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AI, Communication Aids and the Challenge of Authentic Authorship - Whose Line Is It Anyway?

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Abstract

Purpose - AI and, more specifically, large language models (LLMs) have great scope for use in voice output communication aids (VOCAs), and this is being realised as the technology finds a greater foothold in mainstream systems.

Design / Methodology / Approach - In this paper we examine what we know is important in VOCA design and use the approach of casuistry to examine the potential ethical implications of the use of LLMs in VOCAs.

Findings - We suggest that there is relevant similarity between some potential applications of LLMs and the discredited technique of facilitated communication (FC). We highlight risks related to authorship and authenticity of the message produced by LLM-enabled VOCAs and discuss the importance of a holistic view of communication, which is multi-modal and co-constructed by all participants, generating agreed meaning with a shared understanding of where that meaning originates. We also draw attention to the potential impact of LLMs on language and communication development, where they may remove important opportunities for co-construction, correction and non-VOCA interactions that are so vital to development.

Originality / Value - Ultimately, we recognise the potential benefits of LLMs in VOCAs but counsel against a technoableist, technology-led implementation of LLMs without due consideration of the communication needs of VOCA users. We counsel against the uncritical inclusion of LLMs within new and existing VOCAs, and encourage a deeper engagement with the ethical risks of doing so, as well as with important concepts such as authorship, humanness, and user-centred design.

Keywords: Augmentative and Alternative Communication (AAC); Facilitated Communication; Artificial Intelligence (AI); Large Language Models (LLMs); Ethics; Casuistry; Voice Output Communication Aids (VOCAs); Authorship; Critical Disability Studies

Background

Artificial intelligence (AI) and, more specifically, large language models (LLMs) have great scope for use in augmentative and alternative communication (AAC). As the technology finds a greater foothold in mainstream systems, manufacturers of voice output communication aids (VOCAs) are beginning to implement LLMs in existing and new devices, and previous experiences in this field suggest that it is important to consider the ethical implications of how this is done.

AAC is a term which refers to a range of technologies, strategies and techniques used by people who have a communication impairment and who cannot express themselves fully using speech or language. The term encompasses manual signing systems, paper-based systems such as word lists or picture books and powered, computer-based systems that generate digital or synthetic speech output – often referred to as VOCAs or speech generating devices (SGDs) (Judge *et al.*, 2022). In this paper we focus on VOCAs as it is these devices where AI will have the greatest impact. We use the term “AAC users” throughout to refer to individuals who use VOCAs in order to acknowledge that they will have many different modes and methods of communication in addition to their device. AAC users may have complex communication impairments, with co-occurring motor, neurological, sensory, cognitive and social communication difficulties. AAC users include children with developmental or acquired communication impairment around birth or early childhood, adults who have congenital or developmental impairments that continue throughout their lifetime,

or adults who acquire such impairments because of medical conditions such as stroke, motor neurone disease, or certain types of cancer (Beukelman and Light, 2020).

Whilst typing words and sentences using traditional orthography is the most flexible way of producing novel linguistic output on VOCAs, in practice this strategy does not meet the needs of all AAC users, and therefore many VOCAs are dependent on linguistic items being curated and pre-stored, either by the original designers, or by those working to support individual users (Waller, 2019). Linguistic elements can also be represented by graphic symbols, photos or pictograms, which are generally used to support the learning of language for pre-literate children. The design of VOCAs has historically been technology-led, mirroring the changes and innovations taking place in mainstream computing (Shane *et al.*, 2012). Similarly, the selection of pre-stored linguistic items on VOCAs is often guided by available data from typically-developing or non-disabled populations. As an example, “core vocabulary” approaches that present a grid of frequently used words are based on the language use of typically developing children, with more personalised “fringe” vocabulary added later (Banajee, Dicarlo and Buras Stricklin, 2003; Boenisch and Soto, 2015; Judge *et al.*, 2020). Retrieving pre-stored items can support pre-literate AAC users or those with cognitive impairments but may also limit expression and the ability to construct more personal, novel communication (Waller, 2019). AAC professionals (such as speech and language therapists, occupational therapists, and rehabilitation practitioners) often work alongside the AAC user and their families or carers to create systems that are applicable, accessible and acceptable to the individual.

