in real life to many Facebook readers. Students seem to be quite comfortable with their information on Facebook, because the information on Facebook is the type of information that they feel comfortable having available. "There's nothing too incriminating on there [Facebook]. Stuff I put on there I'm pretty comfortable with people knowing" (Luke).

It seems that many students felt very safe revealing information about themselves on Facebook because there are only university students on Facebook, and they felt safe with other students. "It [Facebook] is good because it's only for college students. You won't get any.... crazy people from outside, they can only look at people from Berkeley unless they're your friends" (Joan). It is fascinating, and rather comforting that students feel that they are safe amongst their peers, especially given Erin's story.

Other students feel safe because there is a type of reciprocity on Facebook – your information may be available to everyone, but because everyone's information is also available to you, there is an expectation that people will respect your privacy. "You know...you are safe [on Facebook] ... because everyone is a student at a university. You can just click, and you can see the entire profile; their phone number, contact, and everything. ... [It doesn't concern me] so much because

I can do the same to them. Also you don't put stuff like your social security number on there" (Anita). Like Luke, Anita qualifies what kind of information she is comfortable having available.

Other students were more concerned about their privacy on Facebook. Both of these students were females who have had awkward and difficult exchanges with strangers online, and thus are perhaps more aware about the implications of having your information available to anyone. "In case of stalkers, I put the dorm phone. I don't mind it's because people won't call me anyway. I put my screen name in case people wanna contact me" (Sandra).

Many of the blog software companies have options where you can "privatize" entries so that only other subscribers who are listed as "friends" can read the entries. Students often privatized when writing emotionally charged entries about other people. One student said that she privatized, "More personal things like when I was breaking up with my boyfriend I didn't want him to read it over anyone else that I didn't really know to read it" (Eve). Another student also said that he privatized "relationship stuff, or when I get really pissed off, like at teachers in high school" (Angus).

Some students with blogs privatized their blog entries when they realized that other people read their entries. Additionally, students self-censor what they post on blogs because they are concerned about who would see their blog. "I don't want to say anything about somebody [on my blog]. I am sure that they wouldn't see it, but I wouldn't write something about somebody from my building. Everybody is on Facebook. People know each other" (Cat). Other students are very worried about giving away too much about themselves, and thus self-censor. "I didn't want to reveal too much. I don't want to say these are my feelings, my inner most thoughts" (Sandra).

We asked students who have blogs about what they would think about if their parents saw their online information, and many were somewhat comfortable with the idea. "We wouldn't say, 'hey mom, come read this.' I don't write anything too private. It is all on my [AIM] profile... It wouldn't probably be interesting to them" (Cat). However, other students felt very strongly about having a private world, away from their parents, online. "I don't feel comfortable with my parents knowing my screen name and having them read my profile.... They're my parents and that's my world online. I don't want them to invade it" (Kim). Kim obviously felt very strongly that the online world was a place that she was free to have interactions that were private from her parents.

Perceptions of "always on"

Students often didn't want to be online as much as they are. Many students spoke negatively about someone they knew who was always on the computer. Students seem want to avoid being a person who spends all day on the computer.

Most of the students we spoke to indicated they thought that they were on the computer less than other people in their dorms. Students often had talked about "This one guy on my floor pretty much stays in his room and stays on the computer all day" (Raj). Students spoke about struggling to not always be online. "Their [students in her dorm] computers are always on.... Email, theirs are always open, mine is open when I am connected.... I always have work to do online, but if I can avoid it then I am not online" (Anita). Many students had to make a conscious effort not to be online all the time. "When I find myself not going out or talking to people enough, I'll make a conscious effort to do stuff... stop whatever is keeping me there [at the

computer]” (Luke). Sometimes students make explicit moves in order to not be online, and even dislike having access. “If I go in to study lounges, then I am wireless [connected to the internet]. Which is bad, because the whole point is going to study lounges and stay away from Internet access” (Danielle).

Students had to struggle to be offline, and we detected that there was somewhat of a stigma associated with being on the computer all the time.

I think it's kind of looked down upon to ask for an AIM name to get a hold of someone that you're just meeting. The phone number is so much cooler... I think it's sort of tied in with the thought of being on the computer all the time: 'this is the best way to get a hold of me, I'm on instant messenger all day.' Cell phone number, you could be out doing anything.... You can't sit in front of your computer all day, your eyes will go bloodshot. You won't see real life for a while (Luke).

