

An Investigation of Two-Way Text Messaging Use With Deaf Students at the Secondary Level

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Deaf and hard-of-hearing students are often delayed in developing their independent living skills because of parental restrictions on activities outside the home due to worries about their child's inability to communicate, their whereabouts, and their general safety. Recent accounts of the use of two-way text messagers suggests that, like electronic mail, distance communication problems that have long plagued deaf people may be ameliorated—by the use of such technology (M. R. Power & D. Power, 2004; S. S. Rhone & Cox News Service, 2002). This project was designed as an initial foray into investigating the use of two-way text messaging technology as a way of increasing the independence of deaf adolescents and reducing their parents' anxiety about their safety and responsibility. All the deaf and hard-of-hearing students in the deaf and hard-of-hearing programs at two urban high schools (ages 13–19), the staff of the deaf departments at these two schools, and the parents/guardians of the students participated in this study. Preuse surveys, postuse surveys, and monthly statistics on the number of times each pager was used enabled us to chart how often the participants used the technology. The data were used to identify concerns that parents have about student independence and safety, the extent to which deaf students engage in independent activities, and expectations surrounding how two-way text messaging use might increase independence and literacy skills. The data collected on this project to date confirm that two-way text messaging technology is indeed useful for deaf adolescents and helps alleviate some of the concerns that have kept them from developing independence as quickly or readily as their hearing peers. The potential policy implications for this research are discussed.

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The socialization process in which adolescents participate is typically described as a period marked by family conflict, as the adolescent becomes aware of the need to develop both an individual identity and gain independence from parental control. Bugental and Goodnow (1998) point out that in addition to the family members, there are many stakeholders in this socialization process, including teachers, peers, and others in society with whom the developing child interacts. They point out that although the child “may want to be counted as a full-fledged member of the group, . . . others may want to direct that progression along a particular course” (p. 390). When these courses come into conflict, “negotiation, compromise or mutual attempts at control will inevitably be involved” (p. 390). Within the family conflicts are minor and typically revolve around everyday issues such as homework, chores, personal hygiene, activities, friends, and such. Although they are ongoing, they rarely escalate into altercations serious enough to cause dysfunction (Lamb, Hwang, Ketterlinus, & Fracasso, 1999).

It has long been noted in the literature that deaf adolescents are delayed in social development relative to their hearing peers (Calderon & Greenberg, 2003; Greenberg & Kusché, 1993). This delay has been attributed to parental restrictions on activities outside the home due to worries about their child's inability to communicate, their whereabouts, and their general safety. It is worth noting that because the literacy skills of most deaf students are quite limited, these students

are unable to communicate effectively with the larger community through print.

This project was designed as an initial foray into investigating the use of two-way text messaging technology as a way of increasing the independence of deaf adolescents and reducing their parents' anxiety about their safety and responsibility. Recent anecdotal accounts of the use of two-way text messengers suggests that, like electronic mail, distance communication problems that have long plagued deaf people may be overcome—or at least ameliorated—by the use of such technology (Rhone & Cox News Service, 2002).

Although there is no research base that has addressed these questions directly, Power and Power (2004) have reported on the rapid rise in the use of Short Message Service by deaf people in Australia and around the world. They noted that text messaging allows deaf people to text message both among themselves and with hearing people. The advantage that text messaging has over electronic mail (instant messaging, in particular) is that the equipment needed is compact, easily portable, and already in use by the hearing population. Furthermore, text messaging appears to have given rise to a new genre of writing in English, “with minimal or no syntax or tense and other morphological markers and a limited lexicon of phrases and messages familiar to senders and receivers” (Power & Power, 2004, p. 335), thus bypassing many of the difficulties that deaf students typically exhibit with English writing.