AAC and the Construction of Self

One of the longest-running challenges for the field of AAC is that VOCA users in the overwhelming majority communicate more slowly than their speaking contemporaries. The time taken to convey information using a VOCA is orders of magnitude greater than the time required to communicate through speech. This often leads to conversational asymmetry (Ibrahim *et al.*, 2023), where AAC users are perceived to contribute less information to interactions. VOCA conversation is therefore often characterised by being responsive, comprising mostly one- or two-word turns (Waller *et al.*, 2013) as users often compensate for the time lag by using fewer words. For those who use a VOCA to speak their thoughts aloud, the time stream from thoughts to spoken words is disrupted (Howery, 2018). VOCA users also employ other modes of communication alongside a VOCA to support their interaction across different environments and with different people. AAC users' communication is therefore intrinsically interactional, relational and dynamic. In the past, the very humanness of people with communication impairments has been denied through the misinterpretation of this presentation of self (Goffman, 1959). This results from a lack of engagement with the holistic communicative interaction and a disproportionate focus on the VOCA itself – failing to recognise that people who use VOCAs also make use of speech, gesture, non-verbal or embodied communication.

In transactional communication (situations where there is a defined goal and a predictable structure, such as ordering a coffee in a café) the impact of slower communication rates is less pronounced, yet VOCAs are generally designed in a way that supports this sort of interaction. Often utterances (such as the coffee order from the previous example) can be pre-constructed and recalled, and the predictable nature

of the social interaction means that relevant words and phrases can be on hand for the user. The utterances in transactional communication may also be more efficiently signalled via other means (Clarke *et al.*, 2023).

There is an increasing awareness and understanding of the priorities of AAC users, and what they want from their VOCAs. In addition to this transactional communication, AAC users want to express their individuality, agency, and personal identity (Broomfield *et al.*, 2022). This is important in terms of socially relevant communication with peers (Wickenden, 2011), having a voice that reflects how they want to be heard in the world (Cave and Bloch, 2021), and an idiolect (personal language style) that is indicative of their cultural background (Lund *et al.*, 2024). These are just a handful of the communicative characteristics that express a sense of humanness inherent in personal connections and relationship building. This is enabled through conversational interactions, which tend to be dynamic, co-constructed and enchronic: constantly shifting and evolving with participants building on the contributions and knowledge of others (Barnes and Bloch, 2019; Enfield, 2022). In this form of communication, AAC users are at a significant disadvantage as conversation may move on faster than they are able to contribute. Similarly, much of conversation is narrative retelling of events and experiences for the benefit of informing, entertaining or simply interacting with others. Such “conversational narratives” (Waller, 2006) are a crucial part of how humans build our identities, how we communicate our concept of the “self” to others (Grove, 2013; Toogood, 2022). Yet current AAC systems are poorly designed for this purpose (Soto, Solomon-Rice and Caputo, 2009) and many users are severely restricted in their ability to participate in conversational narrative and thus create and share a sense of self.

For children with developmental impairments who are developing their language skills (and therefore their sense of self) through AAC mediated interactions, there may not be a well-articulated thought just waiting for them to ‘express’ via the VOCA. They face a dual time problem which reflects two facets of expressive communication (Hrastelj, 2021). Firstly, early aided communicators need extra ‘micro’ time within an interaction, *even when they already know what they want to say*. Secondly, they may not ‘know what they want to say’, particularly if this relates to their views and opinions rather than their basic wants and needs. They need extra ‘macro’ time, extra opportunities and experiences to consider what they think before they get to the VOCA output stage.

AAC, Ableism and Technoableism

The notion of ableism within Critical Disability Studies has relocated social and political understandings of Disability, placing them alongside Race, Gender and Sexual Orientation. As Goodley (2017) points out, this minority model approach to Disability views people who are disabled as members of a minority group whose civil rights are curtailed, if not denied.

One criticism of the design of VOCAs, and vocabularies provided within them, is that they are often based on ableist assumptions about the needs, preferences and abilities of disabled people – assumptions that directly give rise to the technology-driven iteration of such systems at the expense of their usability (Sellwood *et al.*, 2024). Shew (2023) adopts the Critical Disability Studies approach to ableism, characterising the design and provision of assistive technologies such as VOCAs within the concept of “Technoableism”. Technoableism is framed as the over-reliance on technology as the

solution to the perceived problems of people who are disabled. Shew herself coined the phrase to describe how, if not guarded against, rather than enabling people who are disabled, technology can disempower by imposing non-disabled ways of living on disabled people. Technoableist VOCA design can be seen in the lack of attention to the individual needs of the user (Judge and Townend, 2013), however there has more recently been a call for greater user-centred VOCA design (Pullin *et al.*, 2017) and more specifically person-led (rather than technology-led) development. Sellwood and colleagues' (2024) manifesto represents a call to arms for a more thoughtful, intentional, and user-involved approach to VOCA design and development.