Luke describes being online all day as being somewhat uncool, away from “real life,” and physically harmful. Students can be extremely critical of people who are attached to their computers.

My friend's computer broke so she sent it in. She panicked. She said, ‘Oh my God! I won't have my computer’ and I asked her ‘Do you need to write a paper or something?’. She said ‘no’... but she said that her desk looks empty. She constantly has to have it on, so instead the entire weekend she had the TV on (Jenny).

It's almost as if Jenny's roommate had to have some media on in the background, whether the computer or the TV. Jenny's roommate's comment about her desk seeming empty without a laptop, and needing the TV, implies that the technology fills a physical space in their lives.

One student acknowledged the stigma associated with being online all the time, and that she was online all the time.

You know how a lot of people make fun of people who find a boyfriend online or who only have friends online and who do nothing but do things on computer. I don't want to turn into one of those people, but I feel like I kind of am. Because technology is such a big part of my life that I can't help it. It's kind of sad.... I'll be in front of my computer. I'll be surfing internet, I'll be online while watching movie or listen to music as my instant messaging window's up. I am playing a game, and I'll be still online... I don't know what else I do, you know..... I go to work or I go to class and that's it (Kim).

Kim felt badly about herself because so much of her social life was online, and that apparently is not socially acceptable.

Other students commented on the idea that everyone is always on in the mobile physical world. A few students we talked to were very irritated about the role of technology on campus. They felt strongly that it affected their social world on campus.

Another pet peeve is when I walk around campus and every one is either listening to the iPod, so they are completely out of it because they have their music in the ears... or on the cell phone and it's really sad. There is like no human contact any more you know people really don't care about their surroundings (Laura).

Some students specifically disliked that mobile media withdrew students from being engaged with what was happening at that moment on campus. “There was this one article criticizing iPod saying how people are discouraged to come up to you since they all see like you are too preoccupied with your music. If you always listen to music you are kind of in your own world and you really don't see anything else” (Danielle).

Other students described how they would leave technology behind in order to get offline.

I don't like being attached to my cell phone. My boyfriend comments on it all the time, 'Why don't you take a cell phone with you?' I don't like being at the beck and call of everyone so I tend to leave it behind. I leave notes for my roommate, 'don't call on my cell phone because I don't have it' (Laura).

Laura does not always like being available to everyone.

Students clearly have conflicted feelings about being at their computers all day, being available all the time by phone, and the use of mobile media on campus. Perhaps one of the reasons that they feel resistant to being online all the time is that they find technology to be a distracting, waste of time.

A distracting, waste of time

Besides some of the feelings about and stigma associated with using technology, many students had strong feelings that technology could be a “distracting,” “pointless,” “waste of time” and that they had “better things to do” than spend their time using some technologies. Students were constantly assessing what was a good use of their time and what was not. For example, students talked about playing video games and appeared to be particularly concerned that they could be doing something better with their time. “I just find better things to do than play games online” (Sarah). It should be noted that students at Berkeley probably prioritize school very highly. Many students were quite content to cut a lot of communication technology out of their lives in favor of their studies, and their descriptions of making these choices revealed a lot about how they perceived the different mediums. Students seemed to have particularly negative feelings about instant messenger.

Students explicitly avoided technology that they thought might be distracting to their studies.

I think that's why I didn't want a laptop, because I feel like I would constantly be using it.... I see people use their laptops in classes. And all I see them do is IM their friends look at random sites while the lecture is happening. I understand that would be entertaining. I just think that it is distracting (James).

Some students found the internet, in general, to be distracting. Many students mentioned that when they were bored, they would spend time “looking stuff up” online. “I try not to [go online]. It's kind of distracting, you know. Even though I don't go online, even though I don't AIM, sometimes I'll be doing my homework and suddenly I remember something I want to look on google” (Sandra). Sandra disliked even thinking about things online that broke her focus on studying.

A few students who had use IM in high school no longer used it because they found it prevented them from doing their work. “I used it [instant messenger] back in high school but not any more because it's too distracting” (Betsy). Students avoided technology that they felt they would not be able to control themselves with.

I turn off all of it, because I find usually when I am logged on , I'd be like, okay, I have got five minutes to talk when I actually don't... You talk, 'Hey what's up? How was your day been? Good weather outside.' That kind of stuff. You are not really achieving anything momentous, at the same time you're wasting a lot of time (Raj).

It is pretty amazing that Raj describes five minutes of small talk as a “waste of time,” but it seems that he is frustrated about small talk. Not only does AIM feel like a waste of time for

some students, but the students don't feel in control of themselves when they are online.

