BuddySync: Thinking Beyond Cell Phones to Create A Third-Generation Wireless Application for U.S. Teenagers

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Why have US teens been slower to adopt cell phones than their European and Japanese peers? We explore both larger, macro issues that structure the choices available to US youths, as well as the beliefs, values, and norms that shape their culture of interaction. While we recognize that structural and cultural factors are intertwined, we argue that the media has tended to portray cultural factors as byproducts of economic and infrastructural conditions. An example of this is the argument that US teens used to prefer pagers because cell phones were too expensive. Such arguments did not consider the value of pagers in satisfying teen desires to be connected but also limit accessibility. What we will demonstrate through this chapter is that there are deeper values that guide teen wireless use, and that these need to be uncovered if appropriate solutions are to be reached.

In part one of this chapter, we examine the structural factors that have affected US teen adoption of cell phones. In particular, we look at issues regarding network compatibility and pricing, which have influenced the way US teens perceive the value and accessibility of cell phones and specific services, such as mobile messaging. While these factors have to a large extent affected US teen conceptions of mobile communication, we also explore how these structural issues are being addressed by US companies, who seek to create some of the macro-conditions that have made cell phone use so common among Japanese and European teens.

In part two, we turn to a deeper examination of the cultural issues that affect the mobile communication habits and desires of US teens. Here, we draw upon ethnographic research that the authors conducted with Ericsson Cyberlab in Singapore. The project, called BuddySync, sought to uncover the cultural issues regarding wireless adoption among U.S. teens. While the study was not specifically about cell phone use, the findings suggested solutions that were uniquely different from the prevalent professional cell phone paradigm. In fact, the teenagers expressed particular communication and connection values that their cell phones and pagers could only partially fulfill. Several key themes emerged that characterize their culture of interaction. First, participants expressed that the benefits of wireless devices was primarily for privacy and not for mobility (the traditional design rationale behind mobile phones). In fact, most respondents imagined themselves using their devices at home, in their own rooms. Second, US teens have, until recently, viewed cell phones as professional tools. Third, desktop Internet access continues to affect how US teens view messaging. Fourth, interacting within groups was the predominant form of communication for most teens. While the phone was preferred for its speed and instant connections, it was cumbersome for groups because one has to connect individual by individual. E-mailing groups was considered too slow and lacking in immediate feedback. Fifth, the teens expressed that cell phones represented being controlled (e.g. by parents, boss) or being on duty. They wanted a means to be able to control who contacted them at certain times, without having to turn the device off. Sixth, the teens consciously and dramatically vary their communication styles depending on the recipient and social context of their communication. For some groups they preferred phone calling, whereas for others, short messaging.

In part three, we explore the design of the BuddySync mobile communication concept. The BuddySync research suggests that existing mobile communication products and interfaces do
not adequately support the social interaction and communication behaviors of U.S. teens. Rather, an alternative approach to the current mobile phone model, which was originally targeted at business professionals, is needed. We explore the research and resulting design for BuddySync, a project to create a new interactive experience based on the way teens see the world around them. Rather than reflect office software metaphors such as documents, folders, and tasks, BuddySync’s organization is people and group-centric. At the core is a teen’s closest friends, represented on the main screen so that teens can quickly update and show each other their moods and contact preferences (e.g. phone, note, all, or keep out). Such a design allows teens the balance between control and expression that characterize their concerns about communication.

Regarding types of communication, this paper explores the significance of scribbled notes and shared notes as an alternative to standard SMS. Buddies can talk or, when they need more privacy, exchange short handwritten notes or scribble notes together in a shared space and in real time. They can distribute handwritten notes to pre-defined groups (e.g. Skaters or Cheerleaders), keep in touch with acquaintances, and speed dial parents for brief, but necessary check-ins.

PART ONE: STRUCTURAL FACTORS AFFECTING US TEEN ADOPTION OF MOBILE COMMUNICATION DEVICES

According to Teenage Research Unlimited, a Chicago based teen market research firm, there are about 31 million young people between the ages of 12 and 19 in United States. By 2010, that number is expected to jump to 34 million. Known as Generation Y, it’s a huge demographic group that some says rivals the "Baby Boomers". In addition, marketers have also noted the expansion of so-called "tweens" in recent years. Tweens are defined as children aged 8-14. There are now 27 million of them in the U.S., the largest number in this age group in two decades. They are highly impressionable consumers, who believe that having the right "stuff" is the quickest route to acceptance (Kantrowitz and Wingert 1999: 64).

