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RESEARCH ARTICLE



Ambiguous Devices as an example of a networked relational encounter

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ABSTRACT

This article uses the author's collaborative environment for networked music performance, *Ambiguous Devices* (developed with Paul Stapleton), as a case study for illustrating a shift in thinking from a transactional to a relational understanding of networked encounters. It draws on Gill's notions of relational interfaces and Buber's understanding of dialogic relations as a way of understanding ways that people might communicate with others at a distance. It looks at an embodied theory of interaction that relates to intersubjective and intercorporeal ways of knowing the other and then looks at ways that these relationships can be facilitated over spatially separate sites of interaction such as those found in networked performance scenarios. Finally, it puts forward a notion of relational encounters as a way thinking about these kinds of affective interactions at a distance and discusses the designed properties of *Ambiguous Devices* that support and facilitate this kind of interaction.

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Introduction

Although there has been a long history of telepresent and networked communications, particularly in the field of the arts, the experience of the recent COVID-19 pandemic threw a spotlight back onto online forms of communication for the masses. With people confined to their houses in large parts of the world there was a sudden uptake in the use of video conferencing technologies for the replacement of normal day to day interactions. People who had been perhaps utilising these technologies sparsely in the past, for the odd chat with friends abroad or remote interviews for jobs, were suddenly using them as their main form of communication in a full range of scenarios. As the pandemic dragged on people started using these technologies to try and replace some of the social connectiveness that they had lost through not meeting people in person. Individuals were using these technologies to take part in social events, such as online parties, quiz nights, as well as a stand-in for more serious events such as attending funerals and witnessing the deaths of loved ones. This move to online

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interactions highlighted the deficiencies in these video conferencing technologies in conveying meaningful interactions at a distance. Interfaces that were designed to be transactional in nature, to be reliable conveyors of information between sites were suddenly being used by people looking for a sense of being present in a situation, of participating at a distance.

From a historical perspective Minsky's (1980) conception of the term telepresence could be argued to stem from the notion of teleoperation – the distant remote control of robotics through sensors, actuators and haptic feedback. This kind of conception of telepresence, one in which there is a 'perceptual illusion of non-mediation' or 'feeling present in a computer mediated environment' (Vinicius et al. 2021) relates to a transactional notion of telepresence: a one-way control of an actor (human) over the slave (robot). Since the 1980s the conception of telepresence has been through many periods of change and evolution. For example, the related term Telematics is described by Kozel (2008) as a broader term than telepresence as it is 'not pinned to presence or to the visual. Telematics permits for a play across absence and presence, as well as a range of dynamic impulses, both human and nonhuman' (Kozel 2008, 86). Similarly, Roy Ascot (1980), one of the first telematic artists, highlights the bi-directionality and intersubjectivity within telematic work drawing on notions of shared authorship and collective understanding.

Creativity is shared, authorship is distributed ... telematic culture amplifies the individual's capacity for creative thought and action, for more vivid and intense experience, for more informed perception, by enabling her to participate in the production of global vision through networked interaction with other minds, other sensibilities, other sensing and thinking systems across the planet (Ascot, 1980, 243)

Such an understanding of telepresence or telematic art isn't based on notions of control at a distance, of transactional interactions of information exchange, but rather, on ideas of creating new spaces for interacting and participating in social interaction whilst physically distant. The symposium that this special issue is based on *From Telepresence to Teletrust*, celebrated and explored this shift in thinking from the transactional, the conveyance of information at a distance, to the more relational conveyance of self. It was this relational understanding of interfacing at a distance with its drive to 'increase contact between people and allow for empathy and shared understanding' (Gill 2015, 5), that seemed most missing in the pandemic. In this article I will use a case study of my own telematic performance environment, *Ambiguous Devices*, that I developed with Dr Paul Stapleton as a case study to explore this shift from transactional to relational understandings of networked interactions.