You can lose track of time really easily on AIM and you feel like you wasted all the time where you could have been doing something else. So, I've converted to the email where I can do it at my preference and reply at my preference. So nowadays I'd say any given day less than 30 minutes [on AIM] (Joe).

Joe likes to be able to contact people at his leisure, and not to be beholden to other's desire to talk on AIM. It concerns him that he loses track of time so easily, so he limits his AIM time.

Many students turned off their phones or IM when they needed to be productive with school work. "I just don't like distractions from work because, then you feel obligated to speak to the person [on IM] it's as if someone calls you. I mean it's basically not turning off your cell phone when you don't want to be disturbed" (Amy). It seems that students feel that that cannot just ignore a technology because they feel socially obligated to respond to people who are contacting them, so they must completely shut it off. "[Wednesday] I have a chem lab report and Thursday I have a paper due. I shut up all my chat clients, I just need to finish because there is no room for anything" (Raj). Raj's use of the words "shut up" is interesting, it's as if the chat clients are talking to him out loud. Some students would block certain people on their IM clients, such that that person couldn't contact them when they are trying to be productive. "If you do need your time away then that's when blocking [buddies on AIM] comes into play" (Anita).

Others perceived Facebook to be a waste of their time. "I don't really need to check it [Facebook] every day or like update it all the time I just think they are wasting their time" (Sarah).

Students' conflicted feelings about being online frequently induced students to turn off technology. Some students had to turn off technologies because they found it addictive.

Addiction, addicted, addictive

Many students went beyond calling technologies "a waste of time" and "distracting," students often used a form of a strong word, "addict" again and again in interviews to describe their attitudes towards some technologies. We found this to be quite notable, and even a bit disturbing. This section is dedicated to understanding the meaning of the word "addict," as the students perceived it. From the analysis of the interviews, there were a few themes of addiction. One was a type of addiction to social contact with peers. Another type of addiction seemed to be an addiction to the challenge and goal-orientedness of games. While neither game playing nor intense social interaction are unusual phenomena, particularly for people who are 18, it is surprising that they characterized these actions with such a negative word.

Students used the word addiction frequently to describe their feelings about computer games. Some students described that the unbeatable aspect of video games made game so addictive.

Friends recommended it [Diablo II] and I played little bit then I kind of got addicted for a little while.... When you are playing online with other people, you can never really beat it because there's always people better than you and that became the point - to have the best character which is really impossible the way some people play. Some people play all the time and have a character that is just ridiculous (Luke).

Luke found Diablo II to be an extremely difficult challenge that at one point enticed him to play, but ultimately Luke found the unbeatable challenge discouraging. Sometimes students avoid certain video games, because they fear that they might get addicted to them based on observing

other's behavior, or their own. Sandra watched her older brother play RPGs, and saw how often he played, and noted her own behavior with instant messenger, and determined that she wanted to avoid RPGs. "I didn't want get sucked into that kind of stuff [RPGs]. I stuck with talking to friends online" (Sandra). Many times students avoid technologies based on interactions they have had with video games, where they might have felt "sucked in" by a game. "I can't start playing it [Nintendo] because one time on vacation our friends showed us how to play and we were addicted for the whole week so I don't want to start into this" (Cat).

Of course, students have varying levels of experience with games, and students have had different relationships with games. Kim is an extremely heavy gamer. Even at Berkeley she manages to play 10 hours of games a week. Kim describes the first game that got her "hooked" on gaming:

[Earth 2025] was the one that got me hooked... Three years.... I remember those years. That was hell. It was like another life. You had responsibilities – move your way up from the private up to general. It was so stressful for a little middle schooler.... you had to do stuff for alliances... sometime we were waging war.... When we had a war, that would be horrible because people would be in different time zones, I had to wake up at 4AM to go into battle. It was horrible. Whatever did I do that for? (Kim).

What is so painful about Kim's case is that the rhetoric of regret implies that it was more than just a bad decision that kept her playing games, there is an implication that she wasn't in control the entire time. Physical addiction is sometimes described using the same language Kim used. However, Kim was able to "get off" of Earth 2025. "I just stopped. 'We're done'... Between playing piano, a big part of my life I then, martial arts, school and I also had to have a social life and I had to play my other games too, I said, 'I can't do this any more'... And then the clan broke apart a little bit" (Kim). Kim found that other activities required her time, and she no longer wanted to spend that much time on video games. However, she struggles to make sure that she will not start "get hooked" on a game to her detriment.