Teen Americans are an attractive target segment because they have grown up using computers and other technologies, and have come of age in prosperous 1990’s. Thus, they tend to have more disposable income than past generations. In addition to working part time jobs, younger and younger kids are getting paid for preparing meals, cleaning the house, mowing the lawn, baby sitting, and helping their parents out with computer work.

Given the attractiveness of this market, analysts have looked to the rest of the world in pondering the potential for an explosion of cell phone use among U.S. teens. In both Europe and Japan, teens lead the rest of the population in cell phone use. Overall subscriber penetration in Germany is 29 percent, while penetration among teens is 40%. Wireless carriers in Finland claim that almost 90 percent of children between the ages of 13 and 18 own cellular phones. In Japan, NTT DoCoMo says that over 70 percent of its i-mode revenues are received from users in their teens and early 20s. According to the Japanese Management and Coordination Agency, 59 percent of Japanese high-school juniors have cell phones and spend up to $175 a month for service. According to the agency, two-thirds of Japanese teens who don’t already own a mobile phone say they want one (Bruzzese 2001)

In the U.S., by comparison, only 25% of those aged 10-19 use a cell phone. The question is, why have US teens—generally considered to be trendsetters—been slower to adopt cell phones than their peers abroad? Companies are asking how they can successfully tune into the teen market, as Nokia and NTTDoCoMo have done in Europe and Asia, particularly as market research firms predict that by 2005, two-thirds of US teens will be wireless (Bruzzese 2001).

This section explores two main macro-factors that have affected teen perceptions of cell phones in the US: infrastructure and pricing.

Infrastructure
The foremost issue to consider in the development of the wireless market for teens is the lack of interoperability between the various service standards in the US. There are three main operating systems in the US: GSM, TDMA, and CDMA. This entails a more time-consuming
development for providers, who must tailor their delivery methods to each carrier’s standards. Because the mobile phone industry has concentrated on selling phones to high level professionals, coverage outside main cities is patchy. Furthermore, a variety of regional semi-monopolies exist in the US, preventing the pricing wars that have brought cheap mobiles to the British, for example.

In Europe and Japan, GSM has become the dominant standard, and where services can be used more consistently across standards. Analysts argue that mobile messaging services will not grow as quickly in the US as SMS (Short Messaging Service) has in Europe and Japan, mainly because the mobile messaging standard has not been defined in the US as it has been elsewhere. In Europe, SMS is part of the GSM standard. Thus, all subscribers to GSM services automatically receive SMS offerings, not as an expensive option, but as an inexpensive bonus service to voice calling.

In terms of Japan’s “always on” I-mode services, users are billed by the amount of data they send, and not by amount of time they are connected to the service. Subscribers pay in order to send SMS, download cartoons, ringtones, and other forms of entertainment onto their cell phones—each usually just a few cents. As teenagers spend hours engaging in such practices, the carriers, portals, application service providers (ASPs), and content providers all make money. In Europe, as well as in Japan, customers pay high per-minute rates for wireless calls, and thus SMS is considered a cheaper way to communicate.

In contrast, the U.S. wireless market consists of a series of networks that are based on varying technologies. While the uniform standards in Europe and Japan allow SMS users to send messages to people who have wireless service through any wireless carrier, in the United States, mobile users can send text messages only to people who have service through compatible carriers. Furthermore, in the U.S. less than 15 percent of wireless handsets are SMS-capable, compared to the U.K. where almost all phones can handle SMS.

In addition, the cost of making a wireless call in the US is usually less expensive than mobile messaging. While their European and Japanese teen peers see it as a cheaper way of keeping in touch than via mobile voice, US teens have, in addition to voice calling, had other wireless messaging alternatives to SMS. These include PC email, email on PDAs, and two-way paging devices. Because of its relatively higher price, the lack of a standard across all carriers, and the availability of other text-based options, mobile messaging, such as SMS, is not considered a standard among US teens, but is seen as an extra service.