Ambiguous Devices is a performance environment for networked music performance that had its main development period in 2011–2013.¹ Its development stemmed from a personal frustration with some of the networked music making practices that were prevalent at the time. In general, these music making practices were striving to recreate the sense of a normal co-located performance, for example, two or more performers on stage in front of an audience, with performers and audience members that might be physically located across three different countries. Solutions underpinning this approach tended to centre on the utilisation of ever-increasing quality of video and audio transmissions, at lower and lower latencies, to present the illusion that these physically

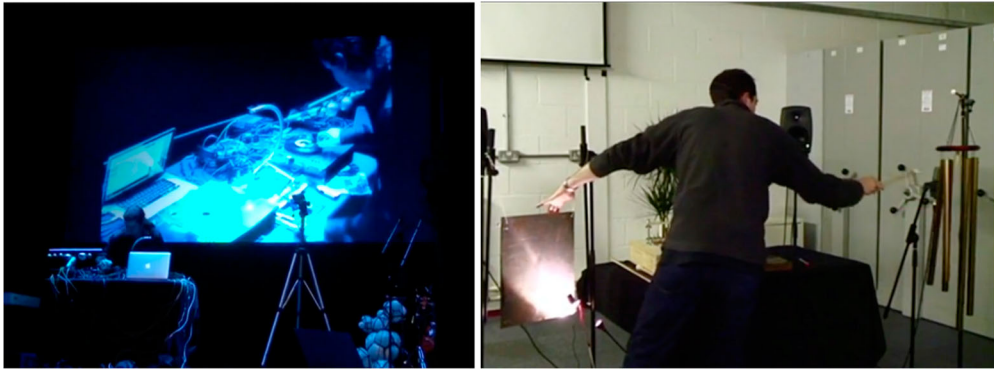


Figure 1. Performance at NIME 2012, Stapleton (left) in Ann Arbour, USA and Davis (right) in Bourne-mouth, UK.

distant players were performing together in the same physical space. In contrast to this 'recreation of the normal', Paul and myself were much more interested in exploring notions of presence that were particular to networked music-making, that explored how the interface for interaction, in this case a networked musical instrument, could provide an additional channel of communication that could help us think of new and different ways of creating performance when situated apart.

Whilst there is already published some extensive documentation of the development of *Ambiguous Devices*, its physical construction, and its relation to a musical genealogy of improvised performative (Stapleton and Davis 2021) what I particularly want to expand on within this article is ideas that relate to the *quality or nature* of the interaction afforded through the interface. I want to focus on the way that interaction through the instrument can be thought to create a shared behavioural space, a 'contact zone' within which to meet and interact, to touch and be touched. The performance environment *Ambiguous Devices* gives us a concrete example of ways in which performing and interacting with and through this instrument explicitly explores issues of embodiment and inter-corporeality, notions of being present without being there, of interpreting the intentionality of another, and linked intersubjective understandings of the other at a distance (Figure 1).

Ambiguous devices

Ambiguous Devices can be most simply described as a single networked musical instrument with interlinked components that can be physically separated across continents during performance. It has been shown in a number of different configurations but has mostly been performed as a setup of two assemblages of elements in physically separate concert locations played simultaneously by two different performers (Figures 2 and 3).

When designing *Ambiguous Devices*, Paul and I were very much interested in how to convey performance presence in a non-literal way through the instrument. Since we (the performers) were mainly playing in physically separate locations, we thought it would be interesting to see what the minimum amount of data exchange between performance sites could be, and still give the performers a sense that they were performing



Figure 2. As setup at SARC, Stapleton's node to the left and Davis' node to the right.