I avoid those [RPGs] like the plague. I avoid Everquest, I avoided Final Fantasy 11. I am trying so hard to avoid world of warcraft. Everyone keeps telling me to buy it. No, I will not play it. Because I know that once I start playing one of those games I might as well drop out of Berkeley. I am not ever going to go to class or anything (Kim).

Other students weaned themselves off of games at the suggestion of their parents. Like Kim, it was also a value proposition about what would be the best use of their time.

I played computer games freshman year in high school.... My mother commented on my using it very often and I said to myself, 'I cannot possibly be using that much.' So, I timed myself for a week. I kind of did a little study on my habits and realized I was sinking a disgusting amount of time into that would be better spent doing more useful things and so after that I completed cut myself off from games and haven't really touched them since (Amy).

Some students' parents interfered more directly when it appeared that their children were addicted to games. "We had video games when I was younger and then my brothers were so addicted to it my mom sold it" (Eliza).

Some students seemed to find the social aspects of gaming addicting.

I started playing poker two months ago and I have become addicted and play every single day.... I have poker nights every week now. It's really bad. I just started playing online maybe two months ago. My boyfriend told me about it so I haven't

actually told many people - it's kind of been our thing (Eve).

Eve's addictive feelings are described as “bad.” In Eve's case, it is notable that while she says that she is addicted to the game poker, she also describes it as being “our thing” with her boyfriend. Eve also said that she talked on the phone with her boyfriend often. She said, “I am a very addictive person, so I can talk [on the phone] easily for hours” (Eve). Perhaps Eve is more addicted to social contact than they actual game of poker, per se.

Other students described AIM as being addictive because that is what they use to communicate with friends. “I find I'm of getting a little more and more addicted to it because I have a lot friends here that keep in touch with AIM” (Raj). As I described above, some students see AIM as being a distracting, waste of time. A few students found themselves “kind of addicted” to AIM, and become determined to stop using it. Sandra describes that once she set her mind on studying she was able to stop using AIM.

I told my group that I should be on AIM less because, we [were] seniors, they [friends in college] were telling me, 'When I stop using AIM, my GPA jumped one whole point.' And I thought, 'Oh my Gosh, I need to stop using AIM.' I knew it wasn't very likely because I was kind of addicted to it [AIM]. But then, just by setting my mind on studying instead I just didn't bother with it anymore (Sandra).

It is interesting that Sandra had to notify her group of friends that she would no longer be online, but that she thought it was unlikely she could achieve censoring her AIM use. It seems that Sandra had to set her mind more on her studies (and perhaps away from social relationships) in order to separate herself from AIM.

The same way that Sandra consciously tried to avoid IM, some students try to avoid blogs, “If I joined myspace I get sucked into that like just like when I was first on Facebook” (Jenny). Many students describe Facebook and blogs as being similarly addictive because you are always wondering what it going on with people, and able to check it. However, finding out information about people through blogs made Sandra very uncomfortable.

I like to play a little game [on Facebook], 'I wonder what changed?'... I look up this guy and, he writes that he is interested in men. I thought, 'What? Something I never learned about you [in high school].’... I find this stuff out through Facebook instead of talking in person, I feel bad about it 'cause feels like I am slipping back into the Xanga phase... I guess this kind of the same addiction that people get to Xanga (Sandra).

It is notable that Sandra referred to a “game” on Facebook. Perhaps because there is a game aspect to Facebook for people, they find it addicting. Raj also talked about game aspects to Facebook.

It [Facebook] is more just an attempt to pass the time. It's a very addictive thing to pass the time. I see people including myself I log onto Facebook maybe everyday.... My girlfriend and I have a rivalry to see how many friends that we have.... She is at 170 and I have 140, so I try to build that up (Raj).

Raj saw collecting as many friends for his Facebook account as a goal – he almost sounded like he was playing an RPG game trying to build up his character. Many other people find Facebook addicting because they like seeing if anyone has communicated with them.

I think Facebook is really addicting... As soon as I am done checking my emails then I go on Facebook. Just to see if there any message or any friend confirmation or whatever or if the people that had asked to add me, added me or looking through people's profiles (Jenny).

Almost half of the students we interviewed described technologies as addicting or themselves as addicted. We believe that this indicates that their relationship with technology is sometimes conflicted. Students are trying to use the technologies for their benefits without letting the technologies take over their lives.