Nonetheless, US carriers have focused more effort within the last year to develop interest in mobile messaging among two distinct demographics—teens and road warriors. Despite the slow uptake in terms of teen interest, analysts are optimistic about what they see as a latent demand for mobile messaging. AT&T Wireless, which launched its SMS offering in late October 2000, counted 700,000 SMS subscribers in the first 10 weeks that the service was available. Currently, about 1 million mobile-originated SMS messages are sent per day on just the AT&T Wireless network (reference). SMS usage rose from 8% to 12% among Internet-enabled phone users. The numbers of those who “intend-to-use” SMS in the future look even brighter, with an additional 30% of Internet-enabled phone owners in the U.S. saying they are likely to use this method of communication (Hartner 2001)).

Indeed, the numbers of messaging-compatible phones being sold in the U.S. is rising significantly. Carriers are starting to allocate more advertising dollars to mobile messaging - money that in the past was reserved for pushing their wireless Internet offerings. In addition, wireless carriers are purchasing more SMS-capable phones than ever before to distribute to their customers. "By the end of the year, every new phone that we sell in our stores will be two-way-messaging [SMS]-compatible," says Janna Ducich, AT&T Wireless's senior product marketing manager for SMS.

Analysts hope that increased mobile messaging usage will lure people into using their mobiles more, and for non-voice communication purposes. As email eased people into computer use, SMS may create the incentives for people to become more comfortable with using their
mobiles in new and creative ways.

**Pricing Structures**

The economic issues shaping wireless usage among teens abroad have been very different from those shaping the US, as mobile phone device and services prices had, until recently deterred US teens from embracing cell phone mania. In the US, having multiple landlines in the home is a common and relatively inexpensive option. It is not uncommon for US teens to have a private line in their room, or for their homes to have a second line somewhere. Mobile devices were simply not "must haves" for American teens as they are for their Asian and European peers.

In Europe, the price of landline services is not significantly cheaper than wireless services, making wireless more of a viable landline replacement than it is in the US. In Japan, landlines are significantly more expensive than mobile plans, and in developing countries such as China, the wait to get one turned on may be months. As was explored in the previous section, SMS is considered a cheaper alternative to mobile voice calling in both Europe and Japan.

The adoption of cell phones among teens in Europe and Asia has, to a certain extent, been driven by the prepaid pricing model. Within this model, wireless companies have created prepaid programs, allowing users to buy blocks of call time in advance. Thus, there are no monthly bills, no contracts, and no credit requirements. However, the adoption of pre-paid plans has been slow in the US, due to the convention of buying airtime on credit. Wireless companies have also, in the past, avoided aggressively promoting prepaid options. Prepaid customers tend to draw lower revenue and have higher turnover than regular wireless users.

Nonetheless, analysts believe that teen-agers and young adults are an untapped market for prepaid cellular service in the US—as they have been in Europe and Japan. Because they don't have credit, teen-agers need a parent to sign up for wireless service today. With prepaid products, they can buy a phone on their own and refill minutes as they're used.

In October, Sprint PCS said it would form a joint venture with the Virgin Group to target 15- to 30-year-old users for prepaid wireless services. Other carriers have already jumped into the market with new packages. Last year AT&T Wireless launched its Free2Go product, a stand-alone starter kit for under $100 with a new phone and prepaid cards. In August, Verizon Wireless began its FreeUp program, specifically targeting the youth market (Reddy 2001).

If US teens are buying prepaid phones, they will, like their European and Japanese counterparts, need places to refill minutes. In Europe, for example, teens can go to places such as cafes, bookstores, and vending machines to replenish. US carriers have begun to sell prepaid products at gas stations and convenience stores, such as 7-Eleven. With increased marketing of prepaid programs, the number of prepaid users should grow to about 25 percent of the wireless market by 2005, said Entner of the Yankee Group. Estimates today put the number at 10 percent to 15 percent (Reddy 2001).