In current VOCA design, communication is frequently conceptualised within a sender-receiver model (Denes and Pinson, 1993); language content and speech generation are inherent to this model and therefore VOCAs are positioned as providing alternatives to disordered speech. The content of these VOCAs therefore focuses on reproducing language, based on existing normative language acquisition and analysis models, and reproduced through synthetic speech output. Again, this model is technology-led, placing the device at the centre of the interaction, as the sole conduit through which messages are sent and therefore the focus of the interaction. However, there is increasing recognition that communication with AAC users is co-constructed. Co-construction recognises that meaning-making is an interpretative process between people who have communication impairment and their communication partners (Solomon-Rice and Soto, 2011). In this model, communication occurs across and between the explicit speech and language signals and more implicit, embodied communication inherent in interaction. Co-construction is contingent on the sensitive,

responsive, intuitive, and curious reactions of people engaged in the interaction (Benson-Goldberg, Gullion and Erickson, 2024).

Uses of LLMs in VOCAs

This paper focuses on the use of large language models (LLMs), as the most pertinent usage of AI in VOCA design, although we acknowledge that AI has great potential in other areas of AAC. There exists much potential for the integration of LLMs in VOCAs – including rate enhancement, where LLMs may “supercharge” word and sentence prediction. The potential for such enhancements to support users appears to be perceived positively by the AAC community (Griffiths, Slaughter and Waller, 2024).

An LLM is essentially a machine-learning model that is specifically designed for natural language processing. LLMs use neural networks to encode and decode vast datasets of language in such a way that meaning can be extracted from sequences of text, grammatical and syntactic structures can be learned, and eventually novel, human-like text can be produced in response to prompts from end users (Brown *et al.*, 2020). LLMs are trained on a large corpus of text – typically scraped from the internet – from a very large number of authors who, by definition, are not the end user. The corpus on which an LLM is trained is therefore primarily written language. What is more, LLM training data reflects the language of the normative majority, being produced by non-disabled users. This would seem to foreground a tightrope that needs to be walked in relation to LLM implementation in VOCAs. The AAC movement is committed to giving people who are communicatively impaired the technical means to participate in the ‘vocal world’. If LLMs are to be implemented in future VOCA design, they must equally reflect the heterogeneity of AAC users while simultaneously reflecting their experiences

and aspirations. LLMs clearly *can* be used to produce language for communication and integrating them into existing or novel VOCAs is not a technologically complex task (Yang and Kristensson, 2023). LLMs contain no user-specific content, context, or information and so, for LLMs to be used to produce output requires the user to craft the input. Typically, this is done using written prompts to the LLM system. The rapid uptake of LLMs presents a risk that old patterns of technoableism, and technology-driven design behaviours may overlook some of the more significant user-centric features of VOCA design. This paper discusses how the integration of LLMs may impact individual AAC users, using the ethical method casuistry to identify some of the ethical challenges and risks of the technology.

Considering the possibility of Facilitated LLM AAC – a Casuistry Approach

Spielthener explains the method of casuists as comparing “the case under consideration to a relevantly similar (analogous) precedent case in which judgements have already been made, and they use these earlier judgements to determine the proper resolution of the present case” (2016, p. 417). In this paper, using the casuistic method, we thus suggest Facilitated Communication and some applications of LLM use in VOCAs as relevantly similar and thus ethically comparable.

Facilitated Communication (FC) and its variants such as Spelling to Communicate (S2C), Supported Typing (ST) and Rapid Prompting Method (RPM) are techniques that purport to reveal the hidden communication abilities of non-verbal people. In its original form, FC is a process where a ‘facilitator’ holds the hand of a person with communication impairment over a keyboard or printed letterboard, moving

their hand to ‘support’ them in pointing to letters or words. It is beyond the scope of this paper to discuss the mechanisms by which this is claimed to work, but no empirical evidence has been found to support any such mechanism by which it could. Further, in blinded testing conditions, the outputs produced are overwhelmingly found to be those of the facilitator, not the purported communicator. The technique is pseudoscientific and has been repeatedly discredited in reviews of published studies (Mostert, 1995; Schlosser *et al.*, 2014; Hemsley *et al.*, 2018), disavowed by former advocates (Boynton, 2012) and regularly attracts the ire of disability rights activists for its paternalistic framing within the concept of the “intact mind”, which devalues the needs and unique perspectives of individuals with severe and complex intellectual impairments (Lutz, 2024). Numerous international organisations advise against or prohibit its use, including the American Psychological Association (APA), the International Society for Augmentative and Alternative Communication (ISAAC) and the National Institute for Health and Care Excellence (NICE).

