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Deaf People Communicating via SMS, TTY, Relay Service, Fax, and Computers in Australia

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Despite the expansion of Deaf people’s use of communication technology little is published about how they use electronic communication in their social and working lives and the implications for their concepts of identity and community. Australia is an ideal research base because the use of a range of technologies is widespread there. To gain access to a wide age range of people who identify as Deaf, members of the national organization, the Australian Association of the Deaf, were surveyed by mail. Results showed that Short Message Service (SMS), telephone typewriters (TTY), voice/TTY relay services, fax, and e-mail were used regularly. Deaf users are discerning of the purposes for which they use each method: SMS for social and personal interactions, TTY for longer communications and (via the relay service) with people and services without TTYs, fax for business and social contact, and computers for personal and business e-mails as well as Web browsing, accessing chat rooms, word processing, games, and study.

Currently Deaf people have available a range of ways in which they can communicate with others—Deaf or hearing—at a distance. As Power and Power (2004) and Bowe (2005) have noted, for the first time since the telephone was invented over 100 years ago Deaf people using Short Message Service (SMS) can be on an equal communicative footing with hearing people who use a mobile phone (called a cell phone in some countries). Although Power and Power (2004) showed that there were differing patterns of use of SMS across countries and that regions of the world vary in their use of different communication technologies, they found little comparative data on actual use of electronic communication.

In order to remedy this situation, the authors chose to investigate how much and for what purposes a group of Australian Deaf people use the communication technologies of SMS, the telephone typewriter (TTY), both direct to another TTY or via a relay service to hearing people and services, fax, and e-mail to enhance possibilities of communicating with hearing people as well as with other Deaf people.

SMS, TTY, relay service, fax, and computers were chosen because these are commonly used in Australia, whereas videophones and video relay are not. For reasons discussed in Power and Power (2004) having to do with higher pricing of mobile phone voice calls relative to SMS text messages and cooperative pricing and connection arrangements between mobile phone companies, SMS became widely used among both Deaf and hearing Australians, Europeans, and Asians. The use of two-way interactive pagers by Deaf people did not become common in those areas, although they were used between Deaf people and between Deaf and hearing people in North America. Power and Power (2004) discuss the advantages and limitations of two-way pager use among Deaf people at some length. In Australia and the rest of the world, Deaf people use the mobile phone as it connects them not only with...
those who own a pager but also with those who own a mobile phone, which in Australia is almost everyone.

Reasons for Using Communication Technology

“Uses and Gratifications” theory of Blumler and Katz (1974), which looks at the psychological, utilitarian, and social needs served by communicative technologies, together with concepts derived from Granovetter (1973) and Christensen (1997) are here considered in relation to Deaf people’s use of SMS, TTY, relay service, fax, and computers in explaining why new technologies are adopted and why their use either declines or is sustained.

From the Uses and Gratifications theory of Blumler and Katz (1974), major determinants of people’s use of media and communication are derived. This paper will look at the following uses and gratifications: instrumentality (getting tasks or business accomplished, making appointments), information (obtaining knowledge, news, and information about events), sociability (keeping in contact with friends and family and chatting), social identity (being a part of a group, such as a deaf organization or chat room), and entertainment (fun seeking or filling in time with games). In a study of student mobile phone use in the United States, Germany, and New Zealand, Broege (2005) found different patterns of use of text compared with voice. She formed the view that the life cycle of a new medium starts with entertainment-like use and moves into functional use once novelty wears off. We will examine this view about reasons why people adopt a new technology in relation to a group of Deaf people containing a wider age range than Broege’s hearing student group.

In his 1997 book, The Innovator’s Dilemma: When New Technologies Cause Great Firms to Fail, Christensen distinguished between “sustaining technologies,” which improve the performance of existing products, and “disruptive technologies,” which emerge and are cheaper and more convenient and which eventually overtake the market, supplanting sustaining technologies. Christensen’s thesis helps us understand the implications of Deaf people’s rapid adoption of SMS.

The SMS channel was originally intended to provide capacity for delivery and receipt of text data (Taylor & Vincent, 2005) making use of a spare channel in mobile phones. It was thus a sustaining technology in that it improved an existing product and provided more reasons to buy it. Young people adopted SMS for the reasons that Christensen said they would adopt a disruptive technology—because it was cheaper and more convenient to their lifestyle (you did not have to interrupt what you were doing to receive a message), but for most users SMS has not supplanted the voice aspect of a mobile phone which is used for more complex messages.