Airtime pricing models in the United States have tended to be on the model of large buckets of minutes for one monthly rate. This may be too expensive for teens to pay on their own. Parents are increasingly opting for family plans—minutes that are shared between family members when talking to each other. However, US teens do not want to spend the majority of their phone time with family members. Thus while the family packages have been appealing for parents, they have not created more excitement among teens to use mobile phones. Some analysts argue that wireless companies should focus on developing opportunities for people to use their phones to make micro-payments--$1 for a ringtone, or a Coke. The current focus, on spending more money to buy a book or a concert ticket, has not excited the teen market. Here, they point to lessons learned in Japan, where teens spend hours downloading ringtones and cartoons for a mere few cents each. Yet these activities have added up, as downloading new applications for their phones has become a national pastime in Japan. These micro-payments may allow US users to become more comfortable in using their cell phones as electronic wallets.
PART TWO: THE CULTURE OF US TEEN MOBILE COMMUNICATION

At the end of 2001, however, analysts concede that American companies are not yet entirely sure of what will boost cell phone use figures in the U.S. to the highs in Europe and Japan. While market researchers keep emphasizing how "hot" the US teen market is for wireless products and services, research has indicated that American teens are nonetheless critical of the growth of wireless. As we explored in this section, some of that skepticism is the byproduct of macro factors, such as the lack of a network standard in the US, and the business models that continue to drive pricing plans and device designs. Beyond these structural limitations, are there unique ways in which US teens communicate in mobile contexts that should inform how wireless products are developed?

In this section, we move beyond structural analyses and look to the teenagers themselves, in order to understand their culture of mobile communication. We draw on the ethnographic research findings from the BuddySync project, which was conducted between 1999 and 2001 by the authors and Ericsson Cyberlab in Singapore. The research goal of this project was to explore the culture of young, mobile, independent, and socially active U.S. teenagers. A team of interaction designers and anthropologists conducted ethnographic research to define the characteristics of how teenagers ‘communicate with one another and to uncover their preconceptions of existing wireless communication devices. Additional research conducted throughout the program included one-on-one interviews to gain more detailed insights into teenagers’ communication habits, evaluations of "Wizard of Oz" demos, and the use of construction sets for determining preferred hardware configurations and trade-offs. In total, 30 different teenagers from the San Francisco Bay Area were included in 200 hours of research. The respondents were 14 to 19 years old, both boys and girls, experienced using a variety of pagers and cell phones, from urban and suburban environments, and varied in their use of private and public transportation.

Research by the authors and Ericsson Cyberlab Singapore suggests that existing mobile communication products and interfaces do not adequately support the social interaction and communication behaviors of U.S. teens. Rather, an alternative approach to the current mobile phone model, which was originally targeted at business professionals, is needed. This section will explore the following findings:

- Privacy more salient than mobility for US teens
- PC Internet vs. mobile Internet models
- Cell phones have been perceived as primarily for professionals
- Group communication
- Control over communication
- Different types of communication with different groups of people

Privacy vs. mobility
The majority of the research participants stated that the benefits of a wireless communication device (phone or pager) was primarily for privacy and not for mobility (the traditional design rationale behind mobile phones). One typical response to the concept demonstrates this strong desire for privacy. "When I am home I have to share my computer, but this [a mobile device] is something that could be mine." In addition, many of the respondents’ parents restrict use of the shared family telephone or create uncomfortable situations by answering teenagers’ calls. It was common for friends to page one another even when they knew both parties were home. This allowed them to alert one another privately and to answer the telephone before their parents.

While privacy was very important, the respondent teenagers felt mobility was less important. These teenagers tended to have very set schedules that involved moving quickly from one place to another. The scheduling of the educational system is a major factor. In the US, teens attend school generally from 8 a.m. to 3 p.m. In Asian countries such as Japan, Taiwan, and Hong Kong, however, high school kids commonly take after-school cram courses to prepare them for college. They thus are away from home for longer periods of time than their US
peers, and have less leisure time. These two factors have led to a high rate of mobile phone use to facilitate entertainment and communication while mobile.

An analysis of possible use scenarios created by the respondents indicated that they were not frequently mobile. Most of the scenarios involved the use of the device in their own rooms at home, talking to friends who were probably in their own rooms. And, although they did want to carry the device with them in their backpacks, few of the use scenarios include using the device while in transit.

**PC Internet vs. Mobile Internet Models**

The BuddySync research findings strongly indicated that American teens are, to a greater degree than their European and Japanese counterparts, accustomed to accessing the Internet over PC's. Their model for Internet accessed information is highly visual and content rich. US teens tend to see wireless web access as an inferior version of their dominant, PC-based model of information access and messaging. Furthermore, in having an Internet centric model, US users in general are used to retrieving material from an intermediary, such as Yahoo. They expect wireless data to be similarly trans-coded from the web, which is much more inefficient than a pure mobile experience. In contrast, for Japanese teens, I-mode is their primary way of interacting with the Internet, and thus their expectations of what should be available wireless are different.

