

# Who said it? Examining misalignments between assistive robots in AAC and lived experiences

Mathieu DePaul<sup>1</sup>, Michael Cabrera<sup>1</sup>, John Kim<sup>2,3</sup>, Alyssa Kubota<sup>1</sup>

<sup>1</sup> School of Engineering, San Francisco State University

<sup>2</sup> School of Education, University of California, Berkeley

<sup>3</sup> Department of Speech, Language, and Hearing Sciences, San Francisco State University

## ABSTRACT

Social robots and other embodied systems are increasingly being explored as supports in augmentative and alternative communication (AAC) contexts, often motivated by recurring challenges in AAC practices such as limited expressive options and interaction breakdowns when communication partners misinterpret intent. However, introducing a robot into AAC contexts can reshape and shift social interactions in everyday communication settings. This paper raises ethical questions that emerge when socially embodied systems mediate AAC interactions, drawn on conversations and perspectives from AAC stakeholders and prior AAC and human-robot interaction (HRI) literature. We frame these concerns around perceptions of authorship and agency, with attention to long-term effects on participation and potential shifts in communicative norms. These tensions highlight the value of ethical reflection alongside system design, supporting more careful and collaborative choices about how robots enter interactions on AAC users' terms.

## KEYWORDS

Human-Robot Interaction (HRI), Augmentative and Alternative Communication (AAC), Socially Assistive Robotics

## 1 INTRODUCTION

Spoken language is not always an accessible or reliable means for communicating in everyday life, particularly for nonspeaking individuals. In those cases, augmentative and alternative communication (AAC) systems can support participation by providing alternative modalities through which people can communicate [3]. These modalities may be unaided (e.g., gestures, manual signs, facial expressions) or aided (e.g., speech generating devices, communication boards/books, written words), and they support participation when speech alone is not enough [2, 6, 11]. These systems can be used to express intentions in an interaction, including expressing wants and needs, sharing information, connecting with others, and meeting social conventions [29]. For many nonspeaking individuals, AAC shapes what can be expressed and how that expression is interpreted in everyday interactions. Interpretation is often context-dependent, so what a message “means” may vary depending on the setting, conversation partner, and lived experiences [41].

Across clinical, research, and community settings, there have been an increase in calls for technological advancements in the AAC space. AAC stakeholders consistently express interest in systems that are faster, more reliable, and more expressive. At the same time, there is frustration that many AAC systems have remained

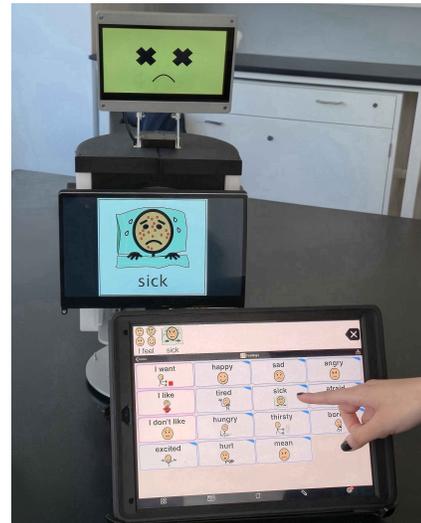


Figure 1: Example socially embodied AAC support [7].

largely unchanged for decades. Traditional AAC technologies often rely on static grid layouts, fixed vocabularies, and limited adaptability [9, 23, 36], with poor integration into modern technologies such as video conferencing platforms [21]. These constraints may restrict expression to requests, prioritize clinical goals, and limit communication that is authentic and reflective of users' identities, conversational styles, or lived experiences [23, 36, 44].

