

Experiences of High-Technology Voices by Augmentative and Alternative Communication Users, c. 1980 to 2020

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Introduction:

'It is really important that the sound that comes from my aid is the way I feel and sound inside my heart' – Alan Martin¹

Augmentative and Alternative Communication (AAC) is a name for a group of strategies which can be used by people with communication disorders, including signing and gesturing, communication boards, and high-technology voice output communication aids (VOCAs). Whilst figures cannot be found for the actual number of people who use AAC, an estimated 0.5% of the UK population, equating to 336,650 people, could benefit from some form of AAC.² This paper will focus on VOCA users to identify their experiences of computerised voices, to explore how they have viewed these voices, and to what extent they felt representative of their voice.

There is a dearth of literature surrounding both the history of AAC devices and services, with no literature exploring the experiences of AAC users, despite there being an increase in research surrounding other communication technologies, such as hearing aids, and other prosthetic devices. AAC users have also notably been neglected from disability research conducted in other areas, such as medicine, social sciences, and science and technology studies. Most research looking at the experiences of AAC users is conducted through proxies, notably caregivers or speech and language therapists, allowing their voices to be prioritised over AAC users'. Most qualitative research conducted with AAC users, in an attempt to capture their experiences of various aspects of life, have been conducted in the field of social sciences. Furthermore, the current research tends to take a 'social model of disability' stance, and

¹ Alan Martin and Christopher Newell, "Living Through a Computer Voice: A Personal Account," *Logopedics Phoniatics Vocology* 38.3 (2013): 102.

² Sarah Creer et al, "Prevalence of People Who Could Benefit from Augmentative and Alternative Communication (AAC) in the UK: Determining the Need," *International Journal of Language & Communication Disorders* 51:6 (2016): 640.

therefore does not focus on people's experiences of impairment, meaning that AAC users are not able to appropriately discuss the experience of using devices, for the fear that it will provide a medical model view of AAC and complex communication needs.³ Exploring voice and identity through the experience of AAC users is important, as they exist in a world where the spoken voice is privileged over other forms of communication, and where many AAC users feel removed from the 'human mainstream.'⁴

This research will seek to correct the epistemic and societal injustice by using a range of sources to put user voices and experiences at the forefront. This will include using user testimonies from the *Communication Matters* journal, qualitative studies from the field of social sciences, and other archival material. Using these sources will mean that certain voices are prioritised, namely AAC users who are more activist in nature and literate, and therefore able to write articles for *Communication Matters*, and those who have been included in research studies. This will likely mean that the voices of those who are illiterate, and use symbols to communicate, will be absent alongside people who have learning disabilities, as they are deemed unable to give informed consent and unable to partake in many research opportunities.

Voice:

The poet Henry Wadsworth Longfellow describes voice as 'the organ of the soul.'⁵ Voice is inherently linked to our identity. It allows us not only to express ourselves, but also allows others to gain information about us: it gives them an indication of where we were raised and our class status, alongside showing our emotions and personalities. It also allows people to recognise others even when they are out of view.⁶ The field of oral history regularly highlights the importance of voice to help provide additional meaning to experiences, with Traies stating 'the diverse voices, each with its own timbre, emotion and regional accent' bring 'stories vividly to life.'⁷

³ Mary Wickenden, "Identity in Teenagers who use AAC: Report and Consultation on a Project in Progress," *Communication Matters* 22.1 (2008): 11.

⁴ Meredith Allan, "AAC and Self-Identity," *Communication Matters* 20:3 (2006): 11 and "Remaking My Voice," Ted, accessed 30th January 2024, https://www.ted.com/talks/roger_ebert_remaking_my_voice?language=en

⁵ Henry Wadsworth Longfellow. *Hyperion*. Volume 2. (Boston: 1839), 28.

⁶ Sarah Marshall, Amanda Hynan, and Nicole Whitworth, "Perceptions of People who use AAC about the Potential of Speech-Generating Devices to Express Identity," *Communication Matters* 33.3 (2019): 38.

⁷ Jane Traies, "The Perils of the Recording: Ethical Issues in Oral History with Vulnerable Populations," *Oral History* 48.1 (2020): 79.