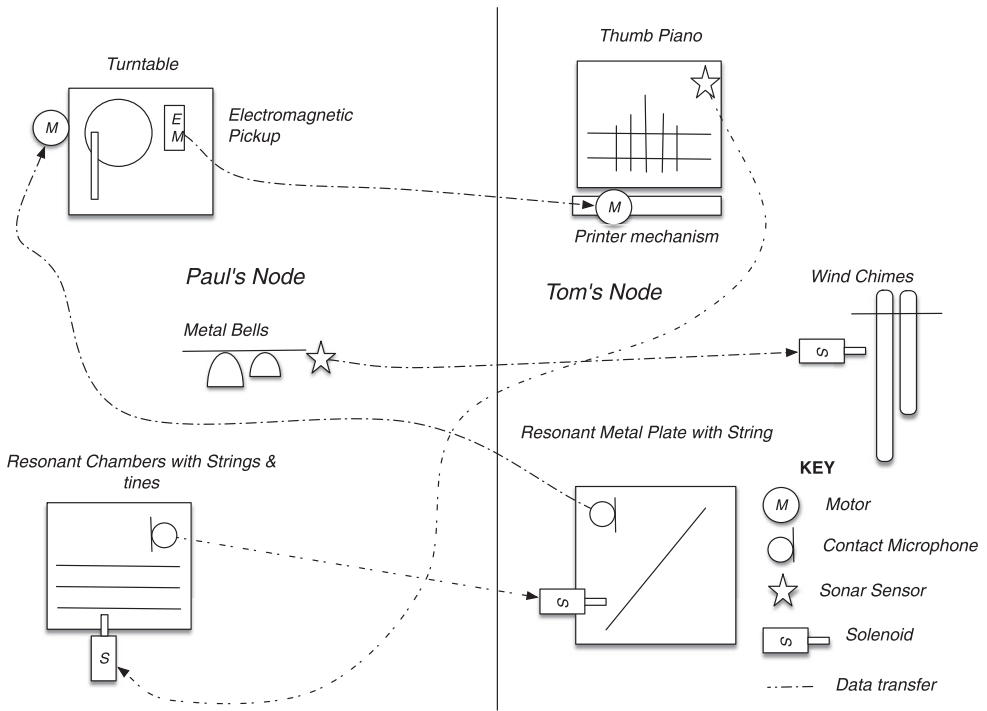


Figure 3. One possible configuration of ambiguous devices with the two assemblages of devices separated geographically in different concert venues.

together. Because of this aim, during performance there is no video transmission between sites, rather there is just the transmission of the sound of the instrument, along with control data passed between the physically separated parts of the instrument. This passing of control data between sites means that you can conceive of *Ambiguous Devices* as **one** musical instrument physically separated by geography. The interconnect- edness of data transfer between the separate sections of the instrument means that per- forming on the instrument at site one, makes elements move and produces sound at site

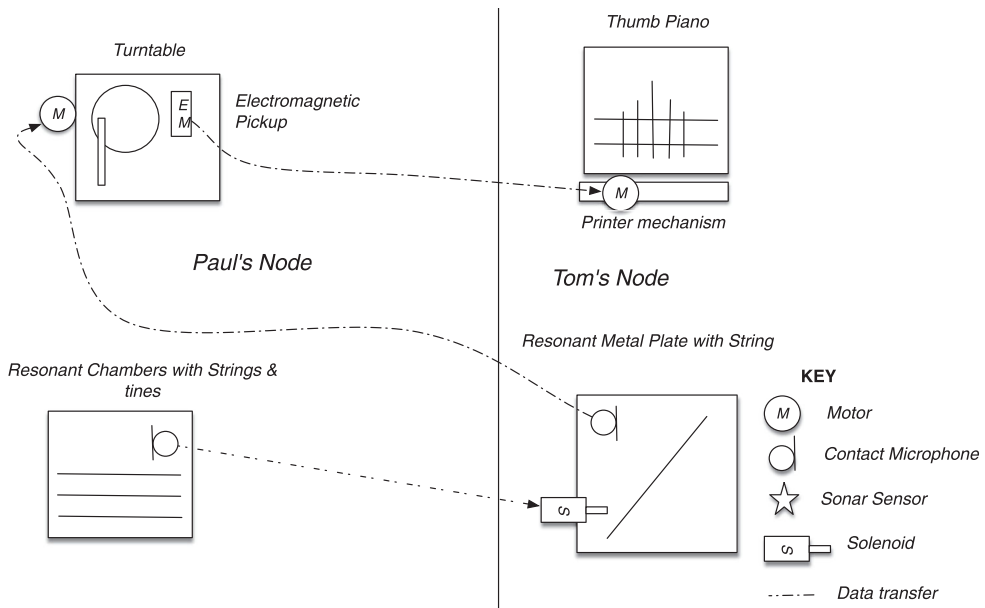


Figure 4. One possible feedback loop within the instrument. Paul can excite a string on his resonant chamber that is picked up by a contact mic, which activates a solenoid on Tom's resonant metal plate. The sound subsequently comes back to Paul activating his turntable which in turn goes back to Tom activating his printer-head driven kalimba. At any point performers can disrupt this loop by say, dampening their resonant material, or add to it by exciting strings or moving the turntable for example.

two and vice versa. Additionally, due to some inherent feedback loops in the instrument design, movements and sound at site one can also set off movement and sound back at site one, via site two. To help with the feel of interconnectedness between sites this control data is kept as analogous to the original analogue sound as possible. Volume levels are encoded using an Arduino (2024) into 1024 Open Sound Control steps and the system is fine-tuned such that interaction with the system feels intuitive. For example, a small movement on the record player produces a similar style of movement of the printer-head driven kalimba. In this way performers can sense what the other performer is doing not only through the sound transmission between sites but also how their element of the instrument is behaving at any given time. Performers can then choose how to respond to these performance gestures, normally through complimenting or actively disrupting them (Figure 4).