For the Deaf, however, the mobile phone may prove to be a disruptive technology if it causes them to forsake other technologies. Before the advent of SMS, Deaf people had no use for the mobile phone; for them SMS did more than sustain and improve existing technology, it was “disruptive” for Deaf people in the sense that it has made them a new market for the phone companies and it has enabled Deaf people to contact hearing people who use SMS much more easily and more cheaply than they can with other technologies. In the more usual everyday sense of the word, SMS has been disruptive because it has become for some Deaf people a main means of socialization. SMS has disrupted ideas of a separate Deaf culture that relied in the main on face-to-face meetings for communication.

Videophones allowing Deaf people to sign to one another over distance may also prove to be disruptive in the sense of removing the necessity for Deaf people to inhabit the same physical space as the person with whom they are communicating, but in other ways it will reinforce the idea of a separate “Deaf” culture and language and will extend the borders of Deaf culture to a “global village” including both Deaf and hearing people (Breivik, 2005).

Being able to use a mainstream technology without any adaptation or intermediary appeals to Deaf people both because it lessens the stigma attached to needing equipment to be modified and it is less expensive than “special” equipment. SMS and fax machines are what we will call “adventitious” technology for Deaf people, meaning that although not designed with Deaf people in mind, the technology suits their purposes and solves what were previously difficulties in communicating from afar.
Creating Communities and Enlarging Networks

Improvements and additions to existing technology have made it possible for Deaf people to interact with a wider group of people and have global contact. Breivik (2005), for example, found that Norwegian Deaf people were using e-mail and the Internet to both interact more with hearing people and to establish “transnational” connections with Deaf people around the world, bringing a new transnational character to the Deaf community.

Bakken (2005) considered the social implications of SMS in relation to social networking and social and linguistic isolation in Norway. Bakken used the concept of “socially deaf” to describe those who had “a reduced ability for communicative interaction with other people regardless of their degree of hearing loss” (p. 163). When interpreters are present, both Deaf and hearing people can avoid being socially Deaf. A hearing person who cannot sign at a function with signing Deaf people without an interpreter is by definition socially Deaf in that context. Technology such as computers and SMS allow Deaf people to escape being socially Deaf in a hearing world when their interaction with another person is through a computer or another kind of text message.

However, it is not just being able to communicate that creates communities or networks. Bakken (2005) introduces Granovetter’s (1973) idea of “weak” and “strong” ties between people in relation to Deaf people and Deaf culture. According to Granovetter, networks that are created between people who are only “loosely connected” can be quite powerful. Those who have access to many means of communication and many different connections with others can have wide influence. Until recently, Deaf people were largely limited to face-to-face contacts, and so, their networks were limited in extent and more likely to create “strong ties” (which is what Granovetter calls more developed and intimate relationships) between members.

Whereas hearing people more easily maintain connections with widely spread acquaintances, Deaf people find it more difficult to easily maintain contact with hearing people than to socialize with Deaf people who have a TTY or are accustomed to communicating socially via TTY or fax. Strong ties between people in a group who contact one another frequently create a comfortable relationship where each can understand the other’s experiences and attitudes. However, one disadvantage of being in a closed group is that the group may become insular and out of touch with other people’s realities.

It is Granovetter’s idea that “the strength of weak ties” is that they connect different networks, leading to a better flow of ideas and information, which in turn leads to innovation and change rather than stagnation. Bakken (2005) observes that in the Norwegian Deaf community “seemingly everyone knows each other directly or indirectly” and that the “milieu for the deaf could be described as several groups attached together with ties of different strengths” with “a type of border around the members” (p. 166). This sense of community can be extended if more weak ties are developed not only between groups in Deaf communities but also between Deaf and hearing networks.

Bakken (2005) points out that SMS provides a way for Deaf people to maintain the weak ties with hearing people that provide opportunities for innovation and for new ideas that will enrich the Deaf community by extending connections and contacts (see also Breivik, 2005). Further research will test whether this is actually happening by asking people who they contact and for what purposes.

Another area of related interest is what it means for a Deaf person not to need to explain or tell that they are Deaf. Bakken (2005) judged from her 13 qualitative interviews and Breivik (2005) from his study of “Deaf identities” that hearing status has become less important or less of a restriction in choosing friends and deafness is not necessarily mentioned to new contacts who do not know that the person communicating is Deaf.

Researching Issues in Deaf Communication and Technology

Our aims in this research were to find out how Deaf people use electronic communication technology and whether new technology could be seen to be rendering older technology obsolete. We wanted to discover the uses and gratifications (Blumler & Katz, 1974) Deaf
people obtain from using these technologies, how the knowledge of these technologies is diffused (Rogers & Scott, 1997) within groups of Deaf people, the implications of labeling these technologies either sustaining or disrupting (Christensen, 1997), and the nature of the strong and weak ties which connect those networks (Granovetter, 1973) in relation to geographically close and distant Deaf communities and in relation to communities of Deaf and hearing people. In addition, we were interested to discover if Deaf people in a larger group than Bakken’s (2005) sample of 13 revealed their hearing status when the technology they were using did not necessitate it.

