The Integration of Social-Haptic Communication in Deafblind Interpreting and Educational Settings
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Social-Haptic Communication
History, Research and Applications

Riitta Lahtinen
Tampere University, Finland

Russ Palmer
Tampere University, Finland

Abstract This essay focuses on the origin of the social-haptic communication (SHC) from early 1990's to the present day, research and applications during the past 30 years. SHC includes a glossary of various haptices that are organised into sub-groups. These vocabularies of haptices have been analysed. Each haptice consists of haptemes, the grammar elements of SHC. SHC can be used with acquired and congenitally deafblind people in different parts of the body. Lahtinen (2008) defined haptices as touch messages that allow two or more people to interact and share their experiences of the visual, auditory and haptic world holisticly and systematicly.

Keywords Deafblindness. Social-haptic communication. Haptic. Haptice. Hapteme. To haptier.

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1 Introduction

Deafblindness causes challenges in many areas of everyday life; in communication, mobility, receiving information and everyday activities. Congenital deafblind people often have other additional complex needs that can challenge learning and independent living (Nordic Welfare Centre 2018). Deafblindness varies a lot between individuals, and their communicative means and combinations thereof may vary. Communication methods vary depending on the usability of senses in them. Some exploit their residual hearing by using individually tailored hearing aid devices (spoken language, clear speech), while others use visual perception (lipreading, visual signing, written text) in combination with sense of touch (Braille, manual alphabets, tactile fingerspelling, tactile signs and sign language). When moving around, people use technological equipment, such as navigation tools, either via mobile phones or as an addition to the more traditional aid such as the red and white cane. When vision and hearing change and deteriorate, other modalities such as touch/tactile, kinaesthetic, smell and taste become vital. The combination of tactile and kinaesthetic information is called the haptic modality, with touch information being only one part of the haptic system. The haptic modality presents the framework for social-haptic communication (SHC) research, because movements are key to understanding the basic elements of the SHC, haptices and haptemes.

We, the authors, share haptices every day. They change according to situations, activities and communication methods we use at that moment. We use spoken language, tactile signs, tactile fingerspelling, block letters, objects and haptices together simultaneously. Sometimes we use haptices independently. This is possible because of the fundamental elements of SHC, defined as haptemes. This grammar of haptices allows new haptices to be constructed in a new situation.

Haptices can be used (haptiered) sequentially or simultaneously (i.e., different haptices at the same time). The SHC approach includes shared experiences of language and environmental information based touch and body movements as well as orientation. For us, in the last 30 years SHC meant sharing additional information independently. SHC allows the linking of many haptices to build a social-haptic sentence as follows: "We are at the doorway of a classroom. In front of you, we have five rows of chairs. The teacher's table is at the front of the room. On your left side there is table with coffee" (Lahtinen, Palmer 2005; Palmer, Lahtinen, Ojala 2017). Haptiering is a part of our multimodal communication and language approach.

2 Social-Haptic Communication: The History

Until 1990s, there were no studies on touch messages. The research on this touch field and how people share information with these messages, later defined as haptices, started from the material available. There was some material on how to use block letters, various fingerspelling systems and tactile sign language. But there was less information on how we produce and receive touch in general and touches in particular onto the body. Touch has been mentioned in some biographies and case study articles of individual acquired and congenital deafblind people. During the first author's early years as a sign language interpreter and teacher of different communication methods in the 1980s, she observed and analysed how deafblind couples and family members were using touch messages between themselves. Many times, they were not aware of using them because touch is a natural way of being in contact with their deafblind family member.

The first time the authors became aware of using touch for telling something important was identified in 1992. Russ did not have his hearing aids on during a fire alarm drill. This made us realise how important carrier of information touch is in an urgent situation where visual and auditive modalities/sight and hearing communication are not an option. Figure 1 demonstrates the international emergency X-haptice onto the back done with a finger or the whole hand (Lahtinen 2008, 189).