Because AAC-mediated messages rely on system outputs and partner interpretations, communication breakdowns can occur and damage the interaction. In this case, communication breakdowns refer to moments where the intended message is not understood completely, and the conversation changes based on that misinterpretation [28]. For example, consider a scenario where a teacher suggests that a student goes outside to play in the rain, but does not know that the student dislikes the rain. While the student states that it is raining (implying that they do not want to go outside), the teacher may incorrectly interpret this statement as agreement to go play. This continued interaction based on an incorrect interpretation can cause distress and confusion for both the teacher and student. These experiences motivate stakeholders' push for AAC technologies to support faster, clearer, and more expressive communication in everyday interactions.

In response, new technologies are increasingly being proposed in clinical or assistive contexts to address these perceived deficiencies in traditional AAC systems. For example, social robots and AI-supported systems have been deployed as tools to support learning, engagement, and socio-emotional communication [8, 24]. In

related work, embodied features such as motion have been leveraged to supplement existing symbol-based communication [10]. In the same line of work, researchers also often frame robots with assigned roles such as teachers, therapists, mediators, or play partners [8, 12, 19, 24]. Together, these systems are often proposed to address challenges that may emerge in AAC use, such as maintaining engagement or supporting more full expression during communication interactions.

As these systems near deployment in the real-world, it becomes important to consider not only their intended benefits, but also how they shape relationships, agency, and participation over time. Longitudinal work in robot-assisted contexts reveal potential relational effects that emerge from continued use, including emotional attachment, shifts in interactional role, and changes in engagement and trust with the robot [16, 33, 35]. Similarly, reviews of human-robot interaction research highlight that ethical concerns, such as normalization of communication and behavior toward dominant norms, power dynamics, and exclusion of disabled people from meaningful participation, are frequently identified only after systems have been deployed in everyday contexts [20, 38].

These considerations are especially important in AAC contexts where communication systems carry extremely high stakes. These ethical tensions extend past how a system functions to how they shape interactions and influence perceptions of agency and competence. When embodied systems mediate social interactions, there are questions about who leads the interaction, who adapts to whom, and how authorship is distributed among the user and system.

We draw on conversations and perspectives from key stakeholders, including ACC users, families, clinicians, and researchers, to examine moments where potential misalignments between assistive technology design goals and lived impacts may exist. Instead of prescribing solutions, we aim to surface tensions that may potentially inform design and deployment. We explore ethical questions at the intersection of AAC and human-robot interaction (HRI) by summarizing recurring challenges raised by stakeholders and prior literature, then framing ethical questions for socially embodied AAC systems. These questions center on agency and authorship, with implications for participation in interactions, what counts as “successful” communication, and presumed competence. We will conclude with goals for discussion.

## 2 RECURRING CHALLENGES FROM STAKEHOLDERS AND LITERATURE

The challenges described here reflect current AAC experiences and perspectives, mostly in contexts without social robots, and motivate the ethical questions raised when social robots enter AAC practice. They are informed by prior literature and informal conversations and observations across many contexts, including ongoing collaboration with a speech-language pathologist who leads an AAC clinic for nonspeaking children, and reflections from AAC-centered conference sessions.

### 2.1 Towards Personalization in AAC

Drawing on conversations with AAC users, families, clinicians, and researchers, there is a clear desire for AAC systems to support meaningful communication beyond basic requests. Stakeholders

repeatedly emphasize a desire for AAC systems to reflect who users are, not just what they want to request. They mention that communication is shaped by cultural contexts and self-identity, rather than universal communication norms. While traditional AAC systems may satisfy clinical goals, such as supporting functional requesting and conversational skills like turn-taking, they may also limit users to transactional communication [10, 13, 30, 32, 34]. Stakeholders emphasize that meaningful communication comes from personalization that supports individuals’ conversational styles, cultural contexts, and lived experiences. Generic symbols, static grids, and fixed vocabularies may fail to represent how users make meaning in everyday interactions. As a result, AAC system designs may limit what users are able to say and how they are understood by others, shaping perceptions of agency, competence, and participation.