Paul and I have previously written about how notions of touch and feedthrough are conveyed through the instrument such that each performer can feel and sense the other performer's presence through how their own section of the instrument is responding live, in real-time, in the moment of performance. Whilst the presence of the other performer can be sensed through the instrument, the non-literal nature of their conveyance creates a different kind of space for performance. In some ways there is no perceptual illusion of non-mediation, rather there is an acceptance that the instrument is acting as a mediator of the other performer's intentionality. However, through time the physicality of the movement of the instrument, its resonating bodies becomes a representation of the embodied actions of your co-performer, a way of establishing an inter-subjective

relationship with them. The very non-transactional nature of the interaction helps highlight and foreground the relational nature of the performance. Through interacting with it I am interacting with the other. I am entering into a relational encounter with the other.

Relational interactions

We could consider the interface provided by *Ambiguous Devices* to be functioning as a relational interface between performers. One way of further exploring the notion of a relational interface is to contrast its features with that of a transactional interface. Gill, in *Tacit Engagement* (2015), defines the transactional form of interface as one that supports 'efficiency, utility and automation', the transference of information to achieve a goal. Transactional interfaces are thus generally found in communication protocols, for example computer networking, as they ensure the reliable transference of data from one place to another. She argues that interfaces that rely too much on the transactional, become impoverished as they are based only on data-driven explicit knowing that is disconnected from an embodied tacit knowing. In response to this overly transactional interface design Gill explores if the 'concept of the interface can [instead] be located in dialogue, performance, and the tacit dimension of knowledge within the human system' (Gill 2015, 127), i.e. grounded in the notion of the relational. For Gill, a relational interface might incorporate the '[t]acit, personal, experiential, ethical and aesthetic' dimensions of the interaction (Gill 2015, 127) and as such can be said to highlight the interconnectedness or intertwined nature of both parties within the creation of meaning in the act of performance. In the context of musical performance at a distance, relational interfaces could be said to highlight the intersubjective nature of these meetings; rather than a literal conveyance of information between sites there is a level of interpretation happening between two agents that is co-determining in its nature and linked to embodied understandings of knowing. I see these relational interfaces, interfaces that highlight the tacit, personal and experiential within the online encounter, as affording some poetic space between the literal and the experiential that help foster a creation of meaning that is interpretative and affords a co-determination of knowing and creating.

Gill grounds her understanding of the relational in work by Cross (2012), who addresses the differences between music and speech as examples of communication media. Cross argues that we can communicate in specifics through language once we have established a 'collective consensus as to the informational content of the interaction' using language as an 'unambiguous reference' that enables a transactional mode of communication (Cross 2012, 814). He contrasts this with music which he understands to have a 'floating intentionality', which he links to its ability to afford interpretations of meaning that remain specific to the individual, whilst still enabling a collective sense of an event. This simultaneous mutual but divergent understanding of the music helps create bonds with others 'allowing them to experience the significance of a joint event as both deeply personal' (individual) 'yet shared' (collective) (Cross 2012, 814). For Cross, an encounter with music is an inherently relational encounter that is associated to a personal act of knowing, an individuated response of knowledge gathering that affords a relational space for interaction.

