

# In The Round: Exploring the Cultural Model of Disability in Accessible Music Improvisation

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Figure 1: Performance of *In The Round*.

## Abstract

This paper documents the development of *In The Round*, a musical improvisation using Accessible Digital Musical Instruments (ADMI) that brings together musicians with and without disability. Key learnings from the project are discussed through a poem that formed the creative foundation of the project. The poem functions as a reflective and epistemic device, unpacking different observations about the process of creating the work that evidence how we have created a culture of accessible music-making deeply linked to accessible practice, technology and creativity. Grounded in the cultural model of disability, the paper argues that accessibility in music-making emerges through interdependent relationships between people, instruments, social techniques,

and temporal structures, rather than through ADMI technology alone. In illuminating this way of working, the paper offers an alternative way of communicating knowledge and contributes insights that we hope may be useful to other practitioners and instrument designers in the field.

## Keywords

DMI, ADMI, practice-based research, workshops, disability culture, cultural model

## 1 Introduction

This paper outlines the creation of *In The Round*, an immersive improvisation that blurs the boundaries between sound, movement and play, bringing together musicians at different stages of their career with and without disability in a shared circle where listening, turn-taking and spontaneous interaction guide the flow of music.

The paper unpacks key discoveries from the process of creating the piece, using creative output from the piece – a poem – to



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structure these observations in a creative way. There is a push within practice-based research to include poetry in academic writing [15]. In using the poem to ground our observations, we capture this cultural practice and learnings within the paper itself, leaning into ways of knowing and new forms of creative knowledge within a formalised structure like a paper. We are employing the methods of our practice-based research – creativity, critical reflection and iterative design – in the context of the paper as a form of advocacy [1]. Informed and inspired by the Magnusson viewing of musical instruments as cognitive extensions and epistemic tools, we would like the reader to be brought into this project to not only read about it but understand these ways of working through the epistemic systems [11] embedded within our own practices.

In this way, it is hoped that the paper itself is more accessible and grounded in the diverse voices within the project, all of whom have different communication needs, ways of vocalising and creating music and sound.

## 2 Background

Various social and creative contexts underpin the project of *In The Round*.

We first describe the theoretical grounding of our way of working, the cultural model of disability, in Section 2.1. Section 2.2 describes the practical context and structure of the project. Finally, a poem which formed the creative foundation of the performance, is outlined in Section 2.3.

### 2.1 Cultural model of disability

As practitioners in the field of Digital Musical Instruments (DMIs), our research team is motivated by and aligned to the cultural model of disability, with growing attention in the DMI space highlighted by Duarte et al. [5]. The cultural model shifts attention away from impairment or access barriers alone, and focusses more on how disability is understood and valued through culture and creative practice.

Emerging from disability studies, the model argues that disability is shaped by narratives and aesthetic conventions that determine whose bodies, voices, and ways of performing are seen as legitimate [7, 8]. Rather than locating disability solely in physical or social limitations, the cultural model emphasises how artistic and technology-based ways of working embed assumptions about ability and virtuosity.

As a team working in the field of Accessible DMIs (ADMI) [20], we are more so motivated and informed by the cultural model of disability. Within this model, as explored by Twardowski:

...representatives of the cultural model consider the interdependence of able-bodied and disabled people in everyday life, and determine the actual consequences of this interdependence for the autonomy of both [21]

In the context of accessible music workshops with ADMIs, this extends to considering how technologies and performances contribute to a broader musical culture of performance and music-making.

It is within this context that we began *In The Round* as a project, with the overarching goal of collaborating and co-creating in workshops and performances using ADMIs.

In a broader sense, accessibility and the use of ADMIs are intrinsically linked to the instrument design [23], and we are arguing that the practice-based reflection and use of ADMIs within artistic practice we refer to in this paper are useful contributions to instrument designers and HCI fields. This builds on work emphasising the role of community in sustaining accessible music technology [10], and calls for disabled people to be centred in the development of ensemble technologies [18]. In using this style of reflection as a research methodology, we are also drawing on a growing tradition of literature that emphasises artistic practice as the primary material for analysis, based in research through design (RtD) and HCI literature [22, 25].