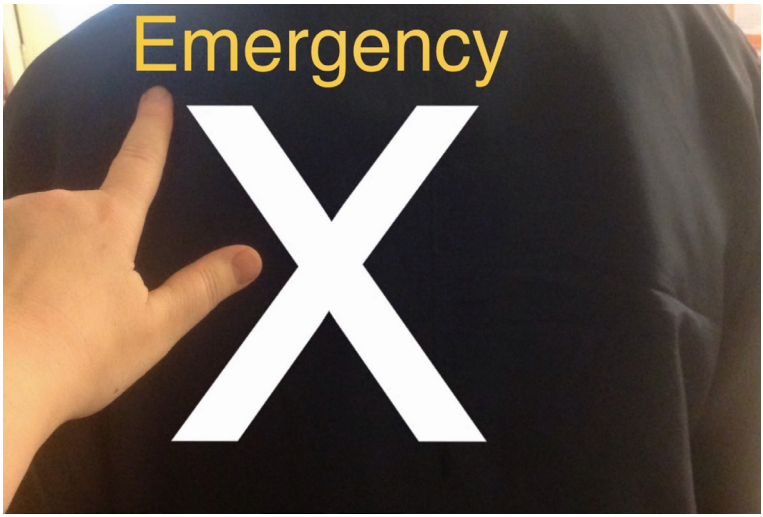

Figure 1 International emergency X-haptice onto the back

Research by the first author (Lahtinen 2008) started in 1991, when touch messages and the haptic framework was introduced to a professor at the University of Helsinki. He commented that if we want to develop it into a philosophy and design the methods for it, it will take about 20 years. He was evidently correct, as the doctoral dissertation was published in 2008 with the title *Haptices and Haptemes. A Case Study of Developmental Process in Social-Haptic Communication of Acquired Deafblind People*.

The first lecture at a conference and the paper published in the proceedings was entitled "Communication with Usher People". This was in 1993 at the Deafblind International conference in Potsdam, Germany. This article was later translated into seven other languages (Lahtinen, Palmer 1994). This focused on how the YES- and NO- and directional-haptices could be produced and received in interactions between a deafblind and a hearing-sighted person in a social situation. This was the beginning of social-haptic communication and it was well-received by the conference audience. The development of SHC over the years has been documented in many publications, articles and books.

During Russ' music therapist studies at Sibelius Academy in Helsinki, Finland in the mid 1990s, one lecture turned out to be a defining moment for the SHC research. All the lectures were in Finnish, which needed to be translated into English spoken language. Nobody was allowed to speak during the lecture and the lighting was dim, so the only available means of communication that remained was through touch. In the end of Guided Imaginary Story, we realised that touch was enough for telling the story given by the lecture: summer, warm weather, seaside, walking on the beach, etcetera.

Afterwards at home, The Body Story concept was born out of the analysis of our experiences during that important lecture, that is, a body-based storytelling technique that improves communication, relaxation and contact with sensory impaired people. The book includes not only the insights from that analysis but also 10 years of practical exercises, feedback and analyses of touch messages with deafblind people, their family members, volunteers and interpreters in different countries. We produced our first book and DVD The Body Story, Creative Musical Images through Touch in 2005 (Lahtinen, Palmer 2005).

From the beginning, it was clear that people with frequent contact with deafblind people would be a very valuable source of information for testing and giving feedback of using haptices. We met many deafblind people, their co-habitants and professionals in the field. The work began with arranging workshops in different countries, such as UK (1993), Finland (1995), Sweden (1996), Norway (1997), Switzerland (1997), Denmark (1998), France (2000), The Netherlands (2007), Italy (2010), Canada (2010), Australia (2010) and Brazil (2015).

Those early days, we were introducing the first level of haptices and analysing how deafblind people understood them. We were trying to identify if there were differences across the countries dependent on the relation between sign languages and cultures. In the Nordic countries, the sign language deafblind communities were strong and had support from their deafblind organisations. This formed the basis for their diverging haptices but within the social-haptic framework. Simultaneously, it emerged that some of these initial ideas were redefined under different names such as haptic signals and haptic communication, resulting in some confusion even to date. The Social-Haptic Network (`https://www.deafblindinternational.org/social-haptic-network/`) held its first international seminar "Touch You, Touch Me" in 2010 in Helsinki, Finland.