In order to research these broader issues based around communication involved in the adoption of new technology, it is necessary to elucidate what is known of the current use of and developments in the area of electronic communication. Accordingly, background research was conducted to find descriptions of each technology and some general evidence of how each was used before proceeding to research-detailed use patterns.

Short Message Service

Previous research (Adams, 2000; Eureka Strategic Research, 2005; Harkins & Bakke, 2003; Network Strategies, 2003; Power & Power, 2004) has demonstrated the widespread and enthusiastic use of SMS messaging by Deaf people. Deaf people all over the world are using SMS for the same purposes as hearing people: maintaining personal contacts, arranging social life, for business, emergencies, and “useful” services like shopping, automobile roadside assist, weather forecasts, and so forth. Especially for personal contact and arranging social life, these purposes are not significantly different from those for which hearing people use SMS (Horstmanshof & Power, 2005a, 2005b).

Findings similar to Power and Power (2004) were found in a survey of British Deaf people (Pilling, 2004). This survey found that 65% of British respondents used SMS, over half of those did so daily, and 35% of the respondents said that if they could only have one kind of text communication it would be SMS (vs. 32% e-mail and 12% TTY). Ninety percentage of their respondents agreed that SMS was “good because you don’t need special equipment for deaf people . . . and you can use it anywhere” (p. 2). Predictive text which was “originally patented as a method for communicating with deaf people via phone in 1988” is widely used by mobile phone users “to simplify the writing of text messages. . . . As the user presses the number buttons, an algorithm searches the dictionary for a list of possible words that match the keypress combination, and offers up the most probable choice” (Predictive Text, n.d., ¶ 2). Thus, only one key needs to pressed for each letter, and the most likely word is suggested which saves time in the sending of messages. Surveying Deaf people provided an opportunity to discover whether this feature was valued by Deaf people, some of whom had limited English language skills.

The popularity of SMSing is demonstrated by the fact that Deaf people are joining “SMS Clubs.” “The clubs can be described as mobile chat rooms. . . . Among the more than 100,000 user-created clubs are some that are designed specifically for the hearing-impaired” (“Hearing Impaired Using Mobile Phones and SMS AC Services,” 2004).

Thus, it can be seen that SMS provides for all the Uses and Gratification categories examined. It is useful, provides information, allows for sociability and social identity, and even for entertainment—when amusing messages are shared with friends.

Telephone Typewriters

Prior to SMS (and still), deaf people had been able to use the telephone system with the aid of the TTY; also known by other names: telecommunications device for the deaf and minicom. In the 1960s, a deaf man, Robert Weitbrecht, adapted teletypes for use by deaf people over standard telephone lines (Lang, 2000). The Deaf nature of this development is indicated by the title of Lang’s book: A Phone of Our Own: The Deaf Insurrection Against Ma Bell. Despite the limitation that both parties to the call need special equipment, that is, a TTY or a TTY modem, TTYs have become a common method of communication between Deaf people, between Deaf and hearing people, and between Deaf people and services that have a TTY. Initially, TTYs were used mostly by two Deaf people communicating with one another, but with the advent
of relay services (see below), Deaf people can now communicate via a relay with hearing people and agencies who do not have a TTY. More and more government and community agencies and services (including emergency services) have TTY numbers that Deaf people can call for assistance, often toll-free. Conventions for use have evolved, and abbreviations were regularly used by Deaf people on TTYs before they became common with SMS messaging (Power, Carty, & Neale, 2000).

Some limitations of the use of TTYs were noted in a large study of TTY use in Australia, which found that some organizations which have a listed TTY number either did not have it available and/or had no one trained in its use, forcing Deaf people to use the relay service (Eureka Strategic Research, 2005).

Recently, TTY connection to mobiles has been introduced in America and Europe (Digital Cell Phone/TTY and VCO, n.d.) but appears to be little used as yet in Australia. In Uses and Gratifications theory terms, use of the TTY is instrumental and informative.

Relay Services

In order to connect Deaf people who have TTYs with hearing people and government and community agencies which do not have TTYs, relay services have been developed in many parts of the world. The Australian National Relay Service (NRS), managed by the Australian Communication Exchange (2006) and funded by the Australian Commonwealth Government, is typical in the services it provides ("We connect anyone with everyone."). The confidential service operates 24 hr/day, 365 days/year, nationally and internationally. A trained Relay Officer takes either a voice or TTY call, connects it to the called number (again TTY or voice phone), and via a computer (for TTY) or microphone (for voice) transmits the call between the caller and recipient. Calls through the service are charged at the rate of a local call. NRS was the first relay service in the world to have a dedicated emergency number.