### 2.2 Project structure

*In The Round* involved diverse participants with varying levels of musical and performance experience. The four performers with disability brought a range of access needs: mobility varied from full ambulatory movement to powered wheelchair use, with corresponding differences in ranges of motion that directly influenced the gesture mappings created on our own custom ADMI, the AirSticks [20]. The AirStick is a small device that can be placed in objects or worn that converts movement into sound, often music but at times also pre-recorded text. In this project, we used a design iteration where the AirSticks connected to a Raspberry Pi ‘hub’, allowing independent use and practice without specialised software or technical knowledge [14]. Some participants communicated primarily through speech, while others used Augmentative and Alternative Communication (AAC) methods or relied more heavily on non-verbal cues. Several participants benefited from visual rather than verbal cueing during improvisation, which informed the group’s adoption of eye contact as a shared musical signal (discussed in Section 3.1).

The stakeholders in the project were:

- **Performers with disability** – four feature soloists who used AirSticks
- **Facilitators** – three facilitators who co-designed mappings, cued changes in the performance and organised the ensemble
- **Percussionists** – ten percussionists from Monash University Percussion Studio

All stakeholders were co-creators of the work across 18 months of development, from June 2024 to December 2025. The project used a combination of acoustic instruments and the AirSticks, a wireless gestural instrument that has an existing community of practice around it [20].

The project was divided into four stages across these 18 months – individual workshops from June to December 2024 (described in Section 2.2.1), a checkpoint performance in March 2025 (described in Section 2.2.2), group workshops from April to November 2025 (described in Section 2.2.3) and a final performance in December 2025 (described in Section 2.2.4). These stages represented milestones within an iterative process. We did not necessarily know what these milestones would be when the project began – instead, they emerged naturally as the project progressed.

**2.2.1 Individual workshops.** The project began with 11 individual workshops between June and December 2024, involving 5 performers with disability. These workshops were conducted on a one-on-one basis with facilitators, often in the home or regular setting of the performer, as per regular practice for this style of music workshop [17].

The purpose of these workshops was to get to know participants, and for participants to increase familiarity with the AirSticks on a more personal level before moving on to group sessions. These meetings were also an excellent opportunity to understand individual access requirements and bodily preferences that would later inform creative and access decisions such as mappings and group session structure.

In line with the cultural model of disability, there was also a social element to these initial sessions, noted by Chadwick and Platt, who point out the importance of humour and novel interactions in these contexts [2]. This element would assist with communication and confidence further into the project.

**2.2.2 Checkpoint performance.** Following on from the individual sessions, an open group workshop was conducted in March 2025. This workshop marked a key milestone where all participants came together for the first time to improvise. The session was an excellent opportunity for participants to meet, and was also open to the public to visit and observe.

**2.2.3 Group workshops.** Following on from the checkpoint performance, from April to November 2025 the project built momentum in the form of drop-in group workshops at a consistent time and place. The workshops involved improvisation practice, iterative AirStick instrument patching, and planning, and are described in further detail in Section 3.1.

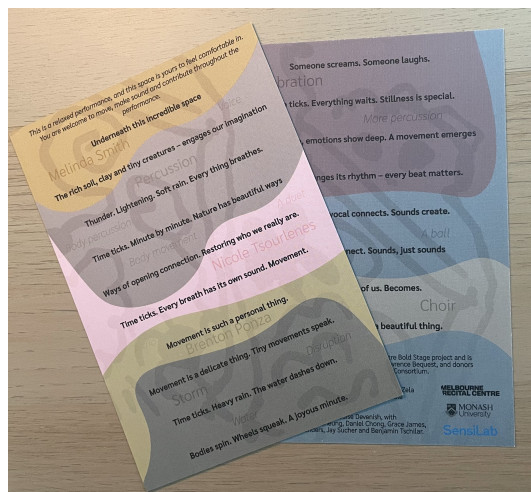
**2.2.4 Final performance.** The final performance occurred at the Melbourne Recital Centre’s Primrose Potter Salon on Thursday 4 December 2025. The performance lasted approximately 50 minutes and was structured around the poem’s narrative arc, divided into seven sections corresponding to thematic shifts in the text. Within each section, performers improvised freely using their AirStick patches and acoustic instruments, guided by the poem as a shared score rather than by fixed notation or predetermined events. The performance occurred in the round with no stage or audience separation, and performers moved amongst seated audience members and sound emanated from body-worn speakers, creating a participatory listening environment.