3 Terminology and Definitions of the Haptic Framework

The first academic publication in the field was Lahtinen (2003), where she studied how haptices (at the time they were referred to as YES and NO-signals) are used to give and receive feedback in a conversation framework. The study shows the adaptability of haptices for the first time. We can haptier them on various parts of the body, and the size of the haptice is irrelevant in feedback so it may be condensed to improve efficiency in some cases. We can haptier confirmations using 1, 2, 3, 4 or 5 fingers, and the meaning is the same (condensation). Feedback confirmation haptices show that location and handshapes are not as important as in visual sign language, that is, the message prevails despite location and haptic form changes. It also revealed how basic movements in haptices copy the body's innate iconic movements. This started the evolution of haptices as a system.

Social-haptic communication research is operating in the haptic framework. The haptic framework provides a wide understanding of how tactile, kinaesthetic (movement), and proprioceptic information are used together **[fig. 2]**. Haptic exploration is defined as a person's contact to the environment through hands, feet and whole body. Haptic signals are delivered by a technical device as a part of haptic communication. Haptic communication and information are received individually through various technical devices. For example, a joystick may give one haptic force-feedback when playing a game.

Social-haptic communication is the interaction between two or more people in a social setting using haptices. Haptices are touch messages, which can be haptiered onto different body areas as agreed. Haptiering means producing and receiving haptices, where both parties are involved in improving the quality of information during a conversation or spontaneous activity. During the interaction,

they are able to gain a holistic experience of the visual and hearing environment. Within the smart clothes research, haptices can be relayed from a distance using wireless technology **[fig. 2]**. This is an area where haptic and social-haptic communication are combined to experience haptices onto the body, which can be defined as mediated social-haptic communication through smart clothes (Holt, Palmer, Lahtinen 2025).

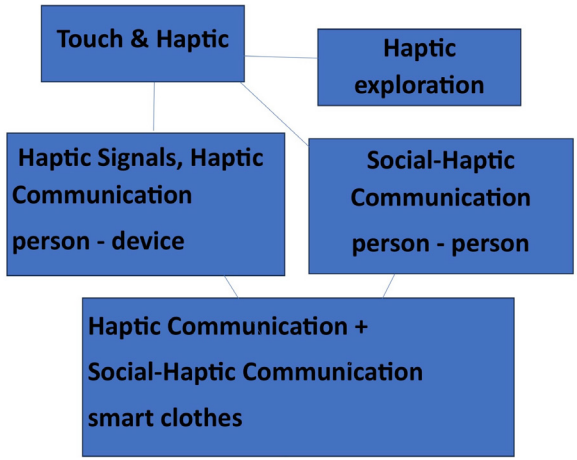

Figure 2 Concepts of touch, haptic, haptic exploration, haptic signals, and social-haptic communication

4 User Groups and Origins of Haptices

SHC can be used as an independent language or provide additional information when combined with auditive (speech) and visual languages (signing) or other communication methods.

For the authors, SHC is conceptualized as a language in the situations and contexts when spoken or sign language is not needed or is not used. This is based on decades of practice using touch constantly and experiencing touch as a native user. Many students who learn certain limited agreed haptices use by their family members or professionals call SHC as a method of communication. For them, haptices give additional information when also using spoken or sign languages. SHC is recorded to be used with deafblind people in different countries who use

- spoken languages, clear speech,
- visual sign language, narrow visual frame signing and tactile sign languages,

- written modality, such as block letters, manual alphabets, various fingerspelling methods, Braille, speech-to-text,
- pictures, such as drawings, photos, pictogrammes,
- body gestures.

Teaching social-haptic communication started in the late 1990s at the Department of Special Education in the University of Helsinki, Finland. SHC was introduced for interpreting education in Finland around the same time and approved officially in the curriculum for those qualifying as interpreters for the deafblind in the early 2000s. Each deafblind person has their own personal interpreting profile that outlines the communication, guiding and description methods they use. This also includes social-haptic communication. During the COVID-19 pandemic, social-haptic communication was introduced as an online course for professionals, researchers and deafblind people with their interpreters or personal assistants. It was clear that teaching SHC online had its challenges, as it is challenging to understand how to experience haptices without physical contact.