This research is predominantly using user testimonies from people with congenital conditions, such as cerebral palsy, who were born with little to no speech. For those with acquired conditions, using AAC felt like a serious loss of identity. Yamagishi et al. argued that voice is such an integral part of who a person is, that when it is lost due to acquired conditions, people may withdraw from social interactions, and even from family too.⁸ Roger Ebert, a prominent US film critic, highlights that his old and new voice are ‘tied indelibly to [his] identity,’ and that the loss of his voice forced ‘the birth of a new person.’⁹ For Denise Gubbay, who had ‘worked in verbal communication all her working life,’ the loss of speech and the use of AAC was very difficult to come to terms with and felt like the loss of her identity.¹⁰ She felt that when she first got an AAC device and was unable to speak that she ‘had no identity,’ and felt that she ‘was merely the object of pity.’¹¹ The use of AAC made it feel like she had been reduced to ‘the sum of her symptoms,’ rather than seen as a person.¹²

Whilst this literature discusses voice in relation to the identity of AAC users, it is important to acknowledge that the priority was and continues to be the development of functional devices which allow them to communicate as effectively as possible.¹³ This means not only having devices which do not regularly break down and need repair, but also have better volume, so they could be heard in crowded and loud environments, and better lighting, so they could communicate with others when outside.¹⁴ Nonetheless, a priority which has remained high on the agenda is the personalisation of voices. Voice is not just functional, allowing them to speak and read out the text they had written; it is a ‘critical function’ for personal identity.¹⁵ AAC users have discussed having personalised voices since the inception of speech synthesis in VOCAs, with the calls becoming more prominent from 2000. This included not only accents, but also intonation to allow further expression. This paper will focus on these two aspects of voice.

Accent:

⁸ Junichi Yamagishi et al, “Speech Synthesis Technologies for Individuals with Vocal Disabilities: Voice Banking and Reconstruction,” *Acoustical Science and Technology* 33.1 (2012): 1.

⁹ “Remaking My Voice.”

¹⁰ Denise Gubbay and Lindy van Creveld, “A Pilgrim’s Progress,” *Communication Matters* 12.2 (1998): 22.

¹¹ Ibid, 20.

¹² Ibid, 22.

¹³ Martin and Newell, “Living Through a Computer Voice,” 96.

¹⁴ Marshall, Hynan, and Whitworth, “Perceptions of People who use AAC”: 39.

¹⁵ Yamagishi et al, “Speech Synthesis Technologies”: 1.

When speech synthesis was first available (c.1980), there was initially only one voice, which was an American male. This meant that despite gender, age, or geographical location, all AAC users sounded like an American man. Yamagishi et al. observed this caused embarrassment for AAC users and caused a lack of motivation to use a VOCA.¹⁶ Because of the small market size of VOCAs, American-accented English became the default, as it was too costly to provide a wider range of voices suitable for so many people, each with their own unique voice.¹⁷ In a Research Institute for Consumer Affairs booklet on communication aids available in the United Kingdom (UK) in 1984, when accent was mentioned in the product information, only American accents were available.¹⁸ In 1988, Stowe, Rowley, and Chamberlain suggested that whilst they understood that only American male voices were available at the time, female AAC users would find ‘varied pitch’ more acceptable in lieu of a woman’s voice.¹⁹ Speech scientist Rupal Patel remembers the time when she saw a young girl and a grown man having a conversation, using their respective devices, but both had the same voice.²⁰ AAC users were all using voices ‘that didn’t fit their bodies or their personalities.’²¹

From a user perspective, not many people look back on these voices fondly. Alan Martin remembers having to ‘speak with an American, swanky voice,’ which he ‘hated,’ as it was nothing close to his Liverpudlian accent.²² This is backed up by other users, including a respondent to a Scope survey on the experiences of people who use communication aids, who said ‘I do not like the American accent. I would like a voice near my natural voice and language.’²³ Even as late as 2008, teenagers who used AAC were still complaining about having an American voice.²⁴

In the early 2000s, when a wider range of voices had been provided, they tended to be a generic ‘accent-less’ Southern-based British accent (closest to Received Pronunciation). Alan, for example, described the voice as more ‘like a BBC news reader than the ‘Scouser’ that

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Research Institute for Consumer Affairs, *Communication Aids: A Guide for People Who Have Difficulty Speaking* (London: RICA, 1984), 22-3. British Library Archive, 88/09034.

¹⁹ Janet Stowe, Corinne Rowley, and M. Anne Chamberlain, “Acquisition and Use of Communication Aids by Those Buying Aids Directly from the Supplier,” *British Journal of Occupational Therapy* 51.3 (1998): 100.

²⁰ “Synthetic Voices, as unique as fingerprints,” Ted, accessed 30th January 2024, https://www.ted.com/talks/rupal_patel_synthetic_voices_as_unique_as_fingerprints?language=en

²¹ Ibid.

²² Martin and Newell, ‘Living Through a Computer Voice’: 98-99.