Over 80 audience members attended. The performance marked the conclusion of this section of the project, but not the end of the process. Instead, it served as a milestone or snapshot of the work completed thus far, and a springboard for future work.

## 2.3 The poem

Behind the formation of the piece and the project lies a poem written by co-author Melinda Smith:

*Underneath this incredible space  
The rich soil, clay and tiny creatures – engages our  
imagination  
Thunder. Lightning. Soft rain. Every thing breathes.  
Time ticks. Minute by minute. Nature has beautiful  
ways.  
Ways of opening connection. Restoring who we really  
are.  
Time ticks. Every breath has its own sound. Move-  
ment.  
Movement is such a personal thing.  
Movement is a delicate thing. Tiny movements speak.  
Time ticks. Heavy rain. The water dashes down.  
Bodies spin. Wheels squeak. A joyous minute.  
Someone screams. Someone laughs.  
Time ticks. Everything waits. Stillness is special.*



**Figure 2: The program note and score with poem given to audiences.**

*Faces engage, emotions show deep. A movement emerges  
The earth changes its rhythm – every beat matters.  
Time ticks. A vocal connects. Sounds create.  
More vocals connect. Sounds, just sounds  
And the song of us. Becomes.  
Time is after all. Just a beautiful thing.*

The poem became central to the creation of the work, informing the structure and AirStick mappings used throughout. Specifically, the poem’s lines served as a score that shaped both the temporal arc and the textural palette of the performance. For example, the opening lines – ‘Underneath this incredible space / The rich soil, clay and tiny creatures’ – mapped to percussionists subtly moving their feet amongst the audience, combined with a intimate AirStick mapping played by Melinda, using phoneme-like snippets of Melinda’s voice reciting the poem to mimic ‘tiny creatures’. Some cues were more explicit – ‘Thunder. Lightning. Soft rain.’ cued a shift to high-energy AirStick mappings involving thunder and rain samples.

In this way, the poem provided a shared creative scaffold that was flexible enough to accommodate improvisation while giving performers and percussionists a common reference point. It was also given to audience members as a program note (seen in Figure 2) and used by percussionists as a score.

We use the poem in this paper as a form of critical reflection on the process of working with and designing for ADMIs, much like we used it in the piece itself. In some senses this reflects Cutler’s idea of ‘figuration’:

Figurations are versatile, fluid and responsive, composing and recomposing in response to a given need or application. In this way they actively critique literal realism making way for expanded concepts and metaphors challenging distinctions and ways of knowing. Indeed, figurations are often about becoming, emergence and not knowing. [3]

Section 3 unpacks key learnings from the *In The Round* project by taking lines from the poem itself.

### 3 Key learnings

#### 3.1 ‘A movement emerges’

The project started off as individual sessions with performers with disability from diverse backgrounds, using AirSticks and experimenting with different soundworlds and ways of creating music.

As the project progressed, we began to incorporate more participants, and conduct sessions in larger groups with different combinations of participants. This led to the creation of a cultural ‘movement emerging’ in which multiple strands of the project could occur at the same time with different people. For instance, at one point in the project we had:

- Percussionists meeting as a group and building improvisation skills
- Two artists with disability meeting separately with their own AirSticks system for private practice, taking advantage of the Raspberry Pi interface they could use independently [14]
- Two facilitators unpacking the structure of the poem for patching and timing to bring to the next workshop

This iterative practice fed back through constant email communication and a shared blog document that contained a log of what happened in the session and work that was required for future sessions.

Two extracts from the blog that demonstrate iterative practice contributing directly to DMI design and accessibility are:

Using simple mappings and sound (white noise + filter + amp), explored how and what made interesting experiences... Distribution of the sub-divisions need to be small (2–3) and well tuned to the player.

and

Composing to the bodies... Fine tune ranges... Rhythmic ideas working very nicely but need to map to actual arm range.