SHC started to be used and applied to other user groups such as people with learning disabilities, staff working with the older people and people with dementia and those in palliative care. Currently, the users also include various other communication disorders and disability groups, especially therapeutically or within teaching framework. Haptices are produced by haptiering what was previously described as drawing onto the body. Haptices are based on (Lahtinen 2008):

- body movements (laughing, stop),
- orientation (directions),
- function and activities (walking),
- written language and letters (T-switch, telecoil function),
- adapted visual signs and sign language (coffee),
- visual perception (shapes),
- auditive sounds (music),
- haptic bodily experiences, vibrations (music).

When signs are converted into haptices, their grammatical structure changes. Touch and the kinaesthetic sense form a distinct channel for receiving messages that are different from visual or auditive ones. This is the reason why sign language signs undergo modifications when they are used as haptices.

5 Social-Haptic Subgroups, Research Areas and Lexicons

Haptices share our non-verbal information, visual, auditive and haptic information, also known as environmental description, in real-time. The iconicity of some haptices makes them universal. Haptices as I AM HERE or I LEAVE and haptiering different shapes (circle, line, square) onto the back are understood similarly in many countries. Haptices can be grouped into several subgroups used in a particular situation or by a specific group of professionals. During more than 30 years of using haptices daily with deafblind people, these different subgroups of haptices have expanded.

These subgroups include haptices that share social information such as facial expressions, emotions and behaviour. Facial expressions are relayed by a subsystem known as Emotional Response Hand (Lahtinen, Palmer, Lahtinen 2010), by which individuals can share their own feelings, or describe other people's facial expressions. These can be SMILE, LAUGHTER, ANGRY, TEARS and so on. This is an adaptive and creative way of sharing expressions onto different part of body as the receiver's face is not recognised as a neutral area for touch. People's body movements are copied and haptiered by WALKING/STANDING-haptices and their variations. Figure 3 illustrates these different lexicons.

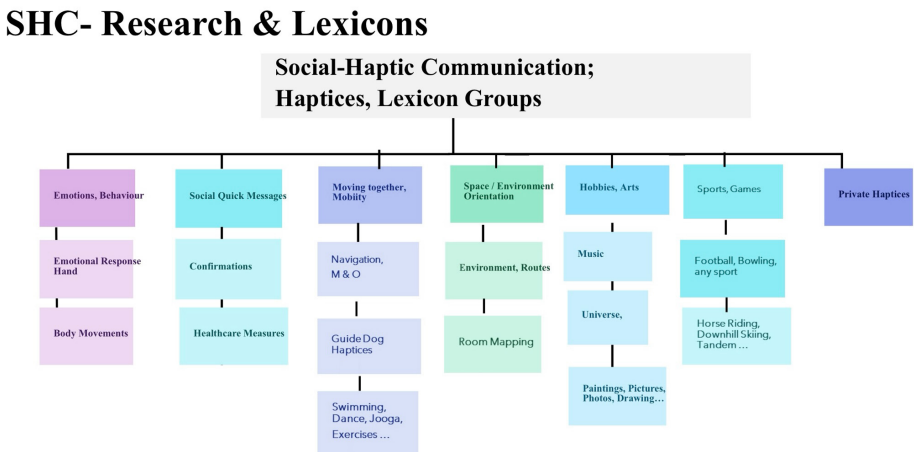

Figure 3 Social-haptic communication lexicon groups and research areas (Lahtinen 2008, 53)

Social quick messages are functional, every day haptices, which we usually teach first for deafblind people and family members. They are for example initiating and maintaining contact (I am here, I stay

here), turn-taking, leaving the personal area and identifying a person (bodyname-haptice). YES and NO-haptices are tapping and sliding movements respectively onto the hand, lower arm or onto the side of a leg or a person's back, depending on the body positions. That was also the first stage in the initial development of the confirmation haptices. In the next phase, the double hands-on confirmations started to evolve.