Differences in the PC Internet vs. mobile Internet models also explain the slower adoption rate for mobile messaging among US teens. In the US, messaging was first introduced through conventional desktop computing. The AOL model of e-mailing and instant messaging has largely defined teen expectations regarding text communication. During our first round of BuddySync interviews, we found that teens automatically compared wireless messaging with what they could do on AOL. US companies try to develop mobile messaging based on this model. Japanese consumers would rather send messages via their compact, fashionable cell phones than via desktop PCs.

Language is also an important variable in assessing wireless communication adoption. A single Japanese character can express a complete concept, making it more efficient on a small screen. US teens may struggle with inputting longer messages, or will, as they have done with pagers, develop an abbreviated language unique to SMS. Having to type in extraneous letters or numbers on the handset may deter users.

The BuddySync research suggested, however, that teens may not necessarily be averse to more complex text inputting. They do not have the same time and concentration constraints that structure professional use models. Our research suggests that being "experts" in inputting text with their thumbs may be a form of prestige building or status, showing that one has mastered a particularly difficult activity.

**Professional vs. teen-oriented image**

In the US, cellular service and mobile phones have largely been viewed as costly and primarily for wealthy individuals and business travelers. Wireless analysts commonly argue that US companies need to shift their focus from older, time-constrained, largely utilitarian mobile users to younger ones who are more open to experimentation.

Teens have, until recently, perceived mobiles as tools for senior businesspeople, and not fashion items. This is due to how mobiles have been marketed—black bricks devoid of customization. The teens that we interviewed in 1999, during the first research phase, commonly said that cell phones reminded them of their parents. This held negative connotations, in that their parents were busy people and often "controlled" by their bosses or coworkers through the cell phones.

The BuddySync interviews we conducted in 2000 revealed that the association between cell phones and working parents had already become less pronounced. While they still associated cell phones with professional parents, teens were to a greater extent using mobile handsets themselves, and perceiving them as important if not indispensable devices in their daily lives.

As symbols of status or identity in general, cell phones can play critical roles in teens’ quest for acceptance, which becomes especially intense in early adolescence as teens become very self
centered and spend a lot of time thinking about what others think of them. Dressing a certain way is both a sign of uniqueness as well as a way of defining membership in a group. What defines "teen" culture is, however, more complex in the US than in smaller European countries and in Japan, due to the more varied demographics. Styles range from the all-American/Tommy Hilfiger to hip-hop to extreme-sports to alternative styles. There is no one dominant teen style with which wireless companies can capture the entire market.

The first successful attempts to appeal directly to US teen tastes and desires have largely been in the realm of hardware. Nokia, in particular, has been immensely successful by letting fashion-conscious teens create custom faceplates for its 5100 series phones. The BuddySync research strongly confirmed, however, that such relatively superficial appearance changes are only the beginning of the process of developing from a professional centric to a teen-centric perspective. Teens were not only interested in what their wireless devices looked like, but more importantly, were concerned about how these devices could enrich their lives. Thus, the ‘cool’ factor wasn’t just about physical styles, but also about the activities that the devices allowed them to engage in. Companies have begun to think beyond exteriors, however, and are developing applications that are teen-specific as well.

There were few teen-specific service and application options available when we were conducting the BuddySync research. Since then, companies have announced several teen-targeted initiatives. Sprint PCS announced the addition of Connexus’ *CD service, which lets kids purchase music they hear on the radio using their cell phones; allowance-based gaming and instant-messaging (IM) services; and a partnership with teen-content provider Katrillion. AT&T Wireless has also partnered with Katrillion and has added Surf Lounge -- more than 60 youth-focused Web sites from MTV.com, Britannica.com, Sweet16.com, and others -- to its Digital PocketNet service. Motorola has backed Talking Drum’s Kode phone, which offers voice recognition for calling up buddy lists and phone numbers. Samsung's Uproar cell phone can also be used as an MP3 player.