Fax

Faxes are in widespread use as a common piece of office equipment also present in many homes. The visual nature of the fax machine ensured its early adoption by Deaf people despite it not being synchronously interactive. Deaf people use faxes for personal and social purposes and for business communication with government and community agencies. A generational difference is evident, with mostly older Deaf people favoring fax use (Knuckey & Slegers, 1999). Most Deaf organizations provide services to Deaf people via fax. However, faxes have their limitations; for example, emergency numbers are often not accessible by fax and/or can be missed by the emergency service (Royal National Institute for the Deaf, n.d.)

Fax machines are used for instrumental and informative purposes in that Deaf organizations use them to broadcast information to their members. In addition, because Deaf people use them to communicate with friends (Knuckey & Slegers, 1999), they also fulfill a social communicative function.

Personal Computers

Computer-assisted communication is popular with Deaf people who use their computers for all the purposes hearing people do: e-mail, chat, browsing the Web, and so forth. Through computers Deaf people now have access to a wider world, hearing and Deaf—especially including more Deaf people of wide and varied interests (Breivik, 2005).

All the phenomena associated with the Web have their counterparts in the computer "DeafWorld" ("Access," 2004): e-mail use (both individually and via lists) is widespread, many Deaf people have developed their own home pages, specifically Deaf chat rooms have been developed, directories of Deaf contacts are available, and advertisements for deaf-related products and services are plentiful. There are "virtual" Deaf clubs, sports groups, gay and lesbian Deaf sites, Deaf sports sites, and meeting and dating sites and Deaf churches have their sites. There is even a Deaf "Rave" site with invitations to parties and an online recovering Deaf alcoholics group ("Sounds of Sobriety").

Concerns are occasionally raised about the impact of technologies on some aspects of Deaf culture. For example, "Deaf culture is in danger of being wiped out by some of the very technologies that have made it
easier for the Deaf to participate in mainstream life: e-mail and text messaging—not to mention closed-caption TV” (Kunerth, 2005). In contrast, others see the development of virtual Deaf clubs on the Internet and video telephones enabling direct communication between signing Deaf people as strengthening connections between Deaf people and developing Deaf culture in new ways (e.g., All Deaf: Forum for the deaf and hard of hearing, n.d.).

Taking into account the above analysis of theoretical and practical issues involved in adoption of communication technologies, a survey was developed to provide data on how Deaf people use SMS, TTY, relay services, fax, and computers.

Method

Participants

The cooperation of the Australian Association of the Deaf was enlisted to mail the survey to its Deaf membership (n = 305) with a reply-paid envelope for return. Thus, anonymity of respondents was preserved. The organization was chosen because its membership identify as Deaf and cover a wide age range rather than the youth groups normally examined by researchers in communication technology. A total of 172 (56.4%) replies were received by the designated cutoff date.

Respondent Characteristics

Respondents identified as Deaf rather than “deafened” or “hard of hearing,” were predominantly signing Deaf people and Auslan users who lived all over Australia and represented all age groups except those younger than 18 who, under ethics requirements, require parental permission. Further details are summarized below.

Deafness status. Ninety-three percentage of the respondents said they were Deaf, 2% deafened, and 5% hard of hearing.

Language use. A majority of the respondents were signing Deaf people. Seventy-two percent reported that they “mostly” used Auslan, 3% Signed English, and 16% speech.

Age. All age groups were represented in the responses. Twenty-one percentage of respondents were 61 or more years of age, 23% between 51 and 60, 24% between 41 and 50, 22% between 31 and 40, 8% between 21 and 30 and 1% were 20 or younger.

Gender. Sixty-one percentage of the respondents were female and 39% male.

Residence. Twenty-four percentage of respondents were from Victoria, 23% from New South Wales, 10% from Queensland, 6% from South Australia, and 2% from Tasmania.3

School attended. Forty-eight percentage of respondents had most of their education in a school for the deaf, 33% in a regular school, and 12% in a special class or unit for the deaf in a regular school.

Education level attained. Thirty-eight percent reported that they had finished university or college education, 23% had finished high school, 13% primary school only, and 11% “some” university or college. Eleven percent reported other levels of education completed (mostly college diplomas or adult high school courses).

Survey Questionnaire

The questionnaire asked how each of SMS, TTY, NRS, fax, and computers was discovered by the respondent to measure how knowledge of communication technology was diffused, the frequency of use of each, to whom and from whom messages were sent and received, when messages were responded to, whether people who did not know the respondent was Deaf were told of that, whether the predictive text capacity of their phone was used (if available), and desired improvements in services and equipment. More questions were devoted to SMS than the other methods as previous research (Power & Power, 2004) had demonstrated its widespread and frequent use by deaf people.