The directional haptices show the direction the other person is approaching from, giving the deafblind person the chance to react or offer a greeting. These haptices are haptiered in relation to the recipient's body. If someone is leaving, this can be indicated by the WALKING-haptice, which will at the same time indicate the direction where the person is leaving. Social quick messages are adaptable; they can be produced onto different body areas such as the back, the shoulder or the arm.

Health care measurements, known as hospital-haptices in healthcare settings, have been studied with deafblind people and hospital staff during treatment procedures such as cataract operations, various medical examinations and when in isolation rooms. Hospital-haptices provide information to patients as to what is happening or how to respond by their own movements. The use of haptices can be agreed by the patient and healthcare practitioner in advance. Haptices are chosen according to individual needs and are for example measurements (BLOOD PRESSURE), length of treatment (END OF TREATMENT), emotions (ARE YOU OK?), movements (DO NOT MOVE) and confirmations (YES, NO) (Palmer 2015; Lahtinen, Palmer, Tuomaala 2016).

Messages when moving together means guiding with body movements, muscles and joints. Additional haptices can be given such as YES and NO-haptices, STOP and WALK and other direction information. Guide dog users and mobility instructors have developed guide dog-haptices (see the chapter by Cathrine Timm Sundin and Nina Frisnes Øyan in this volume). These haptices include information working with a dog, like the position of the dog, what the dog is doing (running around, sitting), the map of the environment and confirmations from the mobility instructors onto the back of a dog user.

Describing space and environment include pointing, directions and the appearance of objects. Objects' thickness, size and depth can be expressed by comparing them with the body dimensions and height. At the same time, the receiver can explore the object and have a contact and orientation to the environment. When haptiering a room onto the back, the receiver is using their mental mapping and muscle memory, based on their bodily experience of the environment, shapes and routes.

Hobbies and arts, like visual arts (pantomime, painting, pictures), and auditive arts (music and dance) can be haptiered onto the body by combining different movement, location and colour-haptices. When

hobbies are described and illustrated onto the body, certain things are often agreed on beforehand such as horse riding (directions, turns, stopping, speed). During downhill skiing, walking poles are used, and through them, we can share haptices such as directions, stopping and speed. When tandem-cycling, the deafblind person can also give haptices to the sighted guide, who is sitting in front of him/her, including directions from memory.

Many sports and games are based on the same kind of game-haptices, for example the game of football. These are (cf. Lahtinen 2008)

- permanent information: starting point, tracks, target (goal, position, defence areas, lane, foul line),
- changing information: advancing of teams, the direction of the ball; straight forwards, to the left or right,
- new position information: penalty kick,
- starting of action,
- results: agreed body location, where the score or route is expressed.

Haptices play an important part of everyday life when visiting museums or exhibitions. In some cases, sign language interpreters may be involved in sharing musical performances (Palmer, Lahtinen, Ojala 2012) or portraying the astronomical events in the night sky (Palmer 2021; see the chapter by Russ Palmer and Stina Ojala in this volume). Private haptices are shared by two people in more intimate situations and are used mostly in a private way and larger body areas, like humour and aesthetic messages.

6 Haptemes, the Elements of Touch

The great discovery of the social-haptic communication research was the realisation that haptices are a combination of smaller elements called haptemes. Every haptice consists of set of haptemes that form a hierarchical, linguistic system of their own. Every haptice has its own set of haptemes, and that set allows each haptice to be identified and distinguished from the others. Each haptice does not have to include all haptemes. They can be combined sequentially or simultaneously, this means producing functional sentence structures. Haptemes here are seen as analogous to phonemes in spoken or sign languages. Spoken and sign languages have their own phonologies through auditive and visual modalities. In SHC, the hierarchical properties of touch are used (Lahtinen 2008).