What follows is a brief review of the communication, social, and emotional development of deaf children. The point of this selective review, which is in no way comprehensive, is to suggest reasons why the development of independence skills is an issue in the deaf adolescent population. Research on the social and emotional development of deaf children repeatedly suggests that the crux of deaf and hard-of-hearing students' developmental challenges is communication, whether face to face, across distances (e.g., telephone), or through writing (see the following reviews: Marschark & Spencer, 2003; Moores & Meadow-Orlans, 1990; Paul, 1998). This communication challenge also manifests itself in delayed socialization because social skills depend so heavily on the ability

to communicate clearly and effectively with a wide variety of people.

Development of Socialization and Independence in Deaf Adolescents

Although it may appear obvious that deafness would have a negative impact on the development of spoken language, the communication difficulties that deaf children experience go far beyond a lack of spoken language. Teaching deaf children to read, what is fundamentally a spoken language, is extremely difficult and has not met with much success. With a median Grade 4 reading level among deaf high school leavers (Marschark, Lang, & Albertini, 2002; Traxler, 2000), it is not surprising that deaf adults sustain chronic underemployment and overall lifetime incomes substantially lower than for the normally hearing population.

Substituting sign language for spoken language has its own set of problems. Because hearing parents raise the vast majority of deaf children, they experience not only later language development but also language learning conditions that are less than ideal. First, their parents may not sign or may not sign well. Second, other than their teachers, they have very few adult language models. Third, their sphere of socialization is limited; they have each other—also immature language models. Deaf parents who sign can provide their children with better sign language models, (Erting, Presizio, & O'Grady Hynes, 1990; Siple, Akamatsu, & Loew, 1990; Swisher, 1991, 1993), but fewer than 5% of deaf children are raised by deaf parents. As well, it is also the case that deaf children of deaf parents experience delay with the development of both academic skills and socialization.

The effects of deafness and its consequent communication difficulties also spread to the development of social awareness and social skills. Deaf children raised by deaf parents have been found to have experienced more consistent parenting, effective communication, and less stressed social environments than deaf children of hearing parents (Greenberg & Kusché, 1987). However, the social milieu of all deaf children is necessarily limited to those who can communicate with them effectively. This has a negative impact on the development

of knowledge and skills that allow the development of social (and academic) independence (Greenberg & Kusché, 1987). Meadow (1976) intimated that the delay that many deaf children exhibit in the dependence of a variety of developmental skills might be the result of inappropriate attributions on the part of their parents. To wit, the parents may misinterpret the inability to hear and speak as the inability to do many other things. Moreover, several studies have shown that mothers of deaf children tend to be more controlling and “intrusive” in their interactions with their children, often because of their inability to communicate effectively through verbal means (see, e.g., Gregory, 1976; Lederberg, 1993). More recently, early identification of hearing loss and early intervention programs that include parent support and education have resulted in better parent–child communication and better child developmental achievements than a generation ago (Bodner-Johnson, Sass-Lehrer, Gatty, & Hafer, 2004).

The impact of a lack of depth and breadth of language and socialization opportunities also affects the mental health of deaf children and youth (Calderon & Greenberg, 2003). In their review of social and emotional development in deaf children, Calderon and Greenberg (2003) found that deaf children tend to be less socially mature and display more impulsivity than hearing children, possibly because they have not been taught to delay gratification, as their parents typically have not been able to explain the need to do so. They also display more egocentricity and lack the ability to take another person’s perspective. Research aimed at “unpacking” deafness, language/communication ability, and personality factors (e.g., the Providing Alternative Thinking Strategies model) suggests that deaf children are able to increase their ability to take another’s perspective, predict outcomes of social problem solving, engage in means–end problem-solving skills, emotional recognition, and frustration tolerance (Calderon & Greenberg, 2003; Greenberg & Kusché, 1993, 1998; Kusché & Greenberg, 1994). However, the Providing Alternative Thinking Strategies curriculum that Greenberg and Kusché (1993) used has not been widely researched outside their own group. This leaves a large number of deaf adolescents at risk for continued social immaturity and has implications for safety in childhood and adolescence.