Frequency counts of data were undertaken for each of the variables, and these data were also analyzed by major independent variables such as gender, age, and education completed (elementary school to university/college).
Results

Methods of Electronic Communication

*Availability of methods of communication.* Table 1 indicates that all methods of electronic communication (SMS, TTY, relay service, fax, and computer) were available to a majority of respondents.

**SMS on Mobile Phones**

*Availability.* Ninety percentage of respondents had access to a mobile phone. Forty-four percentage of respondents had a mobile phone both at home and at work, and 44% also said they had one at home (it is not clear that they meant only at home) and 2% at work only.

*How SMS was discovered.* Fifty-five percentage of respondents said from Deaf friends, 7% from watching others use it, 5% from their hearing family, 3% from their Deaf family, 3% from hearing friends, and 8% gave other reasons.

*Predictive text.* Sixty-four percent said they liked the “predictive text” function on their phone, and 22% did not.

*Deafness acknowledged.* Thirty-five percent said they told callers who did not know them that they were Deaf, 28% said they did not, and 29% said they sometimes did.

*Photographs.* Eighteen percent said they use their mobile phone to send and receive photographs. It is not known whether the 77% who did not send photographs did not because their phones did not have this function.

*Wireless Application Protocol.* Sixty-four percent said they did not use Wireless Application Protocol, 8% said they checked the weather, 1% looked at their horoscope, and 10% used it for other purposes (mostly sports results and news).

*Keypad.* Sixty percent were satisfied with their keypad, saying it was “OK.” Twenty-two percent desired some change in their keypad, most of these wanting a Qwerty keyboard and/or a bigger one.

*Most useful feature.* The most useful feature mentioned was SMS (54%). Also regarded as useful were the vibrating function to announce calls, the alarm for reminders, the address book, and the phone’s mobility—which made it possible to “go anywhere.”

*Changes desired.* The major change asked for was a video capacity (18%; 39% did not respond to this question). Other changes mentioned infrequently were a bigger, brighter screen, the possibility of using more than 160 characters, subsidized call costs, and the capacity to make and receive calls from fixed line phones and to send and receive e-mail messages. One respondent wanted a voice to text capacity. Several (presumably with some residual hearing) wanted a volume control for the voice on the phone.

*Payment and cost.* Most respondents (81%) paid for their phone service themselves, 6% had it paid for by their employer, 1% by a family member, and 3% paid by other means. Sixty-four percent prepaid for their phone service, 24% were on a Plan, and 8% used other means. The mean cost of respondents’ bills in the month before the survey was AUD52, with a range of $5–$300 (two people).

*Frequency of use.* Deaf people were in constant contact through SMS. The mean number of messages reported sent in the month was 171, with a range of 0–600 (600 by two people; about 20 per day). Forty-six percent had sent fewer than five messages the previous day, 37% made 6–10, 6% made 11–15, 4% made 16–20, and 2% made more than 20. They had received a similar number of messages the previous day with 53% reporting fewer than five, 28% between 6 and 11, 7% had 11–15, 2% had 16–20, and 3% had more than 20. On the day they made most calls, respondents made a mean of four calls, with a range of 1–15.

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**Table 1** Availability of methods of electronic communication

<table>
<thead>
<tr>
<th></th>
<th>SMS</th>
<th>TTY</th>
<th>Relay service</th>
<th>Fax</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Using</td>
<td>94</td>
<td>89</td>
<td>84</td>
<td>74</td>
<td>91</td>
</tr>
</tbody>
</table>

*At home and work.*
Comparative Use of Electronic Communication Methods

Table 2 presents the percentage use of each of the above communication methods sending and receiving calls to and from various sources.

Social nature of use. Most sent and received calls are “social” in nature, to and from Deaf and hearing family and friends, especially Deaf friends, followed by hearing family members, hearing friends, and Deaf family members. Most social contacts are by SMS followed by e-mail, TTY, and fax, with the relay service little used in this context. The number of calls sent and received within each service is similar, indicating “reciprocity” of communication with those technologies.

Services. Messages are sent most frequently to call a taxi, followed by contacts to automobile associations’ car breakdown services, emergency calls, shopping, banks, and flight information. Differences emerge in this area, with, for example, the relay service being most used for emergencies (presumably because of its dedicated emergency service number). Perhaps surprisingly, fax is used by almost 50% of respondents to call a taxi. (Some taxi companies did not favor the use of TTY or the relay service as such calls took too long; Eureka Strategic Research, 2005.) E-mail is a favored method of contacting banks and government departments.

