Sonic Inclusion

Opposing Auditory Normalism in Design Through the Lived Experiences of d/Deaf and Disabled People in Socially Public Spaces

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ABSTRACT

We are all affected by sound and human hearing; these are not niche issues. The hearing of every citizen diverges continuously under the influence of an abundance of factors including age, auditory and non-auditory conditions, culture and profession, as well as the environment we are in and whether that environment has been designed with our ears in mind. For many, such as those with sight loss or hearing loss, those with neurological conditions such as Tourettes syndrome or autism, or those with auditory conditions such as Hyperacusis and Misophonia, sound, and attitudes towards sound, can dictate whether a public space is inclusive or exclusive, accessible or non-accessible. Yet sound remains under researched within Inclusive Design and narrowly represented in access legislation.

The research questions how sound and hearing are typically considered in the design and management of socially public space and aims to establish a more sonically equitable approach to Inclusive Design practice - a position in which to think critically about the societal repercussions of design that privileges a normative ear, body and mind. The investigation presents a new critical narrative of sound and social in/exclusion by highlighting how contemporary design has come to prioritise 'the auditory normate'. This individualist perspective assumes an idealised sonic citizen and engenders a culture of design driven by good/bad ears, homogenized sonic interaction and a lack of consideration for the multimodal complexity of human sonic experience.

The research methodology engages a series of hearing-centred design methods that chart examples of sonic in/exclusion in public environments foregrounding the lived experiences of d/Deaf and disabled people in theatres and art centres in London. Research by the Papworth Trust and Department for Work and Pensions shows that disabled people have significantly lower rates of attendance at arts and cultural institutions (Smith, 2017) and that 15% of disabled people experience barriers to accessing the theatre, cinema or a concert - the second highest exclusionary service after shopping (DWP, 2015).

A multimodal framework for discourse analysis is adopted to analyse the research data and to better understand how the lived experiences of d/Deaf and disabled people, communicated simultaneously through multiple modal channels such as voluntary and involuntary spoken language, might form an opposition to the constructed ideals of the auditory normate. Findings show how 'auditory normalism' in design prevents d/Deaf and disabled people from being included as valued members of contemporary society and how a new perspective of sonically inclusive design might contribute to a more socially and sonically inclusive future.

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Author's Declaration

During the period of registered study in which this thesis was prepared the author has not been registered for any other academic award or qualification. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

Signature:

Date: 15.01.19

CHAPTER ONE

INTRODUCTION

1.1 A Sonically In/Exclusive Opening

August 2017 [1]

August 2017, theatre director Matthew Dunster prepares a pre-show announcement. An actress walks onto the stage of Shakespeare's Globe in London and reads:

> *'Hello Ladies and Gentlemen,*
>
> *In the audience tonight, we have a group of people with Tourettes Syndrome. We only mention this because the group have, generously and sensitively, asked us to make the rest of the audience aware.*
>
> *A symptom of Tourettes Syndrome can be involuntary vocal tics, meaning that members of the group may shout out random things at random times. But this is the Globe, so we may not notice anything different! This is the Globe – where everyone is welcome, and anything can happen'*

After the show, an audience member with Tourettes blogs:

> *'So this is what inclusive theatre feels like. A ripple of applause went round the Globe, and went through my skin, prickling it. Our tics continued to be celebrated as part of the dialogue that theatre provides, with a highly professional and talented cast maintaining a fine balance between when to acknowledge a tic, and when the play was the thing'*

The director receives a letter from another audience member which reads:

> *'Thank you to **ALL** the cast and crew for a most memorable and entertaining performance . . . In a world which sadly, is becoming exclusive and perhaps less tolerant, it was lovely to welcome and include audience members with Tourette's. And what a performance it was!*
>
> *The quick witted and unguarded audience comments (obviously with no barriers!) and the interaction between the actors and these comments were both engaging and entertaining . . . At times, there were two performances, linked together by the skills and timing of the actors . . .*
>
> *And so we were all included, with or without tourette's. This was not an exclusive performance, it was one that we could all enjoy, together. Thank you!*

April 2018

A woman with Asperger's is forcibly removed from the British Film Institute on her birthday for laughing too loudly. A fellow audience member tweets:

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[1] This event at Shakespeare's Globe was part of a co-design workshop undertaken during the research (see chapter 4 for further details).

'Wtf. Have just witnessed a woman with Aspergers being forcibly removed from a @BFI screening. Why? Because someone complained about her laughing. I feel sick to my stomach #bfi'

Recent events such as these demonstrate that sound has the capacity to make d/Deaf and disabled people[2] feel included and welcome or excluded and unwelcome within public places. This thesis details a practice-led Inclusive Design research project that foregrounds the lived experiences of d/Deaf and disabled people with regards to sound and social inclusion within socially public spaces in the UK.[3] The multiplicity of ways that sound might function as a socially in/excluding factor has received little attention within Inclusive Design research. Inclusive Designers have tended to prioritise physical and visual concerns within the design and management of the built world (see Imrie, 2005; Imrie and Hall, 2001; Hanson, 2003; Bichard and Myerson, 2009; Tauke et al, 2015). Where sonic considerations have been made it is often in relation to individual experiences, predominantly hearing loss or sight loss (Heylighen et al, 2009; 2010; Rychtáriková et al, 2012). Urban design, policy and planning have predominantly considered sound as inherently unwanted, as noise that pollutes the environment (Ouzounian and Lappin, 2014; Lappin et al, 2018). Noted by Ken Livingstone in his 2004 noise strategy:

'Designers need to understand how sounds will behave in a space, to create soundscapes which are attractive to everyone, as well as supportive to those with special needs . . . The visual quality of much UK urban design has improved enormously over recent decades. The quality of soundscapes in and around new developments may not have been given the same attention. Talented designers can innovate with people-friendly design which pleases the ear as well as the eye'

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[2] The term 'd/Deaf and disabled people' is used throughout this thesis to acknowledge that many d/Deaf people do not identify as disabled (Lane, 2006; Leigh, 2009; Gregory and Hartley, 1991).

[3] The term 'socially public space' is used within a relational model throughout this thesis to refer to 'all those places in the urban world of experience in which public life can develop' (Knierbein, 2015: 47). The two primary research sites (Battersea Arts Centre and Shakespeare's Globe) are both cultural institutions in London. Cultural institutions have significantly lower rates of attendance by d/Deaf and disabled people (Smith, 2017), are reported as the second highest exclusionary service after shopping (DWP, 2015), deliver unequal opportunities of access to disabled and non-disabled people (Museums Association, 2016) and are frequently governed by particular sonic rules which prioritise the normative perspective of the silent or quiet patron (Whitfield and Fels, 2013; Simpson, 2018). Although the two primary research sites are theatres, they are understood within this investigation as multi-purpose cultural institutions – offering cafes, exhibitions, public events and educational programmes alongside theatrical performances. The literature and theory used to contextualise the study (see chapters two and three) therefore draws less from the fields of Theatre Practice and Performance Studies and more on existing considerations within Inclusive Design, Sound Studies and Critical Disability Studies at the scale of the urban built environment.

Building on the above this thesis argues that the design and management of socially public urban spaces in the UK is typically grounded in a position of 'auditory normalism' which prioritises an idealised sonic citizen. Guided primarily by the people-centred design ethos of The Helen Hamlyn Centre for Design,[4] where the study has been located, the research charts an innovative methodological position between the fields of Inclusive Design, Sound Studies and Disability Studies. The methodology is grounded in two Inclusive Design residencies undertaken at Battersea Arts Centre and Shakespeare's Globe in London between 2016 and 2018.[5] The residencies engaged sixty-three people as collaborators in five participatory research events and informed three sonically inclusive design projects. The primary researcher[6] worked closely with disabled-led organisation *Touretteshero* who co-designed and co-delivered two of the research events and guided ethical and accessibility considerations made throughout the study. The input of Touretteshero enabled the research process to be attentive to the communication preferences, interests and needs of a diverse range of research collaborators including people with sight and hearing loss, Tourettes and obsessive-compulsive disorder (OCD). The research adopts a multimodal framework for discourse analysis (Norris, 2014) in order to analyse the complexities of sonic inclusion in relation to the research data. This analysis is undertaken within an overarching social semiotic approach (Bezemer and Jewitt, 2009; 2010) by foregrounding meaning as rooted in social and real life experiences (Andersen et al, 2015). Ultimately, this practice-led PhD aims to make an original contribution to knowledge and understanding within the field of Inclusive Design through three primary areas:

1. **Discourse and Theory:** The thesis responds to recent calls for a more critical approach to Inclusive Design (Hamraie, 2016; 2017) by framing theoretical discourse as a key output of design research. The thesis develops two emerging discourses: 'Sonic Inclusion' – the multiplicity of ways that sound includes and excludes people from society (discussed throughout the thesis)

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[4] The Helen Hamlyn Centre for Design, part of the Royal College of Art, is an international leader in Inclusive Design and Design Thinking. The centre has its origins in the DesignAge action research programme, which was founded in 1991 and became a fully-fledged research centre in 1999. Since then it has used people-centred design to address challenging social issues, building a worldwide reputation by collaborating across community, business and industry (rca.ac.uk/research-innovation/helen-hamlyn-centre).

[5] The key support from these organisations came from Sophie Bradey, Producer - Battersea Arts Centre and David Bellwood, Access Manager - Shakespeare's Globe.

[6] The author (William Renel) is referred to throughout the thesis as the primary researcher. This term is used in order to recognise the collaborative manner in which the research was undertaken and also acknowledges specific discussions of voice and agency outlined in chapters six and seven.

and 'the auditory normate' – the idealised sonic citizen around which many contemporary urban environments are designed and developed (discussed in chapter two and referenced throughout the thesis).

2. **Methodology:** By situating existing perspectives from Sound Studies and Disability Studies[7] within the contemporary trajectory of Inclusive Design, the intention is for new opportunities for more socially and sonically inclusive design practice and theory to emerge. The methodological approach (discussed in chapters three and four) is primarily positioned as an original contribution to the field of Inclusive Design. However, due to the interdisciplinary nature of the research, the intention is that the research methodology will also contribute to the fields of Sound Studies and Disability Studies (discussed in chapters three and nine).

3. **Design:** Three sonically inclusive design projects were initiated as part of the research. These are situated alongside the methodological framework detailed above as a key practical contribution that the research makes to the field of Inclusive Design. The projects include a non-ocular navigation system, a multisensory digital tool and an innovative visualisation technique (discussed in chapter 5).

These primary aims are compounded in the oppositional framework within which the research is situated (see chapter three) that ultimately aims to oppose auditory normalism in design through practice-led design research led by the primary researcher in collaboration with d/Deaf and disabled people in the UK. The rest of this chapter will detail the practical and theoretical contexts that frame the research, introduce the research questions and thesis structure and provide a glossary of key terms.

1.2 Sound and the Social [8]

Hearing and sound affect who has access to public space and on what terms. Such access is influenced by what Goodman (2010) terms 'audiosocial predeterminations' such as class, gender and race, or what Stoever describes as a 'listening ear' – a 'socially constructed ideological system producing but also regulating cultural ideas about sound' (Stoever, 2016: 13). We can learn from auditory explorations made

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[7] For example the method of soundwalking (Adams et al, 2008; Paquete and McCartney, 2012; Westerkamp, 1974) or the concept of psycho-emotional disablism (Reeve, 2012; Thomas 1999).

[8] The title of this section is a direct reference to the title of a presentation given by the primary researcher and RCA colleagues Dr Cecilia Wee and Dr Matt Lewis at IRCAM Forum – Centre Pompidou, Paris in March 2017. IRCAM provided the opportunity to share early findings of this PhD research amongst wider discussions of sonic practice within the School of Communication at the Royal College of Art.

within the realms of acoustic ecology (Schafer, 1994; Truax, 1984), sonic ethnography (Gershon, 2012), aural phenomenology (Arkette, 2004; Ihde, 2007), sonic anthropology (Schulze, 2018) and aural architecture (Blesser and Salter, 2009), that sound impacts on our individual and collective social experiences of space. However, it is notable that the experience of d/Deaf and disabled people is consistently underrepresented within these existing lines of auditory inquiry. Recent movements led by d/Deaf and disabled people, such as *relaxed performances* (Simpson, 2018), as well as recent acts of public discrimination, such as the incident at the BFI in April 2018 described above, highlight the ways in which citizens continue to grapple with the fragile and political mechanisms of sonic accessibility through their embodied and psycho-emotional experiences of social in/exclusion. Normative, non-disabled ears and voices have dominated the design and management of public spaces which offer 'communicative capital' (Paterson, 2010) predominantly to an idealised sonic citizen. When Tamsin Parker, a 25-year-old woman with Asperger's, was forcefully removed from the BFI on her birthday for laughing too loudly it was the perspectives of other cinema-goers, who heckled, cheered and applauded as Tamsin was removed (Parker, 2018; Marsh, 2018), that were prioritised in the way the space was socially produced and maintained. Tamsin's laughter and subsequent crying become a socio-political sounding of oppression – 'an acoustic politics of the voice' (Kanngieser, 2011: 02). The applause and laughter of other cinema goers become disabling utterances and those cinema goers, who subsequently complained, blogged and tweeted about the injustice of the event, provide *earwitness* accounts of inequality (Wargo, 2018), detailing how sonic inequality is produced and contested within the notion of 'allegedly public space' (Kohn, 2003). The prioritisation of idealised sonic citizens who conform to the auditory mould of designed objects, systems and services, developed without the inherent diversity of the population in mind, leads to fundamentally ableist public spaces created by designers, and enforced by managers, audiences and social conventions, whose primary understanding of disability and difference is the pillars of guidelines, regulation and legislation (Boys, 2017). Research by the Papworth Trust and Department for Work and Pensions (DWP) shows that disabled people have significantly lower rates of attendance at arts and cultural institutions (Smith, 2017) and that 15% of disabled people experience barriers to accessing the theatre, cinema or a concert (DWP, 2015).

This research follows a specific line of inquiry which is concerned with the interconnections between society and the urban sound environment (see Carpenter and McLuhan, 1960; Truax, 1978; Southworth, 1969; Blesser and Salter, 2009). Notable work in this area has been undertaken at the *Centre de recherche sur l'espace sonore et l'environement urbain*[9] in Grenoble and by *The World*

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[9] The Centre for Research on Sound Space and Urban Environment (CRESSON).

Soundscape Project (WSP) initiated by R. Murray Schafer at Simon Fraser University. Of particular influence within this trajectory are practice-led inquiries that foreground the possibility of design or sonic intervention to (re)shape the interconnections between society and sound (Lacey, 2016; and Schulte-Fortkamp, 2016). This thesis examines the ideology and embodied experiences of ableist sonic space by bringing together the disciplinary perspectives of Inclusive Design, Sound Studies and Disability Studies. The thesis foregrounds the lived experiences of d/Deaf and disabled people but approaches such matters at the intersections of wider issues of prioritisation, identity and the built environment in relation to sexuality, gender, class and race (Agrest et al, 1996; Colomina, 1992; Kanngieser, 2011; Valentine et al, 2008; Watson, 2006; Weisman, 1994; Wilkins, 2007; Boland, 2010).

1.3 Framing Social Inclusion

Within the social sciences, social inclusion is most frequently understood as an opposition to social exclusion. Empirical research in art and design has taken an active interest in examining social exclusion, particularly since the formation of the Social Exclusion Unit (SEU) and Department for Culture, Media and Sport (DCMS) in 1997.[10] The late 1990s was the time in which a wave of British artists and academics started to formally respond to increased governmental interest in social inclusion.[11] In 2001, the Arts Council commissioned a body of research specifically exploring socially inclusive practice (Jermyn, 2001; 2004). This work provides a literary framework for social exclusion, including historical definitions and measurements and methods of evaluating the arts in relation to social exclusion.

1.3.1 Social Inclusion and Design

In addition to the progression in social inclusion research outlined above is the materialisation of several forms of socially inclusive design practice, driven by a multiplicity of issues occurring across the globe over the past seventy years. This includes political and social movements, national and international events, changes

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[10] At this time social exclusion was defined as a 'shorthand term for what can happen when people or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime environments, bad health and family breakdown' (Office of The Deputy Prime Minister, 1994).

[11] Arts Council England produced several publications in this area including Addressing Social Exclusion (1999) and A Response to Policy Action Team 10 (2000).

in legislation and a growing societal awareness of, and demand for, equality.[12] As Gheerawo (2016) notes, there are a number of different movements and terminologies associated with a socially-focused attitude to design. These include: co-operative design (Schuler and Namioka, 1993), participatory design (Simonsen and Robertson, 2013: 02), user-centred design (Norman, 1988), socially responsive design (Gamman and Thorpe, 2016), universal design (Clarkson et al, 2003: 02) and inclusive design (Bichard, 2018; Gheerawo, 2016).

Histories of social inclusion and design (Coleman et al, 2007; Steinfeld and Maisel, 2012; Langdon et al, 2010) often include the work of industrial designer Henry Dreyfuss (1955; 1960), British architect Selwyn Goldsmith (1963), socially oriented designer Victor Papanek ([1971] 1985) and the 'mother of Universal Design' Patricia Moore (1985). These histories often use events such as the passing of the Americans with Disability Act (1990) to mark the progression of socially inclusive design. Collectively these histories highlight that ways in which Inclusive Design has been increasingly adopted as a practice through which to challenge socio-societal issues beyond the established perspectives of age and ability - towards gender, immigration, economic exclusion and neurodiversity. Recent work, particularly written from 'crip' and feminist perspectives (Ellis et al, 2019; McRuer, 2006; Guffey, 2018; Hamraie, 2017), critique the 'popular' narratives of socially inclusive design for their prioritisation of white, physically disabled male perspectives. Such critiques suggest these histories devalue the perspectives of different genders, sexualities and races and fail to include and account for the perspectives of those with invisible or sensory impairments.

1.3.2 The Social Model of Disability

The social model of disability (Oliver, 1990), created by the Union of Physically Impaired Against Segregation (UPIAS)[13], states that individuals are not disabled by their age or impairments, but because of a societal failure to consider difference in how environments and spaces, structures or systems are designed and developed.

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[12] Events of significance in the UK include the end of the Second World War and the development of the United Nations Universal Declaration of Human Rights (1948), as well as the Beveridge Report (1942) and subsequent development of the welfare state. In the US, significant events include The American civil rights movement and passing of the American Civil Rights Act (1964), as well as the Vietnam War, which saw a large increase in young disabled people experiencing first-hand the physical inaccessibility of society.

[13] The UPIAS are described as 'an early founding organisation of the British disability movement that radically shifted the meaning of 'disability' from the bodies of individuals to a product of the social world' (Liddiard, 2011: 31).

The social model is commonly understood as an opposition to the medical model[14] which states that individuals are disabled by their impairments. The social model, which offers a largely materialist and Marxist approach to disability (Meekosha and Shuttleworth, 2009), is ubiquitous within the theoretical field of Disability Studies (see Oliver; 1990; 2013; Barnes, 1992) and has undoubtedly changed the lives of many disabled people in (re)framing how they understand their impairments within dominant ableist societies (Campbell, 2009). As disabled artist and activist Liz Crow suggests 'I don't think it's an exaggeration to say the social model has saved lives' (Crow, 1996: 207). However, the social model has received a significant amount of criticism (Shakespeare and Watson, 2002; Hughes and Paterson, 1997; Light, 2000), particularly from feminist and critical realist perspectives in relation to the inflexibility of the model and its disembodied and overtly social nature (Corker and Thomas, 2002; Thomas, 1999; Reeve, 2012). Such critiques have given rise to 'renewed' and 'strong' social models of disability (Crow, 1996; Shakespeare and Watson, 1997) which foreground subjectivity and embodiment and, crucially, acknowledge the intersectionality of disability in relation to other social identity categories. In viewing this investigation through a strong social model, sonic exclusion can be theorised as both a structural and psycho-emotional form of disablement that operates via a societal failure to consider the aural differences and diversities of the population.

1.4 Research Questions

The research attends to three primary questions:

How does sound influence d/Deaf and disabled people's experiences of social inclusion and exclusion in socially public spaces?

This question begins by acknowledging a lack of research within Inclusive Design concerning the impact of sound in relation to d/Deaf and disabled people's experiences of social in/exclusion. The intension of the question is not only to better understand the divergent ways in which sound influences the social inclusivity of a public space, but also to chart the multitude of ways that d/Deaf and disabled people might negotiate systems of auditory normativity and power by sounding and unsounding an 'acoustics of assembly and resistance' (LaBelle, 2018: 04).

How can novel applications of sound within Inclusive Design research be utilised to increase the accessibility and social equity of socially public spaces for d/Deaf and disabled people?

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[14] Conceived in the 1980s through the International Classification of Impairments, Disabilities and Handicaps (World Health Organisation, 1980).

This question adheres to the context of this study as practice-led design research (Koskinen et al, 2011; Laurel, 2003) and, ultimately, aims to situate existing perspectives from Sound Studies within the contemporary trajectory of Inclusive Design. In response to recent discussions with regards to the role of Inclusive Design in shaping social equity in the built environment (Bichard, 2018), the question is concerned with both accessibility (who can do what) and social equity (on what terms) in socially public spaces.

How can the production of sonically inclusive knowledge, generated by d/Deaf and disabled people, operate theoretically and practically as a site in which the social, physical and communicative structures of public spaces can be re-envisaged?

This question aims to initiate an auditory turn within recent calls for more critical approaches to Inclusive Design (Hamraie, 2013; 2016). The intention of the question is not only to (re)align the ideology and practice of inclusive designers with contemporary ideas of sound and disability embodiment but also to challenge a depoliticised perception of sound and disability. The question engages a central tenant of the research – to adopt a sound-conscious and people-centred approach to interventions in, and the redesign of, public space.

1.5 Thesis Structure

The thesis is structured into nine chapters, following a traditional British doctoral thesis structure (Davis and Parker, 1997; Dunleavy, 2003).

Chapter One introduces the thesis using recent examples of sonically in/exclusive events to highlight how sound can influence social inclusion and accessibility in socially public spaces. The chapter provides an initial framing of social inclusion and the (strong) social model of disability. The chapter outlines the research questions, details the thesis structure and provides a glossary of key terms.

Chapter Two considers the theoretical foundations on which the research is built, drawing on existing theory and practice from Inclusive Design, Sound Studies and Disability Studies in order to develop the emerging discourse of the 'auditory normate'. The chapter provides a theoretical background to normativity, building on examples of the (ab)normal body in architecture and design (Imrie, 2010; 2012), conceptions of the 'misfit' and the 'normate' in Disability Studies (Garland-Thomson, 1996; 2011) and the construction of the 'normate template' in Universal Design (Hamraie, 2013; 2016; 2017).

Chapter Three introduces the methodological approach to the research detailing the positive influences and limitations of existing approaches within Inclusive Design and Sounds Studies. The chapter details the research design, which adopts a practice-led approach (Rust et al, 2007; Smith and Dean, 2009) within the overarching design research context of the London Doctoral Design Centre (LDoc),[15] who provided funding for the investigation. The chapter provides an overview of the ethical approaches and procedures undertaken and introduces the framework for analysis adopted in later chapters.

Chapter Four outlines in detail the five collaborative research events undertaken during two Inclusive Design residencies between 2016 and 2018. These events form a core component of the practice-led research. Each residency was grounded in the three primary research methods, delivered in response to a series of shared research objectives that were co-defined with research collaborators and staff from the partner organisations during the residencies.

Chapter five details three sonically inclusive design projects that are positioned alongside the Inclusive Design residencies above as the core practical contributions that the research makes. Each of the three projects directly oppose the theoretical construction of the auditory normate.

Chapter six is the first of three discussion chapters that aim to unpack the complexities of sonic inclusion by analysing the research data generated during the design residencies. This chapter considers *sonic agency* as a principle component of sonically in/exclusive experiences in socially public spaces. The chapter discusses existing considerations of agency in relation to design, disability and sound studies. These contextual framings conclude by situating auditory culture within the theory of things (Henare et al, 2007). The chapter adopts a multimodal framework for discourse analysis to examine areas within the research in which sonic agency was present and considers how the meaning of such sonically agentic experiences is communicated through different communicative modes.

Chapter seven introduces the themes of audibility and voice, giving specific attention to issues of audibility and social identity. The chapter situates the growing understanding of the non-normative voice (Eagle, 2014) within the established discourse of invisibility within Disability Studies (Hughes and Paterson, 1997; Mintz,

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[15] 'Funded by the UK Arts and Humanities Research Council, LDoc is a collaboration between three internationally leading London based higher education institutions: The Royal College of Art (RCA), Kingston University (KU) and University of the Arts London (UAL) The Centre provides cross institutional PhD studentships and training, working in collaboration with key industry partners' (ldoc-cdt.ac.uk).

2015). In doing so the chapter frames increases in the audibility of difference as an opportunity to disrupt the politics of visibility and challenge societal perceptions driven by the oppressive ideals of the auditory normate. The chapter uses a multimodal framework for analysis to analyse the differing ways that the audibility of non-normative voices was increased within socially public spaces during the research process.

Chapter eight considers the 'affective turn' in the humanities and social sciences (Clough and Halley, 2007). The chapter situates the lived experiences of d/Deaf and disabled people within existing considerations of affect theory in Sound Studies and Disability studies, foregrounding an 'affective sonic ecology' to generate new knowledge of the divergent affective power of sound in socially public spaces. The chapter introduces 'auraldiversity' a recent paradigm emerging at the intersections of Inclusive Design and Sound Studies that acknowledges the diversity of human hearing (Drever, 2017; Renel, 2018). The chapter concludes by analysing examples from the research data of the divergent and non-normative affective power that sound has on d/Deaf and disabled people. This analysis includes a multimodal investigation of the impact of the sonic environment of a theatre on the involuntary noises and words of a research collaborator with Tourettes during research event three.

Chapter Nine provides a conclusion to the thesis by charting a summary of key findings and research limitations as well as opportunities that arise for future research and development.

1.6 Glossary of Terms

This section outlines key terminology used throughout the thesis in order to clarify how disciplinary-specific and frequently used terms are understood within the context of the research.

- **Ableism/ableist:** ableism is a system of oppression comprised of values and practices that prioritise a non-disabled perspective, thereby casting disability as a devalued state of existence. 'An abled imaginary relies upon the existence of a hitherto unacknowledged imagined shared community of able-bodied/minded people held together by a common ableist homosocial world view that asserts the preferability and compulsoriness of the norms of ableism' (Campbell, 2009: 04). 'Ableism is to disablism what compulsory heterosexuality is to homophobia' (Goodley, 2014: xi).

- **Crip:** A shorthand term for 'cripple', 'crip' was reclaimed by disabled people as a provocative social identity during disability rights and activist movements in the 1970s. The term crip was formalised by crip and queer theories

(Sandahl, 2003; McRuer, 2003; 2006) and is mostly commonly used in activist or informal contexts rather than educational, professional or legal settings.

- **d/Deaf:** Many deaf people whose first or preferred language is British Sign Language (BSL) or American Sign Language (ASL) consider themselves part of the Deaf community. 'They may describe themselves as Deaf with a capital D to emphasise their Deaf identity' (actiononhearingloss.org.uk).

- **Disabled person:** understood within the British social model of disability (Oliver, 1990), a disabled person is someone with an impairment who is disabled by structural and social barriers to society.

- **Disablism:** 'Discriminatory, oppressive or abusive behaviour arising from the belief that disabled people are inferior to others' (scope.org.uk) disablism 'relates to the oppressive practices of contemporary society that threaten to exclude, eradicate and neutralise those individuals, bodies, minds and community practices that fail to fit the capitalist imperative' (Goodley, 2014: xi).

- **Normalcy:** the societal construction which frames contemporary life through norms and averages that, consequently, position abnormality or non-conformity as lesser, lacking or invalid. 'Normalcy is constructed to create the "problem" of the disabled person' (Davis, 2006: 03).

- **Other and Othering:** The positioning of a person as a site of marginality, separation and segregation. To Other someone is to invalidate their existence and position them as separate to the normative and oppressive ideals of the 'good'.

- **Research collaborator:** The term research collaborator is used throughout the text to refer to people that attended and engaged with the research.

- **Tics:** involuntary movements or noises caused by neurodiversity and impairments such as Tourettes Syndrome (Attwood, 2007; Kurlan, 2004).