This very brief review suggests that deafness and its consequent communication difficulties impacts the social and academic development of deaf children and adolescents in a number of ways, and it is not surprising that the parents of the deaf adolescents in our pilot study expressed concerns that have long been discussed in the research literature. This project aims to address these concerns, which center around the deaf adolescents’ development of independence and personal autonomy, while balancing their parents’ concerns for their safety and responsible decision making. Among normally hearing teenagers, the telephone becomes a lifeline through which they maintain social contact with both peers and parents. Because using traditional telephone service is not available to deaf students, teletype (TTYs)/minicomms are often not available or cumbersome at best, and cell phones do not work with TTYs, two-way text messagers might be a viable alternative for distance communication between deaf teens and their parents.

What Were the Issues That Suggested Using This Technology?

As has been summarized in the previous section, deaf and hard-of-hearing students are often delayed in developing their independent living skills because of parental restrictions on activities outside the home due to worries about their child’s inability to communicate, their whereabouts, and their general safety. This project was born out of addressing this concern. Five years ago, one of the researchers was the Head of the Deaf Department in a large urban high school. Parent/family workshops revealed parental concerns regarding the safety of their children because of difficulties with distance communication because the children were unable to call for help or access emergency services. Parents often worried about their children when they were not in direct contact with them. Moreover, if there was a change in plans, there was no way for the children or the parents to alert each other. This often resulted in social isolation of the children. This in turn left them with restricted opportunities for independent problem solving and socialization. Finally, the children’s demands/needs for privacy could often not be met due to these safety concerns.

Student concerns revolved around development of their own independence. It is worth noting that the literacy skills of most deaf students in this setting are quite limited and many are unable to communicate effectively through print. Because they were often accompanied and directly supervised by their parents at later ages than is typical in our society, students voiced dissatisfaction with their opportunities to make decisions for themselves, be responsible for their actions, and have some freedom.

Anecdotal reports suggest that in the adult deaf population two-way text messaging use is on the rise, indicating that two-way text messengers are fulfilling a communicative need (Rhone & Cox News Service, 2002). It would be reasonable to expect that the same positive benefit would accrue to students at the secondary level. We suggest that the use of two-way text messengers with students in high school settings might be one way to increase literacy, independence, and decision-making skills, which are all part of the secondary school curriculum. In our pilot study we want to examine this suggestion, and to our knowledge, this is the first attempt at studying two-way text messaging use in the deaf high school population in a systematic way.

Research Questions and Hypotheses

1. Will the students use the two-way text messengers, and to what extent will they use them? Before we can make any claims about independence and literacy skills, we need to establish whether the students will use the two-way text messengers. We expect that students will use this technology, but the extent to which they use it will depend on the literacy skills of both the students and their parents.

2. Does the amount of independence the students experience increase with two-way text messaging use? We expect that the students will be allowed to go out independently (i.e., without their parents) more often and more frequently if they use the two-way text messengers.

3. How satisfied are the students and parents with this technology? We hope that parents and students will be satisfied, but the extent of satisfaction will be dependent on their comfort level with the technology and, to some extent, their English literacy skills. We

also expect that the parents' concerns about safety will be alleviated somewhat with two-way text messaging use.

Rotary International has a history of working with this deaf program by providing technological devices such as vibrating alarm clocks and wristwatches, portable TTYs, and flashing light alarms and "doorbells." They also provided initial funding for translation of letters to parents who did not have English as a first language and contacts with both Motorola and Bell Canada. Motorola approved a donation of 250 two-way PageWriter 2000X Motorola text messengers, and Bell Canada donated 5 years of monthly services and maintenance and repairs. Together with the two school sites in the Toronto District School Board (TDSB) and research time and expertise from York University, this represents the largest educational partnership in the TDSB.