In June, 2001, Cingular Wireless became the first U.S. carrier to offer customized ringtones for Nokia and Motorola phones and in July, AT&T Wireless began offering a catalog of 500 tones through a partnership with Sonera Zed. In both Europe and Japan, cell phone users commonly assign different ringtones to different callers, creating an auditory caller ID system. But ringtones serve more than a pragmatic use—they have become a cultural fad, most popular with the 14-26 year old crowd. Ringtones have become a way for teens to express their individuality, or their association with particular musical styles or bands. For both Cingular and AT&T, subscribers can typically order ringtones from the carrier’s Web site for about a dollar a piece, and have them delivered via text messaging. Both carriers offer a variety of tunes from movie and cartoon themes to jazz and alternative rock. But the majority of both carriers' offerings are pop music hits from the 1980s and '90s. U.S. ringtone providers face a more challenging environment than their European counterparts, however. It is difficult to persuade publishing companies to release song rights in the US. Also, it is still unclear as to whether US customers will flock to ringtones, as their European and Japanese counterparts have done.

The majority of efforts have been in pushing superficial appearance changes or specific applications, like SMS or ringtone customization, which have been successful among teens overseas. Beyond these, there are also efforts to create unique, integrated device and application concepts that are teen-specific. Gitwit has developed a teen-focused, proprietary handset with a unique curved shape. The device includes a "smart skin," similar in technology to the chip in a smart card. The chip automatically draws related content from Web sites over the carrier's network, such as games, ringtones, or voicemail announcements in a celebrity's voice. The skin itself can carry logos, graphics, and photos, letting teens instantly identify the outside of their phones. Both the content and the look can say, "I'm a Britney Spears fan," or "I'm a skater." Thus, the chip changes the phone's content setup as well as appearance, to suit the personal tastes of the teen. When the user tires of one style, he/she can buy another skin, and thus personalize it differently. The skins, which will sell for $20 to $40 dollars, become the CD's of the wireless world—a stream of revenue once the device is purchased (Newman 2001).

The BuddySync project preceded most of these teen-specific initiatives, but strongly suggested that US teens needed to be able to customize their wireless devices in ways that revealed what
groups they belonged to and whether these groups were sports, academic, music, or hobby based. In the next section, we discuss the agency teens wanted to have in defining both individual and group identity through their wireless devices. Emphasis on Group Communication

US teens today report that they feel overwhelmed by pressures and responsibilities—half have lived through their parents’ divorces, and 63% live in households where both parents work outside of the home. Of all the issues that trouble adolescents, loneliness ranks at top of list. Teenagers may claim they want privacy, but also crave and need attention. Loneliness creates an emotional vacuum that is filled by an intense peer culture (Kantrowitz and Wingert 1999).

What we found during the BuddySync research was that Interaction within groups was the predominant form of communication for most teen respondents. The most frequent and important group is the peer group of 3 to 8 best friends who frequently plan activities, share knowledge, gossip, and work together. Further discussion of how devices support this type of communication revealed two interesting points. First, while the phone was preferred for its speed and instant connections, it was cumbersome for groups because one has to connect individual by individual. Second, the capability of email to send and reply to groups was valuable, but it was considered too slow and lacking in immediate feedback required for typical teenager group communication. Current products and services to support teens’ group communications are at best a trade-off between immediacy and distribution.

Subsequent evaluation research confirmed this strong need for instant group communication. The shared note, group note, and conference calling features of the prototype were easily understood and highly valued by the teenagers. One respondent said it would be “good for getting messages out there really quick. I’d do it a lot to organize people.”

**Importance of Retaining Control of Communications**

The respondents were surprisingly critical of owning and carrying a cell phone. They expressed that cell phones stand for being controlled (e.g. by parents, boss) or being on duty. This feeling was reinforced by the intrusions of cell phones into parents’ lives.

Others mentioned that it is common for teenagers who get cell phones from their parents to hide them in their bags and mute them to prevent others from recognizing them.

The fear of losing control was especially acute for teenagers. They seek to assert control and gain responsibility over many aspects of their lives. The pager appears to possess an interface that fits teenagers and does not raise the same concerns of losing control with their pagers. They expressed that pagers make them aware of a person’s desire for contact and affords them the control to call, ignore the page, or call later. Exercising choice, control, and responsibility is crucial in teenagers’ communication.

Subsequent evaluation research verified the value of features in the prototype that conveyed a sense of control to the users. The respondents anticipated regularly using the options that made others aware of how they wanted to be contacts. Having a "keep out" option was seen as more direct and honest than simply turning off a mobile phone: "Keep out is good. People will know you don’t want to be contacted, rather than [assuming you’ve] just forgotten to turn on [your] pager/cell again."