Gill also relates her understanding of relationality to the notion of dialogue. She contrasts the term 'communication', which she relates to the world of information transfer to that of Buber's notions of dialogue as developed in *I and Thou* (Buber 1970). For Buber, dialogue can 'hold differences' and does not have consensus as its main goal. Gill describes Buber's notion of dialogue as 'as a reciprocal conversation ... an effective means of on-going communication rather than as a purposive attempt to reach some conclusion or to express some viewpoint(s)' (Gill 2015, 17). Buber's notion of dialogue is thus formed on a negotiation of difference – a discursive conversation or what Stapleton (2008) highlights as a *convivencia* (a tense but productive co-existence). Dialogue in this instance can be more than a sharing of words, it can include 'having comfortable moments of stillness and quiet with another person'. For Buber, dialogue does not have to relate to speech, Gill gives the non-verbal example of men dialoguing with their noses, communicating through the medium of pipe smoke (Gill 2015, 17).

Dialogue requires interaction between two agencies and the quality of the dialogue depends on some agential properties. Buber (1970) has a way of categorising levels of agency through the elemental variables of 'I', 'it' and 'thou', with an 'I-it' relationship characterised by an interaction between yourself and a static entity (an object), and an I-thou relationship as a richer mutually defining relationship between yourself and an other, (a thing), (where this other could be human or non-human agent). For Buber, to be in dialogue with something is to be fully present to it, in the sense that you give it your attention, that you are authentic and accessible to it, that you are open to change through interaction with it – that you can enter a state of encounter with it. Relation for Buber 'is reciprocity' – 'it acts on me as I act on it' (Buber 1970, 67). This kind of meeting with an other, is illustrated by Buber's description of an encounter with a tree. In this description Buber contemplates all the ways you can comprehend the tree, as 'picture and movement', as an example of a species, as an expression of Newton's laws etc., but 'it can also happen, if will and grace are joined, that as I contemplate the tree I am drawn into a relation, and the tree ceases to be an It' (Buber, 58). There is thus a relational understanding between the tree and I.

The tree is no impression, no play of my imagination, no aspect of a mood; it confronts me bodily and has to deal with me as I must deal with it-only differently ... What I encounter is neither the soul of a tree nor a dryad, but the tree itself. (Buber 1970, 58)

This understanding of a relational encounter with a tree can be perhaps difficult to unpack. One way into this is to consider Ingold's discussion of the difference between an object and a thing. For Ingold, a tree is a thing rather than an object. Ingold, states that the an 'object stands before us as a *fait accompli*, presenting its congealed outer surfaces to our inspection' ... it is defined by its againstness to the setting in which it is placed. The thing in contrast 'is a going on', or better, a place where several goings on become entwined (Ingold 2010, 4). For Ingold then, a thing is a temporal coming together of threads of meaning, an entwining of matter that is not fixed. This kind of understanding of the tree has parallels with Buber's notion of dialogue. The tree itself is not a fixed object standing against the landscape. The tree is a living, changing collection of entities that can be thought of in different ways across different timescales. You can approach the tree in different ways and these methods of approach can elicit different meanings from yourself.

This rich understanding of dialoguing with another has a lot in common with the kinds of interactions that are happening within musical performances. A performance, particularly one that is built on musical improvisation, needs to be one of negotiation, exploration and mutual becoming. The musicians need to be present to the other performer, and authentic in their own actions, yet open to change, to bend their will to meet the other somewhere in that moment of creating something together. If these interactions are then conducted at a distance, mediated through and by technology the interface of interaction needs to support and facilitate this kind of interaction. It needs to foreground the relational qualities of interaction. *Ambiguous Devices* has a number of features that strive to support the relational above the transactional to help foster these rich interactions. *Ambiguous Devices* is not an object through which you interact. It is a thing, a timely coming together of multiple elements that change and configure themselves differently over time. *Ambiguous Devices* thus challenges this process of performing with another as it places the performers in spatially separate locations with only limited methods of communication between them. This limited transactional conveyance of information highlights and foregrounds the relational connectedness between sites. In foregrounding the difficulties of interaction rather than striving to re-create the sense of performing together in shared physical space you have to let go and trust the technology to convey your performance intentions. The musical instrument itself becomes a site through which to interact with the 'Thou' of the other performer, a thing that conveys their musical intentionality across the network, that comes to represent them in the moment of performance. I argue that it is this very limiting of the communication channels that helps foster the notion that you are having an intersubjective encounter through the musical instrument. The instrument itself, how it moves and interacts in the moment of performance comes to convey the other performer, such that you must approach the instrument openly and honestly and trust in what it conveys in order to have a meaningful relationship with it and thus make meaningful music at a distance.