Rate of use. On the day they sent most messages, respondents sent eight per day for SMS, two for the TTY, three via the relay service, one fax, and two e-mails. Missing data for this question averaged 33%. On the day before they filled in the questionnaire, 41% (SMS) to 81% (TTY) sent fewer than five. We cannot tell how many of these were zero. Also on that day, 5% (TTY) to 35% (SMS) sent 6–10 messages. Almost no respondents sent more responses than that. Figures for messages received are available only for SMS: 53% received fewer than five messages, 29% received 6–10 messages, 7% received 11–15, 2% received 16–20, 2% received more than 20. It appears that respondents receive more messages than they send via any of the methods.

Other uses. Between 17% and 28% of respondents availed themselves of the opportunity to write in other uses of the communication methods than those specified in the responses presented in Table 2. Few were mentioned more than once for any of the services we are investigating: work was mentioned for both sending and receiving, and making medical and other appointments a few times, as was getting bills from phone service providers. Virtually all communication labeled “other” via TTY is conducted through the relay service. For all services, the most frequent other responses were making medical and other appointments, service inquiries, obtaining tradesmen’s quotes, contacting Deaf organizations, and (unspecified) business. When asked

<table>
<thead>
<tr>
<th>Source</th>
<th>SMS To</th>
<th>SMS From</th>
<th>TTY To</th>
<th>TTY From</th>
<th>Relay service To</th>
<th>Relay service From</th>
<th>Fax To</th>
<th>Fax From</th>
<th>E-mail To</th>
<th>E-mail From</th>
</tr>
</thead>
<tbody>
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<td>Deaf family</td>
<td>48</td>
<td>53</td>
<td>25</td>
<td>20</td>
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<td>1</td>
<td>22</td>
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<td>39</td>
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<tr>
<td>Deaf friends</td>
<td>94</td>
<td>93</td>
<td>55</td>
<td>55</td>
<td>8</td>
<td>5</td>
<td>52</td>
<td>51</td>
<td>83</td>
<td>86</td>
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<td>40</td>
<td>28</td>
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<td>31</td>
<td>29</td>
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<td>78</td>
<td>29</td>
<td>17</td>
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<td>4</td>
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<td>7</td>
<td>16</td>
<td>9</td>
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<td>25</td>
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<tr>
<td>Call taxi</td>
<td>19</td>
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<td>25</td>
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<td>3</td>
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<td>6</td>
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<td>Car breakdown services</td>
<td>19</td>
<td>NA</td>
<td>13</td>
<td>NA</td>
<td>17</td>
<td>NA</td>
<td>4</td>
<td>NA</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Flight information</td>
<td>3</td>
<td>NA</td>
<td>19</td>
<td>NA</td>
<td>25</td>
<td>NA</td>
<td>9</td>
<td>NA</td>
<td>41</td>
<td>NA</td>
</tr>
</tbody>
</table>

*NA: not asked.
about what kinds of functions they used their computers for, 10% of those who had them said for sending SMS messages, 87% said for sending or receiving e-mail, 79% looked at the Internet, 45% used chat rooms and 17% said they used their computer for other functions. Included in these other functions were word processing, work (unspecified), study, and games. Surprisingly, given that it is possible to conduct sign language conversations using a Webcam, only three respondents reported that they had a Webcam.

Respondent Comments on Electronic Communication

Fifty-six percent of respondents added comments on their use of electronic communication to the survey. These comments reinforced the results of the survey in that there was general use of all methods of communication for different purposes: “I use all of them; they are necessary to me.” “Very lucky to have all these ways of communicating.” “A very great breakthrough.” Support for the relay service was the largest category of comments.

SMS was favored because of it being always available and portable. Several of our respondents mentioned the desirability of SMS becoming more like voice calls: that is, truly interactive in real time. One respondent commented that SMS and e-mail are good compared with TTY and NRS in that they are not “disabled technology,” but mainstream. Two people commented that there should be a direct emergency number available for SMS. Several volunteered that they preferred the “BlackBerry” communicator because of its wider range of functions compared to a regular mobile phone (A BlackBerry is a wireless, handheld device that supports e-mail, mobile telephone, text messaging, and Web browsing [BlackBerry, n.d.]). Others said it would be helpful to be able to use SMS to contact the relay service. Several people commented that the next generation of mobile phones would enable both sign-to-sign communication and video relay interpreting. A few suggested that the use of TTY-to-TTY calls was decreasing. Others said that the TTY was helpful in contacting the relay service and was important for business and other purposes and needed to be maintained. Several wanted all the technologies to be rolled into one.

Respondents who had completed college or university qualifications used SMS more than any other group, with those who finished high school next. Given the text-based nature of SMS, it is no surprise that those who had only finished elementary school used these methods least as it is likely that they would be the least comfortable in using English.