Conclusion

This paper outlined two of the major themes that we saw in our research, namely, the adoption of technology and how students negotiate the role of technology in their lives. This multi-method approach served us very well in that it pointed out trends through surveys, but through the interviews we came to understand students' use of technology in great depth. We looked primarily at communication technologies. This document focused on the computer connected to the internet, and the applications that students used on the computer: chat rooms, email, instant messenger, blogs and facebook. We also discussed the mobile phone and text messaging on the mobile phone.

We looked at adoption as a function of cost in families and found that contrary to most expectations, students' access to computers and the internet was not strongly correlated with their parent's household income. Parents of students that came from lower income families held beliefs that it was important for students to have access to computers and the internet, despite the costs. Furthermore, in lower income households, the students were often the primary motivation for families to acquire computers, while in higher income households, the parents often purchased computers because they needed computers for work.

Next, we explored motivations for technology adoption. We found that many students went into chat rooms when they initially went online. In some sense, the chat rooms were a "gateway technology" such that the chat rooms gave students a social network online to communicate with. However, the chat rooms did not serve the students goals, as many of them went on to use instant messenger, such that they only communicated with known parties, like friends.

We distinguished between adoption of technology, and adoption of technology practices. Adoption of technology refers to how students find out about and acquire a technology. For example, many students found out about instant messenger from their friends. Technology practices refers to the fact that students adopt particular uses for technologies. For example, many students used AIM lingo because it was considered "cool" and made them part of a their social group who had the same practices.

The adoption of a technology is not necessarily the most important aspect of technology adoption. Students must also find a group of people who value similar technology practices. While students might have adopted technologies because of mandates, without a technology practice that they found valuable, the students did not see much purpose of having a technology. For example, many students adopted email at an early age, but it wasn't until they came to college and they started using it for classes and clubs that they found it useful. Additionally, while many students joined blogs or Facebook out of social pressure, they may not have found a valued technology practice will entice them to continue using the technologies.

Next, we talked about patterns of adoption, in other words, what were student's roles in the diffusion of technologies? We found that students learned about technology from people in their social network and they frequently passed that information to people in a different part of their social network. Students' technology adoption decisions were primarily influenced by someone in their social network who they considered a "technology person." We are calling these technology people "techne-mentors." Techne-mentors are a fluid role that depends on the social context. For example, in the context of a student's family, they might rely on a sibling as a techne-mentor. However, in their peer network, they might be a techne-mentor to their friends, as a result of learning from their siblings.

Next, we outlined some of the ways in which students are trying to negotiate the role of technologies in their lives. There is a stigma associated with being "always on." On one hand students described technologies as being "addictive," but on the other hand, students find that some technologies can be "distracting" and a "waste of time." Students feel conflicted about technology and often turn it off, and leave it behind.

Students adopted communication and information technologies for primarily social reasons from people in their social network. However, students sometimes feel uncomfortable about the role of technology in their lives.

Future work

These are ideas for future work.

- I believe that in my discussion of adoption of technology and adoption of technology practices, I might have treated adoption as a binary choice – one adopts a technology or not. Clearly technology adoption is far more nuanced than this, and in the future I would like to do more to use Rogers' ideas about the adoption process, to analyze students adoption of technology.
- This paper should be framed within other research about how kids use technology. There have been a host of relevant reports that have come out in the last few months, and many of them from Britain. It might be interesting to compare some of my findings with the work being done by the British. This should help to highlight the importance of cultural and institutional contexts to the adoption of technology.
- Additionally, I would like to complete this study several times over the next couple of years in order to observe what technologies have enduring social values for the students. I think that it will also help us determine if there are social uses of technologies that are important at certain ages. For example, most students in this study adopted instant messenger in Junior High, when the technology became widely available. I am curious whether students who were 8 at the time instant messenger came out, adopted it when they were 8, or if they will adopt it in junior high, because there is something about social development in junior high that entices people to adopt instant messenger.
- Video games was a topic that came up a few times with heavy gamers, and it came up quite a bit when students were discussing their more conflicted feelings about technology. We didn't explore video games in this study to the degree that I would have liked. We talked about video games in a few of the interviews, with heavier gamers, but because the length of the interviews, we did not give the role of video games in students lives the attention that it deserves.