When using haptices between two people, the social-haptic shared space concept evolved. This is a space where haptices are shared in a social environment and during activities together as agreed. When using touch, we need to agree the places on the body where haptices

are produced. This is called 'social body space', i.e., neutral areas of the body. Every producer and receiver of SHC need to be aware of this. The deafblind person who is using interpreting services can describe the methods they like to use onto their interpreter profile. They can also add if they like to use SHC and where, this is their neutral body areas. Every time we share haptices, we have a certain body orientation towards each other (free, in front, side by side, behind), body postures (standing, walking, sitting, laying down) and levels of body postures (same level, higher, lower). All these need to be considered when using SHC, and they are the essence of the adaptability of the system.

Haptices are articulated most often by hands, but also other parts of the body can be used such as the head (the receiver feels the head nod movement on their body), foot (foot to foot contact in YES), or shoulder (indicating turns in guiding). Every haptice has a built-in intensity that varies from light to neutral to heavy. While some haptices have a location-specific meaning (TIME/wrist, BLOOD PRESSURE/arm), many of the haptices have the same meaning independent of their location on the body. Handshape haptemes are related to the shape of the producer's hand when haptering. These include e.g. number of fingers (first finger, two or all five fingers) and shape and orientation of the palm. This category also includes the number of hands involved, one (direction-haptice) or two hands together (haptiering a room; orientation point and seats) at the same time. Some haptices are produced by an open palm (YES-haptice) or by one finger (YOU-haptice).

Some haptices can be diminished from using a flat hand (the palm or the back of the hand) into using one to five fingers. Haptic distance is the smallest distance between two touch surfaces that are separable. If the distance is smaller than the haptic distance, the two touches will fuse into one. This means we cannot perceive the number of fingers used if they are too close one to the other, for example when using one, two or three fingers to haptier YES or NO-haptice onto the person's body (Lahtinen 2008). Haptic distance allows one to use more than one finger to give the single, unchanging message. This difference is due to the density and distribution of touch receptors (mechanoreceptors) in the skin. Recently, research into human skin sensitivity and touch has grown greatly in many different research areas such as neuroscience and designing wearable multi-sensory haptic devices (see McGee 2018).

Movement is one the most important hapteme. Movement-related haptemes are directions of movement (up and down, horizontal, vertical, left, right, diagonal, circle, vibration etc.), pressure/intensity (light, medium, heavy), frequency, length, duration, pauses, rhythm, shape and size. Producers' size varies, but if we use a larger area in a haptice, it may intensify the meaning (small or large cup of

COFFEE). Figure 4 illustrates the relation between concepts of social-haptic communication, a coffee haptice (name of touch message) and haptemes (grammar elements of producing a coffee-haptice). Micro movements may be difficult to see and that is the reason why it is vital for the producer to experience the receiving of haptices as well. Length or duration of haptices can be long or short. If the movement in a haptice stops and the hand stays in contact with slightly increased pressure, it forms a question where an answer or feedback is required (Lahtinen 2008).

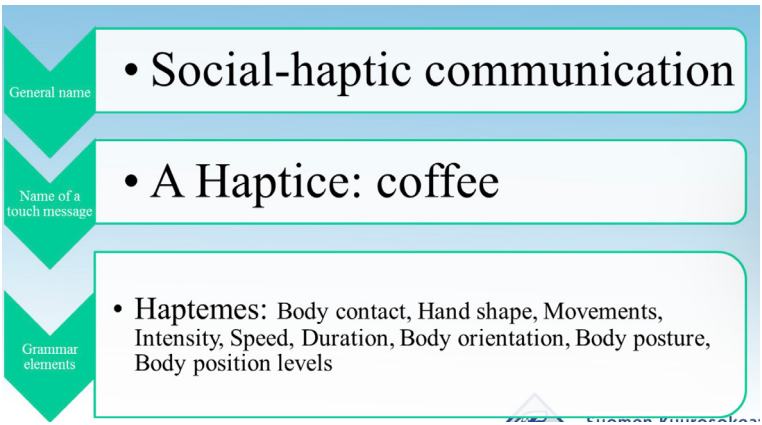

Figure 4 The relation between social-haptic communication, coffee-haptice and haptemes, i.e., the grammar elements