²³ James Ford, *Speak For Yourself* (Scope: London, 2000), 27.

²⁴ Wickenden, “Identity in Teenagers”: 13.

is the real me.’²⁵ Not only were the businesses missing out on local dialects, they also were missing the voices of the other three major UK countries – Scotland, Northern Ireland and Wales. Scott joked when discussing his new Lightwriter, ‘the accent could be more Scottish!’²⁶ BT, much earlier (c. 1996), introduced new software called ‘BT Laureate’ for communication aids which included a synthesised voice in an English accent which similarly only provided the ‘accent-less’ voice.²⁷ Roger, though American, had a British accent for a period of time, earning him the nickname ‘Sir Lawrence’ by his wife.²⁸ He chose this at the time simply because it was the clearest one he could find, which was a common reason for AAC users to choose one voice over another, despite it being nowhere near their voice.²⁹

Many users wanted an accent that sounded like them: a local or regional accent which was representative of their gender. Alan admits that he privately told his friends that he would like a ‘Scouse’ voice. He began paying for additional software using private funds, never knowing if it would ‘prove compatible’ with his device, allowing him to have access to more voices.³⁰ Whilst he acknowledged there had been improvements in his voice since the early 1990s, he continued to seek his voice: ‘a young man from Liverpool. An average ‘Scouse’ voice. A bit like some of the Beatles used to sound in their younger days.’³¹ His whole identity was based around ‘being born and raised in Liverpool,’ which often made using his device difficult as it did not feel representative of him.³² Alan and other users highlighted that if they had a voice which sounded like them, they would have felt more motivated to use their device.³³

Users did attempt to make their voices work for them, by very cleverly trying to insert local dialect and slang into the vocabulary. The teenagers from Wickenden’s study wanted their devices to properly say ‘slang language,’ so they could fit in with their classmates and sound more like the other teenagers in their community.³⁴ As Alan stated, often because of the accent,

²⁵ Martin and Newell, ‘Living Through a Computer Voice’: 99.

²⁶ Scott Wood, “A Personal Perspective,” *Communication Matters* 14.1 (2000): 4.

²⁷ Barnaby Perks, “Cambridge Adaptive Communication,” *Communication Matters* 12:3 (1998): 16.

²⁸ “Remaking My Voice.”

²⁹ Ibid.

³⁰ Martin and Newell, ‘Living Through a Computer Voice’: 99.

³¹ Ibid, 100-1.

³² Ibid, 101.

³³ Ibid and Marshall, Hynan, and Whitworth, “Perceptions of People who use AAC”: 39.

³⁴ Mary Wickenden, “‘Talk to me as a teenage girl’: An Anthropological Study of Identity and Lifeworlds with Teenage AAC Users,” *Communication Matters* 24:3 (2010): 5.

when he tried to manipulate the voice synthesis software by spelling words wrong in an attempt to make them sound more Liverpudlian, they ‘still [sounded] posh!’³⁵

AAC manufacturers did begin to market themselves as providing a range of different voices, accepting that it was important for AAC users to have a voice which was more aligned to their actual voice. In 2003, the company DynaVox introduced DynaWrite to the market, which included ‘a choice of voices’ and the ability to ‘record special messages.’³⁶ In 2005, Toby Churchill Limited launched new models of the Lightwriter, which offered both ‘a male or female British accent.’³⁷ Marshall, Hynan, and Whitworth did acknowledge that by 2019, there was a wider range of voices available to people who used VOCAs and new technologies had emerged, namely voice banking, which meant that AAC users could begin to have voices which were unique to them.³⁸

Digitised Speech and Voice Banking:

Whilst it was acknowledged by many stakeholders internationally that there needed to be an emphasis ‘on producing aids which support the speech organs’ to improve individual ‘perception of identity,’ the technology to create synthesised speech closer to one’s voice was not available until the creation of voice banking technology.³⁹ Voice banking refers to a process for creating a personalised synthetic voice, whereby either a person at risk of losing their speech or a voice actor will record a number of words and phrases. These recordings can then be inputted into a computer model and uploaded on to the device so any inputted speech can be synthesised and said aloud by a VOCA.⁴⁰ This allows the user to have a unique voice and provides alternatives to the generic voices that were previously the only option for AAC users.⁴¹ Voice banking is an option available to some AAC users, usually provided through charities or private funds, but it is not available to all. Roger, who did have the funds to pay privately for voice banking technology, approached a company in Edinburgh in the early 2010s. Initially, he thought it ‘would be creepy to hear [his] own voice coming from a computer.’⁴²

³⁵ Martin and Newell, ‘Living Through a Computer Voice’: 100.