- I would also like to examine in more detail the social network that students have around file sharing. However, because of the tense legal environment with topics related to copyright infringement, I am not sure how this work could be done legally and ethically.
- The data set that this research is based on is a somewhat unique group of people – they are young, and presumably, as students at Berkeley, of above-average intelligence. I would like to repeat this study with students at community colleges in order to see if the role of techne-mentor exists in these students' lives. Additionally, I wonder if the role of techne-mentor is exclusive to a younger population of people who do not yet have large weak-tie networks, and are just now becoming part of the grown-up mass media world. I also want to understand if these students were raised in households with the same emphasis on technology, and whether students have similar feelings about technology.
- There is a question in my mind as to whether this model of the techne-mentor represents an alternate model to Rogers, or whether it further explains Rogers' model in a smaller scale. I would like to go into a community and see if I can identify the opinion leader as Rogers describes, and see whether the opinion leader then acts as a techne-mentor to others. My qualm with this idea is that the opinion leader obviously learns about a technology from someone else, and thus suggests that the idea of opinion leader is also fluid. Perhaps then, opinion leaders are just techne-mentors that influence larger groups of people.
- I would also like to further explore how the fact that we were studying communication technologies impacted our findings. For example, if a student uses a communication technology such as instant messenger, it is in their interest to help their peers with whom they wish to communicate, to get on instant messenger. One can imagine that if a student adopted a digital camera, there would not be as much of an incentive for them to entice other students to adopt a digital camera, because having another student with a digital camera doesn't significantly impact the first student's use of their camera. Perhaps the techne-mentor is an idea that is most useful for explaining technology diffusion and adoption of communication technologies.

Appendix A: Adoption as a function of cost? Mobile Phones

Many students from higher income families saw their parents, specifically fathers, have mobile phones for work before they thought about owning one. Several students laughed recalling their fathers with the large bag phones. Based on our data, we determined that students got mobile phones at the same rate regardless of economic status. Interestingly, according to the data that we have, income was not very predictive of who adopted phones within the age ranges we looked at. We suspect that many parents felt that the phone was either a necessity for their children's safety, which overrode the cost of the phone. Or parents, regardless of income level, determined that it was the financial responsibility of their children. Students reacted with mixed feelings. Some were more than willing to pay for the service on their own, others deemed it a necessity that they supported.

Some students that we spoke to said that their parents wouldn't pay for a mobile phone because they could not afford it. Kim recounted that many of her friends didn't have phones because they had just moved to the US and couldn't afford new phones.

I guess you would call them FOBS (ed: fresh off the boat). They were new to the country so they didn't have money for a cell phone.... One of them just got a cell phone recently. The called me like, 'Oh my God, I finally got a got a cell phone.' And I said, 'Congratulation, you are like a generation late' (Kim).

Eliza described the first people who got cell phones in her school, "It was probably the people with money because it [mobile phones] started off really expensive" (Eliza).

Sometimes parents refusal to pay for a mobile phone was related to social beliefs, as well as costs. Jenny's parent's wouldn't let her have a cell phone for a variety of reasons including that they thought that it was a waste of time. Another reason for their anti-cell phone stance was they thought the cell phone was not worth the money students spent on it. "They think it's really annoying how people are constantly on the cell phone and they've lectured me on... how most conversations are just appointment conversations and it is a wastage of money" (Jenny). Despite her parents feelings about mobile phones, Jenny saved money for her own mobile phone: "Why did I get my cell phone? I just had like money saved up for something and I figured that I should just invest in something. It was a fun thing that it was just cool. ... my friends thought it was pretty cool that they could find where I was at all hours" (Jenny).

Many students who had to pay for their own phones had jobs to support this. Interestingly, some parents bought their children cell phones when they went to school as a cost savings device, "I first got a mobile phone, because going way to college and therefore you don't have long distance costs and also my parents have the same carrier, so we call free and also it is convenient" (Sarah).

Despite the fact that mobile phones were fairly pervasive for students, even in high school, some students thought that the cost of a mobile phone justified the expense, while others didn't.

My mom was always against cell phones, and I had to pay my own cell phone bill.... And all my friends were looking at me like, 'Ben, you're like the technology guy, why don't you have a cell phone.' I'm like, 'my mom's not paying for it and you just gonna have to call me at home'... And then I finally got one, and I don't know I was cheap and was going to the free, old phone (Ben).