Casuistry requires us to establish the ‘relevant similarity’ of equivalent cases. The relevantly similar use of LLMs in VOCAs, we propose, is one where they are used with prompting provided (consciously or unconsciously) by another person or the VOCA itself. There are several ways this could happen in a VOCA with an integrated LLM. A system that has been envisioned for many years (Higginbotham *et al.*, 2012; Judge *et al.*, 2015; Kristensson *et al.*, 2020) is one where the VOCA recognises the communication partner’s speech and automatically generates a reply. We can envision a scenario where the VOCA generates this reply *solely* based on the communication partner’s speech without any intervention from the VOCA user. This is easy to simulate with ChatGPT™, as shown in the example below where (A) represents the

communication partner and (B) represents the responses generated automatically by ChatGPT™:

A: Hi

B: Hey there! How's it going?

A: Good. though it is raining.

B: I hear you—rain can be cozy, but it can also feel a bit gloomy. Are you making the best of it, or is it kind of putting a damper on things?

A: I hate it. Did you see we are going out Friday?

B: I can feel that! Rain can definitely make everything feel a bit dreary. And yes, Friday plans—sounds exciting! What's on the agenda for the night?

A: I've sorted a pub crawl and a bit of a quiz to go with it.

B: That sounds like a great time! A pub crawl with a quiz sounds like the perfect mix of fun and challenge. Have you picked the pubs already, or is it still a bit of a surprise?

Without the context and understanding that this was generated with no explicit prompting by the user, this might be potentially considered a good chat, although closer examination highlights that the responses contain no individualised or personal content, knowledge of the user, their preferences, language, idiolect or their personal opinions on rain or pubs.

There are other scenarios in which another person might (consciously or unconsciously) facilitate communication using an LLM AAC. It is easy to envision a system where the interface is customised to contain some information about the user – traits, preferences, opinions that another person believed the user to identify with – which might then be used to build prompts for the LLM. Again, this is possible to simulate using ChatGPT™:

Prompt to ChatGPT™: *I like Marvel Comics, I live in Mansfield, I am female, I like MacDonalds and Man City football club. Can you speak for me and give some standard chat phrases that incorporate a little about my interests, every time I type 'next' please.*

ChatGPT™: "Hey! I'm from Mansfield. Do you know the area? Also, I'm a huge fan of Marvel Comics. Who's your favorite superhero?"

next

ChatGPT™: "I can't resist a good McDonald's meal! What's your go-to order when you're there?"

next

ChatGPT™: "Being from Mansfield, I've got to say it's a pretty cool place to live. What about you—where are you from?"

next

ChatGPT™: "Man City's been on fire lately! Do you watch their matches regularly?"

Whilst it is possible that these may be genuinely held opinions and identities of the individual, it is also possible that the person inputting the original linguistic items has made implicit or explicit assumptions, or themselves holds beliefs about the individual that are not necessarily accurate. It might also be that no context is provided, but that the VOCA still uses the LLM to provide the next response. The LLM in this example is providing convincing communicative replies, but there is nothing of the individual user within them. This example also highlights the important ethical difference between an AAC user understanding the message generated by an LLM, and consciously choosing or co-constructing this message, and an AAC user not understanding the content or purpose of messages being produced by the system.

These brief examples demonstrate, we suggest, how the use of LLMs to support or augment communication has relevant similarity to FC. In our examples, the LLM and / or the other person providing linguistic items play an analogous role to the facilitator. We do not suggest that all VOCAs including an LLM would necessarily become “techno-FC”, but FC provides us with a cautionary tale from AAC history which we can examine

to draw out ethical principles and learning when considering how LLMs are used in VOCAs. The ethical risk of using LLMs in VOCAs, as with FC, is that it produces communication without content or, more worryingly, communication with someone else's content. The discussion centres on the concept of authorship. Authorship is a key contention in FC – where it relates to the question of who is authoring the message: whether the user is truly being supported to express their authentic thoughts, or whether they are those of the facilitator. Objective, controlled trials of the technique (Saloviita, Leppänen and Ojalammi, 2014; Schlosser *et al.*, 2014) demonstrate that authorship in FC is overwhelmingly that of the facilitator.

In recent years, within AAC literature and practice, the question of authorship has extended into the discussion of how meaning is co-constructed – jointly agreed between communication partners or participants in an interaction, and the question of specific authorship is less important (Ibrahim *et al.*, 2023). In text-based communication, such as that facilitated by LLMs, however, questions remain about who has truly authored or created the messages attributed to a VOCA user, and the risks relate again to the idea of who is being *perceived* as the message's true author.

Risks of Facilitated LLM AAC for Early Aided Communicators

It is important to recognise that the use of LLMs in VOCAs may have significant advantages if properly realised (Griffiths, Slaughter and Waller, 2024). We argue that these advantages must be balanced against the significant risks related to authorship, but also to how over-reliance on such systems may impact the language learning and communication development of their users.