CHAPTER TWO

DESIGNING THE AUDITORY NORMATE

2.1 Introduction

'In insidious everyday ways and in pervasive, representational ways, our culture is taught that disabled people live unliveable lives. We learn that we, as people who live in and with different embodiments, must normalize ourselves, apologize for our differences, or live uninhabitable embodiments'

(Rice et al, 2015: 524)

'Over the centuries, aural spaces have been created or selected to provide environments for a variety of groups and individuals. And the aural qualities of these spaces can either impede or support social cohesion over social distances that range from intimate to public . . . whether intentionally designed or accidentally selected, our aural spaces influence our moods and behavior'

(Blesser and Salter, 2009: 363-4)

Having provided an introduction to the thesis and the research questions in chapter one, this chapter brings together existing theory and practice from Inclusive Design, Sound Studies and Disability Studies to propose that the design of contemporary public space is driven by a multiplicity of ableist perspectives and normative agendas that converge in the concept of the 'auditory normate'. The concept builds on existing anti-normative research (Drever, 2017; Renel, 2018), the neologism of the 'normate' (Garand-Thomson, 1997) and the 'normate template' (Hamraie, 2017.) By establishing the notion of the auditory normate this chapter provides a contextual framing for the rest of the thesis. The chapter functions similarly to a traditional literature review by critically engaging with existing research and practice as a 'means of developing an argument about the significance of [the] research and where it leads' (Bryman, 2016: 98). The conception of the auditory normate also serves as a key original contribution to knowledge and understanding in the field of Inclusive Design. This chapter focuses on the primary research question: **How does sound influence d/Deaf and disabled people's experiences of social inclusion and exclusion in socially public spaces?** by considering the auditory normate in relation to four key areas:

- psycho-emotional auditory disablement
- systematic distorted communication
- legislation of the 'normal' ear
- the social (re)production of auditory norms

The chapter concludes by introducing 'The Auditory Normate Manifesto' which summarises the core elements of auditory normalism and serves as the fulcrum around which the oppositional framework (discussed in chapter three) of the research methodology is developed.

2.2 The Normate and The Normate Template

2.2.1 The Architecturally Normal Body

In 1960 industrial designer Henry Dreyfuss released *Measure of Man* (Dreyfuss, 1960) from which ergonomic and anthropometric data became the guide to functional design. The text foregrounded average measurements of men, women and children and popularised a 'one size fits all' approach to design that side-lined those who did not 'measure up' causing them to be excluded from the equitable use of products, services and environments designed for the 'normal' user (Bichard, 2015).[16] The text is criticised for its normative agenda and informed the creation of other work such as *Designing for the Disabled* (Goldsmith, 1963) which includes ergonomic guidelines for wheelchair users. Dreyfuss' original text sparked interest in the social context of design as a mediator between humans and the socio-political problems of the everyday and informed other texts in the field such as *Design for the Real World* (Papanek, 1971) which defines design as 'a conscious and intuitive effort to improve meaningful order' (ibid, 1971: 04). The concept of the architecturally normal body, and the ramifications of approaching the design of the built environment in this way, can be seen as part of the ongoing exploration surrounding bodies, power and space (Boys, 2017; Imrie, 2004; 2012; Imrie and Hall, 2001).

2.2.2 The Normate

Normalcy is a central theme in Disability Studies, art and activism (Davis, 2006; Garland-Thomson, 1996; Thomas and Sakellariou, 2018). One of core foundations of academic and theoretical discourses surrounding disability is anti-normativity. Disability Studies as an academic field is an explicit attempt to 'reverse the hegemony of the normal and to institute alternative ways of thinking about the abnormal' (Davis, 2006: 15). Liddiard (2016: 40) proposes that 'the construction of Othered bodies legitimates and provides authority to notions of normalcy'. Rosemarie Garland-Thomson coined the term 'normate' to refer to a speculative idealised person who epitomises normative values. They define the normate as 'the constructed identity of those who, by way of the bodily configurations and cultural capital they assume, can step into a position of authority and wield the power it grants them' (Garland-Thomson, 1997: 09). Ray (2013) suggests that the conception of the normate enabled disability embodiment to be situated within 'the list of other qualities dominant society values, such as "white", "male," and "middle-class"'. Ultimately, the normate represents the unmarked privilege of majority embodiments

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[16] Dreyfuss' text has subsequently been revised as The Measure of Man and Woman (Tilley, 2002) and now includes guidelines for design in relation to the elderly, people with sight and hearing loss and compliance with the Americans with Disabilities Act.

(Hamraie, 2013).

2.2.3 The Disembodied Environment & The Normate Template

The concept of the normate is positioned within the field of Inclusive Design through the conceptions of the 'disembodied environment' - which denies the possibility or presence of bodily impairment (Imrie, 2010; 2012) - and the normate template (Hamraie, 2016) which provides a 'useful abbreviation for the complex, critical notion that the world was designed with normative inhabitants in mind' (Hamraie, 2017: 20). The normate template takes as its starting point the concern that knowledge and ideologies privileging the normative are always present in the built environment (Hamraie, 2013) and aims to create a simple and useable term that classifies the normative values distributed across design policy, planning, management and development.

From these concepts we can understand that design serves as the functional and communicative vessel of normalcy in the sphere of the public. 'From a doorframe's negative space to the height of shelves and cabinets, inhabitants' bodies are simultaneously imagined, hidden, and produced by the design of the built worlds' (Hamraie, 2017: 19). Though design and designers do not (necessarily) define social identities directly, they play a pivotal role in framing what is socially (un)acceptable and which voices are heard or silenced (Lifchez, 1987). Inclusive Design (Coleman et al, 2007) has an established history of anti-average-user principles and practice, and yet such histories tell us very little about sound and normativity. This raises important questions that this chapter aims to address: How does the design of the contemporary urban sound environment privilege the embodied experiences of an idealised sonic citizen? How does the design of public space communicate the dominant auditory values and ideologies of designers? And how do non-normative auditory citizens negotiate the everyday of designed spaces?

2.3 The Design of The Auditory Normate

The following section will respond to the questions outlined above by introducing four pillars around which the primary researcher has constructed the notion of the auditory normate.

2.3.1 Psycho-emotional Disablism

The term psycho-emotional disablism is theorised within a social relational model of disability (Reeve, 2012) and is commonly understood within Disability Studies as the undermining of psycho-emotional well-being propagated by ableist agendas towards disabled people and other social identity categories (Thomas, 1999). Reeve (2012) uses a social relational model of disability to contend that disablism is experienced

through two forms of social oppression; structural and psycho-emotional.[17] Sonic exclusion can be theorised through a social relational model of disability as a form of social oppression that creates both structural and psycho-emotional disablism driven by the exclusionary currency of auditory norms. Many people with impairments such as Tourettes that can be audible, or have the capacity to affect what is audible, have the common lived experience of being 'stared at' because of a 'failure' to conform to the auditory norms of a space. These experiences may be heightened in environments that are governed by particular sonic rules such as lifts, cinemas, theatres, galleries, libraries and museums, many of which prioritise the normative perspective of the silent or quiet patron (Whitfield and Fels, 2013; Kitchin, 1998; McGrath, 1996). When difference is (in)audible in a public place the potential for a disabling experience to emerge is established; initiated by an audible event such as an involuntary tic, advanced through the normative gaze (Garland-Thomson, 2009) and solidified by the embodied and oppressive psycho-emotional response of the d/Deaf or disabled person. Consider the following examples in which a person with Tourettes is excluded by the normative expectations of language and communication:

A person with Tourettes attempts to access a service via phone.

The person experiences structural disablement as the algorithm powering the automated voice-control service isn't designed to compute the rhythm and tempo of the caller's voice which includes involuntary noises, pauses and words.

The person experiences psycho-emotional disablement in having reduced confidence in making future calls.

The person experiences structural disablement through decreased access to phone-operated services and support.

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A person with Tourettes goes to the cinema.

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[17] 'Structural barriers are those that operate from outside the individual such as inaccessible environments, physical and social forms of exclusion, discrimination and the like, or in other words, the usual forms of social oppressions acting on a person with impairments which are implied by a social model definition. What differentiates this extended social relational definition of disablism from the traditional social model definition is the deliberate inclusion of psycho-emotional disablism, disabling barriers which operate on the psycho-emotional well-being of people with impairments' (Reeve, 2012:79).

The person experiences psycho-emotional disablement as other cinema-goers mimic and comment on the involuntary noises they are making.

The person experiences structural disablement in being asked to leave the cinema by staff.

The person experiences psycho-emotional disablement through reduced self-esteem and reduced confidence in going to the cinema.

The person experiences structural disablement through decreased access to social activities and psycho-emotional disablement through increased feelings of isolation.

It is clear in these examples (which research collaborators shared with the primary researcher) that it is not just direct (structural) encounters that make public spaces and services excluding. It is also the 'existential insecurity' (Reeve, 2012) connected with the uncertainty of not knowing how other members of the public will react in similar environments and future situations. Such issues are pertinent within the 'voice revolution' (Hennig, 2018) where digital assistive systems are creating new challenges in the realm of Inclusive Design (see chapter seven). The cumulative impact of (in)direct psycho-emotional disablism prevents people from accessing socially public spaces (Smith, 2017; DWP, 2015), has negative impacts on mental health and well-being, particularly with regards to self-esteem and confidence and can lead to 'internalized ableism' in which people 'believe that exclusion from the social world is because of the personal impairment rather than a society that makes normative bodies and minds the necessary passport for full inclusion' (Reeve, 2016: 86). We can understand the intertwining of both structural and psycho-emotional oppression in the examples above as spirals of auditory disablement in which the individual is excluded directly by an object, environment or service and by the undermining of their psycho-emotional well-being which is emphasised by the repetition and regularity in which such instances of oppression are experienced.

2.3.2 An Ableist Culture of Silence

Disability Studies scholars have drawn on the phenomenological theory of the dys-appearing body to suggest that disabling barriers cause impaired bodies to 'dys-appear' (Leder, 1990; Hughes and Paterson, 1997). It is when an impaired body is confronted by physical inaccessibility or prejudiced behaviours and attitudes that the body dys-appears:

> 'The disablist and disabling sociospatial environment produces a vivid, but unwanted, consciousness of one's impaired body. Here, the body undergoes a mode of 'dysappearance' which is not biological, but social'

> (Paterson and Hughes, 1999: 603)

By situating this concept of dysappearance in the auditory realm, we can understand that the cumulative impact of structural and psycho-emotional auditory disablism renders d/Deaf and disabled voices silent and unheard. Such an exclusionary auditory phenomenon is theorised by Paulo Freire (1970) through the conception of a 'culture of silence' in which people are held within a specific societal position by direct and cultural forms of oppression.[18] Freire also introduces the 'myth' in which the oppressed become silent through the dominant normative values disseminated and enforced by oppressors. Within a culture of silence the myth may become an internalised phenomenon creating a hierarchy of knowledge, truth and lived experience. Freire's theory has been adopted in a number of studies which examine the silencing of disabled people within specific contexts including disabled women (Chenoweth 1995; 1996) and people with Polio (Yoshida and Shanouda, 2015).[19]

Whilst the voices of d/Deaf and disabled people remain unheard or lacking in critical quality, societal attitudes towards difference narrow; solidifying as aversive emotions like fear, pity and disgust – the tabloid of ableist sentiments (Hughes, 2016) - which foreground the notion of impairment as tragedy. The notion of psycho-emotional auditory disablement in which d/Deaf and disabled people are held as a culture of silence by the constraints of an ableist agenda is the first pillar around which the template of the auditory normate is constructed and held by society.

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[18] Freire suggests that a culture of silence does not signify silence as 'an absence of response, but rather a response which lacks a critical quality' (Freire, 1973: 21).

[19] Freire's theories of oppression and hierarchies of knowledge are expanded in relation to a diversity of perspectives beyond disability (Leonard and McLaren, 1993), notably, by feminist and critical race theorists (Smith-Maddox and Solórzano, 2002; Yang, 2016).

2.3.3 Systematic Distorted Communication and Ableist Temporal Norms

'Compliance with the embodied norms and conventions of communication has exchange value: it accords communicative capital . . . bestowed principally on the corporeal status of non-disabled people'

(Paterson, 2016: 174)

The work of Jurgen Habermas proposes that society is bound together by three primary mechanisms: power, money, and solidarity (Habermas, 1998). Power and money function within *systems* (political, economic etc.), solidarity functions within the *lifeworld* - the often-overlooked socio-cultural environment of the everyday (Habermas, 1987). Between the *systems* and the *lifeworld* is a series of communicative acts, action and interchanges termed the political public sphere, described as 'the set of forums in which the conflicts originating in the social and economic inequalities the system creates can be engaged and, possibly, resolved' (Gross, 2006: 309-10). The engagement and potential of resolution within the political public sphere creates solidarity which at a national level can be understood as national identity. Habermas theorises that solidarity/national identity in the public sphere can be dissolved by 'systematically distorted communication' (Habermas, 1971) - a key term in the construction of the auditory normate. A central tenet of systematic distortion of communication is the negation of open exchange through the influence of socio-structural factors such as social class, status and power (Paterson, 2016; Crossley, 1997). This phenomenon has been termed 'audiosocial predeterminations' (Goodman 2010), which operate through individual, cultural and institutional channels to define how sound, hearing and listening function within human interaction and communication. Put simply, a middle-class accent may be experienced differently to a working-class accent in different public settings. This auditory behaviour shapes the way in which different voices are listened to in different socio-cultural contexts and holds the potential to distort social interaction. The oppressive and discriminatory power of systematically distorted communication is discussed in relation to gender (Young, 1990), race (Stoever, 2016), and disability (Paterson, 2016), all of which contend that social interactions are framed by socially coded embodied markers drawn from white, middle class, non-disabled, male bodies and hearing practices.

The design of the built environment defines who has access to what types of communication and on what terms. The service counter (e.g in a bank or a pub) is an exemplar of how design might support or neglect different forms of communication within the built environment. Consider the following examples:

- **A pub has no lowered service counter** – a wheelchair user's agency is removed as their communication with the pub staff is reduced to looking upwards, not necessarily being able to see what is available to purchase,

having difficulty in paying, and potentially needing extra support to access the service.

- **A bank entrance is wheelchair accessible and has a lowered service counter for visitors but not for staff** – dictating that wheelchair users are welcome in the bank as visitors but not as staff.

- **The information counter at a train station isn't wheelchair accessible and doesn't have an assistive listening system installed** – the agency of d/Deaf and disabled people is reduced as certain forms of communication are prioritised.

The trope of normative communication is further produced in the physical design of the built environment in areas such as the height and placement of speakers and intercoms systems. Such features are commonly positioned at the height of a standing adult and are subsequently non-accessible to bodies that don't conform to the normative height expectations created in their design.

2.3.3.1 Temporal Norms

Disabled and d/Deaf people also experience communicative sonic exclusion through temporal norms founded within ableist agendas, discussed by Paterson (2016) who describes an interaction between a person with speech impairment and a stranger in which the stranger assumes that the person with speech impairment is and will be a 'waste of time' and looks for some competent other to address (ibid, 2016: 169). Here exclusion occurs not because of a direct communicative misunderstanding but because the interaction is policed by temporal norms set within the mould of non-disabled normative communication which refuses cultural and communicative capital for bodies and minds that don't fit.

Despite the abundance of work around accessibility in the built environment since the passing of the Americans with Disabilities Act (1990) and The Equality Act (2010), d/Deaf and disabled people remain held in an oppressive agenda as extreme users in many public institutions. d/Deaf and disabled visitors to museums report a lack of holistic access, positioning them as 'special' visitors invited to engage with one part of a collection, event or exhibition rather than being welcome by an inclusive experience available to their non-disabled peers (Museums Association, 2016). Although disability studies and disability activism have successfully politicised social and physical space, enabling a radical dismantling of normative and disabling systems of oppression and liberating d/Deaf and disabled people, Hughes and Paterson (1997) suggest that the response to impairment in modernity and the contemporary cultural imaginary has been essentially anthropoemic (Strauss, 1963; 1978) - casting disabled people as separate in society. The Othering of disabled

people through temporal and auditory norms is evident in certain provisions designed to increase the accessibility of public spaces. 'Autism Hour' is a scheme developed by the *National Autistic Society* (autism.org.uk) in which shops and businesses adjust the sensory profile of their environment for an hour per week in areas such as reducing background music and avoiding tannoy announcements. Although such initiatives might increase the accessibility of public spaces for specific individuals at specific times, they fail to address the central issue that these spaces are predominantly non-accessible. In dedicating a specific hour in which a public environment meets the needs of a disabled person the environment acknowledges being non-accessible the rest of the time, in turn furthering the oppressive temporal norms that position disabled people as welcome and included in society only at specific times and or specific locations.

From these examples we can start to understand how physical affordances (Gibson, 1979; Norman, 2013) of the built environment reinforce the oppressive routine of systematic distorted communication and ableist temporal norms that create services and experiences that are non-accessible to d/Deaf and disabled people. As Paterson and Hughes (1999: 604) note, the contemporary world is a verbal world structured around a society where the 'norms of communication and norms of intercorporeal interaction reflect the carnal needs of non-disabled actors'. Systematic distortion of communication and ableist temporal norms are the second pillar around which the template of the auditory normate is constructed. This sounds a call to action for communicating acts, actions and interchanges within the *systems* and *lifeworld* of society that are led by non-normative voices and listening practices. Such a call gains momentum from feminist approaches to design (Brown, 2011; Coker, 2001; Chouinard et al, 2010; Hamraie, 2013; 2016) and, ultimately, aims to oppose the dominant perspective of white, middle class, non-disabled communication, towards design that reflects the diversity of communicative practices and preferences within the population.

2.3.4 Legislating the (Normal) Ear

Sound and acoustics hold great potential to counteract the visual dominance that has driven western architecture historically (Herssens et al, 2011; Heylighen et al, 2009). Though Inclusive Design strives towards the design and management of environments that respond to the diversity of human interests and needs (Imrie and Hall, 2001; Keates and Clarkson, 2004), there is an observed lack of consideration for sound and the diversity of auditory human factors within Inclusive Design research and practice (Heylighen et al, 2010; 2014; Renel, 2018). One of the drivers in contemporary Inclusive Design has been to influence future governments and public policy through participatory methods, particularly in the arena of technology, diversity and equality (Balka, 2013; Coleman et al, 2007). However, existing

considerations of sound and hearing within the history of legislation and policy frame auditory design through the narrow and ableist agenda of 'special' and 'normal' hearing and communication.

Since the late 1980s acoustics in schools in the UK has been an area of growing interest (Shield and Dockrell, 2003) and is a key area in which the sociological and psychological implications of auditory design are beginning to be examined. Around the turn of the century acoustics in schools became a priority area for built environment policy (Gibbs et al, 2010; Woolner and Hall, 2010) leading to an abundance of acoustic standards and regulations including:

- The Department for Education and Skills - *Building Bulletin 93: The Acoustic Design of Schools* (DfES, 2003)

- Education Funding Agency - *Acoustic Performance Standards for the Priority Schools Building Programme* (EFA, 2012).

- The Department for Education - *Building Bulletin 93: Acoustic Design of Schools: Performance Standards* (DfE, 2015).

- Association of Noise Consultants and the Institute of Acoustics - *Acoustics of Schools: A Design Guide* (ANC and IOC, 2015)

In analysing these documents, we can begin to formulate the important role that legislation has played in the construction of the auditory normate. DfE (2015) uses the term 'special hearing' despite 'special' being voted the fifth most offensive disability-related word in a BBC poll twelve years earlier (BBC Ouch!, 2003). The document groups people with visual impairment, hearing impairment, attention deficit hyperactivity disorders (ADHD), auditory processing disorder and autistic spectrum disorder (ASD) together as a homogenised group of pupils with 'special hearing'. This regulated grouping of d/Deaf and disabled pupils under the oppressive banner of 'special' shows a clear lack of understanding in relation to the diversity of hearing profiles. ANC and IOC (2015) also uses the term 'special hearing' to categorize a similarly diverse group of d/Deaf and disabled people. This document compares people with hearing impairment to those with 'normal hearing' and provides guidance on the design of rooms for speech grounded in the perspective of the 'normal voice' (figure 1).[20]

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[20] ANC & IOC (2015) defines a normal voice as vocal communication at 10 microwatts resulting in a sound pressure level of 60 dBA at a distance of one meter which can be increased to 100 microwatts (70dBA) through a raised voice and 1000 microwatts (80dBA) when shouting.
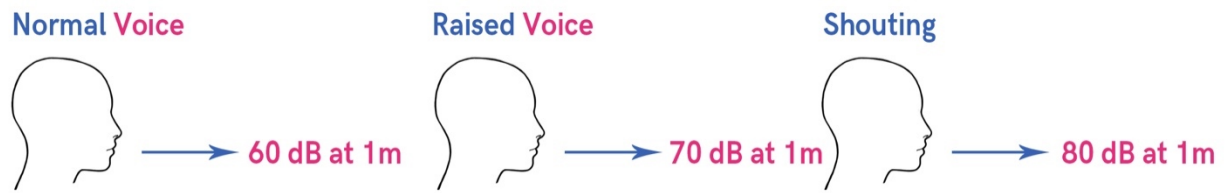
Figure 1. Speech Clarity of the 'Normal' Voice, adapted from ANC & IOC, 2015

This position gives no consideration for differing voice patterns, different forms of communication, or any temporary and longitudinal factors such as Laryngitis or Aphasia that might influence a person's ability to speak at 60dBA and raise their voice incrementally through shouting.

Rychtarikova *et al* (2012) propose that most research that informs acoustics legislation assumes an average person with 'good' hearing therefore disconnecting the aims of acousticians with those of inclusive designers. The statistical measure of *absolute hearing threshold* (Howard and Angus, 2017) is a common reference in acoustics legislation and is described as 'the best hearing level of younger people with undamaged hearing' (Truax, 2001: 16). However, there is research dating back to the 1960s that contends that the difference in human hearing thresholds is log-normal (consistently random) with differences as large as 25 – 30 dB between the best and average hearing thresholds (Hermann and Holzman, 1967). The acoustic standard for *normal equal-loudness-level contour* (BS ISO 226, 2003) has been described as the 'gold standard' of acoustics to which other standards must conform (Florentine et al, 2011) and is another exemplar of how the auditory normate has been constructed through legislation. The standard is grounded in the perspective of an 'otologically normal person' understood as a person between the age of eighteen and twenty-five in a 'normal' state of health who is free from all signs or symptoms of ear disease and obstructing wax in the ear canals, and who has no history of undue exposure to noise, exposure to potentially ototoxic drugs or familial hearing loss (Drever, 2017). *Average hearing thresholds* (AHT) are another example of auditory normativity in legislation. Gathered using large data sets tested under optimal sound-field conditions an AHT is used clinically to ascertain a 'reasonable estimate of what is "normal" with which what is "abnormal," may be contrasted' (Sahley and Musiek, 2015). A final example of auditory normalism is The International Symposium on Hearing (ISH)[21] which brings together the latest thinking and practice in psychophysics, physiology and models of hearing. The title of their publication alone - *Physiology, Psychoacoustics and Cognition in Normal and*

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[21] ISH has been held in Europe roughly approximately every three years since 1969.

Impaired Hearing (van Dijk et al, 2016) - highlights the clear distinctions that continue to separate 'normal' and 'impaired/special' hearing within medical and legislative research.

Each of these legislative documents and standards are important. They are the officially formalised communicative artefacts of design knowledge (Redstrom, 2017; Cross, 2001) that bridge the gap between designed and lived experiences of a public space and will ultimately shape how (auditory) difference is framed in the design and management of the built environment. The documents contribute to the Othering of d/Deaf and disabled people by polarizing 'normal' and 'special' hearing in which 'special' hearing flattens the divergent sonic experiences and needs of a diverse selection of d/Deaf and disabled people into one homogenised group. The documents also introduce the notion of the 'normal voice' as spoken, at a specific volume, increased incrementally as necessary.

2.3.4.1 Governmental Disablement

Access to Work (AtW) is a government scheme that provides employed d/Deaf and disabled people with financial support in relation to work by contributing towards things such as specialist equipment, travel costs and support workers.[22] In March 2015, The Department of Work and Pensions (DWP) announced that AtW would be capped at £40,800 per individual, per year.[23] In 2017 a report titled *Barriers to Work* (Hale, 2017) was published in order to provide the government with the opportunity to listen to the experiences and concerns of d/Deaf and disabled people who rely on AtW. The report found that structural reorganisation of AtW had a disproportionate impact on Deaf customers with call centres ill-equipped to deal with non-hearing customers. Here auditory normalism is produced by the call-centre of a government support programme for d/Deaf and disabled people that is designed with normative communication in mind and is therefore ill equipped to deal with anyone whose communication diverges from the template of the auditory normate. The report also found that Deaf people, particularly those for whom BSL is their first language, were amongst those most affected by the cap due to the daily rate for BSL interpreters without which those people cannot undertake work. The National Union of British Sign Language Interpreters (NUBSI) guidelines for freelance interpreter fees 2018-2019 state the standard day rate for a fully qualified BSL interpreter in London is £260 (nubsli.com). The DWP has subsequently announced that the cap will rise incrementally to £57,200 from April 2018. In comparing the maximum AtW grant figures between 2015 and 2019 with the NUBSI interpreter rates the image below

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[22] AtW does not pay individuals directly and most frequently pays the wages of a specialist support worker or interpreter. The level of support provided is based on the 'individual's needs' (gov.co.uk).

[23] The cap sparked increased campaigning by d/Deaf and disabled people as well as d/Deaf and disability-led campaign groups such as StopChanges2AtW (stopchanges2atw.com).

(figure 2) highlights the number of days within a year that a Deaf person could undertake employment with a BSL interpreter paid through AtW.

Grant awarded or reviewed	Cap per year	Total number of BSL interpreter days paid for	% of year person is able to work
1 October 2015 to 31 March 2016	£40,800	157	43%
1 April 2016 to 31 March 2017	£41,400	159	44%
1 April 2017 to 31 March 2018	£42,100	162	44%
1 April 2018 to 31 March 2019	£57,200	220	60%

Figure 2. Access to Work Grants vs. BSL Interpreter Rates

Here auditory normalism is produced by the government programme that 'aims to help more disabled people start or stay in work' (gov.uk) by dictating how many days a year a person can work based on their language and communication.[24] The notions of a legislated normative ear and governmental disablement outlined above form the third pillar around which the template of the auditory normate is constructed.

2.3.5 The Social (re)production of Auditory Normalism

'[Understanding buildings socially] begins to question the access to and rights within spaces, and at the same time provides the base from which to analyse and critique existing constructions of space'

(Schneider, 2017: 25)

The notion of social production has gained momentum in recent years, particularly within architectural discourses that seek to challenge the unequal distribution of power and hierarchical forms of capitalist organisation and production. Such discourses of 'socially aware architecture' (Schneider, 2017) commonly build upon the writing of French philosopher and social activist Henri Lefebvre (1991) who solidified the idea that space and architecture shape society and in turn are shaped by society. Lefebvre challenges the dominance and prioritisation of the visual, the form and the figure in architectural discourse and suggests that '(social) space is a (social) product' (ibid, 1991:26). Such foregrounding of space as socially produced builds on Marxist definitions of social production, particularly the work of Friedrich

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[24] Oppositions to the AtW cap are ongoing through organisations such as StopChanges2AtW and individuals such as David Buxton, Deaf chief executive of Action on Disability, who is challenging the AtW cap in court as a violation of the public sector equality act (Pring, 2018a).

Engels (1892) which details the shift from individual to social production in relation to the Industrial Revolution in England. In this text, Engels introduces the term 'universal emancipation' as an anti-capitalist agenda to describe socialised production of space as *public* and according to the needs of individuals and communities. Particularly since the 1960s, social theories relating to the production of space have become increasingly politicised, most famously through the academic and activist 'right to the city' campaign (Harvey, 2008) which argues against the systematic production of injustice, inequality and oppression in the social production of space (Harvey, 1973). The history of social production provides a theoretical basis for the production of space that transcends the visual and abstract and foregrounds the making and remaking of space through the diverse lived experiences of people. Pertinent in the (de)construction of the auditory normate, the foregrounding of the social (re)production of space enables a move away from analysis of solely visual and direct design affordances towards critical questions of (sonic) access and (sonic) inclusivity. The sonic, the social and the spatial are inherently linked and must therefore be theorised and analysed collectively.

The visual (re)production of disability has been critiqued in design discourse, particularly around the iconography of disability culture such as the International Symbol of Access which despite continuous calls and campaigns to reimagine the symbol continues to reinforce a limited visual perception and understanding of disability in the cultural imaginary and public sphere (Bichard et al, 2007; Guffey, 2018). Such visual reproductions are challenged through campaigns such as *#Iamnotyourvillain* which calls for cultural institutions to commit to removing negative representations of difference depicted through scars or facial difference in the media.[25] However, there is a clear lack of research that relates to the (re)production of disability though sonic phenomena. When a sonic custom governs an environment the opportunity for auditory normalism to be (re)produced is established. Consider the following example in which disabled writer, performer and activist Jess Thom attended a performance of *Extreme Rambling* by Mark Thomas:

> 'During the interval I was asked if I'd move and sit in the production booth at the side of the stage because some members of the audience couldn't tolerate the noise of my tics.
>
> I'd made sure the theatre and Mark knew I had Tourettes before I arrived. The staff were welcoming and Mark came to meet me before the show. With my permission, he'd explained to the audience at the beginning that I would be making some unusual noises.

