Loughborough University

This item was submitted to Loughborough's Research Repository by the author.
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

Tactile communication in the home environment

PLEASE CITE THE PUBLISHED VERSION

PUBLISHER

© Taylor & Francis

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Ball, Elizabeth, and C.A. Nicolle. 2019. “Tactile Communication in the Home Environment”. figshare. https://hdl.handle.net/2134/2306.

TACTILE COMMUNICATION IN THE HOME ENVIRONMENT

Elizabeth Ball and Colette Nicolle

Ergonomics and Safety Research Institute (ESRI)
Loughborough University, Holywell Building
Holywell Way, Loughborough, Leics, LE11 3UZ, UK

Communication is a crucial part of home-life. It includes interactions, both face-to-face and remotely, with others living in the household, friends/relatives and service providers. Effective communication in these, and other situations, is important to quality of life.
Deafblindness has a profound impact on communication. This paper considers some of the issues that arise when using English-based tactile communication and the implications for the home environment.

Deafblindness

Deafblindness is a combination of vision and hearing impairment, which causes difficulties with mobility, communication and access to information (Department of Health, 2001). The majority of deafblind people have some residual vision and/or hearing, which is sufficient to enable them to communicate aurally using speech or visually using sign languages. A minority of deafblind people have such severe vision and hearing impairments that they rely on tactile communication. This paper focuses on methods of tactile communication that are based on spoken languages.

There are two dominant approaches to attempting to address the communication needs of deafblind people, both of which take a content-focused, information processing view of communication. The rehabilitation approach internalises the problem to the deafblind person and attempts to treat and train the individual. The access approach externalises the problem in situational barriers and attempts to remove these. However, in many situations, especially within the home environment, communication is about more than the transmission of content—it is about relationships. Thus relational aspects of communication must be considered when evaluating tactile communication.

Communication in the home environment

Effective communication is crucial to quality of life. It forms the foundations of healthy family relationships and friendships, which are important to well being. Relationships may break down

completely if communication is disrupted (Aguayo, 1999).
Communication is also important for interactions between service users and providers and for educational and vocational achievement and fulfilment. With an increasing number of services being offered to users in their own homes (e.g. home delivery of shopping) and increased opportunities for home-based learning and employment, effective communication in the home environment may become even more important and influential on an individual's overall quality of life.

English-based tactile communication

The two most widely used methods of English-based tactile communication are Braille and fingerspelling.

Braille is a form of tactile writing. Refreshable Braille displays enable deafblind people to access computers. Thus Braille can be used for distance communication, such as email or text-telephony. It can also be used for face-to-face communication if the speaker, or a language support professional, types onto a computer keyboard and the deafblind person reads from a refreshable Braille display—a form of speech-to-Braille reporting. Potentially, Braille could be used with automatic speech recognition.

In fingerspelling, each letter of the alphabet has a sign, which is felt against the hand. The speaker, or language support professional, spells out each word, letter by letter, onto the deafblind person's hand. In the United Kingdom, the most widely used form of tactile fingerspelling is the deafblind manual alphabet. Fingerbraille is a form of fingerspelling, which is rarely used in this country, but which warrants mentioning because of its potential for overcoming a major drawback of other forms of fingerspelling. The speaker or language support professional taps the deafblind person's fingertips as though they were the keys of a brailler. This enables all Braille contractions and abbreviations to be used. Thus, it increases brevity, maintains clarity and increases speed, relative to other forms of fingerspelling.

Tactile communication: is it effective?

Many issues arise when using tactile communication. Here we focus on four areas: attitudes, concurrent tasks, speed and nonverbal communication.

Attitudes

The British are well known for our inhibitions about touching. For some people, discomfort with using touch acts as an attitudinal barrier to the use of tactile fingerspelling. These people insist, if they have to communicate at all with a deafblind person, that it is done through a language support professional or using Braille, thus eliminating the need for physical contact.

Concurrent tasks

One of the most immediately obvious issues with tactile communication is that it occupies the hands. Thus it becomes impossible to do much else whilst communicating.
In the case of doing research interviews, a deafblind interviewer cannot take notes whilst using fingerspelling. Thus, if having notes is important, speech-to-Braille may be the better option, as the transcript can be saved. In the home environment, it becomes impossible to have conversations over meals or whilst engaged jointly in other activities. This inevitably alters the experience and may negatively impact upon the relationship.