As a result, there is a risk that AAC users are forced to adapt their expression to the system’s, instead of the system adapting to how the user makes meaning. This concern becomes more pressing as AAC systems increasingly incorporate predictive or adaptive features. System suggestions may influence what is expressed, which topics are addressed, and how responses are shaped [43].

### 2.2 Communication Breakdowns and Risks

Because AAC systems often serve as nonspeaking individuals’ primary means of communication, breakdowns in AAC-mediated interactions can carry particularly high stakes [17]. Communication breakdowns refer to situations where the intended message does not come across as it was meant due to misinterpretation, limited expressive options, or more [28]. Stakeholders express anxiety around delays or misinterpretations that may happen in everyday communication. Our conversations with AAC stakeholders suggest that breakdowns not only affect the transmission of messages, but also impact how AAC users are treated as conversation partners, including perceptions of competence and participation.

Prior work on embodied, motion-based AAC highlights how timing gaps and monotonic speech output can disrupt conversational flow and participation [42]. When communication partners are required to wait for a response from an AAC user, interactions may become strained and risk situations where AAC users are overlooked and no longer seen as equal conversation partners.

### 2.3 Relinquishing Agency and Authorship

AAC stakeholders express concern over what “successful” communication looks like and if robot systems risk reinforcing dominant norms, marginalizing alternative practices. These practices raise ethical questions about who sets communicative standards and how authorship shifts among users, systems, and conversation partners. These concerns align with design perspectives that challenge the assumption of universal communication models and instead highlight that meaning is contextual and culturally informed [40].

These dynamics also connect to presumed competence, the assumption that a communicator has more to say and understand than their current output might suggest [4, 37]. Our conversations with AAC stakeholders suggest that limited vocabularies or inflexible system designs may restrict users’ ability to express, and that communication partners may mistakenly attribute these limits to

reduced competence. For example, one account describes how constructing messages through typing can be much slower than spoken conversation, so by the time the response is ready, conversation partners may have already moved on to the next topic [4].

A related concern from our conversations with stakeholders involves facilitation interventions that are meant to support participation, but may unintentionally guide what the user expresses. In school and therapy settings, adults may press symbols on a child's device or use "hand-over-hand support", by physically guiding symbol selection, to show how to use their AAC system [5]. When a facilitator directs selections during an interaction, authorship can shift away from the AAC user, especially when communication partners already hold substantial power over access to AAC and control over opportunities for meaningful participation [31]. This is an important concern to keep in mind as socially embodied systems may prompt and guide AAC-mediated interactions.

## 2.4 Participation in Design and Goal-Setting

Stakeholders emphasize involvement in AAC design and goal-setting, not just evaluating the system after the fact. Partnering with AAC users and families can support ownership and respect users' expertise in their own communication [14, 25, 26].

Co-design work with AAC users highlight how participatory approaches can align robotic systems in supportive, secondary roles in AAC interactions, instead of positioning them as primary communicators or authorities [42]. When disabled stakeholders are not included as partners in design, system goals may reflect clinical priorities more than users' preferences [38]. Together, these observations highlight a tension between participatory design and the limits of preserving agency.

## 3 ETHICAL QUESTIONS RAISED WITH SOCIALLY EMBODIED AAC SYSTEMS

As AAC systems increasingly incorporate socially embedded technologies, like social robots, stakeholders raise ethical questions that move beyond system function. These questions are not only about technical design or limitations. They also concern how meaning, agency, and participation are negotiated in robot-mediated interactions [20]. In AAC contexts, where communication stakes are particularly high, these dynamics are critical considerations. Stakeholders also express uncertainty about what role robots should play in AAC-mediated interaction, especially as long-term use may shift interaction dynamics beyond designers' original intent. Prior work shows that socially embodied systems can reshape interaction roles, expectations, and relationships over time, often in ways that were not intended or anticipated during the early stages of development and evaluation [16, 33, 35]. Building on these stakeholders' concerns, we focus on authorship and agency, and then consider their implications for participation and communicative norms.