Qualities of interaction through the instrument

In this next section I want to explore a little more how *Ambiguous Devices* as an interface might be thought of as an embodiment of a performer's intentions, a facilitator for networked subjective interaction. I will start by examining the nature of embodied intersubjective relationships in general and then move towards how these might be affective when performers are physically separated in performance.

Moran (2017) argues that our intersubjective relationships, our 'exchange of thoughts and feelings between subjects' rely on a shared physical space of embodiment. For Moran, shared physical space is important in the construction of a shared empathetic space, and it is this shared empathetic space that affords the intersubjective constitution of the objective world (Moran 2017, 31). In this understanding empathy is important as a conveyer of intersubjectivity, and empathy in this scenario, is 'founded on the perception of the living body of the other person' (Moran 2017, 31). To illustrate this, Moran gives the example of the ability of a person to enter a room and sense the tension between others that has been caused by a previous argument purely through the perception of their body language and bodily spatial relationships to each other (Moran 2017, 33). These are

culturally specific ways that we can come to have an intersubjective understanding of others that is based on shared embodied understandings of information exchange that are non-verbal.

This knowing of the other through their bodily relations is defined by Tanaka (2015) as an intercorporeal understanding of the other. Tanaka describes intercorporeality as an 'action perception loop between ourselves and an other' (Tanaka 2015). Again, this understanding highlights the importance of the body within this action perception loop, as this understanding of intersubjectivity is not built on the notion of two disembodied minds trying to work out what the other mind is thinking, but rather as a 'carnal intersubjectivity' as communication between 'two *minded-bodies*' (Tanaka 2015). Similarly, MacLaren (2002) describes intracorporeally as a 'bodily mirroring, or a bodily resuming (repedre), of an intentionality that we inhabit over there' (MacLaren 2002, 190). She rehearses Merleau-Ponty's example of the spectator at the soccer game as an example of the kind of mirroring that is happening in our inter-corporeal embodied understanding.

He is of course, not really the agent of the action; he is not actually present there, in the middle of the field where the action is being played out. But neither is he straightforwardly present here, on the sidelines, as someone apart for the game, observing and taking mental note of the plays made. Rather, he is, as it were, a shadow of those actions; he inhabits the player's actions and the game itself in a bodily way, such that those actions play themselves out in his own body. (MacLaren 2002, 190)

In this description, the spectator at the game is not just watching the game, they are at some level living and anticipating the actions of the athlete's body through their own body as part of their experience of the world. They are generating entering an *empathetic* relationship with the player through this bodily mirroring of their actions.

MacLaren (2002) also highlights that not only can we understand the intention of the other through observing their embodied behaviour, but also that we can also acquire *knowledge* from another's embodied experience in the world. MacLaren argues that there is an embodied knowledge that is being passed from one to the other within this process of observing. She gives the example of observing her friend interacting with a horse. In watching this embodied interaction she learns more about horses than can be gained from a picture in a book or piece of writing, 'not only because I get to see the horses themselves in action, but because I can see in my friend's behaviour towards them all the possibilities that the horses are not currently acting out' ... 'his power and volatility' his readiness for 'wheeling and kicking' (MacLaren 2002, 191). She argues that such a transference of knowledge can also be attributed to inanimate objects. For example, when passing a plate to another. The person receiving the plate understands from how it is being held, how to hold it themselves, whether it is fragile, or heavy or even its perceived worth to the holder. In this way, we can learn from others through their embodied actions and their ways of being together (MacLaren 2002, 191).

This embodied understanding highlights ways in which we can gain knowledge about the world through embodied interaction with others, but also the way in which the interface of interaction is very important for affording all these things to the perceiver. There is knowledge to be gained through observing the embodied interactions of others, through observing their stance, their muscular approach to an interaction. Most importantly the material of interaction, which in the case of networked encounters is generally the

mediating technologies of interaction at a distance, becomes a conduit for information exchanges between the spaces that adds to the quality of the inter-subjective experience of the encounter.