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[25] The campaign is gaining momentum with organisations such as the BFI making commitments to no longer fund films which cast villains with facial scars (Lowe, 2018).

When the theatre manager asked me if I'd move, he made it clear that I didn't have to. But inevitably, when I heard people around me had complained and didn't want me to be there, I felt extremely uncomfortable and I agreed to move.

Once in the booth I was hit by a wave of humiliation and sadness. I started to cry. Part of me wanted to leave and never go to the theatre again'

(Thom, 2011)

Here auditory normalism is socially produced by the inhabitants of the theatre and theatre manager, (re)produced in the prioritisation of audience members that fit the sonic customs of that space, and leads to Thom, as a member of the public that diverges from the template of the auditory normate, being discriminated against.

Within British theatre the *Relaxed Performance* movement is beginning to challenge such acts of auditory discrimination. Relaxed Performances are understood as those which adopt 'a relaxed approach to noise or movement from the audience, offer a warm welcome to people who find it hard to follow the conventions of traditional theatre etiquette, and that encourage everyone to respond without inhibition' (Thom, 2016b). The Relaxed Performance movement, formalised by the *Relaxed Performance Project* in 2012, is a key area in which a dialogue between sound and social inclusion is taking place. The movement foregrounds the voices of communities and artists, particularly those with lived experience of disabling barriers in the theatre, who are challenging the cultural perceptions of sonic rules and social expectations. The movement presents sonically inclusive environments as those in which everyone is given permission to be themselves, to be relaxed, and to respond naturally in public space. Early theatre academic Cameron McNabb (2016) notes that the relaxed performance environment is a reproduction of previously more inclusive auditory customs held in theatre culture from hundreds of years ago.[26] Despite the necessity of relaxed performances as an access requirement for many people, only fifty-two (1%) of nearly 4,000 shows at the 2017 *Edinburgh Fringe Festival* offered a relaxed performance, half the number of relaxed performances available at the festival in 2016 (Thom, 2017a). Sonic exclusion in the theatres and

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[26] McNabb suggests that relaxed performances 'may seem like one of the newest things to hit the theatre scene, but the conventions of what we now call a relaxed performance were actually the norm for going to plays for hundreds of years. It might be surprising to many that the earliest drama of England – the plays of medieval drama and even those of Shakespeare – were far more inclusive of disabled persons than the modern theatre is today. For one, there were no rules about audiences sitting still or being quiet . . . Not only were early plays relaxed about audience movement, they were very relaxed, by our modern standards, about noise. There was no "hushed reverence" as the play was showing but rather laughing, singing, cheering, and even booing . . . No one expected a backdrop of silence' (McNabb, 2016).

the relaxed performance movement are important examples of how auditory normalism and the concept of the auditory normate are (re)made by the lived experiences of people in space. The examples above call for spaces that challenge (the often-contemporary issue) of socially produced rules. Such spaces suggest a 'relaxed inclusion' model in which people with diverse experiences and preferences are supported to respond naturally to their sensory environment. Opposing auditory normalism means designing structural elements of a space in such a way that diverse people can inhabit the space together. Only then can the psycho-emotional properties of a space be negotiated and reproduced over time towards new auditory futures and inclusive possibilities. Designers are not only responsible for the production of a social sphere that directly includes as many people as possible, but also the (re)production of a social sphere in the imaginaries and actions of the future (Petrescu, 2017). The social (re)production of auditory normalism discussed above is the fourth and final pillar around which the template of the auditory normate is constructed.

2.5   Summary and Conclusions

This chapter has explored existing theory and practice from Inclusive Design, Sound Studies and Disability Studies to propose that the design of contemporary public space is driven by a multiplicity of ableist perspectives and normative agendas that converge in the concept of the auditory normate. This chapter aims to provide a conception of the auditory normate through discussions of psycho-emotional auditory disablement, systematic distorted communication, legislation of the 'normal' ear and the social (re)production of auditory norms. These perspectives are summarised in the Auditory Normate Manifesto – defined as an ableist system of designed oppression composed of auditory values and practices that produce and reinforce normative hearing and communication, thereby sculpting 'auraldivergence' (Renel, 2018) and auditory difference as devalued states of existence. The conception of the auditory normate serves as the theoretical backdrop in which the practice-led elements of the research are born. The following chapter will introduce the methodological approach to the research detailing the research design and methods, approach to ethics and analysis.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Having introduced the notion of the auditory normate in chapter two, this chapter details the practice-led methodological framework that was developed during the research. The chapter explains how the theoretical narrative of the auditory normate was contested during the research through a practice-led qualitative methodology, grounded in a mixed methods approach (Creswell and Clark, 2018) informed by Nigel Cross' definition of design methodology.[27] The methodology is situated at an innovative position at the intersections of Inclusive Design and Sound Studies and builds theoretically on the critical turn in Disability Studies (Goodley, 2011) which rejects singular approaches to disability, drawing on interpretivist epistemology and constructivist ontology (Bryman, 2016; Willis, 2007). A companion site (willrenel.co.uk) accompanies this written chapter, housing related non-text research media. In locating the methodology as interdisciplinary the intension is to attend to the complex web of sonic experiences embodied and negotiated in the everyday lives of d/Deaf and disabled people in socially public spaces. The chapter is guided by the primary research question: **How can novel applications of sound within Inclusive Design research be utilised to increase the accessibility and social equity of socially public spaces for d/Deaf and disabled people?**

3.2 Methodological Context

3.2.1 Inclusive Design

'Inclusive design aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently and independently in everyday activities'

(Fletcher, 2006: 01)

An Inclusive Design methodology is premised upon working closely with people throughout the design process – from discovery and definition to development and delivery.[28] As is apparent in the wealth of ongoing research projects at the Helen

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[27] Cross defines design methodology as 'the study of how designers work and think, the establishment of appropriate structures for the design process, the development and application of new design methods, techniques and procedures, and reflection on the nature and extent of design knowledge and its application to design problems' (Cross, 2001: 04).

[28] Based on the Design Councils Double Diamond model (designcouncil.org.uk) which is commonly used by inclusive designers in the UK.

Hamlyn Centre for Design and the historical narrative of Inclusive Design methods (Coleman et al, 2016; Gheerawo, 2016), we can understand Inclusive Design as an evolving discipline through which designers are challenging societal issues in a multiplicity of contexts beyond the established perspectives of age and ability, towards gender, immigration and neurodiversity. The challenge for contemporary inclusive designers is therefore to provide innovative and accessible design methods through which an increasingly diverse set of people can be engaged towards an increasingly diverse set of goals. This mandate for evolving methods and outputs has led to the development of numerous toolkits such as *Inclusive* - a set of design activity cards developed by Microsoft (Holmes, 2018). Another example is the *Inclusive Design Toolkit* launched in 2007 by University of Cambridge Engineering Design Centre (EDC). The EDC toolkit suggests four main phases of inclusive concept design:

- **Manage**: Review the evidence to decide 'What should we do next?'
- **Explore**: Determine 'What are the needs?'
- **Create**: Generate ideas to address 'How can the needs be met?'
- **Evaluate**: Judge and test the design concepts to determine 'How well are the needs met? [29]

The EDC toolkit was funded by the EPSRC *I-Design* initiative which was also used to develop the Helen Hamlyn Centre for Design's *Designing with People* platform which offers personas and scenarios for designers to begin the design process (designingwithpeople.rca.ac.uk).

3.2.1.1 Inclusive Design Principles

In 1997, the landmark *Principles of Universal Design* were published at the Centre for Universal Design (CUD) at North Carolina State University. Subsequently, design principle sets[30] have become a common output of Inclusive Design research and can serve as a concentrated medium for communicating the core components of an Inclusive Design methodology. The CUD principles have influenced numerous principle sets such as CABE's *Principles of Inclusive Design* (Fletcher, 2006); TILT's *Principles for Codesign* (Marlow and Egan, 2013); The Paciello Group's *Inclusive*

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[29] The EDC toolkit also includes online tools such as an exclusion calculator that estimates the proportion of the British population that would be unable to use a product or service because of the demands it places on users' capabilities.

[30] Design principles consolidate the core values, ethos and approach that underpins design thinking and practice 'informed by a rich heritage of projects, methods, tools and techniques that we can bring to bear on each specific design context in which we participate' (Simonsen and Robertson, 2013: 03).

Design Principles (inclusivedesignprinciples.org); as well as the *Social Light Movement Manifesto* (sociallightmovement.com). Figure 3 collates the principles outlined above in chronological order.

Principles for Transforming Difficult Tasks into Simple Ones	Principles of Universal Design	Principles of Inclusive Design	Social Light Movement Manifesto	Principles for Codesign	Inclusive Design Principles	Inclusive Design Principles
Donald Norman, 1988	CUD, 1997	CABE, 2006	SLM, 2007	TILT, 2013	Microsoft, 2013	TPG, 2017
Use both knowledge in the world and knowledge in the head	Equitable use	Inclusive Design:	Light is a right, not a privilege, people before places The SLM exists to:	Engage the end-user in the process	Recognize exclusion	Provide comparable experience
Simplify the structure of tasks	Flexibility in use	places people at the heart of the design process	demonstrate and to design well lit environments for social and underprivileged housing areas and people	Design is in the hands of the many, not the few	Learn from diversity	Consider situation
Make things visible: bridge the gulfs of Execution and Evaluation	Simple, intuitive use	acknowledges diversity and difference	involve the community in the actual design of their own environment	Codesign prevents both designer and client from designing only in their own interest	Solve for one, extend to many	Be consistent
Get the mapping right	Perceptible information	offers choice where a single design solution cannot accommodate all users	encourage other designers to work in similar environments and use similar methodologies	Scepticism can offer a hidden perspective		Give control
Exploit the power of constraints, both natural and artificial	Tolerance for error	provides for flexibility in use	educate housing associations, housing management teams and social housing ownership bodies about the benefits of good lighting	Pluralism over unity Codesign offers a chance for a civic education.		Offer choice
When all else fails, standardize	Low physical effort	provides buildings and environments that are convenient and enjoyable to use for everyone	gain the support of city administrations, urban planners, architects, landscape designers, electrical engineers, lighting designers and other associated disciplines	There's a sense of purpose around everything		Prioritise content
	Size and space for approach and use		create attention, arouse public opinion, influence politicians and decision makers	Make locally and make it out of the right materials.		Add value
			promote responsible energy use within lighting design to persuade people that they have the right to expect good lighting	Don't design products for products' sake		
			never use sodium	Tension is an asset		
			Vive La "Light Revolution"!	Shift the design paradigm		

Figure 3. Universal Design Principles (1988 – 2017)

Hamraie (2017) notes that although elements of Inclusive Design methodologies such as toolkits and principles may appear neutral in relation to the real-world challenges of social and spatial oppression, they serve an important function as sites of

knowing-making; the 'social laboratories in which our built world is contested, negotiated and remade' (ibid, 2017: 253).

3.2.1.2 Human-centred Design

Inclusive Design methodologies frequently adopt a human centred design (HCD)[31] approach, particularly in relation to the design of technology and human-computer interaction (Keates et al, 2002; Nicolle and Abascal, 2001). HCD has subsequently evolved beyond ergonomics and human factors (Giacomin, 2014) to incorporate socio-cultural and emotional engagement (Norman, 2005; Hill, 2010). HCD tools are adopted within Inclusive Design methodologies in order to foreground interactions between people. HCD tools have traditionally prioritised language-based techniques (Giacomin, 2014). However, a growing number of non-verbal approaches to HCD are beginning to emerge (Navarro, 2008; Wharton, 2009; Hill, 2010). Despite this multimodal turn, we can observe a clear lack of auditory methods within HCD tools, toolkits and texts.[32] Auditory considerations are adopted solely as methods of data collection, towards other modes of visual or text-based analysis, interpretation and representation.

There are a number of ways in which the established methodological language of Inclusive Design influences this methodology, as well as several limitations that the methodology seeks to address. These are discussed below.

Positive Influences from Inclusive Design

- Inclusive Design frequently adopts a human-centred approach (Giacomin, 2014), positioning those with lived experience in the area of interest at the heart of the process

- Inclusive Design acknowledges diversity and difference (Fletcher, 2006)

- Inclusive Design strives towards simple, flexible solutions to social and societal issues (Gheerawo, 2016; Waller et al, 2015)

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[31] HCD was first established at the disciplinary intersections of computer science and ergonomics which understand HCD as an 'approach to systems design and development that aims to make interactive systems more usable by focusing on the use of the system and applying human factors/ ergonomics and usability knowledge and techniques' (ISO 9241-210, 2010: 02).

[32] See for example IDEO (2003; 2015) Lucero and Arrasvuori (2010) LUMA Institute (2012a; 2012b) and Mulder and Yaar (2007).

Limitations of Inclusive Design

- Inclusive Design is grounded in 'the primacy of ocular values, as evidenced in the shaping of space by visual cues, signs and symbols' (Imrie, 2015: 172). Subsequently, sound in Inclusive Design research is predominantly used as a method of data collection, towards other modes of visual or text-based analysis, interpretation and representation (Rychtáriková et al, 2012)

- Theoretical framings of sound and hearing within inclusive design research are grounded in a position of auraltypicality (Renel, 2018; Heylighen et al, 2010)

- Contemporary Inclusive Design has been critiqued as depoliticised and disembodied – dominated by practical concerns and giving inadequate historical attention to critical theory at the intersections of social identity categories such as gender, race and disability (Kafer, 2013; Hamraie, 2013; 2017, Coker, 2001)

3.2.2 Sound Studies

'[Sounds] interrupt the overly sighted metaphors that govern our understandings about qualitative research . . . sound method/ologies engage justice, politics, ethics, cultural differences (gender, class, sexuality, race, ethnicity, language, (dis)ability, etc.), ownership, and criticality differently, opening new im/possibilities'

(Daza and Gershon, 2015: 04)

Sound Studies advocates a methodological process in which auditory exploration is embedded throughout. A Sound Studies methodology places sound at the centre of the investigation, analysing sonic ideals and/or phenomena within their socio-cultural context, considering 'what sound does in the human world, and what humans do in the sonic world' (Sterne, 2012: 02). Gershon (2013) proposes that sounds are methodologically valuable within qualitative research.[33] A Sound Studies methodology affords the opportunity to avoid ocular binaries and may 'provide a means for spaces, people, and objects to resound and articulate that the impossibility of closing an earlid is a possibility for more socially just, ecological methodologies' (Daza and Gershon, 2015: 01).

The inherently interdisciplinary understanding of auditory culture (Bull and Back, 2016) that underpins a contemporary methodological approach to the exploration of sound in society is well documented in an array of edited volumes attending not only

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[33] Gershon (2013: 258) proposes that sounds are methodologically valuable because 'they sit at the paradox of human experience - utterly individualistic and inescapably socio-cultural in their interpretation . . . a tool for reflexivity as well as for qualitative inquiry'.

to Sound Studies directly (Sterne, 2012) but also musicology (Cox and Warner, 2004) and sound in the built environment (Kang and Schulte-Fortkamp, 2016). Methodologically, Sound Studies has come a long way since the anti-ocular provocations that the sensory privileging of vision could be the major failing of our time (Ellul, 1985) and that 'the world is not for beholding. It is for hearing' (Attali, 1985: 03). Though the field is concerned with new ways of understanding the world through sound, the emphasis of contemporary Sound Studies scholars has shifted towards multimodality and equity of the senses. As Bull and Back (2016: 2-3) note, 'there is much to be gained by interrogating the senses through the filter of the sonic . . . we should recognize that the senses cannot be 'looked' at in abstraction or isolation'. This transition to multimodal approaches is pertinent to this investigation which understands embodied experiences of sonic exclusion as an inherently multimodal concern.

Participatory or inclusive approaches to Sound Studies from a human-centred perspective remain scarce. Yet embedding sonic methods throughout a qualitative research process has inclusive potential.[34] Droumeva (2014) offers a list of contemporary Sound Studies works that adopt a participatory approach,[35] with other notable examples including *Favourite Sounds* (favouritesounds.org) and *Klang Orte Berlin/Berlin Sonic Plates* (sonic-places.dock-berlin.de). These projects provide an important foundation for participatory Sound Studies; taking a collaborative and community-driven approach to the practical examination of the changing social soundscape. However, each of these examples is focused on archival or conservational goals, rather than interventional or solution-driven objectives.

3.2.2.1 Normativity in Sound Studies

A critical turn is emerging within Sound Studies, driven by the voices of (often non-white, non-male) scholars and sound artists interested in the cultural politics of sound within the contemporary world. Publications such as *Sounding Out!* (soundstudiesblog.com)[36] are leading this discussion in relation to race. Gustavus Stadler (2015) examines three major Sound Studies publications[37] noting an

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[34] For example, audio recording allows research data to be captured in real-time and minimises the process of translation – two vital components in the generation of qualitative research methods which meaningfully supply collaborators or participants with agency of representation - a key attribute of inclusive research practice.

[35] This includes the Finnish project One Hundred Finnish Soundscapes (Uimonen and Kyto, 2008) and Acoustic Environments in Change (Järviluoma et al, 2009).

[36] Founded in 2009 and edited by Jennifer Lynn Stoever, Liana Silva, and Aaron Trammell.

[37] The Oxford Handbook of Sound Studies (Pinch and Bijsterveld, 2012), The Sound Studies Reader (Sterne, 2012) and Keywords in Sound (Novak and Sakakeeny, 2015).

insignificant number of non-white, non-western contributors and references within these texts. Stadler also suggests that although a small array of pieces relating to disability, gender and race are included, these remain isolated and lacking in wider critical framing and analysis. Whilst issues of social identity and the work of writers from non-white, non-western backgrounds remain in isolation within major Sound Studies publications, the discipline will continue to (re)produce limited and oppressive perspectives. There is also a growing literature and practice at the intersections of feminism and Sound Studies (see Malhotra and Rowe, 2013; Noy, 2017) including the conception of *the gendered soundscape* (Ehrick, 2015; Jarviluoma-Makela et al, 2003).[38] Dominant themes within this emerging discourse are the human voice and female vocality (Dunn and Jones, 1996; Karpf, 2007; Neumark, 2010), gender and musicology (Koskoff and Cusick, 2014; Macarthur, 2016), and wider considerations of female representation in Sound Studies and sonic arts practice (Lane, 2016). A practice-led approach to the investigation of gender and Sound Studies is evident in the UK (see *EKHO*; *Feminist Frequencies*; *GIRRL*; *Her Noise Archive*). Voegelin (2018) contends that a feminist sound and compositional practice has emerged through the perspectives of those not 'welcomed by, or willing to work in the male-dominated environments of music studios and academic departments' (ibid, 2018: 03). Disability and impairment are often absent in the work of Sound Studies scholars. Where disability is considered, there is a tendency to foreground specific lived experiences, commonly sight loss and hearing loss (Schmidt, 2016; Mills, 2012; Bijsterveld, 2012). In this respect Sound Studies reflects the normativity of Inclusive Design by providing a limited framing of sonic exclusion through the perspectives of sight or hearing loss.[39]

What we can observe within the critical turn in Sound Studies that hearing and listening are situated political practices that are 'never simply neutral but deeply ingrained in culturally informed, historically variable practices' (Hoffmann, 2015: 76). Hearing, listening and sound continuously influence our individual lived experiences which in turn shape our ideology and culture. From this point of view, we can start to understand that sound and sonic design have a vital role to play in furthering or disrupting the normative agendas. There are a number of ways in which the methodological approaches to Sound Studies influence this methodology as well as several limitations that the methodology seeks to address. These are discussed below.

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[38] The gendered soundscape is a theoretical position in which to examine how gender is represented, contested and reinforced through auditory thinking and practice (Jarviluoma-Makela et al, 2003).

[39] The normativity of sound Studies is noted by Stern (2015: 73) who suggests that 'sound studies has a creeping normalism to it – that is, an epistemological and political bias towards an idealized, normal, non-disabled hearing subject'.

Positive Influences from Sound Studies

- Sound Studies frames sound as methodologically valuable within qualitative research and embeds sonic exploration throughout a research process (Daza and Gershon, 2015).

- Sound Studies is a disciplinary centre of knowledge and understanding with regards to the interconnected web of affective relationships between humans and the auditory world (Feld, 1982; Feld and Brenneis, 2004) and thus provides a theoretical framing that enables (sonic) spaces, people, and objects to coexist on equal terms.

- Sound Studies provides a conceptual framework within which to investigate the ecologies, norms and values of the everyday (Gershon, 2013).

- Sound Studies provides a lexicon of terminology enabling ideas about sound to be clearly communicated and examined (Augoyard and Torgue, 2005; Schafer, 1994).

- Sound Studies is increasingly framed from a multimodal perspective (Bull and Back 2016; van Leeuwen, 1999).

Limitations of Sound Studies

- The conventions of much of contemporary Sound Studies are grounded in a perspective of 'auditory normalism' driven by white (Stoever, 2016), non-disabled (Renel, 2018), male (Tiainen, 2018) perspectives, with little regard for the deeply positioned political practices of hearing and listening.

3.3 Research Design

3.3.1 Introduction

The research was designed within the context of the LDoc which champions design research and echoes the growing interest in practice-led exploration observed across contemporary design research since the millennium (Vaughan, 2017). The research design builds on the developing understanding and application of practice-led design research within the UK (Brown et al, 2004; Hockey, 2008; Smith and Dean, 2009), particularly informed by the principles and frameworks of the Arts and Humanities Research Council (Rust et al, 2007; AHRC, 2011). Barrett and Bolt (2007)

describe practice-led inquiries as a new species of research that 'draws upon subjective, interdisciplinary and emergent methodologies that have the potential to extend the frontiers of research'. Ultimately, these approaches position creative practice as a central pillar of design research and an innovative and critical component in the production of design knowledge (Cross, 2001).

The methodology is framed within an oppositional approach at the intersections of Inclusive Design, Sound Studies and Critical Disability Studies. This approach is informed by calls for a critical and (re)politicised approach to Inclusive Design (Hamraie, 2016; 2017). It also draws on feminist and new materialist perspectives in sound studies that theorise a set of critical perspectives intended to disrupt or reframe the politics of visibility (Voegelin, 2014; 2018; Malhotra and Rowe, 2013; Noy, 2017). The oppositional framework builds on Critical Disability Studies by extending constructivist approaches to foreground the (sonic) materiality of the body (Collins, 2018).[40] This interdisciplinary oppositional approach is supported by wider oppositional and adversarial frameworks in design (DiSalvo, 2015; Fuad-Luke, 2009) as well as feminist approaches to designing thinking and practice (Brown, 2011; Coker, 2001). Ultimately, the oppositional framing of the investigation aims not only to theoretically and practically challenge the perspective of the auditory normate (detailed in chapter two), but to contribute to growing critiques of the depoliticised and disembodied nature of much of contemporary Inclusive Design (Hamraie, 2016; 2017).

The research was undertaken collaboratively at two levels: organisational and individual. Sixty-three individuals were engaged as research collaborators throughout the process.[41] The methodology builds Disability Studies appraches that aim to disrupt ableist research practices which adopt normative binaries between 'expert' and 'non-expert' - positioning disabled people solely as 'subjects' or 'participants' (see Barnes, 2003; Kitchin, 2000). In addition to individual collaborators, three organisations supported the study: Touretteshero, Battersea Arts Centre and Shakespeare's Globe.

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[40] This approach expands 'the understanding of disability from a health science perspective to consider it as a civil and human rights issue, a minority identity, a sociological formation, a historic community, a diversity group, and a category of critical analysis in culture and the arts' (Garland-Thomson, 2019: 12).

[41] Including artists, designers and academics as well as d/Deaf and disabled people with lived experience of sonic exclusion in socially public spaces. Many of the individuals that contributed to the research identified within more than one of these categories.

3.3.2 Touretteshero

Touretteshero is a disabled-led community interest company that celebrates disability arts and campaigns for social justice. Since 2010 Touretteshero has reached over 20-million people worldwide and has collaborated with 150 artists and partner organisations. The company aims to celebrate and share the creativity and humour of Tourettes in an accessible way, with the widest possible audience (touretteshero.com).

3.3.3 Battersea Arts Centre

Battersea Arts Centre (BAC) is a multidisciplinary arts centre within an old town hall in South West London. Each year BAC welcomes over 100,000 visitors, provides workshops to 5,000 children and young people, works with 400 artists to curate over 650 performances. BAC's mission is to inspire people to take creative risks to shape the future (bac.org.uk).

3.3.4 Shakespeare's Globe

Shakespeare's Globe is an internationally renowned performance centre and educational establishment dedicated to the exploration of Shakespeare's work. The Globe welcomes an international audience to 'workshops, lectures and staged readings; to visit the exhibition and tour the Globe Theatre, and to watch productions, ranging from original practices to world premières of new writing' (shakespearesglobe.com).

BAC and Shakespeare's Globe were engaged as the primary research environments in which data was collected. A series of five research events exploring sonic in/exclusion in relation to the lived experiences of d/Deaf and disabled people were undertaken. Touretteshero worked with the primary researcher to devise and deliver two of the events, working specifically with young adults with Tourettes who self-identified as having lived experience of sonic exclusion. Figure 4 summarises this core research structure.
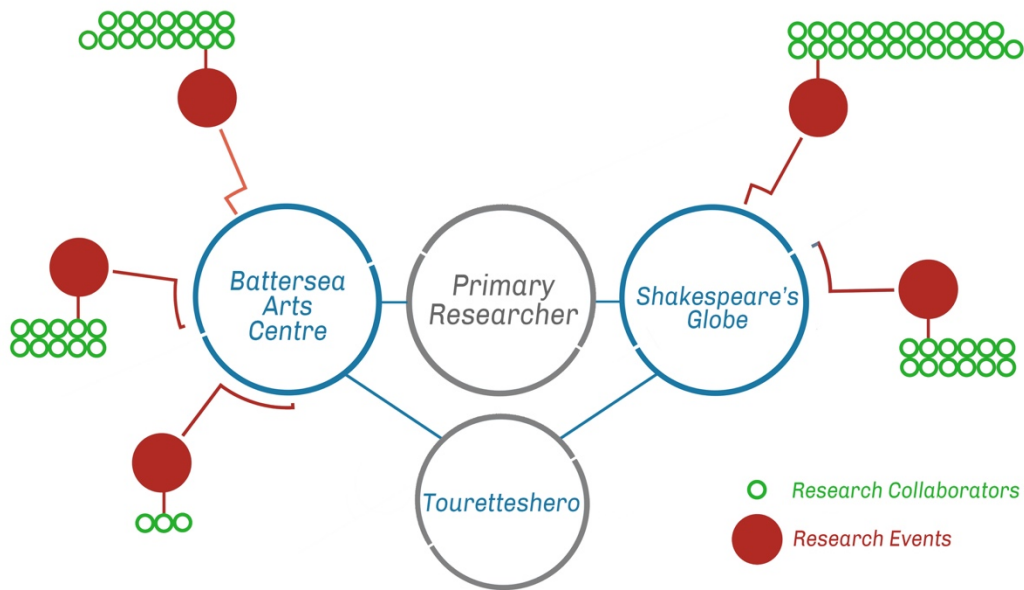
Figure 4. Core Research Structure

3.3.5 Ethics

Within socially engaged research practice, which has a historical tendency to prioritise the voice of the subject or participant over that of the researcher (Leavy, 2017; Kara, 2018), there is now a movement for the ethical approach of the researcher to be explicitly detailed in the methodology.[42] Reissman (2003) contends that the positioning of the investigator is important as it shapes the production of new knowledge and understanding. The research paid close attention to the growing literature surrounding ethics and design within contemporary social and political contexts (Felton et al, 2012; Fry, 2009), building specifically on approaches within the fields of Participatory and Inclusive Design that share an 'ethical motivation to support and enhance how people can engage with others in shaping their world' (Roberton and Wagner, 2013: 65). The five primary ethical considerations made within the research process were:

1. To ensure that collaborators, particularly those who identified as d/Deaf or disabled, could tell their own stories, on their own terms

2. To adopt and design research methods that were attentive and responsive to collaborator's interests and communication preferences

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[42] Liddiard (2011: 108) suggests that a reflexive account of the researcher's approach and process 'provides a means to flesh out and unpack many of the tensions, contradictions and politics inherent within research'.