³⁶ DynaVox, “DynaWrite,” advertisement, *Communication Matters* 17.1 (2003): 23.

³⁷ Toby Churchill Limited, “New Lightwriter and AdVOCate+” advertisement, *Communication Matters* 19.1 (2005): 23.

³⁸ Marshall, Hynan, and Whitworth, “Perceptions of People who use AAC”: 38.

³⁹ Margita Lundman, Elisabet Tenenholtz, and Karoly Galyas, *Technical Aids for the Speech Impaired – Internationally Coordinated Development Work: Report on Project*, 1978. The National Archives, MH 154/1298.

⁴⁰ Richard Cave and Steven Bloch, “Voice Banking for People Living with Motor Neurone Disease: Views and Expectations,” *International Journal of Language & Communication Disorders* 56:1 (2021): 118.

⁴¹ Cave and Bloch, “Voice Banking for People Living with Motor Neurone Disease,” 118.

⁴² “Remaking My Voice.”

When it was created using old footage from television and radio and uploaded onto his laptop, ‘it sent chills down [his] spine.’⁴³ Whilst he acknowledged that there are a good range of voices on computers, ‘they all sound like somebody else, while this voice sounded like [him].’⁴⁴

Prior to voice banking technology, the only way to have a more personalised voice was to use digitised speech. This meant the recording of set words and phrases, which were uploaded onto the device. However, users were limited solely to the small number of recorded words and phrases, due to the increased memory capacity that was needed. For example, in 1984, Tracey, a young girl from Birmingham, received her communication aid.⁴⁵ A number of other pupils, around the same age as Tracey and also from Birmingham, recorded set words and phrases. Tracey was then able to pick the voice which sounded most like her, and those 230 words and phrases were uploaded onto her device.⁴⁶ This meant that whilst she was limited to those recorded words and phrases, she had a voice which sounded like her. Her parents also began to associate Tracey’s voice with her, as they didn’t know the schoolgirl who had provided the voice.⁴⁷ Synthesised speech, on the other hand, provided the ability for infinite word combinations, but sounded less natural and more robotic.

The Difficulty of Regularly Changing Voices:

Some AAC users experienced feeling attached to some voices over others, and as the voice software technology was not universal, every time a device was changed, there was always the chance their voice would change too. Often the change of voices was due to sudden communication aid breakdown, so was not on AAC users’ terms, for example, wanting to upgrade to a more sophisticated device.⁴⁸ Marshall, Hynan, and Whitworth found that when VOCAs had a better voice, it was easier for AAC users to switch to the new device, but when the voice was perceived as worse, it led to negative feelings and ‘the loss of identity’ as others would no longer recognise them.⁴⁹

Lee Ridley discussed this and said he ‘didn’t really like [the] voice at first,’ when he changed to a newer model of the Lightwriter as he had become used to the old voice, which he

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ ‘Tracey Gets a Voice at 15 – Thanks to British Genius,’ *Daily Mail*, 15 November 1984, Birmingham Archives, MS 1579.2.8.2.1.

⁴⁶ “Tracy Gets a Voice at 15.”

⁴⁷ Ibid.

⁴⁸ Marshall, Hynan, and Whitworth, “Perceptions of People who use AAC”: 40.

⁴⁹ Ibid.

identified with himself.⁵⁰ Conversely, Alan felt that it would be easy to change to a different device, if there was a better voice provided, but would find it hard if he had to switch to a new device which had worse voice quality. He was happy with the voice he had, as he thought it was ‘the best available for [him] at the moment.’⁵¹ He found that upgrading his device, which had a new voice, allowed him to get ‘one step nearer’ to his ideal voice.⁵² Some AAC users, particularly as more advanced technologies have become available to more people in the last decade, were allowed to trial a range of devices, and therefore voices, which helped them to choose the one they liked best and felt was most representative of them.⁵³ Despite this, they were still intrigued by the voice banking technologies, which they had not yet been able to access, to give them a more personalised voice.⁵⁴

Expression:

Locke wrote about the functions of communication: ‘propositional speaking’ and ‘intimate talking.’⁵⁵ Propositional speaking is the transmission of facts, whilst intimate talking is the paralinguistic elements of speech which help to convey meaning, including intonation, body language, facial expressions, and gestures.⁵⁶ Intimate talking is something that high-technology AAC devices have and continue to miss, much to the frustration of AAC users; those markers of identity which allow them to show their personalities.⁵⁷ Some professionals working on new AAC devices and software did acknowledge the difficulty of expression through devices. Turner, for example, created new software which moved away from pre-stored words and phrases, suggesting that ‘it may be hard to develop your own linguistic voice, your individuality through the words and syntax of others,’ but could not provide the change they wanted in intonation.⁵⁸ It is highlighted by Meredith Allan, former President of the Australian Branch of International Society for Augmentative and Alternative Communication and an AAC user, that society has a ‘dominant language culture,’ which AAC users have to fit into.⁵⁹ Whilst she