These blog reflections show how repeated testing with performers informed continuous refinement of AirStick mappings, including sensitivity and gesture ranges in response to embodied capability rather than abstract technical goals. This clearly aligns with previous research on accessible DMI design, which emphasises iterative, performer-led development and embodied calibration as essential to inclusivity and expressivity [13, 23, 24].

#### 3.2 ‘Time ticks’

A running joke amongst performers was the ongoing hypothetical question: “what would we do if the concert was tomorrow?” Having a regular time for meeting, and consistently meeting across the year, with the possibility of performance at any given time, counter-intuitively relaxed the creative process.

Regular meetings, which might involve workshops, AirStick testing and practice time, typically occurred once every few weeks at a consistent time and place. The facilitators would be present on a set afternoon every fortnight, and participants were welcome to attend on any of the days at a time of their choosing. This consistency of meeting times proved to be a great asset in the creative process.

This was important from an access perspective, as literature has consistently shown how disability cultures require more time and flexibility in scheduling and pace, particularly in creative and collaborative contexts where fluctuating energy, health and



**Figure 3: Performers interacting amongst audience members.**

access needs are present [9]. Opening space for disruptions, delays and unforeseen circumstances, and creating non-essential meetings that could be missed meant that overall, more artists could attend more sessions, and every session would be fully engaged with those who could attend.

Regular meeting times were also important from a creative perspective, creating a ritual and safe co-creation environment in which we could test new ideas, and iteratively improve AirStick patches. This is clear in the literature on participatory and inclusive arts practice, which emphasises repetition and temporal consistency as key conditions for trust-building [12].

Of course, this process meant that every session could be different on any given day, but rather than being a drawback, the different combinations of participants that partook in the meetings offered a form of creative experimentation, encouraging different duets, trios and performance combinations and different soundworlds to test, pursue or discard.

#### 3.3 ‘Faces engage’

A number of improvisation and performance techniques surfaced throughout the process that contributed to a positive music-making environment when using DMIs.

With many new stakeholders and different combinations of groups as noted in Section 3.1, improvisation was in theory made more difficult, particularly for those with limited musical experience involved in the project. New techniques for playing, new ways of communicating and new music-making strategies emerged as small breakthroughs that were noted amongst the group and in the final performance, seen in Figure 3.

One simple example of this was the use of eye contact. Eye contact became a shared musical cue, supporting duetting, soloing and turn-taking without relying on verbal instruction or formal musical knowledge. For performers with limited prior musical experience, this form of visual listening made interaction feel legible. In this sense, our faces quite literally ‘engaged’ as part of the instrument.

A second technical but significant decision was the use of small, discrete speakers attached to performers using AirSticks. Rather than projecting sound from a distant or centralised system, sound created using the AirSticks came from bodies in space. This reframed the improvisation as a form of conversation that noticeably reduced abstraction, particularly for performers mapping movement to sound for the first time.

### 3.4 ‘A joyous minute’

A consistently low-pressure and informal environment played a large role in shaping the musical outcomes of the project. This dimension is, in our experience, rarely foregrounded in NIME literature on instrument design and performance, yet had clear musical and performance effects.

Sessions prioritised play, humour and a relaxed environment over technical correctness or efficiency. This created conditions in which participants felt culturally safe to take risks, to withdraw from playing or to re-enter the music on their own terms.

Moments of laughter, surprise or shared silliness often coincided with heightened musical participation and longer and more confident playing.

## 4 Broader implications

What do these key learnings and their embodied, practice-based discoveries emerging from the poem mean for ADMI design and the NIME community more broadly?

In some senses these discoveries are limited to a specific group and time. However, we feel that the ways of working embedded within the project, and the ‘epistemic tools’ [11] we have used in the process, warrant a deeper reflection about the ways in which we design, make and play in the context of DMIs, and contribute to a research culture that honours practice-based ways of working [22, 25].

By grounding the project in the cultural model of disability, we are in some senses claiming that the ‘project’ itself is a community of practitioners rather than a team using a specific DMI or a specific performance outcomes. In that context, it is an interesting thought experiment to imagine how one would cite this way of working in a community like NIME.