3. To provide collaborators which agency over how their experiences were represented and included in the dissemination of the research

4. To prioritise collaborator anonymity throughout the process

5. To ensure that collaborators felt comfortable to withdraw at any time, without penalty

Such matters of agency, diversity of communication, anonymity and control are issues held within the real-life experiences of many d/Deaf and disabled people who face multiple barriers to the goal of an equitable existence within contemporary society (Oliver, 2013). This lack of societal equity is particularly acute when mechanisms that support the rights of d/Deaf and disabled people in the UK[43] are continually cut or closed by an ableist governmental agenda that continually creates disabling barriers to the mobility, independence, and quality of life (Thom, 2017c; Pring, 2018b). Reflections on the emancipatory focus of disability research (Barnes, 2003; Danieli and Woodhams, 2005) suggest that a robust ethical and methodological approach to the study of disability and disablement lies in a critical realist approach (Archer et al, 1998) that foregrounds both collaborator agency and the importance of analysing the experience of living with an impairment towards actual change in medical and social realms (Watson, 2012). It was therefore crucial to ensure that d/Deaf and disabled research collaborators were given a clear and accessible understanding of the ethical considerations made and upheld in the research methodology. The following section will detail the practical steps undertaken in order to do so.

Ethics Approval

Ethics approval was obtained from The Royal College of Art (appendix 1) informed by the RCA's Research Ethics Policy and Research Councils UK *Terms and Conditions of Research Council Training Grants*. Ethics was discussed with partners Touretteshero, BAC and Shakespeare's Globe before each of the events and with the supervisory team throughout the process.

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[43] Such as The Independent Living Fund, Access to Work and Disability Living Allowance.

Recruitment

A specific approach to collaborator recruitment was devised for each research event, informed by the nature of the group that each event aimed to engage.[44]

Information Sheets and Consent

All research collaborators were provided with an information sheet and consent form (appendix 2). The information sheet detailed the overall aims of the research, outlined the types of data that would be collected and how the data would be stored. The sheet also detailed the manner in which confidentiality and anonymity would be handled through the use of pseudonyms and removal of potentially identifying factors. The consent form provided specific details of each research event activity, asked the collaborator how they would like to be described in the written thesis and detailed the right to withdraw from the research at any time without penalty. Contact information for the researcher was provided to ensure that collaborators could ask any questions before or after the event. The contact information of the researcher's primary supervisor was also provided to ensure that collaborators had the opportunity to raise any concerns before or after a research event with a person other than the primary researcher. All collaborators were offered a follow-up conversation or meeting with the primary researcher to discuss any issues relating to the event.

3.4 Data Collection Methods

The following section introduces the methods adopted within the methodology to capture data within the core research structure outlined above. Three primary data collection methods selected: open discussion, binaural soundwalking and co-creation weekends within which sub-methods such as visualisation and omnidirectional sound recording were applied. The intention of the primary methods was to work with research collaborators to capture two key categories of data:

1. **Primary:** Lived experiences of sonic in/exclusion in socially public spaces in different modal formats (visual, audible, etc.).

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[44] Invitations to the Open Discussion events, which aimed to engage a large group of academic and non-academic collaborators, were circulated to inclusive designers via the networks of the Helen Hamlyn Centre, to Sound Studies scholars and sound artists via several Facebook forums including *Sonic Arts Forum*, *Sound Practice Research: Goldsmiths University of London* and *Sonic Arts Research Centre*. Invitations to disability-led organisations and disabled people were circulated via the Touretteshero events page and twitter account which, at the time of writing has over 16,500 followers. For the co-creation weekends, which aimed to select a small group of collaborators with similar lived experiences of sonic exclusion, a guest blog post was posted on the Touretteshero website (Thom and Renel, 2016; 2017).

2. **Secondary:** Creative responses to lived experiences of sonic in/exclusion in different creative modal formats such as poems, sound recordings, illustrations and photographs.

3.4.1 Method 1: Open Discussion

Open discussion in qualitative research is often referred to as focus group research and 'involves engaging a small number of people in an informal group discussion . . . 'focused' around a particular topic or set of issues' (Wilkinson, 2004: 177). Focus groups and open discussions enable the effective collection of data from multiple participants simultaneously and are inherently social activities (Krueger, 2000). The research follows Onwuegbuzie *et al* (2009) who propose that focus groups are most effective when they are between one and two hours in duration and are populated by six to twelve participants.[45] Though an abundance of approaches to the design of open discussions exists (Ashbury, 1995; Krueger, 2000) the approach undertaken within the research methodology was informed by Open Space Technology (Owen, 2008). Open Space invites self-organising groups of participants to co-create the agenda of a discussion during the course of the research event, in keeping with the ethical considerations of agency discussed above and later in the thesis (chapter six).[46]

3.4.2 Method 2: Binaural Soundwalking

Binaural soundwalking is a method developed during the research that combines two existing perspectives: binaural recording and soundwalking. Binaural recording is an approach to two-channel stereo recording in which two microphones are positioned at two ears either on a human head (listening subject recording) or an artificial head (dummy head recording).[47] Binaural recording has been situated as methodologically

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[45] 'The rationale for this range of focus group size stems from the goal that focus groups should include enough participants to yield diversity in information provided, yet they should not include too many participants because large groups can create an environment where participants do not feel comfortable sharing their thoughts, opinions, beliefs, and experiences' (Onwuegbuzie et al, 2009).

[46] Co-founder of Touretteshero Jess Thom notes that 'open space is useful because it gives people control over how they contribute to a discussion. It enables contributors with different professional and lived experiences to exchange ideas equally and, with the right preparation, is a flexible method that supports different bodies and minds' (Direct correspondence with primary researcher, August 2019).

[47] Zhang et al (2017: 02) note 'humans have only two ears to perceive sound in a 3D space. Hence, it is intuitive to use two locally separated microphones to record audio as it is heard; and when played back through headphones or a stereo dipole, a 3D sound sensation is created for the listener. This is known as binaural recording'.

valuable in relation to disability studies (Grond and Devos, 2016) and is adopted as a creative application of recording technology that simultaneously attends to the individual and shared components of a soundscape. Soundwalking (Adams et al, 2008) is described as a method of attentive listening to the sounds within an environment (Truax, 1978) pioneered within the field of Acoustic Ecology (Schafer, 1994; Truax, 1984), notably by Hildegard Westerkamp.[48] A soundwalk can be designed in several ways: alone, as a pair, or in a group (considering alternate perspectives of group listening and individual listening). Soundwalking can investigate numerous locations or focus on one environment. Regardless of the design, Westerkamp suggests that the intention is always to rediscover and reactivate our sense of hearing within a specific context. Brooks *et al* (2014) position local experts as key to successful soundwalking. Their approach supports the ethos of the HCD which situates people with lived experience at the heart of the research or design process. Soundwalking is well established within the field of Sound Studies, to the extent that it is described as one of the 'safe' Sound Studies methods (Foale, 2014), and one of the key methodological tools within Sound Studies and soundscape composition (Lacey, 2016). There are numerous methodological applications of soundwalking,[49] the approach adopted within this methodology was designed to be relaxed and aimed to make the research collaborator feel as comfortable as possible in telling their story, on their terms.[50] Soundwalking is emerging as a tool within architecture and urban design processes (Brambilla and Maffei, 2010; Lacey, 2016) and there is a growing interest in the application of soundscape research within the design of the built environment (Lappin et al, 2018; Davies et al, 2007; Ouzounian and Lappin, 2014; Cain et al, 2008). The approach to binaural soundwalking adopted in this methodology foregrounds the voices of d/Deaf and disabled people, building on continued calls from Disability Studies scholars that disabled people remain secondary in contemporary research practices across the disciplinary spectrum (Barnes and Mercer, 2010; Davis 2006; Oliver and

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[48] Westerkamp defines soundwalking as 'any excursion whose main purpose is listening to the environment' (Westerkamp, 1974).

[49] Such as music therapy and memory studies, public art and methodologies for identifying perceptions of the urban environment (Marontate, et al, 2016; Kull, 2006; Paquete and McCartney, 2012; Adams et al, 2008).

[50] This relaxed approach is influenced by paired conversational approaches to capturing lived experiences through audio recording such as Story Corp (storycorps.org) in the US and The Listening Project (bbc.co.uk) in the UK. The approach is also informed by the growing interest in walking methodologies within qualitative research (Springgay and Truman, 2018), particularly those that examine affective and sensory embodiments (Springgay and Truman, 2017a) and those that consider social identity theories (Springgay and Truman, 2017b).

Barnes 1997).

3.4.3 Method 3: Co-creation Weekend

Since the 1980s there has been an increase in focus on the users of design, encapsulated in the shift from designing *for* to designing *with* people (Sanders and Stappers, 2008). Figure 5 charts this progression through a transition from customer to co-creator.
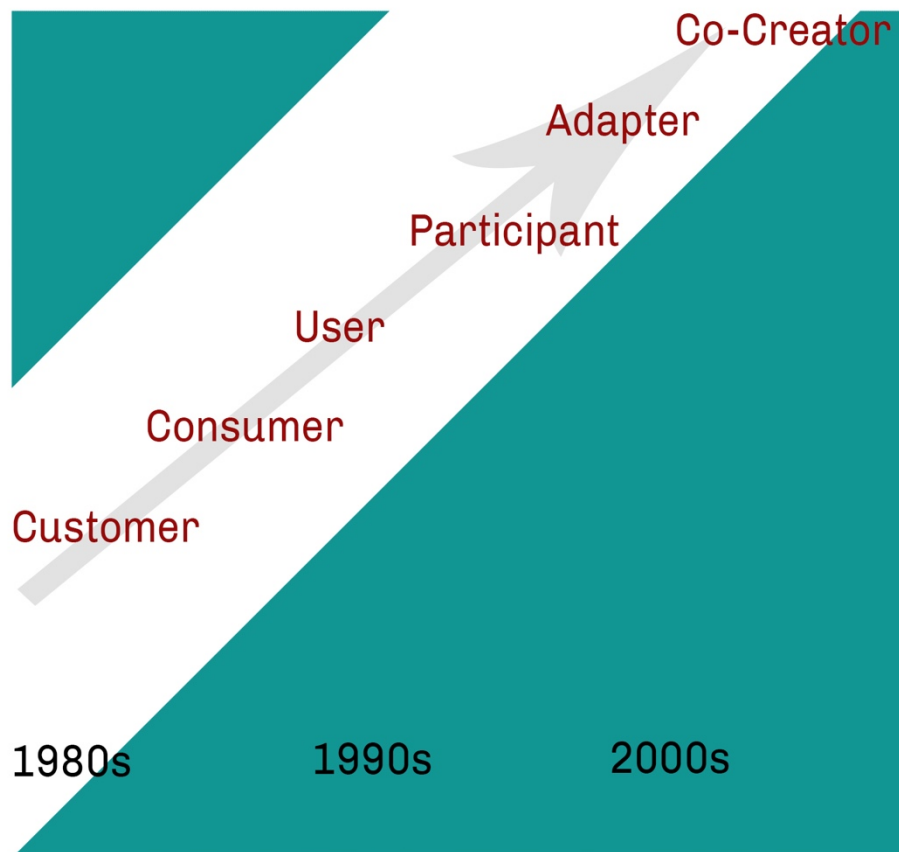
Figure 5. Increasing Participation in Design, adapted from Fuad-Luke (2009: 143)

The co-creation workshop has been used as a catalyst in this trajectory and is frequently adopted as a design research method that situates the experiences and perspectives of a diverse group of participants at the centre of the design process (Rill and Hämäläinen, 2018). A co-creation workshop is understood as a designed environment in which design exploration can take place, exploring existing narratives and perspectives and defining new scenarios.[51] The approach to co-creation within

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[51] Marlow (2013: 27) contends that 'part of the concept behind hosting workshops as a stage for the codesign process is to critically recontextualise the space. In activating spaces as well as object through a dialogue with end-users and by developing scenarios that facilitate different experiential activities, these spaces and objects becoming meaningful and effective . . . the workshop stems from

the research methodology was grounded in two weekend events working closely with a small group of disabled people with shared lived experiences of sonic exclusion. The events were developed in collaboration with Touretteshero, drawing on their experience of developing similar events (Thom, 2016a). Figure 6 summarises the research design.
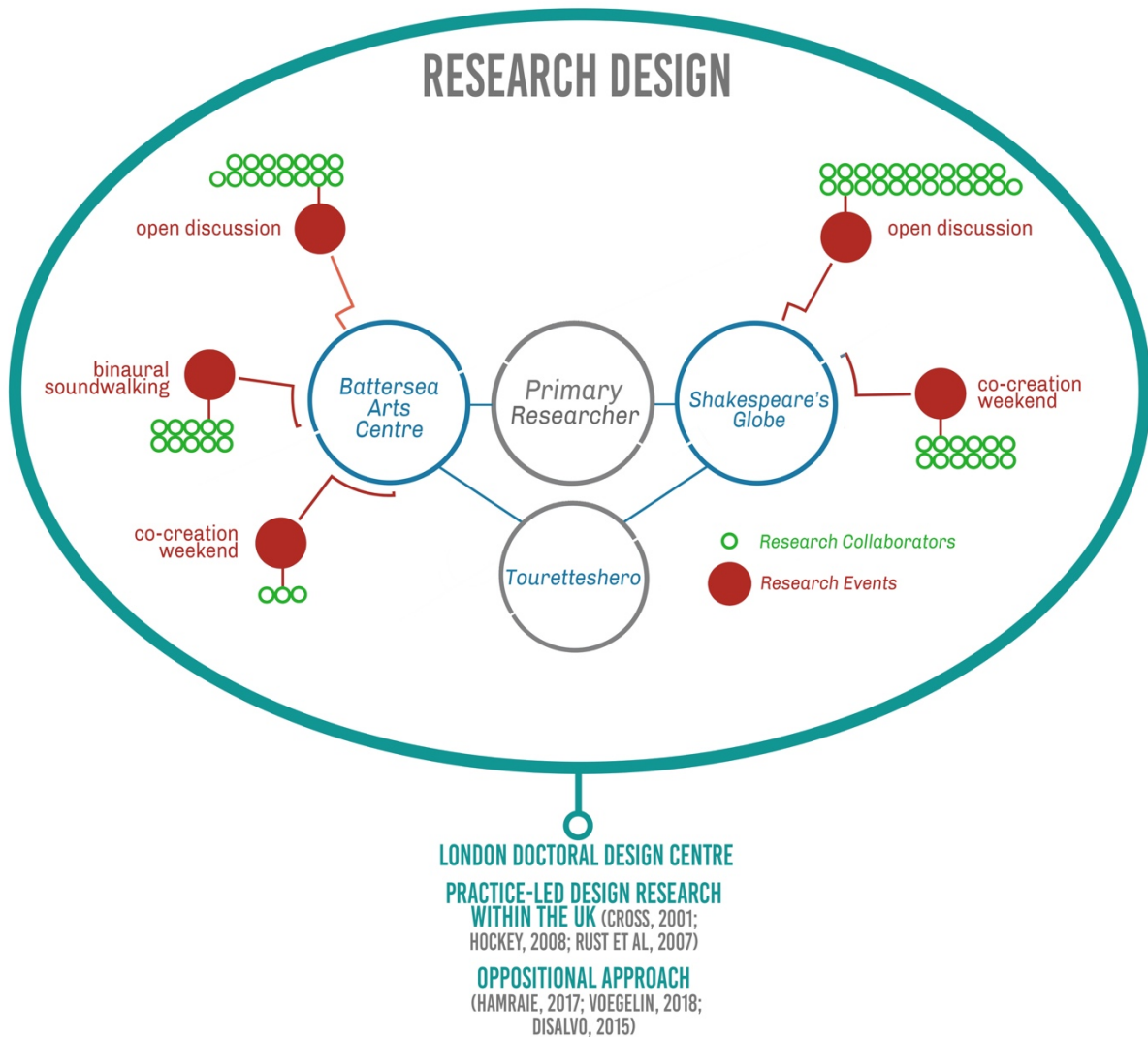
Figure 6. Research Design Summary

3.5 Analysis

This section introduces the multimodal framework for discourse analysis applied in later chapters (six, seven and eight). In adopting a multimodal approach, the intention is to better understand the multiplicity of ways that d/Deaf and disabled people are excluded from public spaces because of sound and, crucially, how these

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an instinct for gathering and debating, the need for a productive relationship between interaction with a site, its materials and its narrative, to evolve meaningful design'.

experiences are communicated through different modal channels. The analysis draws heavily on the work of Sigrid Norris (2004) and foregrounds an auditory approach with regards to data collection and analysis - building on multimodal approaches that focuses on sound and auditory modes (Dalton et al, 2010; Phillips and Smith, 2012; van Leeuwen; 1999). In this regard, the framework departs from Norris' work which prioritises video cameras and audio-visual data. Ultimately, the analysis proposes that sound can create exclusionary experiences that are embodied and communicated through non-auditory channels - such as proximity and visual layout (see chapter seven), as noted by Goodale (2011: 140) who suggests that 'sound can be read for more signs than those produced by listeners'.

3.5.1 Multimodality

Multimodality dissolves the hierarchy of monomodal approaches and regards individual modes as partial to the complete meaning present within a larger system. Multimodal approaches consider the interrelationships between individual modes within systems of meaning and question how singular modes interact and influence others within a multimodal ensemble. A multimodal approach is driven by the notion that spoken or written language (the focus of traditional discourse analysis) is but one method for communicating meaning and, therefore, monomodal approaches are limited to representations of partial meaning. Within the expanding theory and application of multimodality,[52] the analytical approach adopted in this methodology assumes a social semiotic approach[53] foregrounding meaning as 'rooted in the social, in the real life experiences of the people who make meaning' (Andersen et al, 2015: 143). According to Bezemer and Jewitt (2010) a social semiotic approach to multimodality is guided by three primary assumptions:

- That representation and communication always draw on a multiplicity of modes, all of which contribute to meaning.

- That all forms of communication (modes) have, like language, been shaped through their cultural, historical and social uses to realize social functions.

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[52] See for example multimodal listening (Ceraso, 2014), multimodal ethnography (Pink, 2011) and multimodal discourse analysis (Kress, 2011; Pirini, 2017).

[53] Social semiotic approaches to multimodality are influenced by the work of Michael Halliday (Halliday, 1978; 2004; 1991; Halliday and Hasan, 1985). Particularly their systemic functional theory that establishes a position in which to conceptualise the semiotic resources used to create meaning and the tools for analysing meaning created in the interactions between those resources in communicative experiences.

- That meanings realised by any mode are always interwoven with the meanings made with those other modes co-present and co-operating in the communicative event. This interaction produces meaning.

By adopting a social semiotic approach, the methodology can begin to investigate the meaning of sonically in/excluding experiences held between the meaning potential of a designed object, environment or service within a socially public context, and how such meaning is (re)produced and communicated by the people, norms and ideologies that govern the space.

3.5.2 Communicative Modes and Mediated Actions

Norris (2004) describes communicative modes (such as gaze, layout and posture) as systems of representation that are never bounded or static units but *heuristic*.[54] The unit of analysis within this methodology is the *mediated action* (referred to as *action* given that all actions are mediated) of which there are smaller (lower-level) and larger (higher-level) actions. All higher-level actions are made up of multiple chains of lower-level actions which can be embodied communicative modes (such as gaze and gesture) and disembodied modes (such as the layout of a room). Norris also introduces the term *frozen actions* to describe higher-level actions frozen in material objects in the past which influence the present.[55] The notions of disembodied modes and frozen actions have strong ties to the concept of *affordance* - introduced by Gibson (1979: 127) as the things that an environment offers or furnishes, 'good or ill'.[56] The disconnected nature of designed affordances and the needs of disabled people has been considered within the field of Inclusive Design (Imrie, 2010; 2012; Hamraie, 2013; 2017) and Disability Studies (Garland-Thomson, 1996; 2011). With these existing considerations of affordance and exclusion in mind we can begin to understand how Norris' proposed network of communicative modes and mediated actions might be utilised as a methodological tool through which to better understand the multimodal research data (discussed in chapter four). The following section will further discus elements of Norris' framework.

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[54] Here the term heuristic 'highlights the plainly exploratory function, and also accentuates the constant tension and contradiction between the system of representation and the real-time interaction among social actors' (Norris, 2004: 11).

[55] For example, if you see a pint of milk in a friend's fridge, you will know that your friend has brought the milk and placed it in the fridge. The previous actions of buying the milk from the shop are frozen in the milk in front of you.

[56] The concept was developed by Donald Norman to describe the perceived or actual properties of an object and the 'capabilities of the agent that determines just how the object could possibly be used. A chair affords ("is for") support and, therefore, affords sitting' (Norman, 2013: 11).

3.5.3 The Modal Density Foreground-background Continuum

Modal density 'refers to the modal intensity and/or modal complexity through which a higher-level action is constructed' (Norris, 2004: 79) - informed by the social actors and socio-environmental factors involved. Modal density defines the intensity or complexity of modes that individuals employ. When modal density is high the focus of the individual is the higher-level actions constructed. When modal density is low, the individual will *background* the higher-level action though may remain partially aware of it. The heuristic notions of foreground, midground and background refer to three levels of simultaneous attention and/or awareness that an individual has during an interaction or experience. Norris combines these two factors in a methodological tool termed the *modal density foreground-background continuum* (Norris, 2002; 2004) which represents simultaneous higher-level actions that an individual constructs throughout an interaction or experience. The continuum transcends the hierarchy of communicative modes present in other multimodal frameworks (Jewitt et al, 2016) and 'does not assume that specific modes are always inextricably linked' (Norris, 2004: 151). The tool enables the many simultaneously constructed high-level actions that an individual engages in to be analysed through a relational and heuristic model.

Analytical Conclusions

Norris' system of interlocking mediated actions and the conception of the modal density foreground-background continuum are pertinent to this investigation of sonic exclusion. These tools highlight three important factors:

1. The meaning and meaning potential of a sonically in/exclusive experience is negotiated between the embodied and lived experiences of an individual, the real-time influence of an environment and the actions embedded (and/or *frozen*) in that environment (or memories of it).

2. During an individual's experience of sonically in/exclusive interaction or experience the modal density of numerous communicative modes and higher-level actions simultaneously fluctuate within a continuum of attention and awareness.

3. That no communicative mode is superior or better suited to understanding the meaning of sonic inclusion and that specific modes are not always inextricably linked.

The third point is particularly important to this investigation as it acknowledges that communicative modes have divergent influences on the experience of social actors and on other modes within the multimodal ensemble. The framework for multimodal analysis outlined above is applied in chapters six, seven and eight to analyse the lived experiences of d/Deaf and disabled people in socially public spaces.

3.6 Summary and Conclusions

This chapter has provided an overview of the practice-led qualitative methodological framework within which the research is located - situated at the intersections of Inclusive Design, Sound Studies and Disability Studies. The methodology builds on the critical turn in Disability Studies (Goodley, 2011; 2012) which rejects singular approaches to disability (theory) and draws on interpretivist epistemology and constructivist ontology as well as feminist and new materialist perspectives. By charting the positive influences and limitations of existing approaches within Inclusive Design and Sounds Studies the chapter details and innovative methodological position which positions the lived sonic experiences of d/Deaf and disabled people at the heart of the research and design process. The chapter provides an introduction to the analytical approach undertaken, grounded in a multimodal framework for discourse analysis particularly informed by the work of Sigrid Norris (2002; 2004). The chapter aims to provide contextualisation with regards to the analytical framework, which is applied and further discussed in chapters six, seven and eight. The following chapter reports on the application of the methodology by outlining in detail two Inclusive Design residencies undertaken at BAC and Shakespeare's Globe between October 2016 and September 2017.

RESEARCH EVENTS & DATA

4.1 Introduction

Having introduced the methodological framework within which the research is located in chapter three, this chapter outlines two Inclusive Design residencies undertaken at BAC and Shakespeare's Globe between October 2016 and September 2017. Each residency made use of the three primary research methods introduced in chapter three; delivered in response to a series of research objectives co-defined with research collaborators and staff from the partner organisations:

1. To engage research collaborators, particularly those that identify as d/Deaf or disabled and/or as having lived experience of sonic exclusion, in collaborative research processes to practically oppose the theoretical position of auditory normalism.

2. To explore sonic in/exclusion in the context of two multi-purpose cultural institutions in London to generate new practical knowledge and understanding of the ways that sound in/excludes people in socially public spaces.

3. To use collaborative methods to generate multimodal data that can be analysed to generate new theoretical knowledge and understanding of the ways that sound in/excludes people in socially public spaces.

These objectives draw on calls for a critical perspective to Inclusive Design (Hamraie 2013; 2016). The chapter describes the generation of a series of multimodal data sets (Kress, 2011; Norris, 2004) from five research events within the two Inclusive Design residencies. In detailing the content and data from these events, the chapter considers the complexities of sonic in/exclusion within an innovative methodological position at the intersections of Inclusive Design, Sound Studies and Disability Studies. Building on LaBelle's (2018) suggestion that sound offers opportunities for individuals and communities to negotiate systems of (auditory) domination, the research events described below are intended as practices of sounding and unsounding an 'acoustics of assembly and resistance' (ibid, 2018: 04). The intention is to begin to dismantle the template of the auditory normate established in chapter two and attend to the aim of the research by initiating a collaborative opposition to auditory normalism in design through the lived experiences of d/Deaf and disabled people. The chapter concludes by providing a summary of research data, highlighting how this is expanded through theory and practice in the following chapters.

4.2 Data Collection Events

The emphasis on data collection within the methodology was to capture the lived experiences of d/Deaf and disabled people, in their own words and on their own terms. Each of the five events detailed below was tailored to the collaborator's personal interests, access needs and communication preferences. In total, sixty-three people contributed to the research, of which thirty (48%) self-identified as d/Deaf or disabled (figure 7). It is notable that research events three, four and five were attended by 100% d/Deaf or disabled collaborators. The following section will describe each event, including specific methodological influences and data collected.

Figure 7. Total Research Collaborators

4.2.1 Research Event 1 – Open Discussion – BAC

Figure 8. Research Event One Poster

Research event one was attended by fifteen collaborators, five of which identified as d/Deaf or disabled.

Figure 9. Research Collaborators - Event One

The event was arranged around a large rectangular table and recorded using a mixed microphone approach (Ballou, 2015) – positioning a single omnidirectional microphone at the centre of the group alongside two cardioid microphones positioned at 180-degree intervals. The omnidirectional microphone provides a low gain-to-feedback ratio and captures sound equally from all directions, the cardioid microphones provide a higher gain-to-feedback ratio and capture localised sound from their point of focus.[57]

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[57] This mixed microphone approach was used to record the voices of the research collaborators equally. As noted in chapter three, Inclusive Design has traditionally given little consideration to auditory factors during the design process (such as microphone selection and arrangement). The considerations outlined here therefore create the opportunity for new sonically inclusive approaches within the field.