This understanding of intracorporeally raises issues for networked interactions at a distance. In what ways can we have rich interaction across networked sites where we are not bodily co-present? How can we generate an empathetic space between sites where we cannot see the other or enter into a bodily relationship with them? Whilst some argue that the network itself can become a 'third space' for a conjoined embodied experience, in contrast to this *Ambiguous Devices* seeks to become a conduit for our own embodied behaviour which can be projected, via the physicality of the instrument, into the other performance space. Through this physicality, *Ambiguous Devices* becomes a projection of action across the network. Through the transmission of acoustic soundings, resonance, and movement at a distance, mediated through the interface of interaction, *Ambiguous Devices* thus enables a conveyance of performance presence, a touching at a distance.

In Stapleton and Davis (2021) we write about Dix's (1997) notion of feedthrough as a way of conceptualising this touching through the site of interaction, through the musical instrument. For Dix, feedthrough 'effectively creates an additional channel of communication through the artefacts themselves' (Dix 1997, 148). Dix gives the example of moving a piano as a tactile, embodied version of feedthrough through an interface. Whilst the piano movers might talk to each other to communicate, the most important feedback you give each other is through feeling the movements of your fellow movers through the piano. The slight push and pull of the piano as it is lifted or moved into space. Similarly to this, *Ambiguous Devices* acts as a physical manifestation of feedthrough. It allows us to communicate with each other in a distant performance context much more fully than if we just sent full resolution latency free audio and visual information. The way the instrument reacts is based on an embodiment of the intention of the other performer. Also, the fact that there is some ambiguity within this interaction, some level of poetic distance from what is actually happening at the other site, makes you more open and attentive as a performer. This adds a richer and more affective level of intercorporeality to the experience that goes beyond the projection of a two-dimensional likeness into a shared space.

Interaction as a relational encounter

Another way of conceptualising this kind of coming together is through the notion of encounter. We can conceptualise an encounter as a rich form of interaction. Encounters can take many forms; we can think of an encounter as a chance meeting between strangers – or a passionate exchange between lovers. The richest forms of encounter are affective, they offer the possibility for change, for growth, the ability to reconfigure our identities, or a space or a place. An encounter suggests 'engagements across difference' (Faier and Rofel 2014, 364) that can result in tensions, resistance, unpredictability or difficulty within the interaction. It is these indeterminate elements of the encounter that give it its affective power, that lead to negotiation, chance and rich interaction within the sensory exchange.

Following Barua (2015) we can conceptualise the notion of encounter as a meeting within a 'contact zone'. A term coined by Mary Pratt in relation to imperial encounters,

'the space in which peoples geographically and historically separated come into contact with each other and establish ongoing relations, usually involving conditions of coercion, radical inequality, and intractable conflict' (Pratt 2008, 8). Particularly pertinent to this discussion, is how, as she terms it, the contact perspective, 'emphasizes how subjects get constituted in and by their relations to the other In terms of co-presence, interaction, interlocking understandings and practices' (Pratt 2008, 8).

This notion of encounter within a contact zone is an interesting way to conceptualise coming together online. Online encounters bring together people separated by space and time and they allow for meetings across differences, be they geographical differences, physical distances, or social or cultural differences. As Faier and Rofel (2014) highlight, ethnographies of encounter focus on the cross-cultural and relational dynamics of these processes. They highlight how meanings, identities, objects, and subjectivities emerge through unequal relationships involving people and things that may at first glance be understood as distinct' (Faier and Rofel 2014).

Encounters are part of our everyday lives, their affective nature means that they make memories, they change us as people, they are moments to pause and reflect. To have an encounter, to engage across difference, suggests placing ourselves in a vulnerable position, one that challenges our norms, makes us question our beliefs, that at leaves us open to ideas of change.

Encounters can forge knowledge, the meetings across difference can be a place to learn something new about ourselves and what we have encountered, but they can also help us question our subjective selves. Encounters with non-humans help us expand our relational understanding of nature and encounters with technologies can help us to question the boundaries of our bodies.

Encounters are of interest to me as they suggest a meeting between two things, in Ingold's sense of the term, where change might happen. They suggest unpredictability and vulnerability within this conception of a meeting. Placing ourselves in these states, I would argue, makes us more open to notions of meetings across difference that are meaningful and affective. They are more likely to enable us to explore intersubjective and relational qualities to create truly meaningful and affective interactions across distance.