Nature of the Study

This study took place at two large inner-city public schools. At each school there is a deaf education department staffed by teachers of the deaf, interpreters, and educational assistants. On average there are between 30–40 students in the department in any given year. Students have the opportunity to take courses both within the department (in small classes with the teacher of the deaf) or in the mainstream with support services. These students represent multiple cultures and many come from homes where English is not spoken or not spoken much. Some of the students communicate orally and others via sign (or some combination of speech and sign), and many of the parents of these deaf students do not know enough sign language to communicate easily with their child. Moreover, the target student is typically the only deaf person in the family. As is the case with many deaf students, the literacy levels of the deaf students in this study are not commensurate with their hearing-age peers.

Participants in this study included (a) all deaf and hard-of-hearing students in the deaf and hard-of-hearing programs at the two high schools ($n = 48$; 21 girls, 27 boys), (b) the staff of the deaf departments at these two schools, and (c) the parents/guardians of the students. The students in this program ranged in age

from 13 to 19 (Grades 9–12). Access to special education programs in this geographic area may continue until the year the student turns 21, and so a few students chose to continue in this high school program beyond typical ages. The vast majority of these students had severe-to-profound congenital hearing losses and were being educated in congregated settings by teachers who were specially trained to teach this population. All the students had hearing parents, and many students came from homes where languages other than English were spoken. One of the high schools, which 16 of the participants attended, used a combination of signing and speaking for instructional purposes. The other high school only used speech for instructional purposes, although many of the students used a combination of signing and speaking to communicate among themselves. Some of the students in this latter school used speech exclusively. The staff at both schools included both deaf/hard-of-hearing and normally hearing individuals. All the parents were hearing.

Data were collected using three sources of information: (a) preuse surveys, (b) postuse surveys, and (c) frequency of use information provided by Bell Canada. This frequency information consisted of monthly statistics on the number of times each pager was used. This enabled us to chart how often the participants used the technology. (NB: We neither had access to the content of the messages nor to the identities of the people to whom the messages were sent.)

The main goals of the data collection of the first phase of this study are to identify concerns that parents have about student independence and safety, the extent to which deaf students engage in independent activities, and expectations surrounding how two-way text messaging use might increase independence and literacy skills.

Training Procedure and First Round of Data Collection

All participants attended an information session prior to receiving their two-way text messagers. This session occurred after school hours and was approximately 1 and 1.5 hr in duration. Simultaneous interpretation was provided in several languages (Turkish, Korean,

Farsi, Tamil, Cantonese, Punjabi, Urdu, Vietnamese, Russian, and American Sign Language), as requested by the participants. Informed consent letters were distributed to all potential participants describing the purpose of the study and what was expected of the participants. The researchers and school-based personnel were all at this meeting to answer any questions the participants might have had. By agreeing to participate in this study, each participating family received three two-way text messagers (one for the deaf student and one for each parent).

Preuse Surveys

Following the informed consent procedure, each participant filled out a pre-two-way text messaging use survey (see Two-Way Text Messaging Use Survey, Form A for Parents, Teachers/Office Staff, and Students in Appendix A). These surveys were generally completed in English, although some were filled out in other languages and back translated to English. Still others were filled out in English through the use of interpreters. This survey was designed to elicit thoughts on how the participants thought the two-way text messagers might be used prior to actually having any experience with them. However, because many students' reading/writing skills are weak, follow-up interviews were conducted in sign language to ensure that complete information was obtained. These interviews were videotaped for later transcription and translation. Once the investigators were satisfied that an accurate translation has been obtained, the videotapes were destroyed to protect the students' anonymity. This constituted the first round of data collection.

Following this, the two-way text messagers were handed out to the participants. Each family received three two-way text messagers—one for the deaf student, and one each for the parents. In case of single-parent households, only two two-way text messagers were distributed. As well, all of the staff members and the research team (the authors) received two-way text messagers.

Postuse Surveys

Following 4 and 9 months of two-way text messaging use, the participants were invited to a feedback

meeting to see if there were any changes about either their concerns or expectations based on experience with the two-way text messagers. They also filled out a second survey (see Two-Way Text Messaging Use Survey, Form B for Parents, Teachers/Office Staff, and Students in Appendix B), designed to elicit information on how the participants actually used their two-way text messagers. Clarification was sought for any unclear responses, particularly when English translations had been provided for the surveys completed in languages other than English.