By grounding the project in the cultural model of disability, we are positioning the instrument not as a discrete technical artefact, but as a ‘constellation’ of technologies, social practices, facilitation techniques, temporal structures and shared habits. Expressivity in *In The Round* was co-created by people, technology and practice, rather than residing solely in mappings or sound synthesis. This kind of framing has been explored in the past, particularly when it comes to expert users and the ecosystem of interaction around specialised instruments [4, 6, 16].

Rather than asking how to cite a single instrument or system, this work invites the community to consider how we might reference ways of working, communities of practice and shared values, particularly in the context of accessibility.

Translating this constellation framing into practical terms, we offer several implications for designers and facilitators working

with ADMIs. First, instrument design should be understood as extending beyond hardware and software to include scheduling practices, spatial arrangements and social facilitation strategies – these elements are not incidental but constitutive of accessibility. Second, facilitators should plan for variable attendance and fluctuating group composition as a creative resource rather than a logistical problem, building session structures that are modular and resilient to change. Third, shared creative artefacts – such as the poem used here – can function as ‘boundary objects’ [19] that bridge different communication needs and musical experience levels, and we encourage other practitioners to explore similar scaffolds. Finally, the use of small, body-mounted speakers and visual cueing systems (such as eye contact for turn-taking) should be considered as design parameters on par with mappings and synthesis, given their demonstrated impact on performer agency and ensemble cohesion.

The contribution of *In The Round* sits across multiple layers – a digital instrument, a collaborative process, social and spatial techniques, scheduling practices and creative artefacts. Knowledge emerges from these layers’ interaction over time.

To support this framing, Figure 4 depicts the project as a constellation of practices, techniques and creative artefacts rather than a single instrument. The AirSticks sit alongside an array of elements, with no single element operating independently. Accessible music-making inspired by the cultural model of disability is shown at the centre of the image, emerging amongst these relationships.

## 5 Conclusion

This paper has presented *In The Round* as a practice-based exploration of accessible music-making, using an immersive improvisation, a poem and reflective artefacts to show how musical knowledge and expressivity can emerge across people, technologies and ways of working.

Taken together, the findings presented in Section 3 point to a consistent theme: that accessibility in ADMI-based music-making is not achieved through any single design decision but through the sustained interplay of iterative instrument calibration, flexible temporal structures, embodied social techniques and a low-pressure creative culture. The iterative patching described as ‘a movement emerges’ and the scheduling flexibility as ‘time ticks’ created the conditions for trust. Likewise, when ‘Faces engaged’ and participants felt safe in the informal atmosphere of ‘a joyous minute’, these acts translated into trust and musical agency. These elements reinforced one another over the 18-month process, suggesting that the significance of this work lies not in any individual technique but in the demonstration that accessible music-making is a cultural practice sustained by interdependent relationships.

There is no ‘conclusion’ to the work created thus far in the sense that this is an ongoing project. ‘The song of us’ is a song that will change the next time we meet, but it will represent ‘us’ every time we do meet. The ‘us’ is the many different relationships we’ve formed and how we’ve grown together. That song was presented at Melbourne Recital Centre as a form of manifesto around accessible music technologies, and accessible music more generally.

### 5.1 Future work

The presentation was a culmination of the project thus far and a celebration of the work conducted over 18 months, but was



Figure 4: A constellation of practices contributing to accessible music-making.

not the finale or end point. Instead, it represents a snapshot of the collaboration at that point, and a chance for audiences to witness growth, ways of working and a new approach to music-making. Future work will continue to build on these relationships, allowing the song of this group to change and grow as new people, practices and ways of making music enter the circle.

## 6 Ethical Standards

The AirSticks project is funded partially by the Australian Government through the Australian Research Council. The project received ethics approval with the informed consent of human participants. Key ethical considerations included ensuring that participants with disability retained creative agency throughout the process, that consent was obtained in accessible formats appropriate to individual communication needs, and that power imbalances between facilitators and participants were actively mitigated through collaborative decision-making and flexible participation structures.

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