OMNIDIRECTIONAL
CARDIOID
COLLABORATORS
PRIMARY RESEARCHER
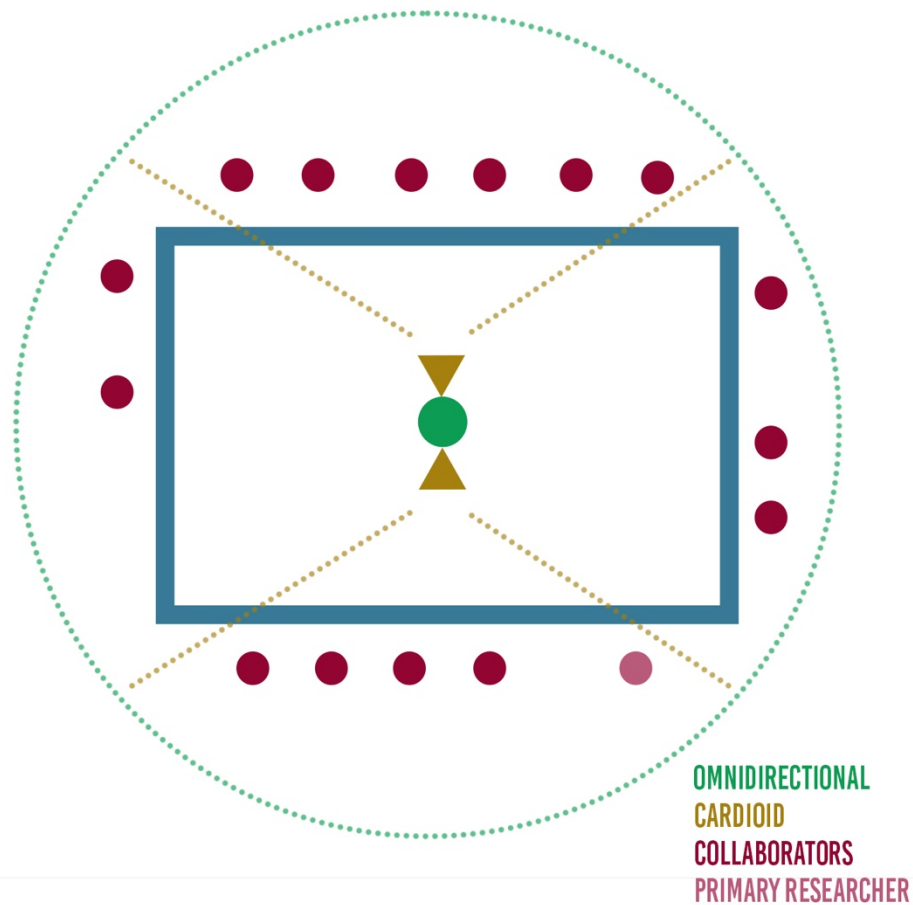
Figure 10. Microphone and Group Placement – Event One

The discussion was separated into two, hour-long sessions. The first opened with several provocations from the researcher relating to sound and social inclusion in public spaces followed by questions, comments and discussion. The primary researcher introduced the 'relaxed inclusion' model of the workshop - inviting collaborators to rearrange the layout of the tables and chairs to meet their needs and to make noise, move and respond to the space in a way that was natural to them. Collaborators were invited to move in and out of the event space freely. Cushions were provided on the floor for anyone who might find that preferable to tables and chairs. Collaborators were given post-it notes and were encouraged to write words, questions or statements during session one and stick them to the table to create the agenda for session two. A live illustrator [58] visualised key quotes and

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[58] Amber Anderson (amberanderson.co.uk).

topics from the discussion in real-time (figure 11).[59] Against closed or guided research methods, such as questionnaires and one-to-one interviews which can lead to pre-determined or directed contributions from research participants (Creswell and Creswell, 2018), the event prioritised broad questions and foregrounded listening to the responses of research collaborators. The Helen Hamlyn Centre for Design Yearbook (2017) suggests that by positioning listening at the heart of a research process, and asking open-ended rather than closed questions, the collaborator is located at the centre of the process and supported to express their thoughts and perspectives openly. The event focused less on the wealth of Sound Studies literature concerning listening (Back, 2007; Carlyle and Lane, 2013; Chion, 1994; Herbert, 2012; Rice, 2015; Schafer, 1977; Tuuri and Eerola, 2012) and more on methodological approaches in Disability Studies that emphasise the 'the art of "listening" to the voices of disabled people' (Barton, 2005: 325) to avoid tokenistic collaboration (Liddiard, 2011).

Research Event 1 – Data collected:

- Audio recordings (omnidirectional, cardioid) – duration: two hours and fifteen minutes
- Discussion transcript
- Live visualisation of key quotes and topics[60]

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[59] The live illustrator uses the term 'live scribe' to refer to their practice of real-time visualisation. This is recognised in the use of the term throughout this thesis. The primary researcher is aware of the historical power dynamics embedded in the practice of scribing (Bird, 2018; Tiffin and Lawson, 1994; Beach, 2010) and the potential therefore for the use of the term to become problematic within the inclusive and collaborative ethos of this research project. The intention, however, is to recognise the artists preference.

[60] The aesthetics and visual grammar (Kress and van Leeuwen, 2006) of the live visualisations was discussed with the live illustrator throughout the research process. The primary design concern was to create a series of visualisations that were friendly and accessible to a broad range of people. In merging simple, cartoon-like graphics with key quotes and short sections of text the intention of the live scribing method is to communicate the core components of a discussion with the collaborators involved in a summative and accessible manner. The visualisations consciously reflect the collaborators who were present at each event in relation to ethnicity, gender and impairment. If the live scribing method was adopted in further research with the aim of public exhibition, then the primary researcher who suggest that the visual grammar of the images better reflect a diversity of social identities. Issues surrounding the representation, agency and audibility of d/Deaf and disabled people are further discussed in chapters six and seven.
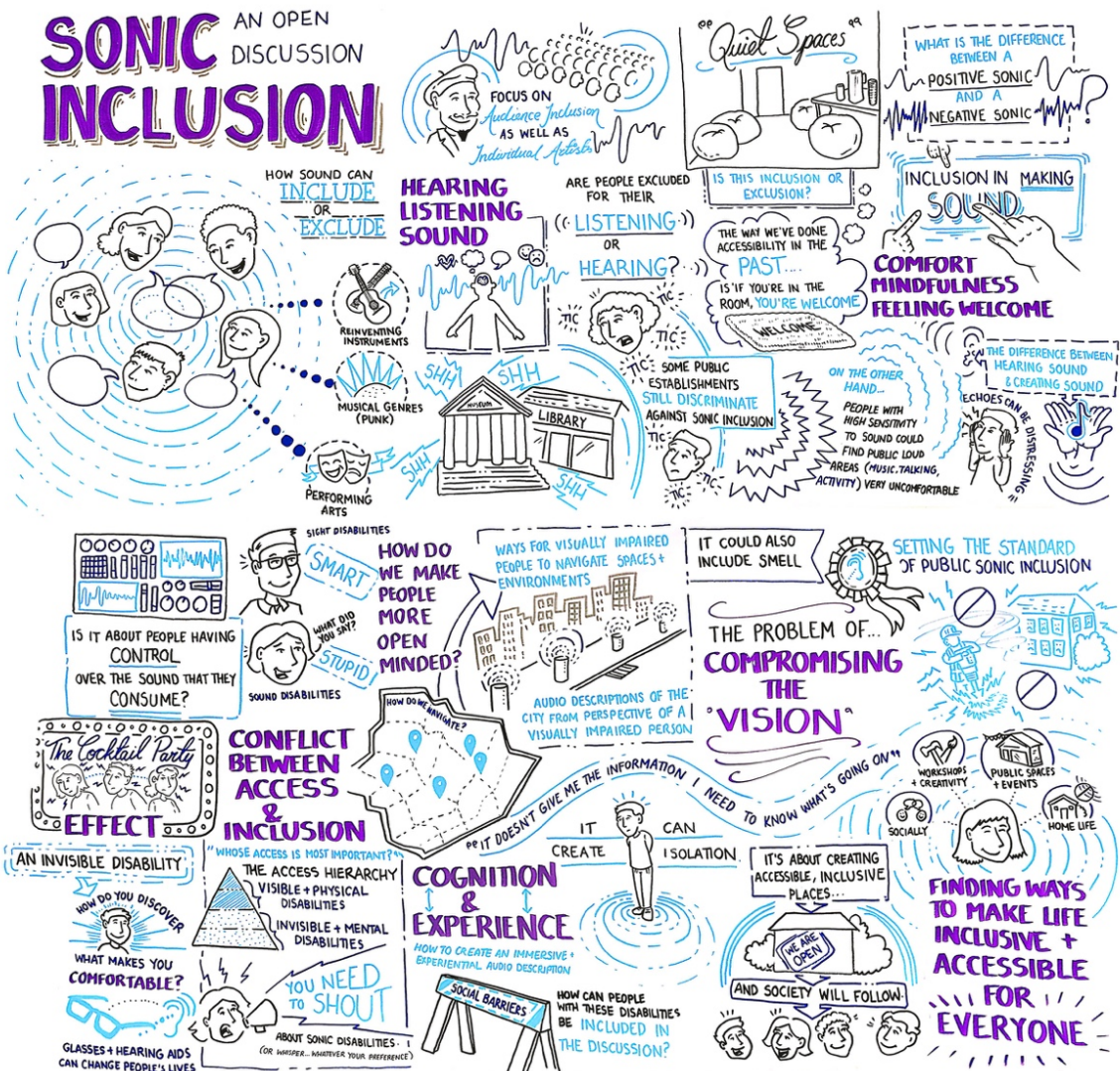
Figure 11. Live Scribe - Event One

4.2.2 Research Event 2 – Open Discussion – Shakespeare's Globe

Figure 12. Research Event Two Poster

Research event two was attended by twenty-three collaborators, nine of which self-identified as d/Deaf or disabled (figure 13).

DEAF OR DISABLED

NON-DISABLED

09 **14**

Figure 13. Research Collaborators - Event Two

The discussion was arranged around a large rectangular table and recorded using a mixed microphone approach (figure 14). To increase the accessibility of the event for people with hearing loss, two BSL interpreters and a palantypist were presented. The palantypist translated speech-to-text in real-time and provided a discussion transcript after the event. These additional accessibility considerations are an example of the ways in which the data collection methods evolved as the research developed.

OMNIDIRECTIONAL
CARDIOID
COLLABORATORS
PRIMARY RESEARCHER
BSL INTERPRETERS
PALANTYPIST
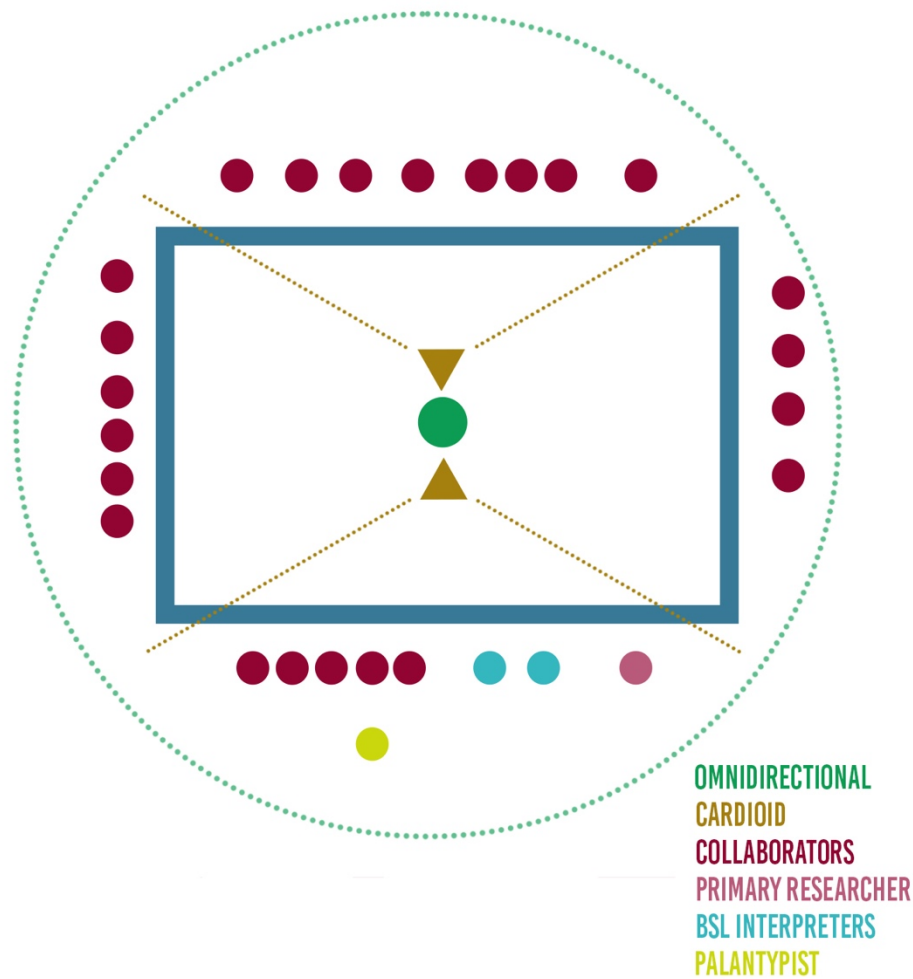
Figure 14. Microphone and Group Placement – Event Two

The discussion was separated into two, one hour and fifteen-minute sessions. The first started with introductions from the group and provocations from the primary researcher relating to sound and social in/exclusion in public spaces followed by questions, comments and discussion. As with event one, the researcher introduced the 'relaxed inclusion' model of the workshop and collaborators were given post-it notes and encouraged to write words, questions or statements to create the agenda for session two. A live illustrator visualised key quotes and topics from the discussion (figure 15).

Figure 15. Live Scribe – Event Two

Research Event 2 – Data collected:

- Audio recordings (omnidirectional, cardioid) – duration: two hours and forty-five minutes
- Discussion Transcript (provided by palantypist)
- Live visualisation of key quotes and topics

4.2.3 Research Event 3 – Binaural Soundwalking – BAC

Figure 16. Research Event Three Poster

Three collaborators took part in the binaural soundwalking workshop, all of which identified as d/Deaf or disabled.

DEAF OR DISABLED

NON-DISABLED

03 00

Figure 17. Research Collaborators - Event Three

Each collaborator was shown a map of the BAC building (figure 18) to guide their navigation of the space and was encouraged to move freely between any of the public and private rooms in the building.
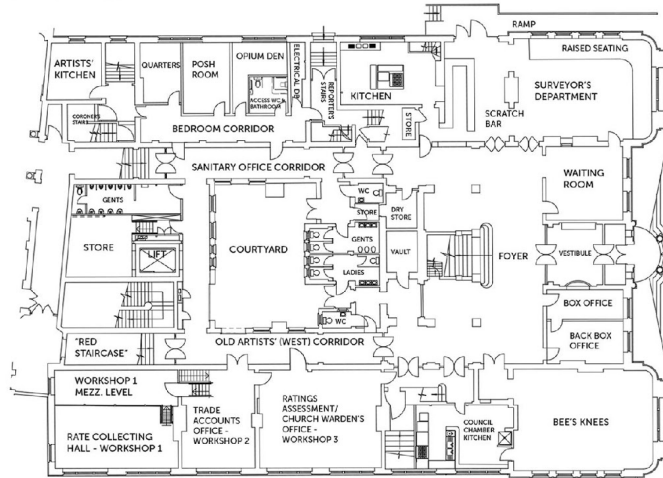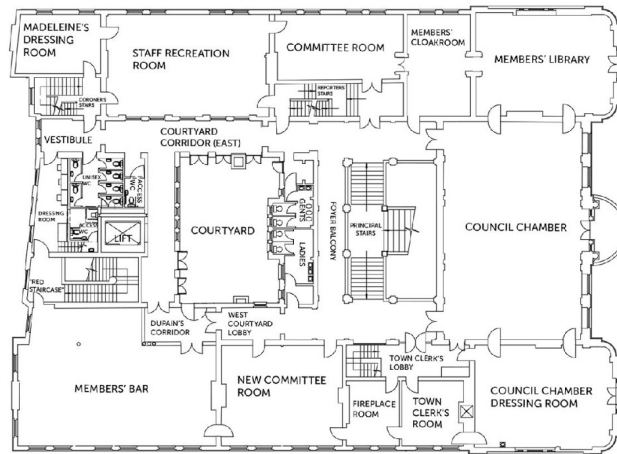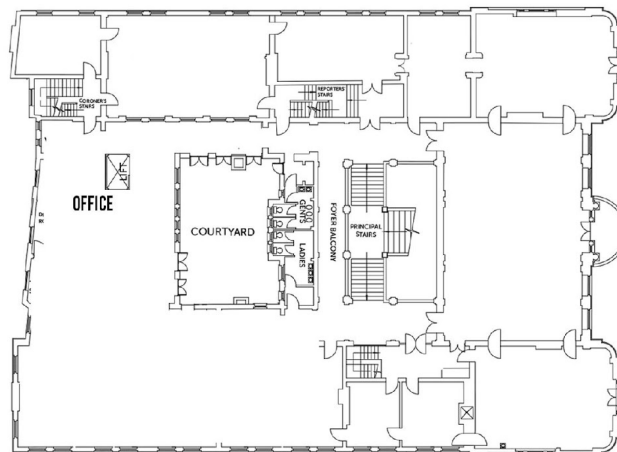
Figure 18. Map of BAC

An hour-long, one to one, conversation with each collaborator was recorded, capturing their lived experiences of sound and social inclusion in socially public spaces as well as soundscapes from across the building. Each workshop concluded with the collaborator feeding back what they felt were the most pertinent moments of the conversation to a live illustrator who visualised these in real-time (figure 19).
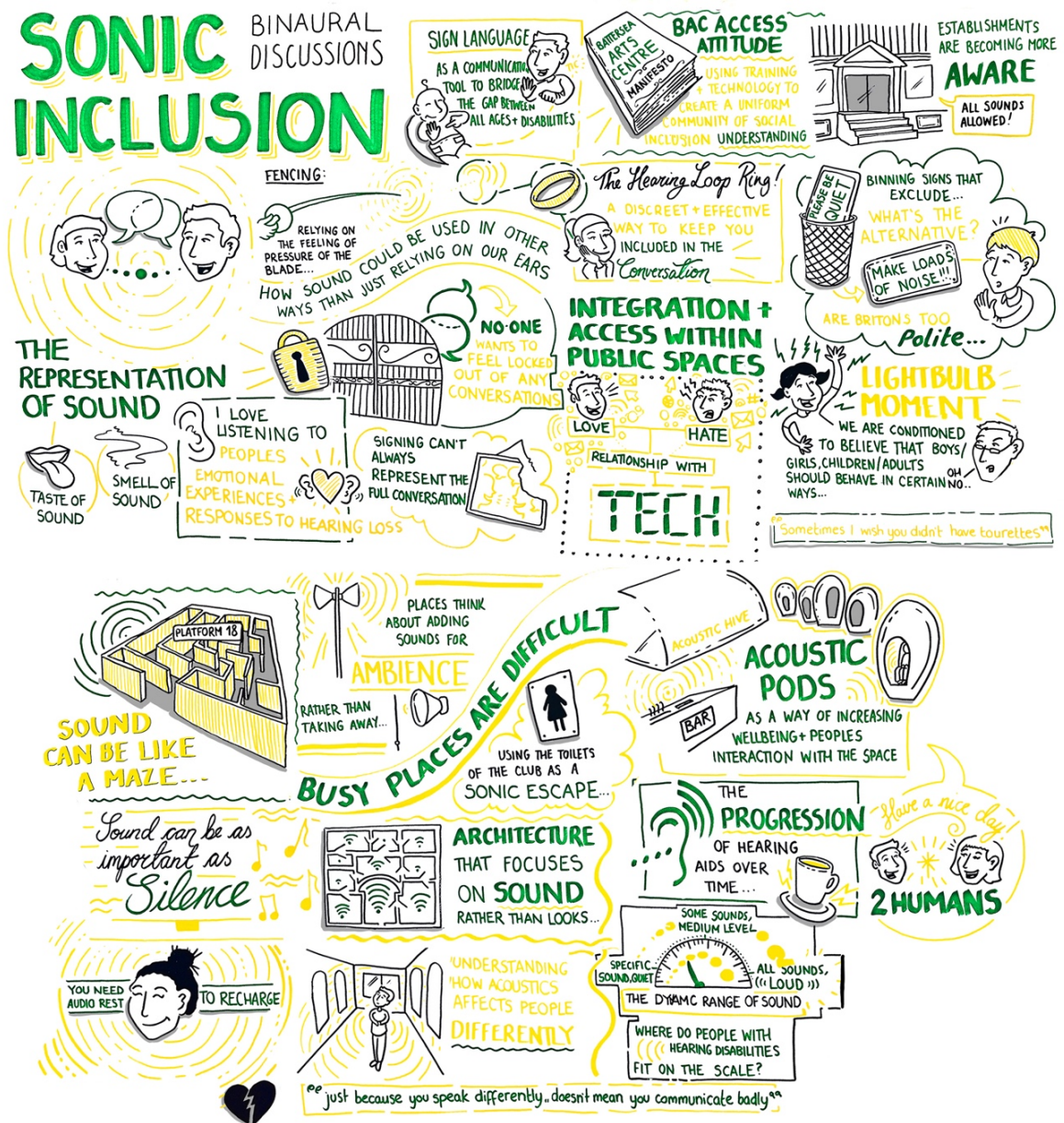
Figure 19. Live Scribe of Collaborator Feedback – Event Three

Research Event 3 – Data collected:

- Audio recordings (binaural) – duration: three hours and forty-five minutes
- Discussion transcript
- Live visualisation of collaborator feedback

4.2.4 Research Event 4 – Co-creation Workshop – BAC

This workshop was co-designed and delivered by Touretteshero. It took place at BAC across two days and was attended by seven disabled adults with Tourettes aged between 16-25 (figure 20).

Figure 20. Research Collaborators - Event Four

The aim of the workshop was to engage a small group of disabled people, with self-identified lived experiences of sonic exclusion, in a co-creation workshop to better understand the ways that sound might impact on the experiences of people with Tourettes in socially public spaces. The event was structured around five phases, detailed below.

Collaboration Agreement

The weekend opened with the primary researcher providing an overview of the relaxed inclusion model and introductions from the group. The collaborators worked together to co-author a series of agreements to define how they wished to work together throughout the event (figure 21). This phase was informed by approaches to co-creation within Inclusive Design that foreground the creation of working environments where participant agency is prioritized, towards equity as a catalyst for innovation (Marlow and Egan, 2013).

COLLABORATORS AGREEMENT

1. LISTEN TO EACHOTHER
2. IF ANYONE NEEDS A BREAK, THAT'S FINE!
3. RESPOND RESPECTFULLY TO EVERYONE'S TICS!
4. BE OPEN & FEEL FREE TO ASK QUESTIONS
5. SHARE TIME EQUALLY
6. PERMISSION TO MOVE THE SPACE AROUND
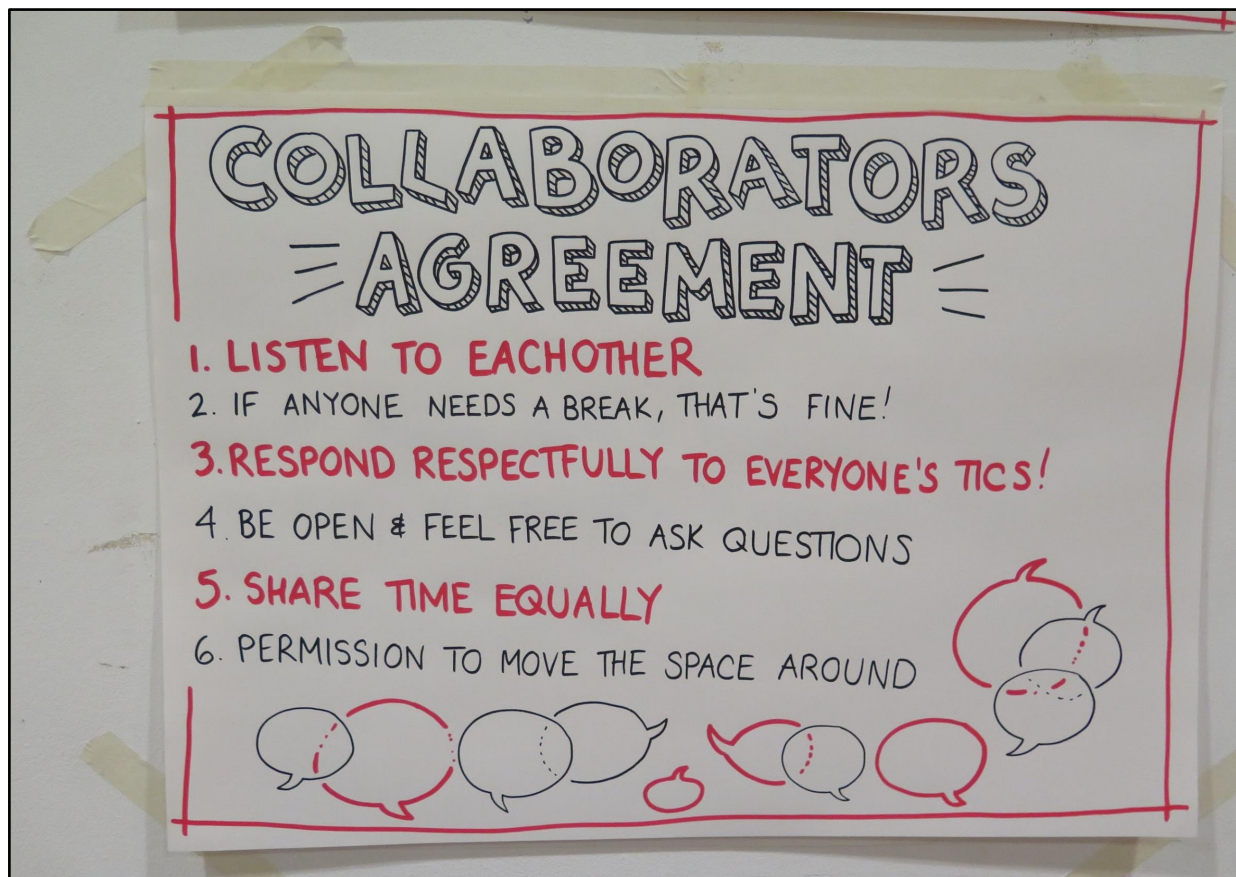
Figure 21. Collaborators Agreement – Event Four

Personal Personas

Personas are a common tool within design research and practice. Advocates of personas within human-centred design suggest that a persona may facilitate empathy between the user and designer, revealing important information that might otherwise be lost within a design cycle (Cooper, 2004; Cooper and Reimann, 2003). Within Inclusive Design 'personas are a common tool that designers and marketers employ when thinking about who will use their product' (Holmes, 2018: 98). However, the use of personas within design research has been critiqued by researchers who suggest that when used inconsistently a persona may exacerbate the political reasons that the tool was employed in the first place (Rönkkö et al, 2004).[61] The creation of personal personas within event four served a different purpose to the market-oriented views outlined above. Each research collaborator was invited to share information about themselves and the group worked together to create a persona in response. The personas were illustrated and placed on the wall

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[61] It has also been observed that personas are often speculative and not grounded in user research or based on real people (Saffer, 2007). This can result in the potential for personas to operate as designer's 'imaginary friends' (Saffer, 2005).

(figure 22). Initially the group discussed the personas as a way for the collaborators to be referenced in the written thesis. However, by the end of the workshop it was agreed that 'collaborator X' would be more appropriate to ensure the representation of collaborators to be consistent across all events.

Figure 22. Research Collaborators Personal Personas – Event Four

Provocation & Discussion

Following the opening phases of the event, the primary researcher presented a video 'mash-up'[62] which functioned as a 'design provocation' in which a designed medium is deployed to 'provoke reflection and debate among users and viewers' (Bannon

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[62] A combination of multiple audiovisual sources that form a new identity in which the meaning and/or semantics may 'deviate from the content of the source videos' (Endres-Niggemeyer, 2013: 18). The mashup at research event four included smartphone footage of Martin Creed's Work No. 409 for choir and elevator, permanently installed at the Royal Festival Hall in London, Dom Jolly's Trigger Happy TV episode in which a giant mobile phone is answered within the silence of the South London Gallery, an edit of Julian Treasure's TED talk Why Architects Need to Use Their Ears, and short clips from Channel 4's Alternative Voices project which saw five people with communication differences, including Tourettes and Cerebral Palsy, join the channel's continuity team.

and Ehn, 2013: 48). The group discussed the mashup and quickly began to share their own stories of sound in public spaces.

Sonic Inclusion Principles

As discussed in chapter three, principles have become a common output of Inclusive Design research and can serve as a concentrated medium for communicating the core elements of a methodology. Coleman *et al* (2016) contend that until a deeper understanding of design exclusion is embedded across the discipline of design, principles will continue to function as central component in the distribution of Inclusive Design knowledge. The group at research event four considered existing principles (Fletcher, 2006; Marlow and Egan, 2013; Norman, 1988; sociallightmovement.com) and discussed the elements of being in a socially public place that they felt were pertinent to the sonic inclusion of d/Deaf and disabled people. The group agreed upon six principles which were illustrated in real-time (figure 23) as a manifesto from the perspective of a speculative sonically inclusive venue:

- We welcome and celebrate sonic diversity

- We offer sonically flexible environments

- The sonic agency is shared by the venue and its visitors

- We take a multi-sensory approach to our visitor experience

- We communicate our policies and profiles in an open and accessible way

- We take a sustainable approach to sonic inclusion through our training policy and procedures

Figure 23. Sonic Inclusion Principles Live Scribe – Event Four

In addition to visualizing the manifesto, and with the permission of everyone in the group, the illustrator created drawings of humorous vocal tics from the workshop, collated in what the collaborators termed 'The Tictastic Board' (figure 24).

Figure 24. 'The Tictastic Board' – Event Four

As vocal tics weren't common for some members of the group, it was agreed that the illustrator would also visualize key motor/movement tics (figure 25). This included chest banging, blinking, arm waving and a 'standing on one leg tic' which the collaborator described as a 'once in a year' event.

Figure 25. The Tictastic Board' (movement tics) – Event Four

These motor tic visualizations highlight the multiple ways that Tourettes can manifest beyond involuntary noises and words and against the oppressive stereotype that characterizes Tourettes as 'the swearing disease' (Thom, 2012), despite the fact that only 10% of people with Tourettes have Coprolalia.[63]

Creative Responses

During the second day of the workshop, the group generated a series of creative responces to the outcomes of day one. These included illustrations (figure 26), photographs (figures 28-30), poetry (appendix 5) and video (figure 27).[64]

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[63] Coprolalia is the 'involuntary outburst of obscene words or socially inappropriate and derogatory remarks' (tourette.org).