Eve was another student who couldn't justify the cost of the cell phone herself, and developed a

philosophical mantra to justify not having the phone. "I was the only one who didn't have a phone and I created this whole, 'I'm anti cell phone' thing... Really it was just because I didn't wanna start paying \$50 a month" (Eve). One student we spoke with even said that he had a cell phone, but stopped the service because the expense was not worthwhile. "Yeah, I had one [cell phone] for a couple of years, just I gave it up when I came to Berkeley. I figured... I don't know as I guess I wouldn't need it. And it was kind of like an unnecessary expense. But I'm probably going to get another one" (Luke). Luke was particularly unusual, and used calling card to make calls. Another student, Eliza had a mobile phone from her mom, but she gave her mobile phone to her little brother who is still in high school. "I figured once I got a job I would get it. But I kept putting it off and I don't want to spend the money... when I explain it to other students they usually understand because their parents pay for theirs" (Eliza).. Eliza also commented that "besides my mom would probably call me on it all the time."

The use of text messaging seems to be a direct function of the cost structure of American calling plans, and the length of time it takes to text message. Text messaging is sometimes used less frequently, or stopped all together because students find it too expensive. "Last year, I did [text messaging] a little too much, all my paychecks were going towards texting. It's fun, you know it's just like, your classmates can talk to if they like, 'Hey what are you doing, I am bored,' probably I'd say after that, 'Yeah, I am bored too'" (Kim). Many students had the unpleasant experience of getting a bill that was too expensive because of their texting. Jenny curtailed her texting habit mainly because of she went over her limit one month. "One month I went over my text limit, and so I stopped... I had seen my bill and I was a poor high school student... and my parents got mad at me, so I stopped" (Jenny). Angus said that text messaging was not worth the cost. "I text messaged once or twice but it wasn't really worth it. Like it took too long, and you had to pay for it" (Angus).

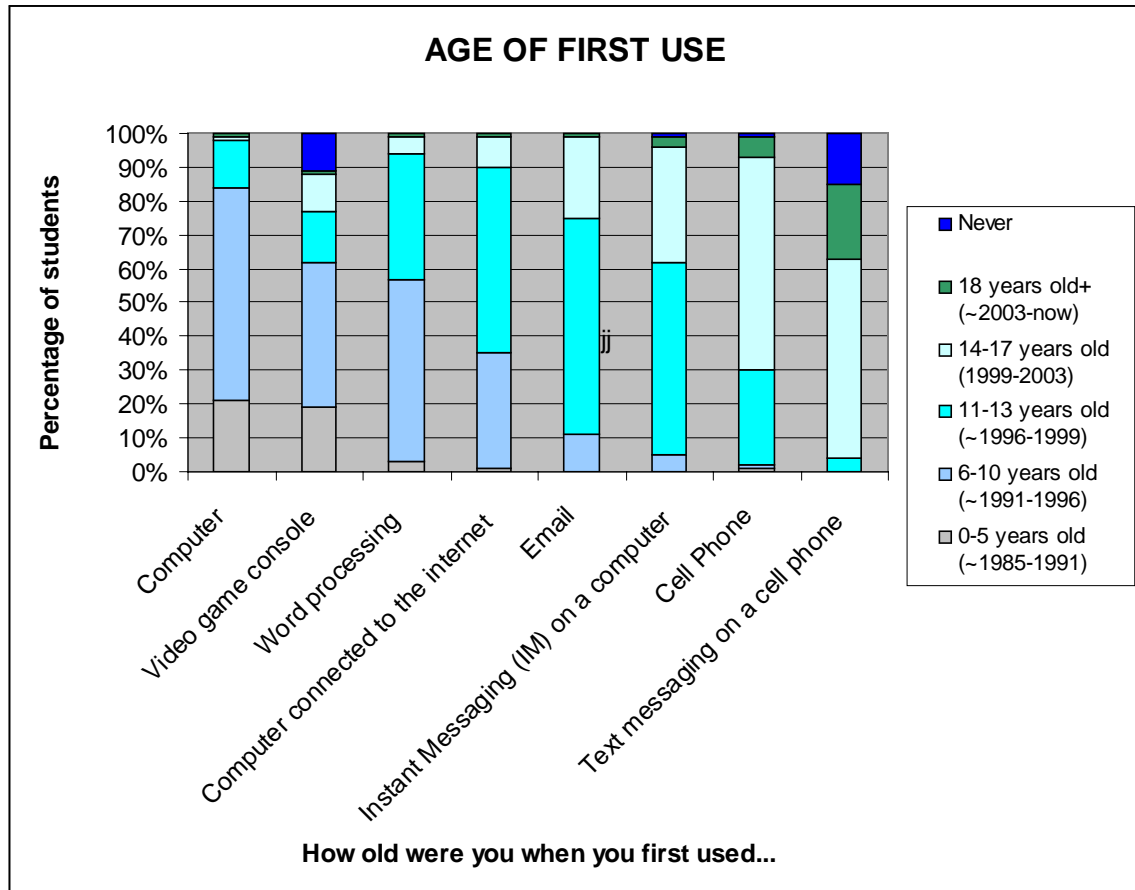
Raj went to high school in New Zealand and compared the differences in the pricing plans in the US and New Zealand and how that influence his text messaging habits.