Where there are more than two people present, including everyone equally in the conversation becomes difficult. Particularly if the deafblind person has their hands otherwise occupied, others may talk amongst themselves leaving the deafblind person out. If the deafblind person is included

in the conversation, the person communicating to him/her must simultaneously voice the words for the benefit of others. Whilst some people find this easy to do, even helpful, others find it difficult.

Speed

Compared to speech or sign languages, both fingerspelling and Braille are slow. In the case of fingerspelling, Reed, Delhorne, Durlach and Fischer (1990) showed that at speeds of up to 5 letters per second, which equates to approximately a quarter of the speed of speech, fingerspelling could be received with high accuracy of 80-100%. However, accuracy of reception fell as speed increased or complexity of sentences increased. The exception to this is fingerbraille. In Japanese, fingerbraille can be received at approximately seven-eighths of the speed of speech (Hoiuchi and Ichikawa, 2001). In the case of Braille, Hislop (1984) showed an average paper-based Braille reading speed of 126 words per minute. Most refreshable Braille displays have larger Braille cells and dots than paper-based Braille. Enlarged Braille letters slow down reading (Millar, 1977). Additionally, as Stuckless (1994) points out using QWERTY keyboard entry, it is impossible to enter text at the speed of speech. Thus speech-to-Braille though faster than most forms of fingerspelling, is still slower than speech.

Using slower methods of communication may have a number of consequences. Amongst them is that overall less communication may take place. This may sometimes mean whole topics are avoided. Often it means that summarisation is used. Adjectives are usually the first to go. A person who responds to nouns without the adjectives loses relational ground.

A further consequence of using slower methods of communication, especially if through a language support professional, is that there are inevitable gaps between the speaker finishing and the deafblind person receiving and responding. These gaps seem to cause a great deal of discomfort. For example, in a focus group involving a deafblind researcher using speech-to-Braille and four participants, three of the participants found the gaps so disconcerting that they refused to go ahead with the discussions. Gaps disrupt the flow of communication and relational ground is lost.

In the home environment, not only may slower communication lead to less communication and the loss of relational ground, it may also lead to interactions being broken off prematurely which may not only adversely affect the relationship but also prevent a deafblind person from giving or requesting further information.

Nonverbal communication

Nonverbal communication and context are critical to full understanding. Relational ground is lost, inclusion and control suffer, and little pleasure is realised, if nuance is not picked up, if emotional overtones are missed or sarcasm is taken seriously, for example.

Braille is a purely text-based system. Thus, it fails to transmit nonverbal communication, such as gaze, gestures and tone of voice (Fox, 1999). Communication, especially socio-emotional communication, is less effective in purely text-based systems (Sproull and Kiesler, 1991). Consequently, signals needed to understand the conversation, cues for turn taking and context may be missing. Frustrations and misunderstandings abound and development of relationships is impeded (Spears and Lea, 1992).

Unlike Braille, fingerspelling is capable of transmitting at least some nonverbal communication. Some emotions, such as shock, tension or laughter can be felt. Hoiuchi and Ichikawa (2001) showed that timing structure, that is, duration of touch and gaps between characters, is used to add emphasis and meaning in fingerbraille. The same is true of the deafblind manual alphabet, in the author's experience. However there is still a need to ensure that adequate cues about words, nonverbal communication and context are transmitted (Fuglesang and Mortensen, 1997). Interestingly, in the author's experience, speakers often underestimate how much nonverbal communication can be picked up through fingerspelling.

This has important implications for communication in the home environment. The use of Braille is likely to lead to less effective communication, misunderstandings, frustrations and

inhibited relationship building. Yet, Braille is sometimes the only option: a visiting service provider, for example, is unlikely to be able to fingerspell but may be able to type or, in the future, to use automatic speech recognition systems, to communicate through Braille.

Considerations for designing home environments

Both the systems of English-based tactile communication commonly used in the United Kingdom, Braille and fingerspelling, have strengths and weaknesses. As a result, they are appropriate for different types of tasks.