In varying degrees all methods were used by respondents for all of social, work, and “service” purposes. Of particular interest is the extent to which SMS and to a somewhat lesser extent e-mail is used more than the TTY and the relay service to communicate with both Deaf and hearing family and friends (though the comment was made that the TTY was good for longer communications). The relay service, however, plays an important role for business/work purposes, in contacting services (especially government departments), in maintaining contacts with hearing family and friends, and in contacting emergency services. E-mail is the most common method used for business/work and for contacting some services.

Few statistically significant differences emerged from SPSS Crosstabs chi-square analyses of age, gender, or level of education. No important differences were found in the level of usage of any method between men and women.

Data from this sample demonstrate that Deaf people of all ages use SMS and fax. Some significant differences appeared among age groups in use of SMS with hearing friends, $\chi^2(5, N = 171) = 12.925, p = .024$, in SMS with business, job, or work, $\chi^2(5, N = 171) = 27.021, p < .001$, and in use of fax with Deaf friends, $\chi^2(10, N = 171) = 26.686, p = .003$, fax with hearing family, $\chi^2(10, N = 171) = 23.597, p = .009$, and fax with hearing friends, $\chi^2(10, N = 171) = 18.712, p = .044$. Respondents between 31 and 60 years used the fax and SMS to communicate with their Deaf friends and hearing family and friends more than did the younger or older groups. There were also significant differences among age groups in uses of the relay service with business/job/work, $\chi^2(5, N = 171) = 16.834, p = .05$, with government departments, $\chi^2(5, N = 171) = 30.943, p < .001$, and with banks, $\chi^2(5, N = 171) = 21.653, p < .001$. Those aged 31–50 years used the relay service to business, job, work, government departments, and banks and for business
or job purposes more than the other age groups. They and the 51–to-60-years age group also used e-mail for business and job purposes more frequently than the other groups. Twenty respondents reported using SMS to receive calls from a pager.

Level of education was related to differences in use of electronic communication. University or college graduates reported significantly higher use of most services than did less educated groups, though occasionally the “completed high school” group joined them; for example, for use of SMS for business and job purposes, χ²(4, N = 167) = 11.511, p = .021, and the relay service for business/job/work, χ²(4, N = 167) = 13.289, p = .010, and contacting government departments, χ²(4, N = 167) = 15.203, p = .004, and banks, χ²(4, N = 167) = 21.508, p < .001, the relay service to Deaf family, χ²(8, N = 167) = 15.765, p = .046, and the fax to hearing family, χ²(4, N = 167) = 13.289, p = .010. University and college graduates also used e-mail more than the other groups for sending and receiving business and job-related messages, χ²(8, N = 167) = 27.994, p < .001.

Discussion

Both the quantitative and write-in results show satisfaction with and widespread use of all of SMS, TTY, the relay service, fax, and computers. Deaf people depend upon a variety of electronic text communication methods and use each for particular purposes for which they find them best suited: SMS for quick and easy messages about personal and social matters and limited business, TTY-to-TTY “for longer chats” (as one respondent wrote in), the relay service for business and contact with people and organizations without TTYs, e-mail for communication with people who have computers, and fax for a range of social and business purposes. They also use their computers for accessing functions in ways similar to hearing people: Web browsing, playing games, study, and accessing chat rooms and other Web sites, a large number of which have grown up as specifically Deaf initiatives.

SMS allows contact between Deaf and hearing people on a “level playing field” (Power & Power, 2004) so that it is not necessary to identify oneself as Deaf when making a call. Following Bakken’s (2005) research with a small sample of 13 people, we asked our 172 subjects whether or not they let people know they were Deaf. If being Deaf was central to their sense of self, one could argue that they would. Bakken (2005) argued that hearing status has become less important or less of a restriction in choosing friends. Certainly, in a text-based distance relationship such as an online relationship or in text-based business contacts, it is no longer necessary for the other person to know about an interactant’s deafness. In fact, in our survey only 35% of respondents said that they always identified themselves as Deaf and another 29% said they sometimes did when making and receiving SMS calls with someone who did not know they were Deaf. It would be of interest to explore the motivations for these responses.

In this study, unlike Broege’s (2005) study of student use of mobile phones in the United States, Germany, and New Zealand, we do not find “novelty” wearing off as each method appears to have developed a niche specialization, with Deaf users becoming quite sophisticated about which method they use for particular purposes. Unlike Broege’s study of young people, our Deaf sample included a wide range of ages, and it appears that use of all the methods examined continues throughout the lifespan.