### 3.1 Authorship and Attribution

Authorship in AAC-mediated interactions refers to who communication partners treat as the source of meaning and intent [15, 39]. This topic includes concerns about facilitated communication, when a facilitator's influence may be confused for the communicator's original intent [15, 39]. In traditional AAC interactions, authorship

can already be complex, as messages are constructed through symbol selections, system design constraints, and conversation partner interpretation. When robots are introduced as socially embodied supports for communication, they may take on facilitator roles by prompting responses and shaping interactions, complicating the attribution of authorship in interactions even further.

This raises questions about who is "speaking" when meaning is expressed through user selections and robot behaviors. This is important because robots can contribute meaning to interactions through motion and other expressive behaviors that may supplement AAC outputs [10]. For example, embodied AAC systems have combined symbol-based messages with motion to help communication partners interpret intent beyond what static selections may convey [42]. This means that interpretation can rely on both what the user selects, and how the robot embodies that selection.

Relatedly, as AAC systems incorporate predictive or adaptive features, system suggestions may influence what the user can express, what topics are addressed, and how responses are shaped [43]. In this context, do communication partners perceive intent as coming from the AAC user, the robot, or the designers that created the robotic behaviors? When communication breaks down, responsibility may also become a gray area. Authorship of a message matters because it can inform how competence is presumed [15]. If communication partners attribute meaning to the robot or the system's programmed behaviors, they may discredit the communicator's intent, preferences, or contributions in social interactions [43].

Authorship attribution can also shift depending on how a robot is framed within various contexts. When researchers position robots in roles such as teachers, tutors, mediators, or peers, the robot may be interpreted as the authority guiding the interaction, rather than as an extension of the user's expression [12, 19]. At the same time, many social robots rely on fixed behaviors, which can limit personalization and make designers' assumptions more present in these systems [19]. In this case, the interaction may be perceived as co-constructed between the communicator and the system, leading to questions about what parts of the message comes from the user versus how much is attributed to the robotic system [12].

### 3.2 Agency and Control

Stakeholders emphasize the importance of preserving AAC users' agency, especially avoiding systems that limit communication to requests or clinician-defined goals [1, 36]. Social robots may complicate this issue by shifting who leads an interaction. Robots that are designed to support or guide communication may unintentionally redistribute interactional control by shaping message prompting, conversational pacing, and how the conversation unfolds, including risks of robot-mediated interference framed as being for users' own good [12, 19, 20]. Similar concerns have been raised for AI-supported AAC systems with predictive or personalized suggestions, where users must balance between efficiency using the system and control over their participation in interactions [43].

Prior work emphasizes that, beyond symbol meanings, AAC users must learn strategies for timing, selection, and interaction pace in order to participate effectively in conversation [10, 30, 32]. These skills include turn-taking and managing response timing, which are often treated as key goals in AAC interventions. With

robot-mediated interactions, if social robots initiate turns, prompt responses, or dictate the pace of an interaction, they may make communication easier in the short-term while also potentially limiting opportunities for AAC users to practice initiating and managing the interaction themselves [12, 19]. This raises questions about whether users are reciprocally engaging with conversation partners, or if they are adapting to the robot’s timing and cues. More generally, we consider if such systems support transferable communication skills, or instead shift interaction patterns and styles in ways that align with the system’s intent, rather than the communicator.

### 3.3 Participation and Communication Norms

Authorship and agency questions also have important implications for participation, including who is meaningfully taking part in interactions. Longitudinal robot-assisted studies have found relational effects that surface over time, including emotional attachment, changes in participation patterns, and changing expectations of responsibilities during interactions [16, 27, 33, 35]. In AAC, these changes matter because participation is not just about transmitting messages, it is also about treating AAC users as active conversation partners with chances to initiate and respond when they want to.