**Strong Differences in Types of Communication with Different Groups of People**

In each stage of the research the respondents recalled many different communication scenarios in many different settings. It became apparent throughout that teenagers (probably more than adults) consciously and dramatically vary their communication style depending on the recipient and social context of the communication. Analysis of the respondent’s scenarios resulted in the following four general communication typologies described on the next page:

**A. Close Friend Group Communication**

- Focus: Privacy, sharing, personal interaction
- Size: 2-8
• Structure: 1 to 3 individuals in the Close Friend Group are "best friends". Ages 12 to 16 prefer same gender groups. At ages 16-17 the group gets increasingly mixed in gender and less tightly knit.
• Time: Late afternoons, evenings, and weekends
• Location: A small number of consistent locations including: home, friends' homes, mall, movie theater, or other activity centers. Communication within Close Friend Groups most often occurs in school.
• Mobility: Short rides from parents or with friends
• Activities: Close Friend Groups spend time together watching TV, skateboarding, biking, and going to movies. Close Friend Groups of younger teenagers are focused on school activities, while older groups (16+) are more focused on interests.
• Comm. style: Typical exchanges include short messages to plan activities and homework. Long communications include calls and emails for sharing stories, emotions, and dreams.
• Medium: Close Friend Groups always prefer the most private medium available.
• Development: The importance of Close Friend Group communication decreases as teenagers begin having boy/girlfriends.

B. School Friend Group Communication
• Focus: Groups, self-identity, restriction, secrecy
• Size: Cliques of 10-30 individuals
• Structure: Group formation driven by teens’ search for identity. Groups are created around activities or style. School Friend Group members are unknown to parents.
• Time: During school
• Location: Classroom or school break areas
• Activities: Meetings around school and activity schedules.
• Comm. style: Secret messages in class, or large semi-chaotic exchanges between large groups
• Medium: Notes or face-to-face
• Development: Highly segmented by gender, until older

C. Job Contact Group Communication
• Focus: Duty, being controlled, making money
• Structure: Separated from all other groups and activities; Close Friend Groups can interfere with job.
• Time: Afternoons, evenings, and weekends. Often compete with Close Friend Group communication for time.
• Mobility: Mobility combined with full accessibility becomes important part of job responsibilities.
• Activities: Specific to job function. Usually isolated from activities with other groups.
• Medium: Specific to job and usually controlled by job manager
• Development: Money from jobs plays important role in teenagers’ establishing their independence.

D. Parents Group Communication
• Focus: Transportation, security, scheduling, and the development of trust and responsibility
• Structure: Varies by proximity to friend and services and by the use of public transportation. Teenagers who are dependent on parents for transportation are less independent. Most parents and teenagers accept roles as part of their family’s social structure.
• Time: Early mornings, evenings, and weekends
• Activities: Interaction with parents is focused on homework, school obligations, purchasing things, and transportation. Parents are the schedulers for teenagers under 16. At this age purchases are granted individually to assure involvement. Older teenagers (16+) earn and spend their own money with different parental involvement.

• Comm. style: Security check-ins, scheduling, short check-in messages.

• Medium: Phone, face-to-face, email, and family calendar. Family shares PC, phone, and answering machine without problems.

Development: Checking-in serves an important social role in building trust and responsibility.

PART THREE: THE BUDDYSYNC DESIGN CONCEPT

This mobile application concept was created by Ericsson Cyberlab Singapore and the paper's authors to focus solely on supporting the social interaction and communication behaviors of teenagers. It is intended to be a third-generation wireless application that supports teens and their conversations, activity planning, awareness of friends, and need for fun.

Figure 1 shows the main screen of the interface.

The facial representations are the primary interface element for initiating communications through handwritten notes, shared notes, or phone calls. By having friends control their facial expressions, the teenaged user is provided with an at-a-glance and continually updated status of his closest friends. The packet-based nature of 3G networks (i.e. the end terminals are always on-line) makes this feature technically possible. To initiate a note, call, or shared-note session, the user first selects a friend by tapping on her face and then selects the preferred communication method. This reverses the more common interaction approach in which applications or documents are selected first, followed by the selection of recipients. Office software metaphors such as documents, folders, and tasks, need to be questioned and replaced by themes that fit into teenagers’ lives. Putting the peer group at the center of all interactions is a simple yet important distinction that reinforces the teen-centric interaction model behind the interface.