For these Deaf people, the primary use (and presumably the one from which they obtain most gratification) appears to be sociability: They use SMS to contact Deaf and hearing family and friends. Instrumental use is for obtaining services and for business or work follows in popularity. The extent to which these methods play a role in attesting and developing social identity as Deaf people has yet to be further explored, but already Deaf people are claiming their own territory in these technologies; for example, by the establishment of Deaf chat rooms, Web sites, and SMS clubs. The ease of SMS and e-mail communication may also mean that Deaf people are expanding their social networks with hearing people. We found, for example, that 79/78% of Deaf people use SMS and 65/67% e-mail to send/receive messages to and from hearing friends, levels that would have been difficult or impossible before these technologies were available. It may well be that electronic interconnectivity will
transform the Deaf community and the lives of Deaf people in ways that will break down barriers between them and hearing people.

Ease of communication with Deaf people’s hearing families may also have increased and been made easier: 83/81% of our sample report using SMS and 65/67% e-mail to send and receive messages to and from their hearing family members. Our results show that this adventitious communication technology is widely used and enjoyed by Deaf people who value it, in part, because it is mainstream technology not specially designed for Deaf people.

That these communication technologies are so widely used is due to the diffusion of information within the groups. Our results show that 55% of respondents said that they had heard about SMS from Deaf friends, a finding which one might have predicted from research on the diffusion of innovations which has found evidence of the importance of personal contact with trusted others in the diffusion of innovations (Rogers & Scott, 1997).

Implications for the Development of Deaf People’s Written English

This study surveyed members of the Australian Association of the Deaf, who are likely to be among the more actively communicating signing Deaf people and who, as noted above, are better educated than the general population of Australian Deaf people, so there are some limitations about its generalizability to the wider Deaf community. All the methods surveyed depend heavily on text and hence on English (though in the case of SMS and to some extent the TTY, a somewhat different genre of English). The finding that university and college graduates in the sample report considerably more use of these methods of communication than do those with lower levels of education, especially for “formal” activities such as business and job-related messages and contacts with agencies such as government departments and banks, supports this contention and once more illustrates the importance of the development of Deaf people’s English skills to high levels. More than ever, new communication technologies have made communication text based. Consequently, not being confident with text becomes more of a handicap when social and business contact between people is increasingly not face-to-face but through text-based technologies such as e-mail or SMS. It is interesting that predictive text is used by the majority of respondents (64%) perhaps because it obviates the need to be able to spell well as recognition, rather than recall of words, is required. More detailed research needs to be done with lower-literate Deaf people to discover how they are coping with the ubiquity of the mobile phone and text-based SMS and computer-mediated communication as there is upon the kind of English Deaf people use with SMS and the difficulties they encounter in using SMS; for example, the extent to which they may be disadvantaged by the use of “alphanumeric” (the phonetic use of numbers to replace letters in a word, such as “CU L8ER”; often, as in this example, based upon the phonological representation of the element).

Future Developments

These data were collected in mid-2005. Electronic communication methods for Deaf people are changing rapidly. Video on mobile phones and computer Webcams are providing better visual definition and becoming more widespread, enabling signing Deaf people to better communicate face-to-face. Similarly, video relay services (already available in a limited number of places) will enable more direct communication with hearing people and services from both mobile phones and computers. The future holds the promise of even more useful and flexible electronic communication for Deaf people communicating among themselves and with hearing people and services.

The use of new technology to communicate raises questions not only about improvements in technology itself and ways in which people might use and adapt them but also about how use of new technology to communicate in different ways with wider groups of people affects Deaf people’s concepts of identity and community.

The data that this paper provides allow more detailed questions to be researched in more locations. Although expanding our knowledge of usage, our research does point the way to what further research needs to be done. Researchers with close access to
deaf people with low levels of literacy may find ways to investigate the effect of being cut off or isolated from peer groups through lack of literacy skills. Perhaps low-literate deaf people will devise new ways to use text-based technologies to expand their networks and communities. Certainly there is a great deal of research of different kinds to be done in this area.

This paper showed that Deaf people are adapting Deaf culture to new technologies and that new technologies give them new ways to communicate on an equal basis with those who previously they had difficulty even contacting. The paper illustrated the extent to which Deaf people of all ages are using communication technologies and gave them an opportunity to speak out about what they have discovered and what their needs are. We thank our participants for their time and effort.

One commentator sums up the overall attitude of respondents to the survey, “Without this technology communication would be very limit[ed]. There was a time when we didn’t have these things. Now I often wonder how we did survive.”

Notes
1. We adopt the usual convention of using “Capital D: Deaf” for members of the signing Deaf community.
2. As of late 2005, only one limited video relay service operates in Australia.
3. In reporting results, where percentages do not add to 100, the remaining percentage is due to missing data because of no or uninterpretable responses.

References


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