What Have We Learned?

By the end of the first year of this project, some 43 students, their parents, and their teachers had joined the study. The data collection from all the participants was staggered because the two schools began participation in the project at different times. As well, given the shifting nature of school populations, differing numbers of students, parents, and school staff participated in the three rounds of data collection. The responses on the pre- and postuse surveys were examined for emergent themes.

Prior to using the two-way text messagers, both the students and their parents expressed concerns around personal safety. They needed to know that they would be able to contact each other in case of emergency. The parents wanted to be able to know where their child was, whom their child was with, and how to guide the child to safety if he or she got lost. With this in place, the students believed that they would be able to go out at night without their parents and to manage in case they got lost. The parents and staff reported that they were able to have direct communication with the students and other staff and parents who are deaf or hard of hearing. This eliminated some safety concerns regarding fire alarms and emergency procedures and contributed to ease of coordination of everyone's activities.

Although the parents naturally needed to know if their child's plans changed, they also were concerned if they would be able to contact their child if their own plans changed. They wanted to know if their child was going to be late coming home or whether their adolescent needed a ride. They were also concerned with

their adolescent's insistence on privacy when they were effectively out of contact with him/her.

Following both 4 and 9 months of two-way text messaging use, the overwhelming majority of the students expressed satisfaction with access to the technology. Only four expressed dissatisfaction. However, this dissatisfaction was not with the technology but with the increased levels of independence they wished they had. These students said that they would prefer to have "much more freedom," and they wished they could go out more often. In these cases the students were not accruing the anticipated benefits of the technology.

Students mentioned that they used their two-way text messagers not only to communicate with their parents, school staff, and each other but also for other things as well. For example, one student mentioned that the alarm function helped him remember to take his medication. Many students reported that homework assignments could be recorded. Others used their two-way text messagers to remind them of significant dates (birthdays, appointments with doctor, dentist, etc.) or to type out messages so that other hearing people could read them (e.g., restaurant orders, to call emergency services). This provided an incentive to improve their English.

Typical comments obtained in writing¹ from the students' surveys included the following:

- The pagers helped me to send my dad and my dad is less worry. After school I allowed to play basketball, ball hockey with friends.
- The pagers help me that alarm helps me to homework, meet friend, and birthday. Help me to remains medican, I feel good to help me the alarm. I feel more satisfied that I have often go out somewhere.
- [This technology] helps me to communication with hearing world and deaf friends. Parents get mad at me if I'm late. I inform them where I am.
- My mom lets me have more independence now that she has a pager to get a hold of me when she needs to. I'm very satisfied, I'm allowed to go out more now than before.

One student reported (through sign language) that he used to feel angry and did not have a sense of self-efficacy. Since learning how to use the two-way mobile

text messaging well, it is his main link to his friends. This is especially important as he goes out of the school on cooperative work projects. He has become an expert and is now helping to run further workshops for both students and parents. He has also become the troubleshooter for broken pagers that are sent to the equipment coordinator and has been able to identify problems and correct them so they do not need to be sent to the company for repair. He is also changing the software to update the equipment for the next workshop. As a result of his successful leadership in this area his self-esteem has increased remarkably. He has been assigned as a mentor and role model for an elementary school deaf student. This has been extremely successful for both students.

The parents were uniformly satisfied and were gratified that the two-way text messagers had been introduced to the program. They indicated that they were less worried about their children. One mother wrote:

My daughter, is a 13 year old and is currently leading a very busy life. She is in a theater group, she plays hockey and soccer and is learning to sail and canoe. You can imagine what it is like trying to keep up with her. As in most families life gets busy sometimes and miss[ed] communications tend to surface. The [text-messenger] has been invaluable. We have a system in place for checking in with each other every night after school. I can let her know if I am running late, or need to go food shopping. A_____ in return can let me know how much home work she has and what her after school plans are.