Communicative expectations are situated rather than universal, shaped by relationships and contexts [40]. Mediated communication systems may shift or reinforce communicative norms, including through pressures to standardize and prioritize clarity and efficiency, which can overlook the human work needed to support access and participation [22]. In AAC contexts, social robots may further shape these norms by modeling particular behaviors and roles [20]. When researchers and practitioners position robots as teachers, mediators, or peers, they may inadvertently define what counts as successful participation, for example the system may decide which responses are appropriate for the user [12, 19]. Similar work in disability-focused HRI studies warn that embedding communication norms in technologies may privilege certain communication styles and disregard and marginalize others [18, 38, 45].

Socially embodied systems may also shift interactional expectations so that dominant norms are not automatically set as the default goal [45]. For example, Williams et al. describe a turn-taking design that discourages communication partners from filling pauses in conversation when someone is taking longer to respond, adjusting the pacing of the conversation rather than treating the delay as something to correct [45]. The focus moves away from requiring people to adapt to normative communication practices and towards shifting the interaction to better support participation [45].

Together, these questions and tensions around authorship, agency, participation, and communicative norms, reveal the need for early reflection on how socially embodied systems are introduced into AAC practice. Rather than addressing issues as they appear, we hope to motivate closer examinations of ethical issues that can develop after these systems are deployed.

## 4 EARLY CONSIDERATIONS FOR ROBOT-MEDIATED AAC

As socially embodied systems are increasingly entering AAC contexts, one consideration is *how these systems are framed within interventions*. Prior studies have assigned robot roles in learning

contexts, including teacher, peer, or pupil [12]. Other work assigned the robot to roles such as friend or play partner to promote social interaction, which may shift the child from spectator to active participant [19]. Together, the robot’s role shapes interaction expectations, so it becomes important to define the robot’s role early, rather than emerging over time. This is especially important in AAC contexts where communication authorship and responsibility is already potentially unevenly distributed.

Another consideration is *whether robotic systems can meaningfully adapt to meet individual communicators’ preferences*. Studies have found that many socially assistive robots are pre-programmed with fixed responses and behaviors, which may limit personalization and not reflect an individual’s own thoughts, preferences, or personality [10, 19]. Related work also points to the lack of standardization in how socially assistive robots are deployed in speech and language therapy [19]. In AAC contexts where stakeholders express that meaning is rooted in their lived experiences, this limited adaptability may create breakdowns between how users make meaning in everyday contexts and the robot’s interaction style.

Robots may also introduce *relational complications that may be addressed early*, even if they typically only appear after sustained use. Prior work found cases of attachment behaviors, which raise questions about over-reliance, as they report possibilities that users may become overly dependent on socially assistive robots for communication, and may even withdraw from other interpersonal relationships [16, 19, 33]. In addition, ethical concerns arise from potential unintended effects on the relationship between therapist and child [19]. For example, Estévez et al. reported in some cases, children responded more strongly to praise from the robot compared to the same praise from the speech therapist because the robot was perceived as a more objective evaluator [16]. Together, these issues highlight why more intentional discussions need to occur early in design stages, including thoughtful consideration of the robot’s role and the effect that dependence has on interactions.

## 5 CONCLUSION

As social robots are increasingly proposed in AAC and other assistive communication contexts, it is critical to consider not only what these systems were designed to do, but also how they shape interactions, agency, and participation over time. These considerations are especially important in AAC contexts, where communication systems carry extremely high stakes and are often users’ primary means of communication. When social robots mediate communication, questions emerge about who leads communication, who adapts to whom, and how the ownership of meaning is attributed when communication is co-constructed by the user and system.

This work invites collective reflection, rather than prescribing any one solution. By drawing on lived experiences and stakeholders’ concerns, we hope to surface ethical tensions that may not be immediately apparent during early design stages. In particular, we encourage discussion surrounding authorship, agency, participation, and normativity in AAC-mediated interactions with social robots. By bringing together researchers, clinicians, designers, AAC users, and families, we aim to support ethical questions early, before new systems are deployed and embedded in AAC practices.

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