Braille is well suited to tasks that require large amounts of factual information to be transmitted, but poorly suited to tasks where there is a high socio-emotional content.

In contrast, fingerspelling is relatively well suited to tasks involving high socio-emotional content, but poorly suited to tasks where speed matters or where either of the communicators feels uncomfortable about physical contact.

Consider, as examples, the following pairs of tasks. Within each pair, the topic and situations are similar. However, the first task (a) involves primarily factual information, therefore, most likely to be suitable for using Braille. The second task (b) involves a higher socio-emotional content and is, therefore, most likely to be appropriate for using fingerspelling.

1. a) Discussing instructions for cooking a recipe.
   b) Discussing how much a meal was enjoyed.

2. a) Accessing a broadcast news bulletin.
   b) Accessing a broadcast drama.

3. a) Talking to a social worker about the community care assessment process.
   b) Talking to a social worker about social care needs during a community care assessment.

4. a) A conversation with a partner about details of the travel arrangements for a holiday.
   b) A conversation with a partner about where you both want to go on holiday.

Currently, the most accessible home environment, with respect to tactile communication, would be one which enables communication partners to choose which method of communication is most appropriate to the task. Both systems, it seems, have their strengths and weaknesses, so must be used in combination for the best overall result. However, this is often not practical and is rarely achieved.

Often, communication is viewed simply as the transmission of information and the relational aspects are overlooked. This, combined with the facts that technology can support Braille and that strangers can usually type but can rarely fingerspell, has led to a tendency for Braille to be used more and more. Due to its limitations in relational communication, we must, it seems, be cautious not to overuse Braille-based technological solutions to deafblind communication.

However, technology may have much to offer in the future. To be most useful, technologies would need to not only interpret verbal information (speech recognition), but also nonverbal information. Both the verbal and nonverbal information would need to be transmitted in a tactile code that can be received at high speeds. Both of these issues need substantial work before technologies of this type could be of significant benefit to deafblind people.

Future work is needed to try to develop a method of English-based tactile communication, high and/or low tech, which combines the strengths of both Braille and fingerspelling and overcomes the weaknesses of both. The ideal system would be usable by strangers, socially acceptable and fast. It would provide quality verbal and nonverbal information and serve both the informational and relational purposes of communication.

References

Aguayo, M. 1999, *Rehabilitation of deafened adults: a puzzle with missing pieces*. Unpublished MSW thesis. Waterloo ON Canada: Wilfrid Laurier University

Department of Health 2001, *Social Care for Deafblind Children and Adults*. LAC, **8**

Fox, B. 1999, Directions in research: language and the body. *Research on Language and Social Interaction*, **32**, 51–59

Fuglessang, L. and Mortensen, O.E. 1997, Communicative Strategy—Including transfer to tactile mode. Plenary presentation at the *4th European Conference on Deafblindness*, Madrid, Spain, July 1997

Hislop, D. W. 1984, *Characteristics of tactual reading by blind optacon and Braille readers*. Doctoral dissertation, University of Illinois at Chicago. Dissertation Abstracts International, **45**(02B), 0799

Hoiuchi, Y. and Ichikawa, A. 2001, Teletext receiver by fingerbraille for deafblind. In *Proceedings of CSUN 2001 Conference on Technology and Persons with Disabilities*, California State University, Northridge

Millar, S. 1977, Tactual and name matching by blind children. *British Journal of Psychology*, **68**, 377–87

Reed, C.M., Delhorne, L.A., Durlach, N.I. and Fischer, S.D. 1990, A study of tactual and visual reception of fingerspelling. *Journal of Speech and Hearing Research*, 786–797, USA

Spears, R. and Lea, M. 1992, Social influence and the influence of the 'social' in computer-mediated communication. In M. Lea (ed.), *Contexts of computer-mediated communication* (Harvester Wheatsheaf, New York), 30–65

Sproull, L., and Kiesler, S. 1991, *Connections*: *New ways of working in the networked organization*, (MIT Press, Cambridge, MA)

Stuckless, E.R. 1994, Developments in real-time speech-to-text communication for people with impaired hearing. In M. Ross (ed.) *Communication Access for Persons with Hearing Loss*, (York Press, Baltimore MD), 197–226