In New Zealand, everyone texts, no one calls... But here in the U.S I very rarely text. Just because everyone here has a calling plan. So because everyone here has a calling plan, you are using like, you are paying for minutes, right...So why pay extra like an additional 20 cents when you can call.... So in that respect like I don't even, I have no use for like text messaging (Raj).

The cost structure in New Zealand made calling prohibitively expensive, while the cost of text messaging in the US makes texting an unappealing communication choice.

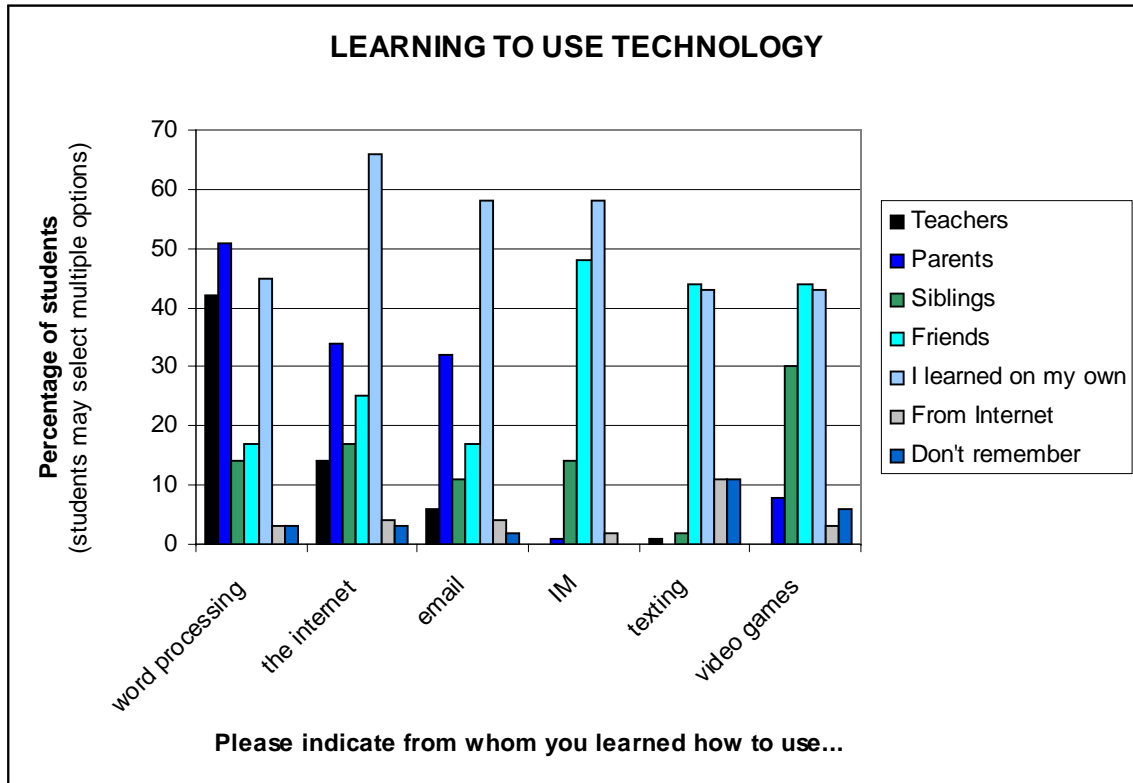
Appendix B: Survey data on age of first use

Below is a graph that describes the age that students born in 1985 and 1986 (N=158) first used several technologies. The technologies along the bottom axis are roughly in the order that most students seemed to first use the technologies.



Appendix C: Suvey data on who taught students technologies

The chart below shows from whom students born in 1985 and 1986 (N=158) learned how to use several technologies. Students were allowed to select as many options as they needed to. What is particularly notable about this graph is the technologies in Appendix B that the students used at a younger age (such as word processing, a computer connected to the internet and email) they learned how to use from parents and teachers. The technologies that students started using later (such as IM and text messaging), they learned how to use from their friends.



Appendix D: The survey