[64] This approach was informed by participatory design processes in which the act of making in response to, and in order to inform, research enables participants to creatively examine the (potentially challenging) conversations which occur during co-creation by drawing on their specific skills, grounded in their individual understandings of the everyday (Brandt et al, 2013). The approach was also guided by arts-based research methods within Disability Studies. Particularly those that contend that arts-based research methods gesture towards new categories of knowledge production, enabling new understandings of disability and difference emerge (Currans et al, 2015; Rice et al, 2015).
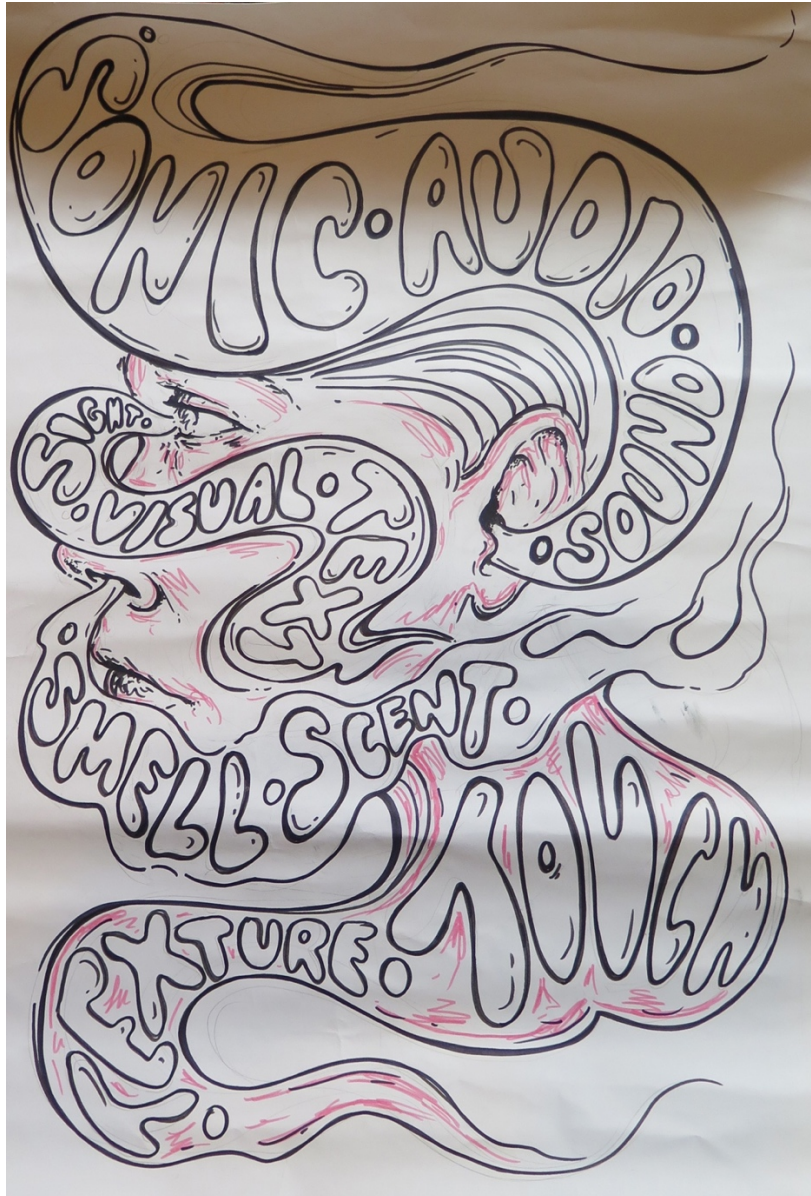
Figure 26. Collaborator Illustration - Event Four

One of the collaborators created a poem titled *I Speak a Language* that was recorded and edited into a short film. The collaborator commented:

> '*The poem is about how Tourette's becomes a force and it, and I, become one but also how I try to distinguish myself from its power. I tried to use as much imagery and description to evoke its ever-changing form in which Tourette's waxes and wanes*'

> (Direct correspondence with primary researcher)

The event was the first time the 18-year-old collaborator had met another person with Tourettes.

I SPEAK A LANGUAGE THAT NO-ONE UNDERSTANDS. I DO A DANCE THAT NO-ONE SEES THE BEAUTY IN. I AM LOSING CONTROL. NO-ONE EVER TELLS YOU THAT YOUR BRAIN CAN BREAK YOUR HEART, BOIL DOWN YOUR BODY INTO SOUP, STEAL YOUR VOICE, SKIN THE SMILE FROM YOUR FACE. I SHAKE TO THE BEAT OF A BROKEN DRUM, I ROCK TO THE RHYTHM OF MOVING TIDES, I SCREAM SO LOUD THAT I WAKE UP THE ANGELS IN HEAVEN AND MAKE GOD COVER HIS EARS. I SWEAR SO MUCH THAT IT STINGS MY LIPS. MY BARK IS BIGGER THAN MY BITE. I'M KEPT ON A LEASH BY POPPING PILLS EVERY DAY, BUT EVERY SO OFTEN I BREAK FREE AND HOWL TO THE MOON. WHAT TIME IS IT MR. WOLF? TIME FOR A TIC MY DEAR. EVERYDAY MY LUNGS BLOOM, BUT SOMETIMES OUT OF MY MOUTH COMES FLOWERS, BUT MOST OF THE TIME WEEDS. MY LEGS BECOME TREE TRUNKS, AND MY ARMS ARE ROOTS SPRAWLING INTO THE AIR. EVERY TIME I SEE SOMEONE WHO GREW FROM THE SAME SEED AS ME, I WANT TO REASSURE THEM THAT THE CONDITION ISN'T ALWAYS EVERGREEN. I WILL GROW AND MAYBE GROW OUT OF IT. FOR ALL THE DARK DAYS WHERE THE SUN SLIPS FROM THE SKY, THERE ARE BRIGHTER DAYS WHERE THE SUN SAYS HELLO. SOMETIMES SHE COMES TOO CLOSE AND BURNS ME BUT I AM LEARNING HOW TO EXTINGUISH THE FLAMES. SHE HAS NO LONGER THE POWER TO SCAR ME, THE ONLY MARKS I HAVE ARE THE ONES I MADE MYSELF. NOW WHEN I HOWL, MY PACK HOWLS WITH ME. PEOPLE ARE STARTING TO LEARN THE LANGUAGE AND DANCE OF DIVERSITY.

I AM GAINING CONTROL.

Figure 27. Still Image Taken from Collaborator Film – Event Four

Inspired by Picasso's *Light Drawings,* one of the collaborators made a series of photographic responses to the personas from day one of the workshop. Each member of the group drew their persona in the air using the light on a smart-phone. The collaborator captured each persona using a camera with a long exposure time.
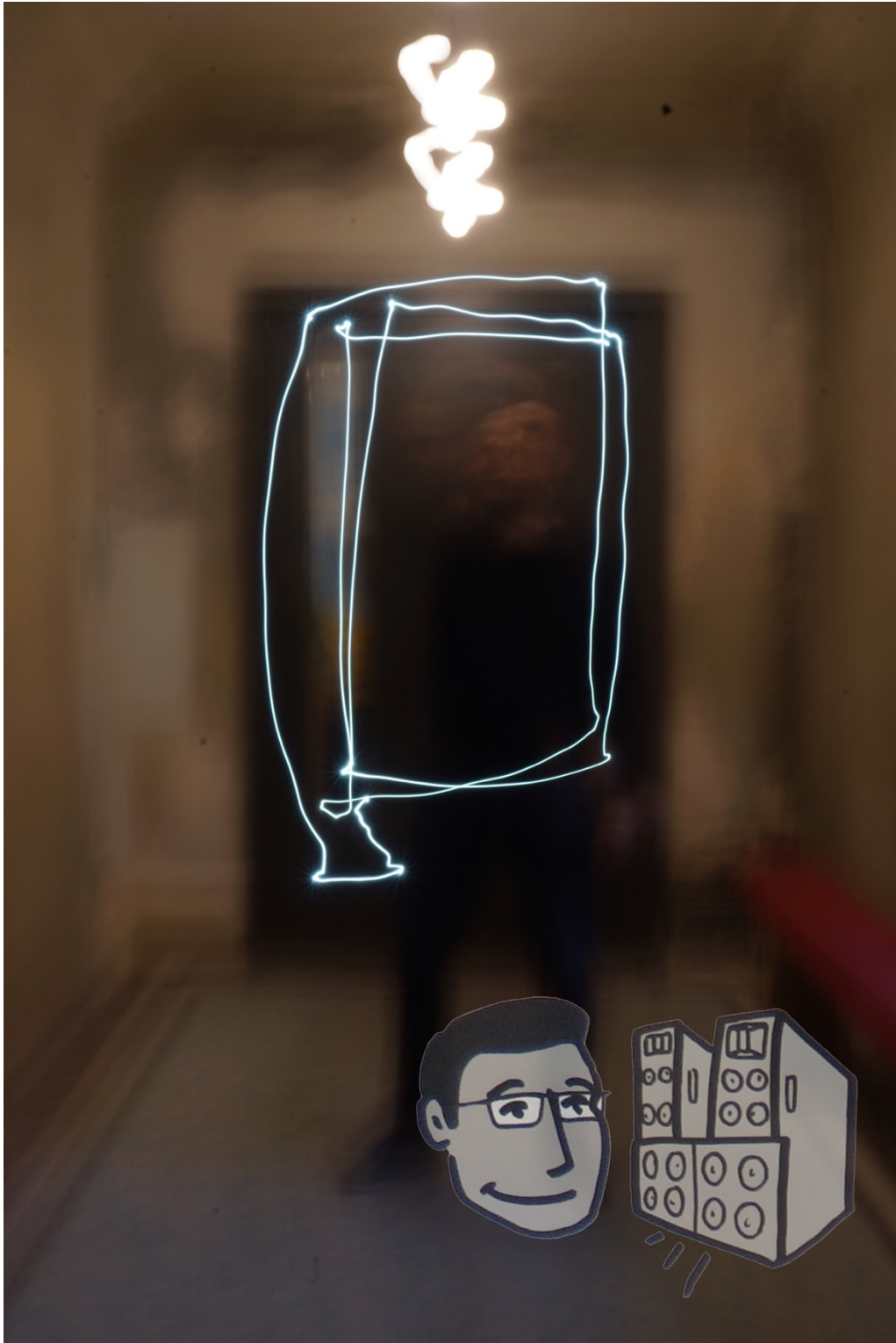
Figure 28. Persona Light Drawing 1 – Event Four

Figures 29 & 30. Persona Light Drawings 2 and 3 – Event Four

Following the workshop, a collaborator commented:

'*The workshop reminded me that it is not always a misfortune to live with a condition. It was the first time I had ever been in a room with more than one*

other person with Tourettes and there was such a liberation of being able to express our tics freely and speak, often with humour, about our experiences'

(Direct correspondence with primary researcher)

Research Event 4 – Data collected:

- Audio recordings (omnidirectional) – duration: two hours and thirty minutes
- Co-authored sonic inclusion principles
- Live visualisation of principles and tics
- Creative responses: illustration, photographs, poetry and video

4.2.5 Research Event 5 – Co-creation Workshop – Shakespeare's Globe
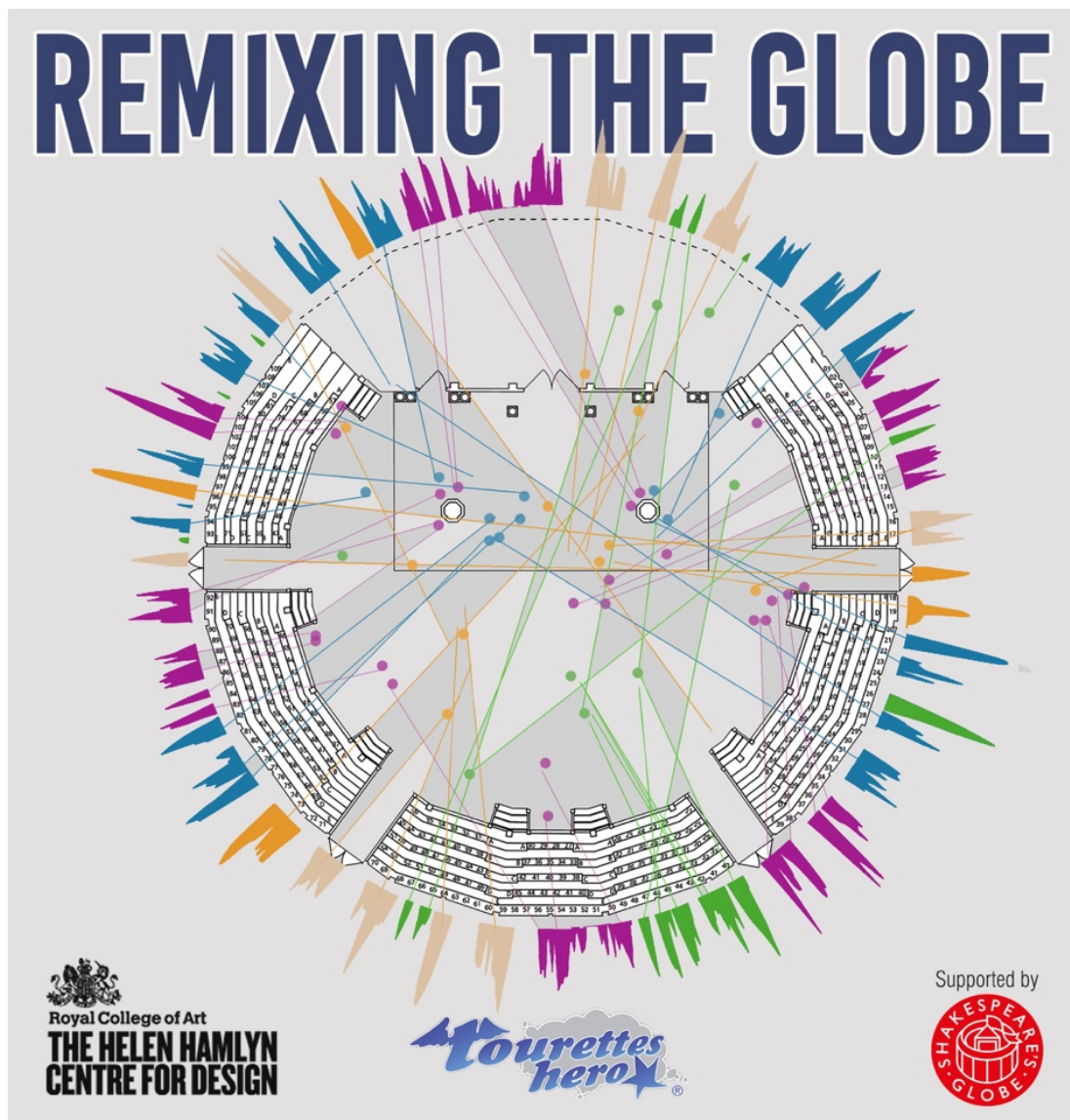
Figure 31. Research Event Five Poster

This workshop, *Remixing the Globe*, was co-designed and delivered by Touretteshero. It took place across two days and was attended by seven disabled adults with Tourettes aged between 16-25.

DEAF OR DISABLED

NON-DISABLED

07 00

Figure 32. Research Collaborators - Event Five

The aim of the workshop was to engage d/Deaf and disabled people, with self-identified lived experience of sonic exclusion, in a participatory soundmapping workshop to better understand the multiplicity of ways that sound might include or exclude people from socially public spaces. The group worked together to co-create a series of interactive sound maps which highlighted elements of Shakespeare's Globe that the group felt were pertinent to the inclusion or exclusion of d/Deaf and disabled people. The workshop culminated in an exhibition in which the soundmaps were presented to the public and staff from Shakespeare's Globe. The event was structured around five main phases, detailed below.

Collaboration Agreement

The weekend opened with the group working together to co-author a series of agreements to define how they wished to collaborate throughout the event (figure 33).

Figure 33. Collaborators Agreement – Event Five

Soundmapping and Data Collection

The group were given a tour of Shakespeare's Globe. During this secondary phase of the workshop collaborators collected data to populate the sound maps using a range of equipment.[65]

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[65] Including: Binaural microphones (Roland CS 10EM, Sennheiser Ambeo Smart Headset), handheld digital audio recorders (Zoom H5 and H6), handheld data-logging sound level meters (Faber Acoustical SoundMeter Pro App), smart-phone activated sound stickers (Mayfly Stickers and related App - mayflysound.com) and cameras (Canon PowerShot G1).

The goal of the soundmapping phase was to chart the elements of Shakespeare's Globe that the collaborators felt were pertinent to the inclusion or exclusion of d/Deaf and disabled people. The group discussed the different types of sonic elements that might cause exclusion and subsequently focus was given to charting:

- **Sonic objects** (items, objects and things that produce sound e.g the loud bell in the foyer during the interval)

- **Sonic environments** (spaces filled by sound[s], noise and/or silence e.g toilets and the café)

- **Sonic experiences** (lived experiences of sound in public spaces)

The group also catalogued sounds that were experienced as particularly loud, quiet, provocative or calming as well as environments in which the sound of the space changed suddenly or unpredictably.[66]

Discussion

Collaborators were invited to share their recordings and photographs with the group and discus their experiences of the data collection process. A live illustrator visualised the discussion (figures 34-35).

Figure 34. Visualising Discussion in Real-Time – Event Five

[66] This data collection phase was informed by approaches to Sound Studies that utilize sonic cartography as a tool to better understand the intersections of sound, space and identity (Gershon, 2013), as well as wider auditory epistemology concerned with technology, sound and space (Blesser and Salter, 2009; Bull, 2000; Eisenberg, 2015).

Figure 35. Live Scribe of Discussion – Event Five

In addition to capturing key topics and quotes, and with the permission of everyone in the group, the illustrator created drawings of humorous vocal tics from the workshop (figure 36). These included:

'Brian Blessed works in the stage crew'

'Hitler stole my chunky tomato soup'

'Cous cous creams'

The creation of humorous graphics alongside the potentially challenging discussion of social exclusion being undertaken helped the workshop stay light hearted. It also enabled the group to celebrate the humour and innate creativity that Tourettes can bring.
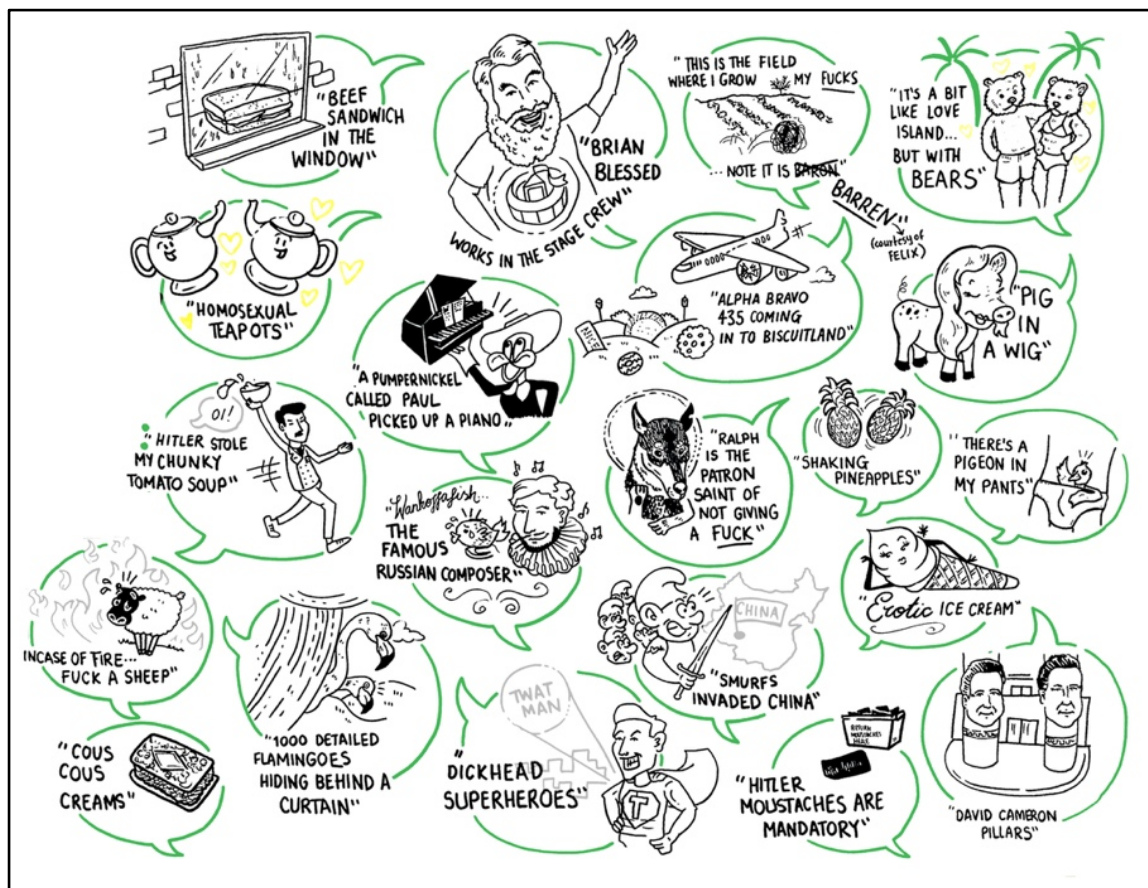
Figure 36. Visualisations of Collaborator's Vocal Tics – Event Five

Performance

During the workshop, the group attended a performance of *Much Ado About Nothing* in the Globe Theatre. A pre-show announcement (appendix 3) was written

by the director Matthew Dunster acknowledging that there were members of the audience with Tourettes and they, as well as the rest of the audience, were welcome to make noise and move freely in the space during the show. This announcement gave everyone permission to be themselves and react naturally in the space. Following the performance, a member of the audience wrote a letter to the director (appendix 4) thanking them for a 'most memorable and entertaining performance'. On the second day of the workshop, the group of research collaborators held a conversation with the cast of *Much Ado* (figure 37) in which the group could share their experiences of the performance from the perspectives of stage and audience.

Figure 37. Research collaborators meet Globe cast – Event Five

Exhibition

Three interactive physical-digital sound maps populated by key sonic objects, environments and experiences concerning social inclusion and relating to different areas of the Globe building were co-created by the group (figures 38–39).

Figures 38 & 39. Collaborators Building an Interactive Sound Map

An exhibition of the maps (figure 40-41) has held in the Sackler Studios at Shakespeare's Globe to 'make public' (Latour and Weibel, 2005) the outputs of the workshop and spark further discussion between the collaborators, members of the public and staff from Shakespeare's Globe.

Figure 40. 'Remixing the Globe' Exhibition, Shakespeare's Globe 2017
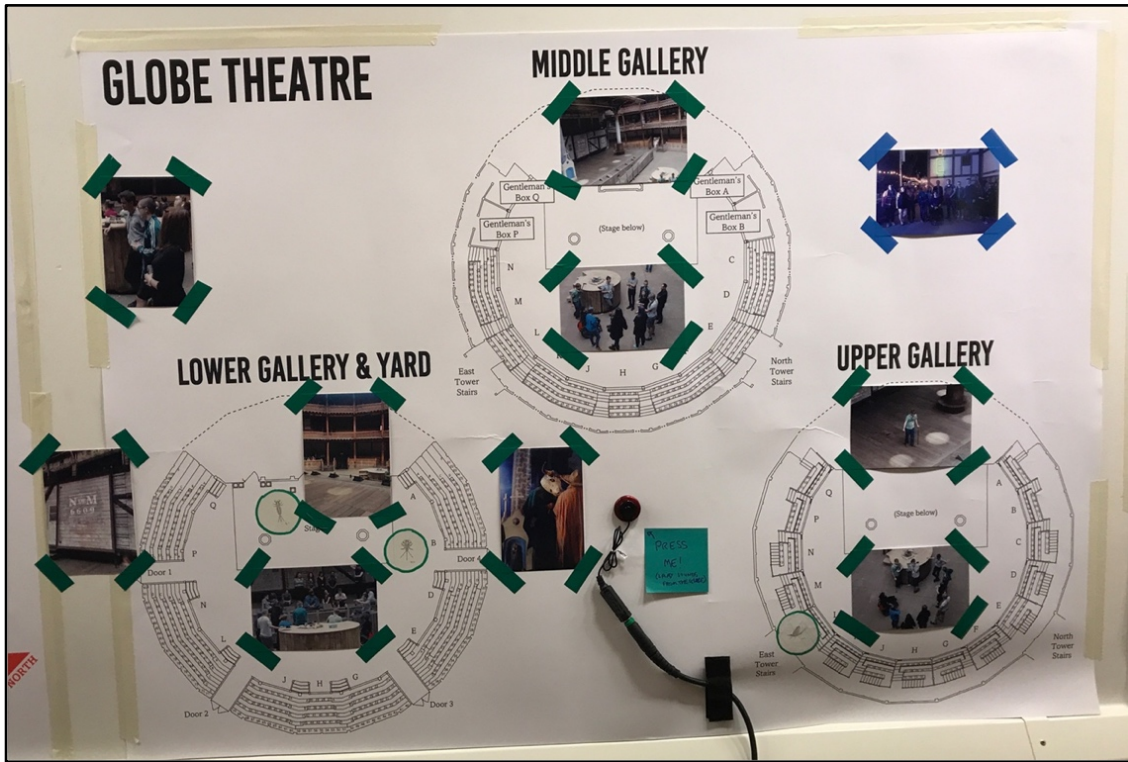
Figure 41. Interactive Sonic Inclusion Sound Maps

Research Event 5 – Data collected:

- Audio recordings (omnidirectional) – duration: three hours and fifteen minutes
- Discussion transcript
- Live visualisation of discussion and tics
- Interactive sound maps
- Exhibition and related materials

4.3 Summary and Conclusions

This chapter has outlined five research events undertaken during two Inclusive Design residencies at BAC and Shakespeare's Globe between October 2016 and September 2017. Building on calls for more critical Inclusive Design (Hamraie 2013; 2016) the chapter considers how the research methods of open discussion, binaural soundwalking and co-creation weekends can be utilised to engage collaborators with a range of lived experiences in the co-production of new knowledge of sonic in/exclusion. The chapter describes the collection of multimodal data (Kress, 2011) that emerges from the events (figure 42).
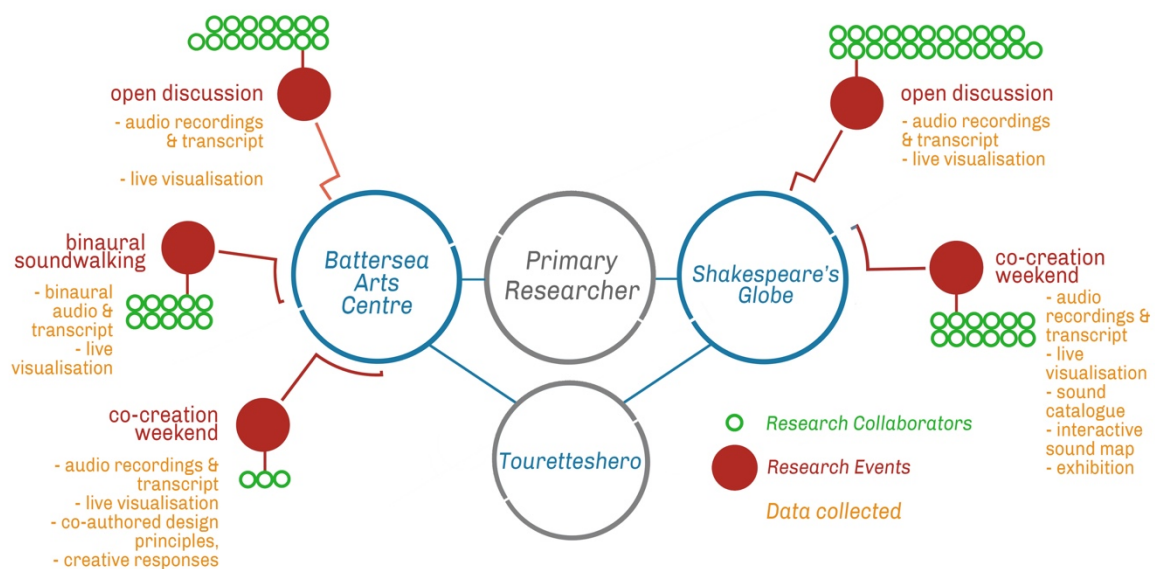
Figure 42. Summary of Research Data

The following chapter details three sonically inclusive design projects that function as core elements of the research practice.