Design Implications
Based on the research findings, it was evident that a solution for teenagers needs to emphasize the most private and common communication between teens and their close friends. It was also evident that the application should accommodate the other types of communication, but clearly separate them from communication with close friends. This segmented approach created a model of interaction that was instantaneous, highly directed, and private.

This model differs from other communications applications such as email, address directories, and cellular telephones on several counts. These differences are articulated in three design principles:

1. Communications within a group take on a greater or equal priority to communication between individuals.
2. Communications are immediate and original. There are no representations of communications in lists or in-boxes, or as documents or icons. Communications simply appear in their original form and disappear after they are read.
3. There are permanent connections to peer groups. Members of peer groups and potential recipients have a physical, real-time representation in the application that allows teenagers to feel permanently surrounded by their friends.

The following describe the key elements of the functional prototype that was created based these principles:

General UI Structure
The organization of the UI follows the organization of people within the teenagers’ world. The main sections are Buddies, Groups, Visitors, Myself and Parents.
Proxies
The default and idle screen is the Buddies screen (Figure 2), which displays proxies of the best friends, their moods, contact preferences, and personal comments. This design approach is closely related to existing work on social awareness and proxies by Erickson et al. (1999). Specific to this approach is the emphasis on representing the emotional status of each close friend. Each person can choose his or her own face and the faces can be easily changed to reflect a change in mood. These mood representations provide the user with information on how a friend is feeling before calling or writing them a note. Knowing this and being able to anticipate what kind of response they might receive was very important to the teenaged respondents.

Along with the mood, users can broadcast their contact preferences. By selecting from All, Phone, Note, or Keep Out icons teenagers can have control how accessible they are to others. Though they indicate preferences, these icons do not block incoming communications. Teenagers did not want to be cut off from their friends even when they were in bad moods. Ultimately, friends must balance the importance of the contact against the temperament of the user.

Group and Shared Functions
The strong emphasis on group communication is reflected in the shared note feature. The shared note feature is an informal and spontaneous implementation of a shared workspace along the lines of the existing shared board concept of Ishii and Kobayashi (1992).

Ink Captured Notes
There have been several proposed ink capturing devices, but for many reasons they haven’t developed into full-fledged products [1]. For this application, the combined needs for privacy and creativity in communication between close friends strongly supports ink captured messaging. In spite of broad computer use, teenagers still exchange handwritten notes with their close friends on a regular basis. This type of input was found to be more supportive of the individual expression and creativity commonly seen in teenagers’ communication with one another. In addition, because the devices will rarely be used in truly mobile situations (i.e. driving, walking) inking presents few ergonomic problems.

Functions Excluded from the Application
As part of any application design there are a number functions that, while possible, are inconsistent with the interaction model of the target user. Some of the features that we excluded from this application because of their inconsistency with teenagers included:

1. Automated locating via GPS to track teens’ whereabouts: It would not support parents’ seeking to instill responsibility in their teenagers.
2. A shared schedule: It potentially replaced one of parents’ reasons for communicating directly about activities and commitments, effectively undermining the trust-building process.
3. Typical PIM functionality: It was associated with dull responsibility rather than fun communication with friends.

PART FIVE: CONCLUSION

This chapter has explored the question as to why cell phone use is less popular among US teens than it is among their Japanese and European peers. We began by exploring common structural arguments—e.g. the pricing system and US network infrastructure have not, so far, encouraged widespread mobile phone use among youths. We then expanded the analysis by also considering cultural factors—what does mobile communication mean to US teens? Through an iterative ethnographic research and design project, BuddySync, the authors have found several unique values that underlie teen communication in the US.

There is a need for an alternative approach to existing mobile communication products that have traditionally been targeted at mobile professionals. By designing an application around an interaction model specific to teenager culture, we observed an increased usefulness, acceptance, and enjoyment of this mobile communications product among teenagers. Similar functionality could have been provided through a PC or PDA paradigm. While this would lead to a functional interface, it would be less engaging and less connected to what’s important to teens. This iterative process of ethnographic research, design, and evaluation could be effectively applied to creating new products for other specific user groups (e.g. seniors, alternative cultures).

REFERENCES