I argue that the performance environment *Ambiguous Devices* sets up a situation for interaction at a distance that has many qualities that enable this understanding of encounter to occur. In entering into a performance with *Ambiguous Devices* you are entering into a meeting within a contact zone which can be defined as the liminal space of performance constructed by your bodily relationship to the instrument at your site of interaction as well as your intentions projected through the instrument to the other site of performance. Engagement in this space has many of the elements of engaging within a contact zone. There is an inherent risk of performing in this way. There is the danger of the unknown, of the unknowable, of the lack of normal embodied cues sent between spaces. This highlights the element of trust you must have with your co-performer within this space and of the interface to convey and receive performance intention. You must leave yourself open to the opportunity for change, if only musically in the act of improvisation. An improvisation that is mediated through the interface of the instrument. Conveying and re-embodying the intentionality of the performance at the other space. This helps create an improvisational space – one within which you alter and change

your response based on the perceived intentions of the other as projected by and through the soundings and physically of the shared interface for interaction.

In this way *Ambiguous Devices* has elements of touch, trust and vulnerability at its core. In the act of performing for others you are making yourself vulnerable, this vulnerability is highlighted by the networked nature of the interaction. As such, you have to really trust not only yourself and the other performer, but the way in which their intention is being conveyed through the body of the instrument. Touch then is all important, as it is your touch, conveyed though the instrument to the other that conveys your music intention and your performance presence to the other site. As Massumi (2008) would state, the emphasis of interaction has shifted from the instrumental to that of 'lived relation', where you are finding ways of 'operating on the qualitative level of thinking-feeling,' not just 'eliciting behaviour' (Massumi 2008, 7). As such the quality of the interaction has shifted from a transactional to a relational. From an instructional, transactional interaction to an inter-subjective relational interaction.

Summary

This article has used the authors networked musical instrument, *Ambiguous Devices* (developed with Stapleton) as a way of illustrating a discussion about embodied relational interactions at a distance. To better understand what might be missing in networked interactions I have examined the notion of relational interfaces as a way of meeting 'the other' in such a way that we can develop an intersubjective and empathetic understanding of each other. I have looked at rich forms of interaction offline in 'real flesh space,' and tried to bring together strands of understanding of embodied relations to form inter-subjective or intercorporeal relations between things. I have tried to examine what it is I feel is missing from these seemingly impoverished notions of online interaction turning to Gill and Buber to understand the ways that we might meet each other in dialogue, to create spaces for meeting that enable change and growth. I have put forward some ideas of how we might understand rich interactions as notions of encounter and ways in which intersubjective relationships can be actively explored in meaning making. I have also tried to understand notions of intercorporeality and intersubjectivity and how they might relate how we might make meaning in these encounter spaces. Finally, I have turned to Gill in an attempt to understand how these ideas might feed into the design and implementation of networked interaction spaces. Using an example of previous work *Ambiguous Devices* as a case study I have grounded the discussion in some concrete outcomes and returned to some previously explored themes of touch and feedthrough as a way of thinking about the way that interactions can be mediated through and with technologies in a relational rather than transactional manner. For me relational interfaces are the best way of opening us up to change and response within the moment of interaction, of providing spaces, situations or 'contact zones' within which we feel open and ready to respond to the needs of another, that really allow empathetic response to issues that are deeply based on an intersubjective understanding. I feel that *Ambiguous Devices* is a great example of a performance space that seeks to provide this level of deep interaction between two performers and associated audiences.

Note

1. *Ambiguous Devices* has been presented at CCRMA 2012, NIME 2012, INTIME 2013 Coventry, Re-New Copenhagen 2013, as well as informing other related activities such as a symposium on Interagency in Technologically-Mediated Performance at BU 2016, a workshop on Distributed Agency in Performance at ICLI 2016, a AHRC-funded research network on Humanising Algorithmic Listening 2017, and other ongoing activities.

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Tom Davis is currently an Associate Professor at the University of Bournemouth working primarily as an instrument builder, improviser and sound artist. Tom works mainly in the medium of sound and is interested in meaning making in the mode of activity, and related notions of lived experience, embodied cognition, and musicking as a performative act. Currently Tom is particularly interested in exploring notions of the performer-instrument relationship as a co-constitutive coupling between humans and technologies and how such post-phenomenological conceptions can deepen our understanding of the ways in which encounters with technologies simultaneously become encounters with ourselves. Tom has had work performed at many international conferences and festivals and has exhibited within the UK and Europe.

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