SONICALLY INCLUSIVE DESIGN PROJECTS

5.1 Introduction

Having outlined the research events and data collection process in chapter four, this chapter will detail three sonically inclusive design projects that - alongside the Inclusive Design residencies discussed in the previous chapters – function as the core practical components of this research. The three projects presented develop the practice-led opposition to the conception of the auditory normate discussed in chapter two. The design projects are:

- **Devoted and Disgruntled:** A multimodal intervention designed to 'level the playfield' between visual and non-visual experiences of a large performing arts conference.

- **Audio-Embedded Live Scribing**: A digital tool fusing multimodal data within an interactive online platform.

- **The Sonic Story:** An innovative visualisation technique which distributes key auditory information about a performance, event or building.

5.2 Project One: Devoted and Disgruntled

5.2.1 Context

The prioritisation of visual cues in the design of navigation, orientation and wayfinding in public spaces emerges from the research events and data outlined in the previous chapter as a key area in which socially public spaces become sonically exclusive. During event one, the group discussed non-ocular approaches to wayfinding, considering examples in which sound is harnessed as a navigational tool.[67] Collaborators at event five observed that many navigational cues to aid orientation and wayfinding within Shakespeare's Globe were visual (signs, screens etc). The sonically inclusive manifesto co-authored by collaborators during event three called for a multi-sensory approach to visitor experience; describing multisensory as a 'universal language' (Figure 43).

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[67] A collaborator noted: 'On San Francisco State University Campus there are all these little units that are solar powered, and they make fairly quiet sound . . . you probably don't notice them but if you tune into them, you realize you can. It's very easy to find where you are on the campus by: "Oh the one with the sound of the parrots or the bongo drums and then I take a left"' (event 1 – open discussion).
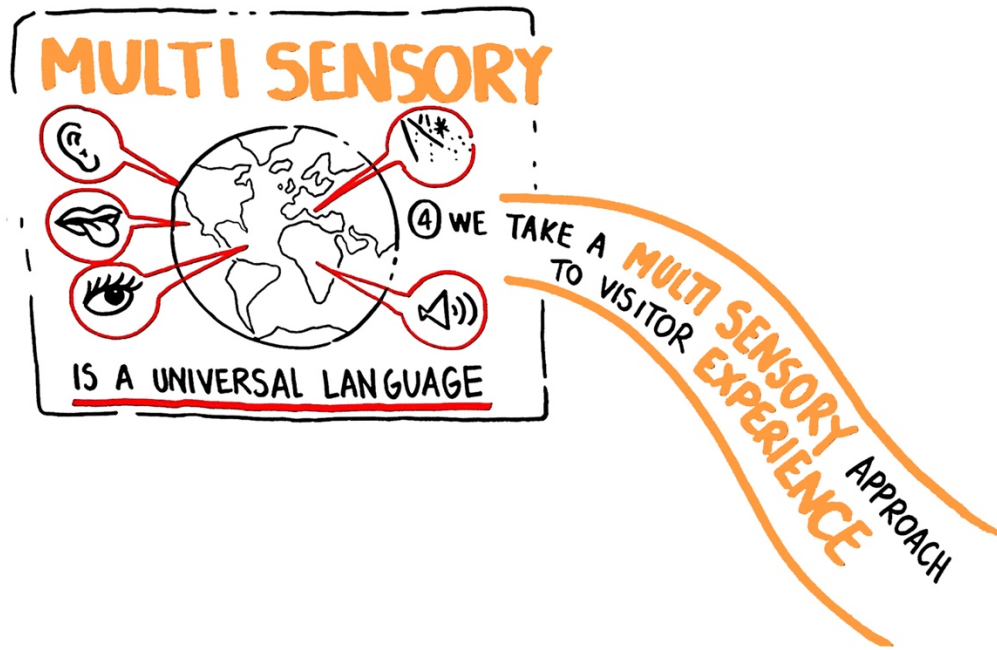
Figure 43. Multisensory Is a Universal Language- Event Four

Many accounts from people with sight loss provide rich descriptions of navigating, orientating and wayfinding in public places using sound and sonic phenomena (Hull 2001; 2017; Sacks 2011). Since the 1970s there has been a wealth of design that considers interfaces and systems that aid non-ocular navigation (Borenstein and Ulrich 1997; Grond and Devos 2016). British accessibility legislation states that public institutions should be designed to facilitate suitable orientation and way-finding for a range of people with different sensory preferences, affording a clear *legibility of space* in which facilities and routes of navigation are identifiable and predictable (BS8300-2, 2018). The design of multimodal cues for navigation can create new opportunities for wayfinding in cultural institutions and other socially public places (Grow, 1999; Brock et al, 2015). A multimodal approach to signage and information more broadly, with specific increases in auditory and tactile elements, can provide a diverse range of visitors with a clear understanding of the purpose and layout of a building leading to increased opportunities for independent use of a public space (BS8300, 2018; Gaunet and Briffault, 2005; Ross and Blasch, 2000). Monomodal approaches to navigation, orientation and wayfinding within an environment will inevitably lead to design exclusion (Clarkson et al, 2003) experienced by specific visitors.[68] The sensory formats through which information is

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[68] Adopting solely visual cues for navigation, particularly those without a high contrast between graphic and textual elements, may lead to the exclusion of people with sight loss. Auditory-only cues may lead to the exclusion of people with hearing loss. People with learning disabilities or autism may experience design exclusion when wayfinding cues are complicated to follow, such as cues with inconsistent 'visual grammar' (Kress and Van Leeuwen, 2006) in relation to elements such as colour

available within an institution clearly communicate which visitors have been considered and prioritised in the design and management of the space. If a socially public space aims to be inclusive of a diverse group of visitors then the design of navigation, orientation and wayfinding information must consistently attend to the multiplicity of sonic and multimodal structural barriers that the environment might create.

In response to the context above, the primary researcher worked with a research collaborator with sight loss to design a non-visual orientation and navigational system installed at the 13th annual Devoted and Disgruntled conference in Warren Street.

5.2.1.1 Devoted and Disgruntled

Devoted and Disgruntled (D&D) is an annual performing arts conference coordinated by *Improbable*.[69] D&D brings together approximately 500 attendees annually and is a key moment for professionals from across the performing arts sector to convene and debate the latest discourses arising within the UK theatre scene. Improbable adopts a process called Open Space (Owen, 2006) to facilitate D&D to encourage all attendee's voices to be heard equitably, removing potentially hierarchical features of traditional conference formats such as key-note speakers and fixed agendas. In addition to the annual event, Improbable run monthly 'satellite' events in which 30 - 100 attendees conduct a shorter discussion using the Open Space format. There were two key pieces of feedback from previous D&D events that the sonically inclusive design project aimed to respond to:

1. A lack of accessibility provision for blind and partially sighted people, leading to low attendance numbers for people within this group.

2. An overtly visual experience of the conference environment - with elements such as the agenda for each day provided solely as written text on a large wall, and the title of each of the individual discussions spaces highlighted using solely visual cues combining text and image (often animal names).

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or font, or cues that foreground textual information without easy-read or picture-supported communication embedded (Charlop-Christy et al, 2002; Chinn 2017; Siegel 2000).

[69] Improbable describe D&D as 'an opportunity for arts people at every point in their careers, from audiences to artists, CEOs to FOH staff, grassroots groups to seasoned professionals, to come together and focus on a central question. This three-day event uses an Open Space format, meaning that attendees set the agenda themselves - anyone can call a session, bringing the issues and topics they want to discuss to the floor' (devotedanddisgruntled.com).

The primary researcher conducted phone interviews with members of the Improbable core team to better understand the Open Space process and to discuss in detail the feedback above. A collaborator with sight loss - Chiduike Miracle Maduforo (Miracle) - was recruited through the existing networks of the primary researcher.[70] Miracle worked closely with the primary researcher throughout the project.[71] The primary researcher, Miracle and the Improbable team worked collaboratively to develop a brief (figure 44) that would guide the design process and create key points of reference against which the success of the design could be evaluated.

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[70] Miracle has Congenital Nystagmus (a condition of uncontrolled eye movement) which means their vision varies from day to day and is severely reduced in particularly low or bright lighting conditions. Miracle can identify colours but can find it difficult to identify an object if they haven't seen it before. They note: 'My sight and hearing work well together, I need both to localise and navigate. In extremely bright conditions (like a really sunny day) I find it hard to distinguish visual things like colours. In these conditions I rely on sound and hearing to give me the sensory information I need to understand the space though my vision is constantly looking for information, even when it can't find any' (direct correspondence with the primary researcher).

[71] Building on a central tenet of Inclusive Design practice by ensuring that people with lived experience in the area under investigation are positioned at the heart of the design process (Coleman et al, 2016).

Devoted & Disgruntled Sonically Inclusive Design Brief

The overall intention of the design is to level the playfield between visual and non-visual experiences of the 13th annual D&D conference. The design will:

- **create** increased opportunities for blind and partially sighted patrons to navigate the conference confidently and independently

- **respond** directly to feedback provided about previous D&D events

- **prioritise** the lived experiences of people who identify as blind or partially sighted

- **adopt** non-visal techniques and materials where possible

Prototypes of the design may be installed and tested at D&D satellite events. The final design will be installed at the 13th annual D&D conference in January 2018.

Figure 44. Devoted & Disgruntled Design Brief

5.2.2 Prototype – D&D Satellite

In response to the brief, a series of prototypes were designed and tested at a satellite event in November 2017. The event was attended by approximately thirty-five people and took place at Theatre Deli in London. The prototypes focused on design in two key areas: 'earcons' and a high contrast floor map.

5.2.2.1 Earcons (prototype)

An earcon is a non-visual feedback technique developed within the field of human-computer interaction (Dix et al, 2004) which utilises designed tones in structured combinations to generate auditory messages; providing information relating to an object, interaction or operation. Jacko (2012) contends that earcons function differently from auditory icons (Gaver, 1989) as 'there is no intuitive link between the earcon and what it represents; the link must be learned' (Jacko, 2012: 222). Subsequently, earcons tend to adopt more traditional musical approaches than auditory icons which focus on everyday sounds mapped to computer events (Gaver, 1997; Gaver et al, 1991). Drawing on design guidelines for earcons (Blattner et al,

1989; Brewster et al, 1994), five prototypes were developed.[72] Each of the prototypes (figure 45) was designed to deliver a distinctive set of sonic characteristics, drawing on design guidelines that suggest timbre, pitch, rhythm, duration, tempo, intensity and Major/Minor Mode are the key components of a successfully designed earcon (Jacko, 2012).

Figure 45. Earcon Speaker Prototype

[72] The prototypes were: harp, rain, Kora, hang drum and flute, created using VST instruments within Native Instruments' Komplete 12 (native-instruments.com), recorded and mastered in digital audio workstation Logic Pro X.

5.2.2.2 High Contrast Floor Map (prototype)

A high contract floor map was prototyped, aiming to aid navigation, orientation and wayfinding for people with sight loss by highlighting clear routes of navigation and points of interest using high contrast materials. This prototype drew on contrast sensitivity research undertaken by the EDC.[73] The primary researcher and Miracle tested the legibility of the different high contrast colour combinations to generate a speculative colour scheme (figure 46) - tested through installation at the satellite event.
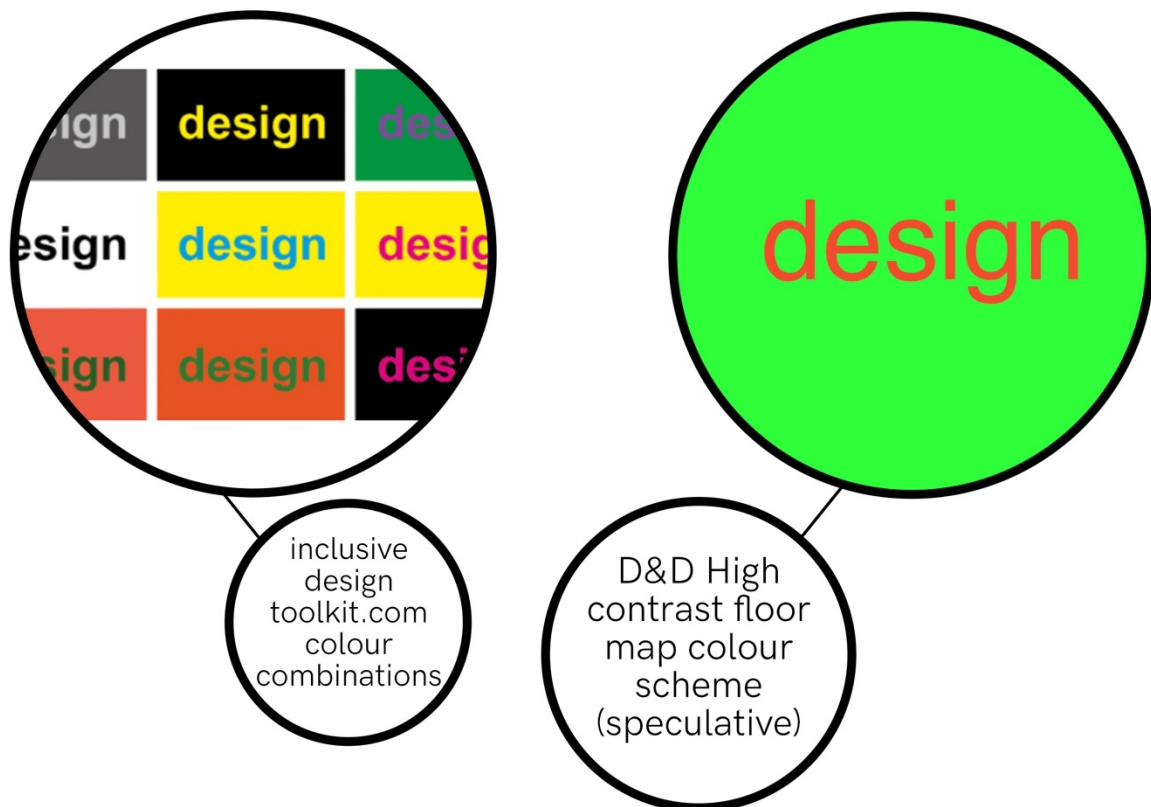
Figure 46. Speculative High Contrast Colour Scheme

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[73] The EDC defines contrast sensitivity as 'the ability to perceive the difference in brightness between a foreground and background colour. It is related to the size, distance and illumination of the object to be detected . . . Contrast sensitivity is important for activities such as detecting and reading text, moving around in the environment, and detecting the outlines of buildings, roads and pavements' (inclusivedesigntoolkit.com).

A twenty-metre high contrast floor map (figure 47) was installed at the satellite event in November 2017 using the colour scheme outlined above. The earcons were installed in five locations within the floor map, highlighting specific discussions.

Figure 47. High Contrast Floor Map Prototype

5.2.2.3 Prototype Results & Evaluation

The primary researcher and Miracle attended the event to test the effectiveness of the prototype against the themes detailed in the brief. Below is a summary of the results and a list of areas to be developed in the final design.

Create: the prototype created increased opportunities for people with sight loss to navigate confidently by imbedding auditory and high contract cues within the event.

Respond: the prototype responded to previous feedback by increasing non-visual experiences and interactions with event.

Prioritise: the prototype prioritised the lived experiences of people with sight loss, additional tactile information could be added to the design to better meet the needs of people with no vision.

Adopt: non-visual materials where used in the delivery of the earcons. Further non-visual techniques (such as tactile feedback) could be introduced to extend the accessibility of the design.

Key areas identified for future development:

- Create additional colour and tactility for the floor map
- Increase the variety of earcon sounds, including more recognisable instruments
- Synchronise the earcons with the visual cues for the breakout groups[74]
- Design auditory cues to highlight logistical points of interest (such as toilets, entrance and exit)
- Use better sound quality speakers using 4mm speaker cones or larger to increase the frequency response of the earcons
- Add non-visual communication to the agenda wall which is currently just written text on pieces of paper

5.2.3 Final Installation – 13th Annual D&D Conference

The prototypes outlined above were iterated and expanded by the primary researcher and co-designer Miracle during December 2017 and January 2018. The final designs were installed at the 13th annual D&D conference (D&D13) that took

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[74] The difference between the earcons and the visual cues was confusing at the event (for example the earcon rain was playing from the cat breakout group).

place at ND2 (figure 28) in London - attended by approximately 400 people across three days.

Figure 48. ND2, Warren Street

5.2.3.1 Earcons (Final Design)

For the final design, twenty-five earcons[75] were installed, each foregrounding a recognisable instrument or sound in response to the feedback above. The visual signs for each of the discussion spaces was redesigned to correspond to the earcons. Each earcon was allied to a small battery powered loud speaker (figure 49).

Figure 49. Earcon Loud Speaker, D&D Final Installation

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[75] The final earcon set included: piano, bass guitar, double bass, rain, harp, acoustic guitar, electric guitar, drum kit, hand drum, cello, trumpet, organ, clarinet, flute, wind chimes, gongs, orchestra, banjo, harmonica, choir, birdsong, synthesiser, accordion, sitar, marimba.

In addition to the discussion spaces, logistical points of interest were highlighted with four spoken audio beacons,[76] connected by the high contrast map.

5.2.3.1 High Contract Floor Map (Final Design)

The speculative colour scheme developed during the prototyping stage was developed to create a higher contrast with the black conference floor (figure 50).

Figure 50. Final High Contrast Colour Scheme

Tactile interaction was embedded in the high contrast map by enclosing rope within the tape (figure 51). This rope was small enough to be rolled over by a wheelchair user but large enough to provide sufficient tactile feedback for a person with a cane.

[76]Highlighting toilets, children's playroom, café/lounge and the exit.
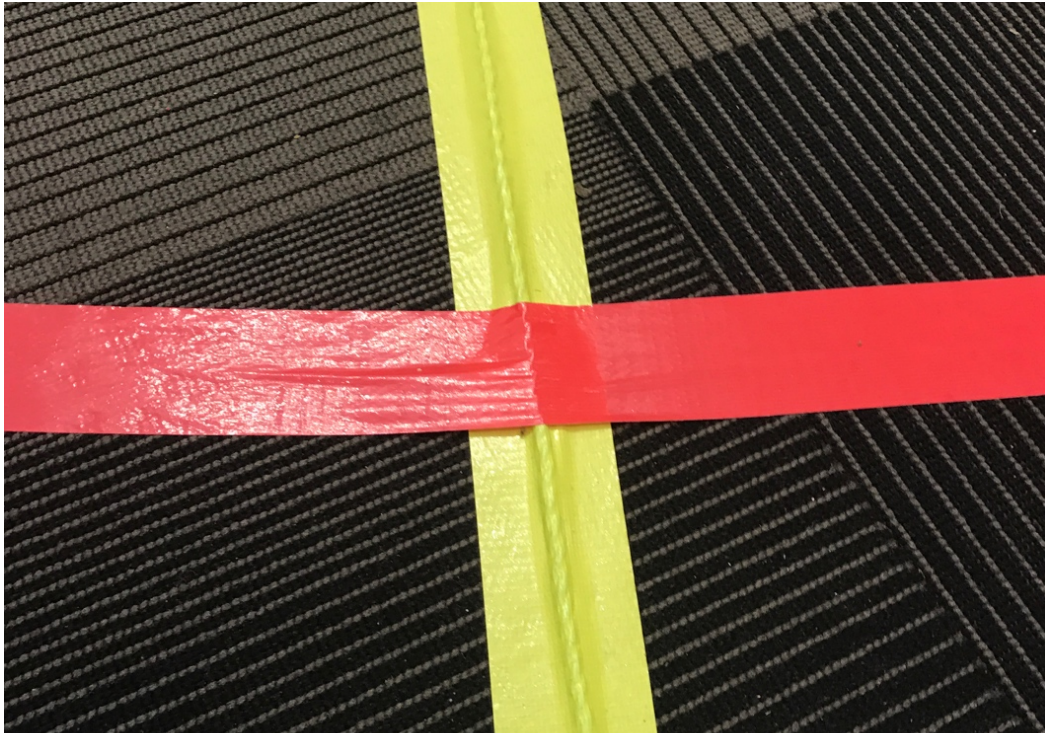
Figure 51. High Contrast Tactile Floor Map, 13th Annual D&D Conference 2018

Braille and large format maps and well as a text to speech computer for the agenda wall were added to increase the accessibility of the design. Figure 52 summarises the development of the D&D sonically inclusive design project from prototype to final installation.

D&D Prototype

Two-colour high contrast floor map

Five earcons highlighting breakout spaces

D&D Final

Three-colour high contrast floor map with tactile feedback

Twenty-five earcons highlighting breakout spaces

Four spoken audio beacons marking logistical points of interest

Braille & large format maps of the conference space

Text to speech agenda wall
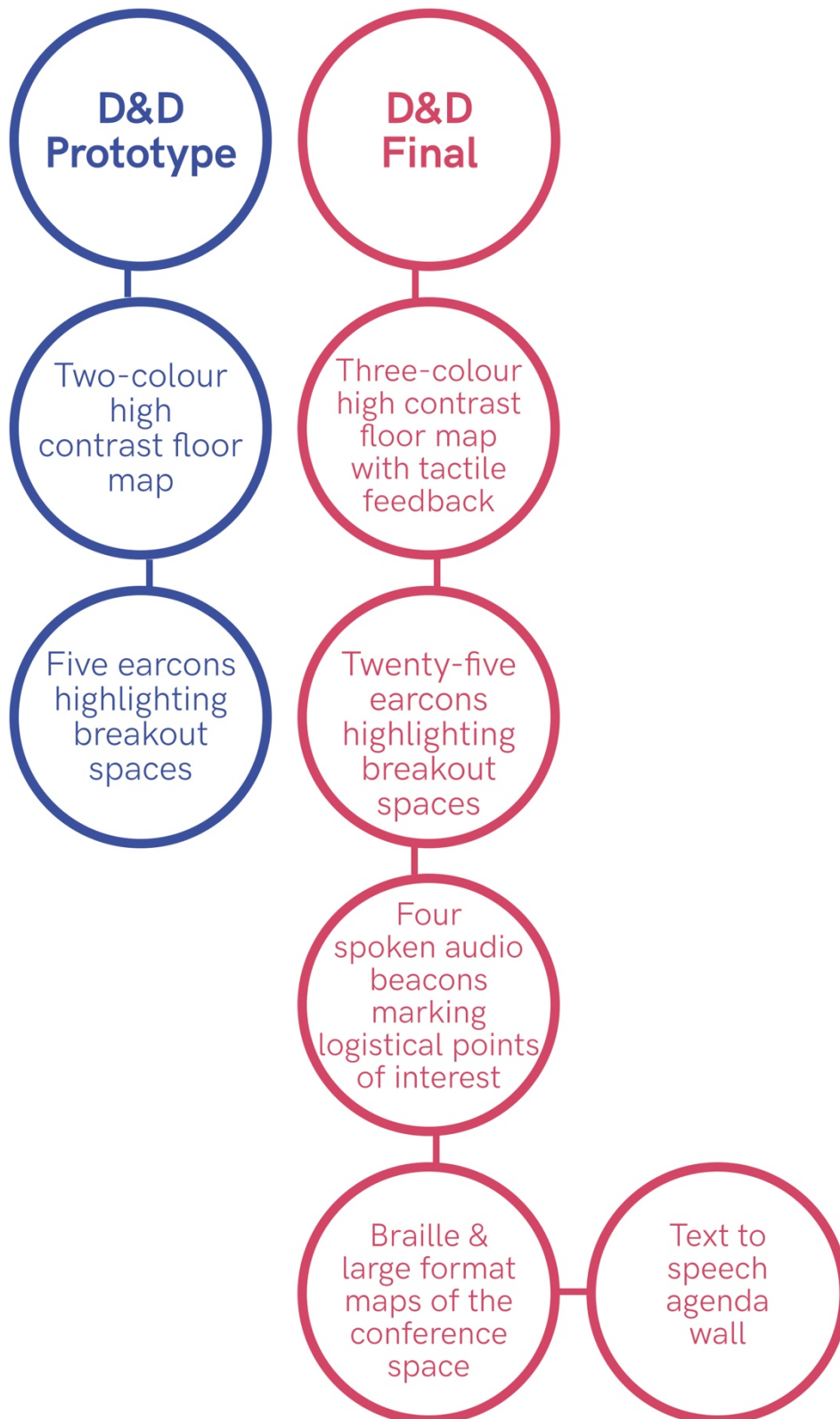
Figure 52. Summary of D&D Design Project Development

5.2.3.3 Results

The primary researcher and Miracle attended the event to test the effectiveness of the final design against the themes detailed in the brief. Below is a summary of the results.

Create: the design created increased opportunities for people with sight loss to navigate confidently and independently. There were three blind or partially sighted patrons at D&D13 who were made aware of the access provisions when booking their tickets. By installing auditory, tactile and high contract cues across navigational information within the conference, the design adhered to recent British accessibility legislation (BS8300-2, 2018). Additional *easy-read* or *picture-supported communication* (Charlop-Christy et al, 2002; Chinn 2017) could be incorporated in future designs to increase the accessibility for people with learning disabilities.

Respond: the final design responded to previous feedback by increasing non-visual experiences and interactions with the event. *Improbable* reported that D&D13 had the highest level of accessibility provision designed with blind and partially sighted people in mind and, subsequently, the highest attendance by people who self-identified as having sight loss.[77]

Prioritise: the final installation prioritised the lived experiences of people with sight loss by working with a co-designer with lived experience to develop provisions for the event. The multimodal information provided gave equitable opportunities to navigate the event through different sensory channels. An attendee with sight loss commented:

> *'I have never been somewhere with so much rich sensory information designed with visually impaired people in mind. Please can you come and install this setup in my office at work!'*

<div align="right">(Direct correspondence with primary researcher, D&D13)</div>

Adopt: tactile and audible materials were used in compliment with visual resources throughout the design.

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[77] The Open Space producer from Improbable commented: 'D&D13 was attended by a significantly more diverse range of artists and practitioners that ever before, and possibly one of the most diverse theatre gatherings the UK has ever seen – of around 400 attendees, around 20% identified as disabled' (Direct correspondence with primary researcher, email 14.08.18).

5.3 Project Two: Audio-Embedded Live Scribing

5.3.1 Context

The adoption of digital technologies has reshaped the ways in which communities are able to organise themselves, communicate, and act creatively. The rapidly evolving relationships between technology and society gives rise to ethical questions with regards to digital in/exclusion. Tanaka et al (2010: 171) propose that 'digital technologies represent, at once a possible solution to social exclusion, and a feature of mainstream society that makes inclusion all the more difficult to attain'. The 'digital divide' has been defined as a societal separation on a global scale between those with and those without access to information technologies (Compaine, 2001; Warschauer, 2004). Addressing digital in/exclusion is an arena that falls in and out of focus within the UK government (Mayer-Schonberger and Lazer, 2007; DCMS, 2009; GOS, 2017; DCLG, 2008) but remains a priority across several academic disciplines.[78]

5.3.1.1 Technology and Disability

Mills (2015: 176) notes that 'until recently, technology has been the subject of forceful critique . . . in the field of disability studies'. The history of technology and disability is entangled in the political arenas of medical and assistive systems and legislation.[79] The medical dominance within existing discourses surrounding disabled people and technology has been critiqued for reproducing the ableist tropes of disability as a problem to be solved or removed (Ott et al, 2002; Ladner, 2011). The social model positions the lack of access to, or unequitable experience of, technology as a primary disabling barrier in contemporary society (Bigonnesse et al, 2018; Harris, 2010). Roulstone *et al* (2016) contend that the increasing adoption and affordability of technology creates new opportunities for designers to transcend the outdated conceptions of medical and assistive systems. In relation to socially public spaces, technology design holds the potential to create new disability/technology relationships that foreground the 'cultural dynamics through which the symbolic significance of a technological device evolves' (Blume, 2012: 359).

Within the context above, the Audio-Embedded Live Scribe design project was initiated, primarily to utilise digital tools to 'make sense' (Coffey and Atkinson, 1996) of the large amount of multimodal research data collected during the research

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[78] Including Communication Studies, Interaction Design, Computer Science and Inclusive Design (Katz and Rice, 2002; Bobrowicz et al, 2010; Warschauer, 2004; Holmes, 2018).

[79] Such as the Technology-Related Assistance Act for Individuals with Disabilities (1988) and Assistive Technology Act (1998) in the US and reports from the Work and Pensions Committee (WPC, 2018) in the UK.

events and to generate accessible avenues through which research collaborators could engage with the findings of the study beyond the written thesis. The primary researcher developed a brief (figure 53) that would guide the design process and create key points of reference against which the success of the design could be evaluated.

Audio-Embedded Live Scribe Sonically Inclusive Design Brief

The primary focus of the design is to combine the multiple data (images, audio and transcription) collected during the research events within an interactive and accessible interface. The design will:

- **Utilise** digital technologies to offer a multimodal engagement with research data

- **Generate** multiple sensory points of interaction, taking into account different cognitive preferences and communication needs and enabling d/Deaf and disabled people to navigate the interface confidently and independently.