⁵⁰ “Lee,” Abilia Toby Churchill, accessed 7 December 2021, <https://web.archive.org/web/20170201041713/http://www.toby-churchill.com/lightwriter-community/user-stories/lee/>

⁵¹ Martin and Newell, ‘Living Through a Computer Voice’: 100.

⁵² Ibid, 99.

⁵³ Marshall, Hynan, and Whitworth, “Perceptions of People who use AAC”: 39.

⁵⁴ Ibid.

⁵⁵ John Locke, “Where did all the gossip go? Casual conversation in the Information Age,” *American Speech Language Hearing Association* 40.3 (1998): 27.

⁵⁶ Locke, “Where did all the gossip go?”

⁵⁷ Mandy Brown and Joan Murphy, “The Personal Touch,” *Communication Matters* 16.1 (2002): 3.

⁵⁸ George Turner, “Let Language Develop, Let People Develop,” *communication Matters* 17:2 (2003): 17.

⁵⁹ Allan, “AAC and Self-Identity”: 11.

admits that gesture is often used by both AAC users and non-users alike, and is acceptable in ‘the verbal world,’ the lack of ability to communicate quickly and opportunities for ‘intimate talking’ means there will always be ‘a stigma placed on [them] by the global community.’⁶⁰

Most AAC users have struggled to convey meaning using their devices, due to the lack of expression available. A lot of what is conveyed in conversation is not just the words that are said, but also the intonation that we put on our words to provide additional meaning. Denise highlighted this, saying: ‘a person using a Lightwriter is totally reliant on words to get the message over. To add to this, the fact that in the English language a lot of the meaning is carried through stress and intonation, we begin to see how difficult it is to use the Lightwriter to its full potential.’⁶¹ Alan found it difficult using devices when working with children, as when he said ‘Wow’ or gave praise, it sounded ‘a bit flat,’ and he thought made him sound ‘a bit sarcastic.’⁶² Lee, a stand-up comedian, had to spend a great deal of time typing words differently, because the device wouldn’t say it correctly, and had to play his set through a few times to ensure that it sounded ok.⁶³ On the other hand, Roger picked out a device which provided him with more expression. Using a Macintosh laptop, which included ‘the Alex voice,’ he could enter text which would be read out and which he said understood ‘the difference between an exclamation point and a question mark,’ making a ‘sentence sound like it was ending instead of staying up in the air.’⁶⁴ However, the ability for the laptop to be able to do this could be because it is bigger and therefore more capable of having these features, than a small, portable VOCA. Roger suggested having an ‘Ebert test,’ in which if speech synthesis ‘can successfully tell a joke and do the timing and delivery’ well, then that’s a voice he would want.⁶⁵

Conclusion:

Whilst many users acknowledged that difficulties in using AAC tended to lie more in functional aspects of the devices, many wanted access to a more personalised voice, which helped to express who they were. Whilst there have been notable improvements in technology and the range of voices available to AAC users, there is still a way to go to ensure that all users feel

⁶⁰ Ibid.

⁶¹ Gubbay and van Creveld, “A Pilgrim’s Progress”: 22.

⁶² Martin and Newell, ‘Living Through a Computer Voice’: 100.

⁶³ “Lee.”

⁶⁴ “Remaking My Voice.”

⁶⁵ Ibid.

that they have a voice which is representative of themselves. Voice banking provides an opportunity to get a step closer to having access to this voice, but not all users can access this technology, instead having to rely on the pre-programmed voices on the devices. Even voice banking technology has a way to go, in terms of allowing users to have the natural intonation and expression of speech, giving users the option to say something ‘happily’ or ‘funnily,’ rather in the monotonous, evenly timed speech. In a world where the spoken word is prioritised, this will continue to be something high on the agenda for VOCA users, so they can begin to feel more in line with the communication norms of society. Overall, whilst some users felt that their voices were beginning to sound more like them, it has been difficult for VOCA users over the years to speak in a voice which did not feel representative of them. Whilst they acknowledged that there had been improvements and new devices that brought them closer to their voice, several had still not reached the point where their voice felt fully representative of their identity.

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