Other benefits that parents reported were being in contact with their child more often, being more aware of their child's movements, comfort knowing they could get in touch with their child at any time, and keeping connected to other people through e-mail. These were the very concerns that introduction of this technology were designed to address.

The staff, particularly the deaf staff, also expressed uniform satisfaction, stating that they were now able to coordinate schedules more easily and to contact each other. One staff member, who was in charge of cooperative education placements off campus, wrote "My Co-op students have many questions and concerns re-

Table 1 Wish list of improvement to two-way text messaging technology

Hook ups to phone-teletype relay service for contact with friends who do not have two-way text messagers
Internet, e-mail, instant messaging
9-1-1 access (direct to emergency services)
TV, movies
Digital camera
Graphic calculation
Webcam so we can talk to others with American Sign Language
Map of the city
Dictionary (American Sign Language-English, other languages)
More and different games
Make available in color (the current model is black/white)
Moveable cover
Block senders capability

garding their work placements. In addition to discussing issues in class, they contact me via . . . telephone and TTY, . . . e-mail, . . . [and] pager² system." It was also easier to communicate with the students and make them responsible for their whereabouts. For example, if a student was absent, an interpreter might not be needed for a particular class and was therefore free to work with another student or in the office. This information could be communicated easily via the pager.

As well, as part of this collaboration, Bell Canada has asked us to suggest design changes that would benefit deaf people in particular. Therefore, after 9 months of use, we asked the students to give us a "wish list" of improvement to the two-way text messaging technology that they would find helpful. This wish list is presented in Table 1.

Concluding Thoughts and Next Steps

In short, the participants love the technology. They describe its convenience (small size, no need to find paper and pencil) and the feelings of safety, freedom, and privacy that it allows.

The TDSB has purchased two-way text messaging devices for all staff working with the deaf and hard of hearing in the entire school board as a result of seeing the safety benefits to the student participants. The project was also extended to a group of Grade 8

students at the school for deaf children who were integrated into a nearby neighborhood (hearing) school. Although they began their day at the neighborhood school, they needed to report in to the deaf school prior to making their way to the neighborhood school. Consequently, they were often late for classes. In order to alleviate the time pressure on them, the students in were allowed to take the subway directly to the neighborhood school in the morning and use this technology to page the vice principal of the deaf school that they had arrived or if they were going to be late or absent. This has the triple benefit of developing personal accountability, commitment, and communication.

Moreover, the participants who left the school system, through graduation or changes of school placement, reported feeling angry and sad that they had to return the two-way text messagers. One student reported that with the text messenger, she was allowed to take the subway independently because her parents felt that she could be contacted and that she could communicate her safe arrival. Other students who had participated but who had moved to other schools wrote to request that the project be started at their new school.

That said, the frequency of two-way text messaging use is highly variable, ranging from a handful of messages to several hundred per person per month. Given the small number of participants and the high variability in frequency of two-way text messaging use, it does not make sense to talk about “average” frequency. We do not know the reasons for this variability, but speculate that to some extent, individual students’ literacy levels might influence how likely they are to use the two-way text messagers in the first place. However, we need to analyze further the relationship between literacy levels and two-way text messaging use. Several students did mention that the two-way text messagers motivated them to improve their reading and writing skills. A key focus for our continued research will be a consideration of the ways in which the students used text in their messages, to examine some of these texts, and to determine how students’ reading and writing levels come to bear on their use of the pager. One of the challenges of moving into this aspect of the research is concern with the

confidentiality of the messages and the expectation of privacy that participants have. We are currently exploring options as to how we can ethically access this sort of data.

It is also possible that parents’ needs to keep track of their children might have an influence on how often a student pages the parents and vice versa. Further, we know that some of the students were able to use a regular phone (with amplification), and they might be choosing to use the phone for certain purposes and the pager for others. Other students, usually those with greater hearing losses, might be using the pager exclusively. This would also impact on the frequency of two-way text messaging use.