We can map the environment such as a room, a restaurant or a meeting room with haptices. That gives an overview of the surroundings and the spatial layout of the safe routes. This is done by locating on the map at least the following items and directions: the door, the furniture, the people in relation to the person and the amount of the objects. After the shape of the room, the receiver is placed in the room with STAND-haptice. This initial placement is followed by other items, such as doors/exits, tables or chairs and other items needed. The map may include the location of other people, and the more sophisticated maps include people moving around, entering and leaving the space. The body map may also include others' non-verbal feedback (SMILE, YAWNING, CRYING). A single haptice can also consist of many layers of messages simultaneously, such as the combination of confirmations and emotions (excited YES with stronger intensity), similarly to what happens when using speech or signing, our emotional state is involved (happy, sad, tired etc.) (Lahtinen 2008; Palmer, Lahtinen, Ojala 2017). Environmental haptices function from the receiver's perspective. Mapping proceeds logically from overview

to details. This helps the receiver build up a mental image of the space and be more independent in a social situation.

7 Conclusions and Future Considerations

This article has outlined more than 30 years of history and development of social-haptic communication. Over the past two decades, it has expanded to different countries and various client groups: from the deafblind people to the people with learning disabilities, the older people and other groups across disciplines in research. In decades of teaching SHC, it has become clear that producers must receive and analyse haptices themselves in order to understand how the grammar of touch is perceived through the skin.

Deafblind people and their family members find haptices as a new and flexible way to enrich the communication with spoken or signed languages. Haptices function either with or without visual and hearing aids, they function in the dark and in noisy situations. Social-haptic communication as a system has developed and now includes many lexical subgroups. It has been recognised both as a teaching aid for people with special needs, and in various rehabilitation programmes. It has also been included in sign language interpreter education and some Master's programmes.

The Social-Haptic conference in Venice in 2023 has highlighted how some countries have combined research and practice. The deafblind end users have made an important contribution in the development of haptices within the SHC framework. Dr. Elaine Comes Vilena published her doctoral thesis in Sao Paolo, Brazil in 2022. In Italy, Laura Volpato has finalised her doctoral thesis on haptices in 2024. Both of these researchers have involved the deafblind people to evaluate SHC as co-researchers. Many other countries have developed their own haptices dictionaries and vocabularies based on their everyday practical experiences. SHC has rapidly developed through different deafblind communities.

Over the past 10 years, SHC with deafblind people has expanded into research fields across the world. Recently a research group (GEPICH 2020 onwards) started to study and exchange information on social-haptic communication and inclusion through regular monthly online meetings. This includes professionals and deafblind users co-operating online by discussing and exchanging new ideas and applications to adapt SHC into their culture.

Recently SHC has been adapted and incorporated into technological devices, e.g. within the SUITCEYES project 2018-21 (www.suitceyes.eu). Haptices are the input for vibration-inducing sensors. A wearable garment will relay haptices remotely through vibrations (see Holt, Palmer, Lahtinen 2025). In the future, it may

be possible to use technology to experience gaming activities or the garment may help you to orientate in your surroundings. For example, a deafblind person could feel different haptices at a distance being stimulated through wearable vest using computer technology. It may be possible for some deafblind people to use this kind of technology to orientate and explore various gaming facilities (www.suitceyes.eu).

SHC increases effectiveness of communication with less energy, transmit confirmations, emotions and context in real-time. It can be invisible to others, keeping the experience more subtle. It expands the individual personal space and promotes interaction with others in social settings. One of the authors explains the importance of SHC in everyday life as follows: "Social-Haptic Communication is a part of my everyday life. As a deafblind user of SHC, the way I feel and see the world have made me realise that having the tools to communicate with people has been giving me new opportunities which I would not have dreamed of, especially academically and in my music. It allows me to be equal and gives me a rich quality of life taking in real time information spontaneously. More importantly, it enables me to use the interpreters and personal assistants in different situations allowing me to have more opportunities through arts and culture. Within my family, SHC has allowed me to have a more flowing and clearer communication avoiding misunderstandings".

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