The social psychology of Mead (Morris 1962) places interaction with others at the centre of the development of minds and selves, which is often conceptualised as ‘humanness’ in AAC literature (Dickerson *et al.*, 2002). Since its inception, AAC has made social participation accessible to people who are communicatively impaired. The humanness of AAC users is dependent on such participation, and questions should be asked about the potential impact of LLMs on this. Language is essential for the development of self as well as mind, Mead argued that selfhoods are developed through the reflective process from these discourses. Contemplating the humanness of AAC users in relation to AI begs the following questions: What implications do LLMs have on this process? Could LLMs help educate children with communication impairments?

Children who use AAC often acquire language skills using a VOCA in their interactions. However, language is only one part of their communicative system and they are also adept at using other modes and methods, such as material artefacts in the space, vocalisations, gaze, and bodily actions (Pilesjö, 2013, 2014). Adults who interact with children who use VOCAs may use their own talk and observations of the child’s other communicative actions to scaffold the child’s aided utterances and support them to develop expressive (aided) language skills. This may include asking questions, recasting utterances, elicitation, and praise (Solomon-Rice and Soto, 2011; Clarke, Soto and Nelson, 2017; Savolainen *et al.*, 2020; Tegler *et al.*, 2020). As an example, if a child’s linguistic skills are not yet sufficient, a personal photograph can be used to elicit a range of other information from the child:

SLT: How were you feeling that day?

Child: Nervous

SLT: Who is the story all about? ((pointing to VOCA))

Child: me

SLT: Okay, me. ((writing on paper)) Anybody else? Who's that? ((pointing on photo))

Child: Mom

In this example (adapted from Solomon-Rice and Soto, 2011, where underlined words are selections made by the child on a VOCA), the speech and language therapist (SLT) uses open questions and other material resources in addition to the photograph to support the child's personal storytelling, including pointing to their VOCA and writing down everything the child said on a large piece of paper. This level of co-construction between the adult and child would be impossible for an LLM to achieve. LLMs offer the potential for rate enhancement, or for expanding the child's utterances, but children still need to learn the elements of telling their own story, developing their own idiolect and personality.

Using the relevant similarity identified through our casuistry lens, we would advise caution about putting narratives together for the child, or authoring their narratives for them, as this will likely hamper the development of their linguistic and social skills. If LLMs speed up language construction by providing an 'adult-like' sentence output, children may miss opportunities to reflect on what they really think, and to develop expressive language (content and grammar) which accurately represents these thoughts to others, thus developing humanness, and an autonomous sense of self.

Conclusion

Critical Disability Studies, technoablism, and the legacy of tech-led AAC design cautions us against the uncritical application of mainstream technologies as default

alternatives to remediate for perceived disability. In this paper, we have used the casuistic method to highlight ethical risks of embedding LLMs into VOCAs without due diligence to the needs of AAC users, or a robust consideration of the ‘augmentation’ of communication in a way that meets the needs of the end-user. People who are disabled share the same position as everyone else when it comes to the future of AI: what will be the extent of their influence over its development? We acknowledge that there are clear potential benefits to the responsible integration of LLM technology into AAC. We propose that how and when this technology should be integrated requires careful and thoughtful future research and development. This is allied to much of the work in the broader fields of mainstream and specialist education, where discussions about appropriate use of AI are a current area of focus for professionals and researchers.

We draw parallels with a previous, discredited, technique where AAC users were shown not to be the authors of their own messages to highlight this risk. Howard Shane wrote of FC that “if the source of communication is questionable, there is no assurance that communications are authentic” (1994, p. 259) and we believe that this constitutes a relevant similarity with LLM-generated output, where the authorship of utterances may be questioned. Communication encompasses multiple modes of expression, co-construction and dynamic interaction between participants, which are in turn based on the shared understanding of how meaning is constructed, and who is authoring the messages. In LLM-augmented VOCA use, conversation partners might perceive a response to be authentically that of the user when a combination of pre-stored linguistic items for use in prompts and the LLM itself might be said to be the “truer” author. This requires a more nuanced ethical engagement with the concept of authorship: who creates the intent and who generates the message content?

We have highlighted that co-construction of messages and meaning in interaction is a vital part of learning language, communication, and social interaction. The use of LLMs in VOCAs risks jeopardising or reducing these opportunities for emerging aided communicators. Overlooking the basis of co-construction and authorship by over-zealously incorporating LLMs into VOCAs, raises an ethical risk of losing the humanness of the person.

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