Low English literacy levels among many of the families may also have influenced frequency of use within the family. However, it did not stop parents from communicating as best they could in English. For example, one parent reported “it changed us better to have pager like to contact my son from pager. It did help us pagers and it helped us to know where my son is.”

Additionally, English difficulties did not stop the students from paging each other, resulting in one two-way text messenger within a family recording far more calls than the other two-way text messagers in that family. The students did express a wish for other languages (by which they meant orthographic systems such as Cyrillic, Chinese, and Tamil) to be available on the two-way text messagers.

What Are the Policy Implications of This Research?

The data collected on this project to date confirm that two-way text messaging technology is indeed useful for deaf adolescents and helps alleviate some of the concerns that have kept them from developing independence as quickly or readily as their hearing peers. There are potential policy implications for this research that need to be considered. It is the case that teachers are required to write Individual Education Plans (IEP³) for the vast majority of deaf/hard-of-hearing students in the education system. One of the central features of the IEP is making note of the accommodations that must be provided for any

particular student to access the program and to be successful. Typically is it under the heading of accommodations that individualized equipment is identified. This includes “any type or item of equipment or any electronic product or system, whether commercially produced, adapted or custom-made, that the student needs,” and would include technologies like sound field systems, TTYs, and signaling devices (Ontario Ministry of Education, 2004, p. 28).

If it can be shown that text messengers afford students access, in the way that other technologies have done, then it would be reasonable to suggest that two-way text messengers should be added to this list of recommended accommodations. In fact, there is an expectation that “in addition to established accommodations, new strategies and assistive devices are constantly emerging as teaching practice is enhanced through new research and technological innovations” (Ontario Ministry of Education, 2004, p. 28). As well, an aspect of adding two-way text messengers to this list would be an expectation that they would be made available and funded by the school system. As recently as May 2005, the Expert Panel on Literacy and Numeracy Instruction for Students with Special Education Needs (Ontario) recommended that all school boards needed to create institutional structures that support responsible use of assistive technology. They went further to suggest that stating how assistive technologies are used should be a mandatory part of each district school board’s special education plan (Ontario Ministry of Education, 2005). If one accepts that this attitude is representative of other large education systems, it seems clear that further research on the use of newer technologies with the school-age population is warranted.

To extend the policy implications beyond the school board, an argument for the funding of two-way text messengers through Assistive Devices Programs could also be made. In a climate where the rights of persons with disabilities have become central to public discourse, there is a place to think about the ways in which two-way text messengers and other such technologies provide access and remove barriers for deaf/hard-of-hearing individuals.

What began as a little pilot study to see whether high school deaf students would use a two-way text

messaging system has expanded to include middle school deaf students and deaf staff. The demand for the system has spread to another school with deaf students (in a different school board) based on word of mouth. It would appear that this technology has much to offer deaf students and is making an impact beyond what it was originally designed to address either by the manufacturers or by this study.

Appendix A: Preuse Survey

Parent Form A

1. What concerns about safety do you have with respect to your son/daughter?
2. Other than to school, where does your son/daughter go independently?
3. How often does your son/daughter go out alone? With friends?

Alone	With friends
a. very often	e. very often
b. often	f. often
c. sometimes	g. sometimes
d. never	h. never

4. How do you think two-way text messengers will help alleviate some of these concerns?

Demographic Information

Age of your deaf child:

Gender of your deaf child: male female

Language in which this interview took place:

Please rate your English skills:

Speaking	Listening	Reading	Writing
Poor	Poor	Poor	Poor
Fair	Fair	Fair	Fair
Good	Good	Good	Good
Excellent	Excellent	Excellent	Excellent

Student Form A

1. What problems do you have with your parents around your independence?
2. Where are you allowed to go by yourself?
3. Where are you allowed to go with friends?

4. Are you satisfied with how often you are allowed to go out?

- a. very satisfied
- b. satisfied
- c. not very satisfied
- d. very dissatisfied

5. If “no” to question 4—Would you prefer to be able to go out independently more often? How much more? Where to?

Demographic Information

Your age:

Language in which this interview took place:

Are you a boy or girl?

Please rate your English skills:

Reading	Writing
Poor	Poor
Fair	Fair
Good	Good
Excellent	Excellent

Two-Way Text Messaging Use Survey—Teacher Form A

1. What concerns about safety and independence do you have with respect to your students?

2. How do you think the two-way text messagers will help alleviate some of these concerns?

Demographic Information

Your gender: male female

Age(s) of your deaf students:

Your hearing status: deaf hard of hearing hearing

Appendix B: Four-Month Postuse Survey

Parent Form B

1. What concerns about safety do you still have with respect to your son/daughter? Are there any new concerns?

2. Have the two-way text messagers helped alleviate some of these concerns? If so, how?

3. Other than to school, where does your son/daughter go independently?

4. How often does your son/daughter go out alone? With friends?

Alone	With friends
a. very often	e. very often
b. often	c. sometimes
d. never	f. often
g. sometimes	h. never

5. What changes to the two-way text messagers would you like to see?

6. Have the two-way text messagers helped you (or your child) in any other way(s)?

Student Form B

1. What problems do you have with your parents around your independence?

2. Where are you allowed to go by yourself?

3. Where are you allowed to go with friends?

4. Are you satisfied with how often you are allowed to go out?

5. If “no” to question 4—Would you prefer to be able to go out independently more often? How much more?

6. What changes to the two-way text messagers would you like to see?

7. Have the two-way text messagers helped you in any other ways?

Teacher Form B

1. What concerns about safety and independence do you still have with respect to your students?

2. Have the two-way text messagers helped alleviate some of your original concerns?

3. Have any new concerns developed?

4. What changes to the two-way text messagers would you like to see?

5. Have the two-way text messagers helped you (or your students) in any other ways?

Appendix C: Nine-Month Postuse Survey

Parent Form C

1. What concerns about safety do you still have with respect to your son/daughter? Are there any new concerns?

2. Have the two-way text messagers helped alleviate some of these concerns? If so, how?

3. Other than to school, where does your son/daughter go independently?

4. How often does your son/daughter go out alone? With friends?

Alone	With friends
a. very often	b. often
c. sometimes	d. never
e. very often	f. often
g. sometimes	h. never

5. What changes to the two-way text messagers would you like to see?

6. Have the two-way text messagers helped you (or your child) in any other way(s)?

Student Form C

1. What problems do you have with your parents around your independence?

2. Where are you allowed to go by yourself?

3. Where are you allowed to go with friends?

4. Are you satisfied with how often you are allowed to go out?

5. If “no” to question 4—Would you prefer to be able to go out independently more often? How much more?

6. What changes to the two-way text messagers would you like to see?

7. Have the two-way text messagers helped you in any other ways?

Teacher Form C

1. What concerns about safety and independence do you still have with respect to your students?

2. Have the two-way text messagers helped alleviate some of your original concerns?

3. Have any new concerns developed?

4. What changes to the two-way text messagers would you like to see?

5. Have the two-way text messagers helped you (or your students) in any other ways?

Notes

1. These were taken verbatim from the surveys.

2. Among the school staff, the two-way text messenger system was often referred to as the “pager system.”

3. An IEP contains “specific educational expectations, an outline of the special education program and services that will be received; a statement about the methods by which [a] child’s progress will be reviewed; and for students 14 years and older (except those identified as exceptional solely on the basis of giftedness), a plan for transition to appropriate post-secondary school activities, such as work, further education, and community living. The IEP must be completed within 30 school days after [a] child has been placed in [a Special Education] program, and the principal must ensure that [parents] receive a copy of it” (Toronto District School Board, 2004, p. 3).

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