- **Accommodate** different accessibility considerations including audio description and captioning, adhering to web accessibility standard (e.g. BS 8878, 2010)

Permission to use the audio and transcription of all research collaborators will be obtained prior to the inclusion of such data within the design. The final design will be shared with all research collaborators who contributed to the study and will be submitted alongside the written thesis.

Figure 53. Audio-Embedded Live Scribe Design Brief

5.3.2 Prototype

A prototype interface (figure 54) was generated using *Max MSP* (cycling74.com) and data captured at research event one.[80] The interface utilises transparent buttons layered onto the image to activate audio files recorded at different moments of the discussion. This layering enables the user to click on different areas of the image and hear/read what was said at that moment. With the audio description box enabled, the user can click and receive a description of each element of the image. The interface highlights the name of the person speaking, serving as a real-time referencing system for the data set.

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[80] The data set included a large illustration generated in real-time at the event, two hours and fifteen minutes of audio recordings and a transcript of the entire discussion.
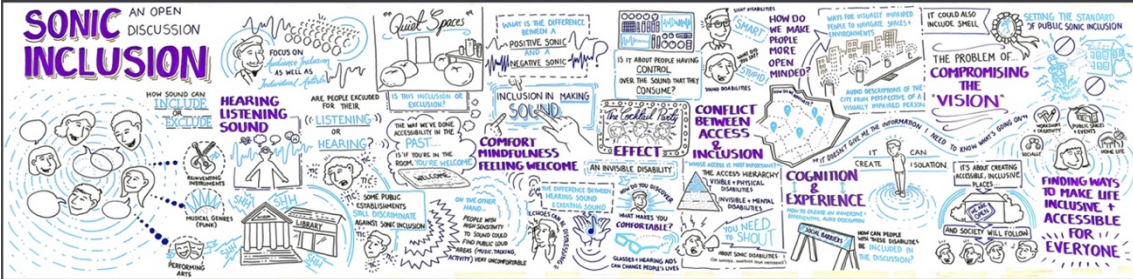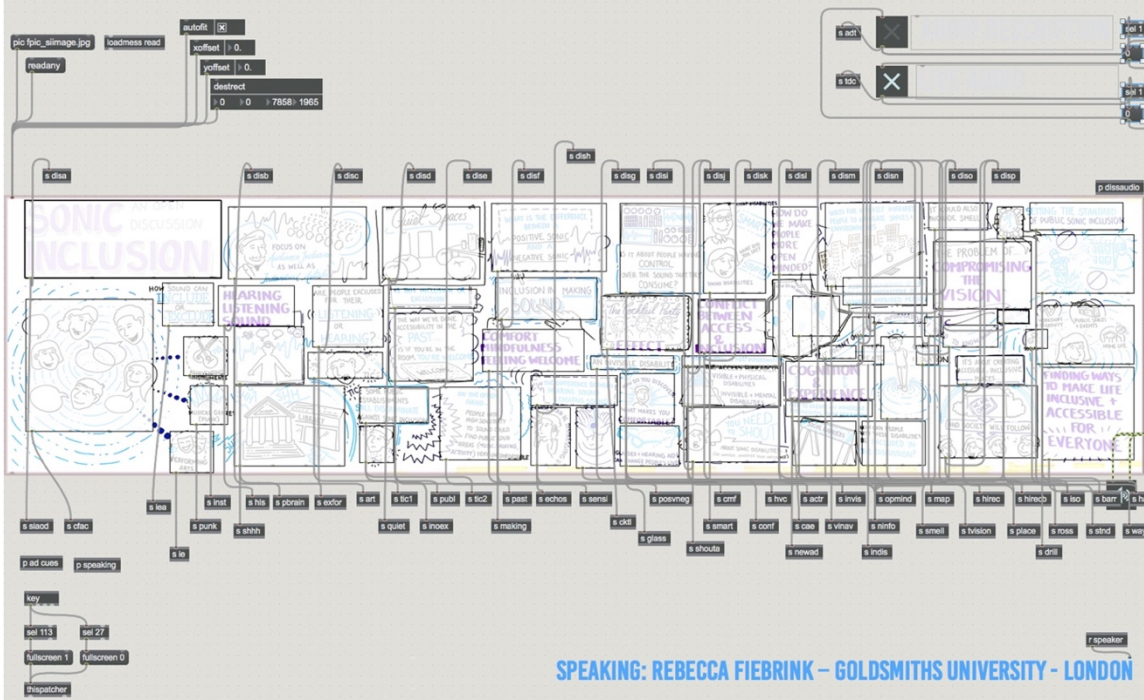
Figure 54. Audio-Embedded Live Scribe Prototype

5.3.2.1 Prototype Results and Evaluation

The AELS prototype was tested via a small advisory group of four d/Deaf and disabled people, recruited through the existing networks of the primary researcher. The group included people with sight loss and hearing loss, who each spent approximately one hour experimenting with the interface before providing verbal feedback. Informal observations (Kemp, 2001; Orlowska, 1991) were made by the

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primary researcher during each of the testing phases to inform areas for future development. The following section evaluates the positives of the prototype against the themes established in the brief and outlines key limitations drawing on the advisory groups feedback.

Positives

Utilise: the prototype utilises digital technologies and offers a multimodal engagement with research data that works well on both desktop and tablet devices. Two of the advisors commented on the temporal dimension added to the visual image in the ability to click and hear the live audio from specific parts of the discussion.

Generate: the interface generated multiple sensory points of interaction, considering different cognitive preferences and communication needs. All four members of the advisory group commented on the integration of different sensory modes within the interface. An advisor with hearing loss commented:

> 'So often I have limited access to digital content because of a lack of captioning or I see disabled people being Othered by specialist provision that meets their needs but through equipment that is just for them. What's great about this is that it has everything that I need and we are all using the same thing'

> (Direct correspondence with primary researcher during testing, 01.11.16)

Accommodate: the interface included audio description which one advisor with sight loss commented would greatly increase the accessibility of the interface for people with restricted vision.

Limitations

The prototype was built within *Max MSP* and is consequently only available to people with the appropriate software installed on their computers. Subsequently, the primary researcher was unable to circulate the AELS prototype to the attendees of the research discussion as originally planned. Due to time restrictions within the prototype phase the interface failed to include captioning functionality. Through discussions with the supervisory team and colleagues at the Helen Hamlyn Centre, it was decided that hosting the AELS within an online platform would greatly increase the transferability and impact of the design. In addition, a research advisor commented that an 'image enlarge' function would increase the accessibility of the

interface for certain people with sight loss. Figure 55 summarises the positives and limitations of the prototype design.
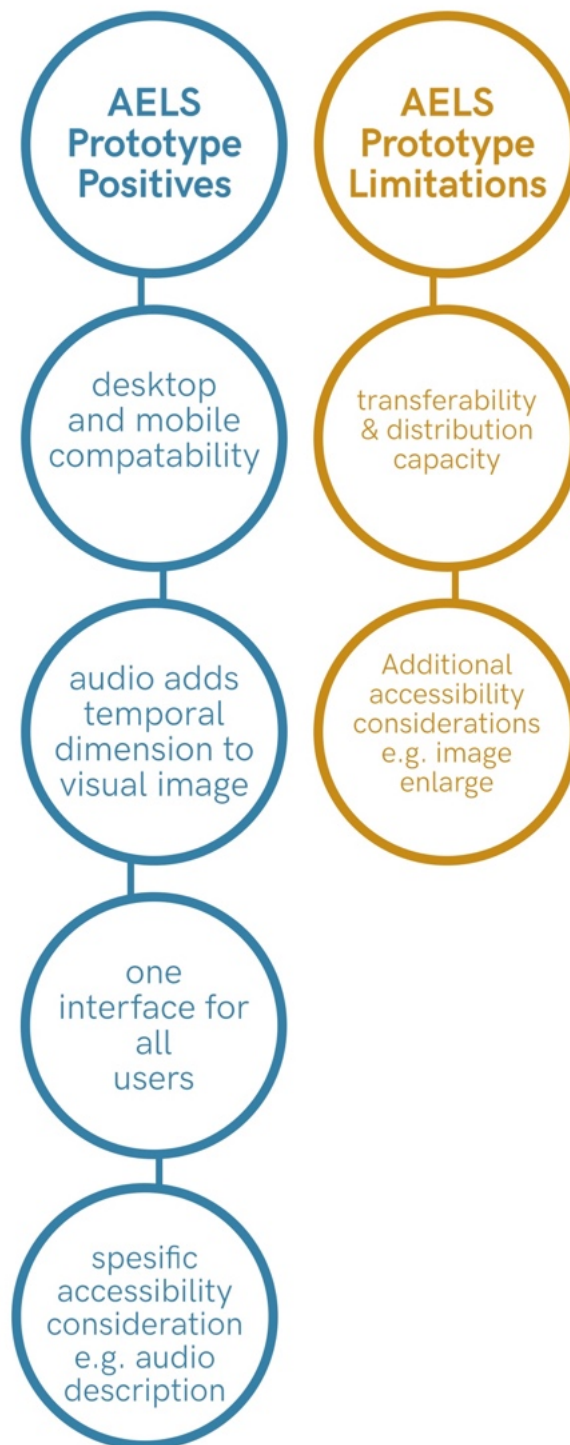
Figure 55. Positives and Limitations of AELS Prototype

5.3.3 Final Design: Interactive Digital Platform

The final AELS design (figures 56 and 57) is a multi-sensory digital tool populated by data from research events one and two,[81] hosted within an online digital platform (willrenel.co.uk). The AELS features integrated audio description and captioning - positioning accessibility at the heart of the interface.

Figure 56. AELS Final Design – Desktop Interface

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[81] The data set includes two live illustrations generated at the events, five hours of audio recordings and two transcripts of the discussions.

Figure 57. AELS Final Design – Tablet Interface

The master images and audio files are deconstructed and assembled as individual frames within a master grid. The grid interface resizes when the user zooms in and out - functioning fluidly on both desktop and tablet devices. The user can click on different images (which automatically enlarge) and receive additional content via audio or captioning. Each frame within the content is tagged and a 'frame search' page within the platform enables users to keyword search and create custom collections of data.

5.3.3.1 Evaluation and Limitations

The platform was distributed to all the collaborators who contributed to the discussions. Feedback was invited via email or phone. As the primary research did not provoke collaborator feedback by asking certain questions, most responses from the collaborators were short, positive statements.[82] As with the prototype, the final digital was tested via a small advisory group of four d/Deaf and disabled people. Each of the group spent approximately one hour experimenting with the

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[82] As the primary research did not provoke collaborator feedback by asking certain questions, the majority of the responses from the collaborators were short, positive statements which included: 'love the website, it's a great way to interact with the discussion we had' and 'the tool is great, can you make one at our next event?'

platform before providing verbal feedback to the primary researcher. Informal observations were made by the primary researcher to inform areas for future development. The following section evaluates the positives of the final design against the categories established in the brief and outlines key limitations drawing on feedback from the advisory group.

Positives

Utilise: the platform utilises digital technologies and offers a multimodal engagement with research data through the modal channels of image, sound and text. The platform resonates with the principals of contemporary data visualization and data driven design (Krum, 2014; McCandless, 2009; Kirk, 2016) by delivering an engaging and easy to understand system that communicates a complex data set through a simple interface.

Generate: the platform generates multiple sensory points of interaction, considering different cognitive preferences and communication needs. One advisor commented:

> '*The platform is intuitive to use and prompts you to engage with the different elements of the site . . . I imagined that I would just click and listen to the audio, but I found myself reading certain bits as well as listening'*

> (Direct correspondence with primary researcher, 29.10.18)

Accommodate: the platform accommodates different accessibility considerations through the integration of audio description and captioning across all content. The interface meets the requirements of both the British Standards *Web Accessibility Code* (BS 8878, 2010) and the W3C standards for *Web Content Accessibility* (W3C, 2018).[83]

5.4 Project Three: The Sonic Story

5.4.1 Context

As discussed in chapter two, sonic exclusion can be theorised as a form of social oppression that creates both structural and psycho-emotional disablism driven by the exclusionary currency of auditory norms. An increased understanding of psycho-emotional disablism in socially public spaces is paramount to the inclusion of people with impairments that may remain invisible, such as those who experience social

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[83] In accordance with W3C an 'accessible mode' button is embedded within the AELS interface in order to quickly simplify the interface, extrapolating textual content and removing additional colour to increase the visual contrast between the text and background layers.

anxiety or are diagnosed with social anxiety disorder. Research shows that invisible impairments such as social anxiety disorder are shrouded in ableist stereotypes, stigma and negative judgement (Fox et al, 2016; Gee et al, 2012) which create barriers between individuals and social situations (Werner et al, 2012). A recent report by AccessAble asked 845 disabled people and carers about their experiences accessing venues and services and found that 99% of respondents check accessibility provisions in advance of visiting a new place. It was also reported that 75% feel nervous or anxious visiting somewhere new (AccessAble, 2018). The report highlights the importance of making accessibility provisions available to visitors prior to their visit. There is also a growing number of accessibility considerations within socially public spaces that are being utilised to familiarise patrons with the nature of public environments. A key example is the Visual Story (Figure 58), a method intended to provide all the information that a visitor might need prior to and during their visit to a building.[84]

Figure 58. Extracts from Hamlet Visual Story, Shakespeare's Globe, Summer 2018

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[84] The Visual Story format was established through the relaxed performance movement in the UK, formalised by the Relaxed Performance Project in 2012 in which eight theatres piloted relaxed performances and a 'relaxed inclusion' methodology across a number of cultural institutions.

5.4.2 The Sonic Story

Through a series of one-to-one meetings with the Access Manager at Shakespeare's Globe, the primary researcher highlighted a lack of auditory information available to patrons of the Globe. In response, the Access Manager and primary researcher developed a 'Sonic Story' brief (figure 59) that would integrate into existing Visual Story provision. It was agreed that a prototype design would be delivered between October and December 2017, evaluated through conversations between the primary researcher and Access Manager and developed into final design in 2018.

Sonic Story
Sonically Inclusive Design Brief

The design will:

- Highlight the different sounds within a performance at Shakespeare's Globe in a clear and accessible way.

- Be included in the existing Visual Story accessibility provision – a PDF document that is available to patrons online prior to a performance and as a physical document collected from the front of house staff.

- Draw a particular focus to loud and quiet moments within the performances and sections in which the sound of a performance changes unexpectedly.

A prototype will be made between October – December 2017 with a view to a final design at some point in 2018.

The Access Manager will provide the primary researcher with access to the performances and performances spaces as necessary.

Figure 59. Sonic Story Design Brief

5.4.2 Prototype: Romantics Anonymous

A Sonic Story prototype was developed as a visual representation of a performance highlighting key elements of auditory significance such as loudest and quietest moments or areas in which the sound changes dramatically. The prototype uses a data-logging sound level meter calibrated to each environment to capture real-time sound level measurements every 0.1 seconds. An early test recorded at a performance (figure 60) highlighted that this calibration produced an overly large set of data; approximately 500,000 values per performance.
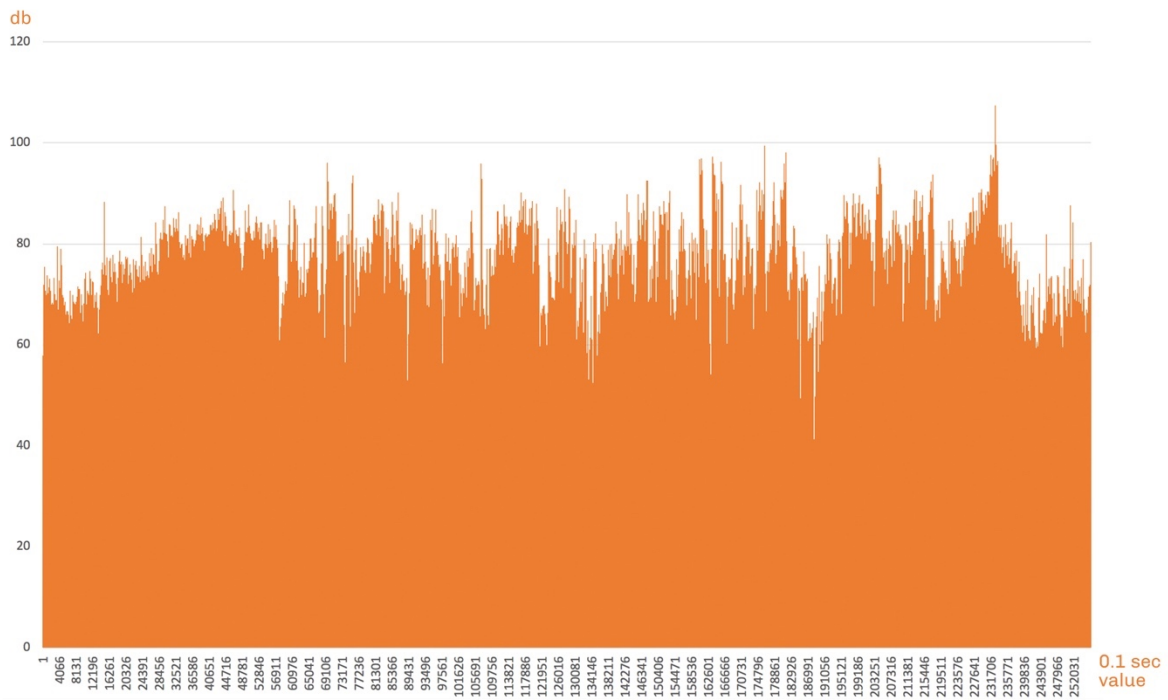
Figure 60. Sonic Story Prototype Data Values

The sound level meter was recalibrated to capture sound level measurements every second. This provided a more manageable and useful data set which was averaged and inputted into a visualisation system developed in *Max MSP*. The resulting graphic (figure 62) was installed within the Visual Story of *Romantics Anonymous* (figure 61) in the Sam Wanamaker playhouse at Shakespeare's Globe.

Figure 61. Visual Story, Romantics Anonymous
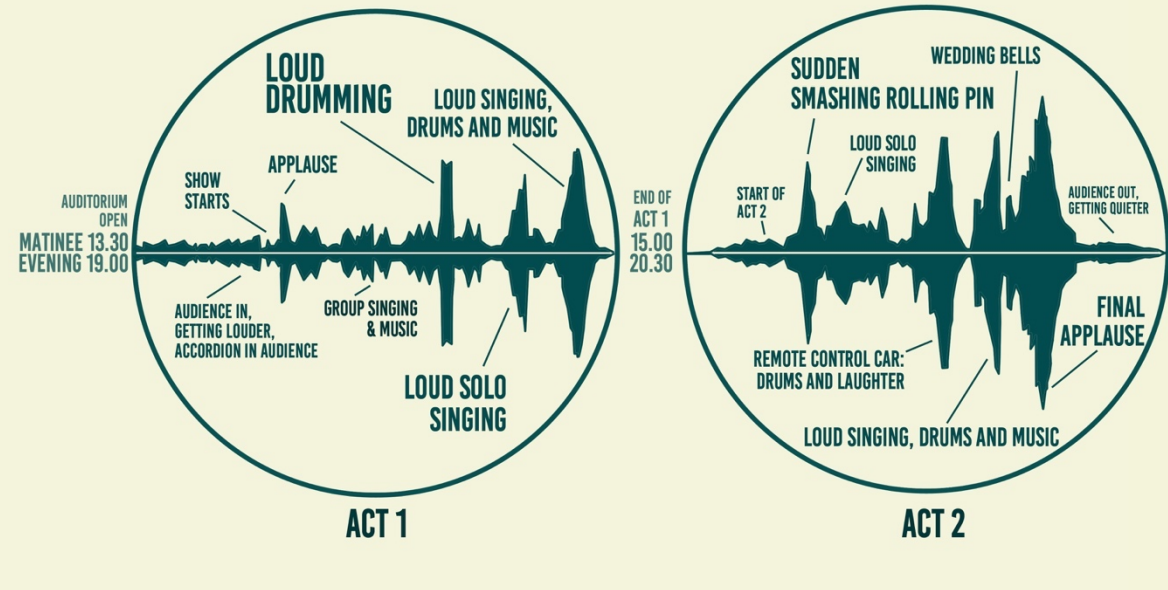
Figure 62. Sonic Story Prototype - Romantics Anonymous, Shakespeare's Globe

5.4.2.1 Evaluation

The overall layout of the graphic was deemed successful – separating the performance into two acts, clearly marked by two large circles. It was observed that the image would integrate better within the existing Visual Story design if it was portrait. It was also observed that the aesthetics of the prototype did not match that of the performance. These considerations were developed in the final design.

5.4.3 Final Installation: Globe Summer Season 2018

It was agreed that Sonic Stories would be created for all relaxed performances in the Globe Theatre during the summer season 2018. A colour scheme was created (figure 63) to ensure that the Sonic Stories were aesthetically matched to each performance.
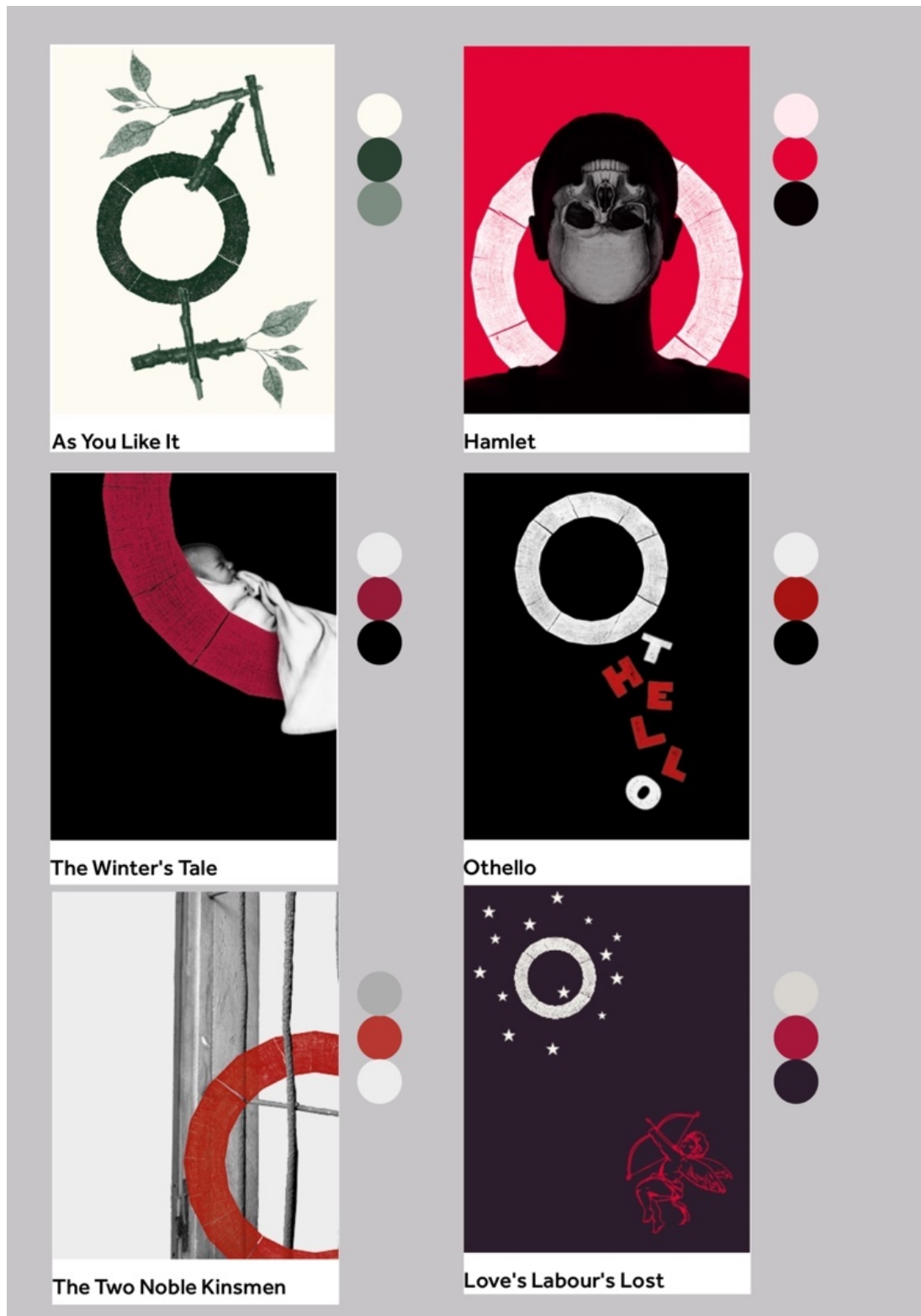
Figure 63. Colour Scheme, Sonic Stories - Globe Summer Season 2018

Six Sonic Stories were generated (figure 64) and installed in the Visual Story documents during the Globe summer season 2018.
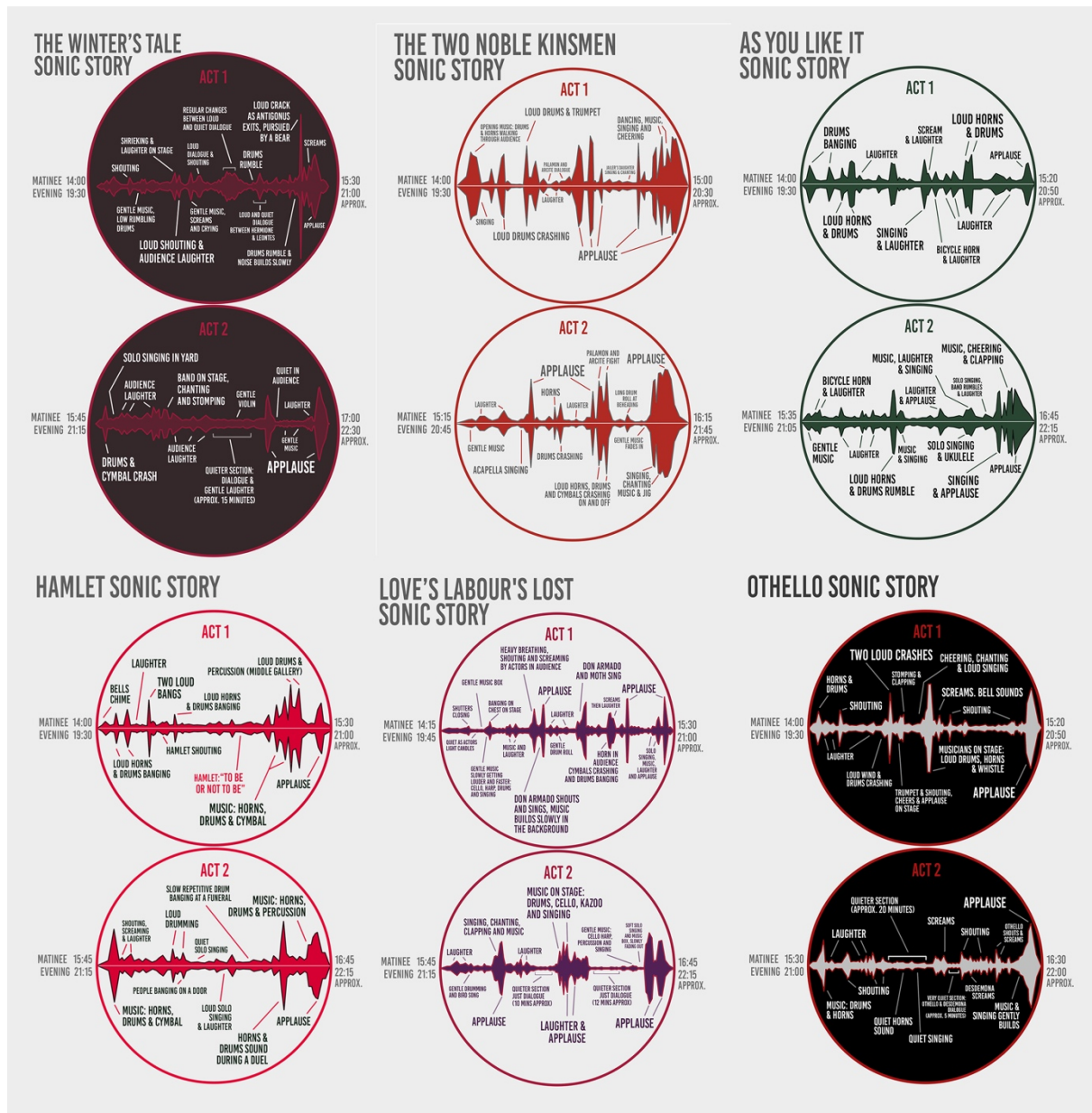
Figure 64. Six Sonic Stories from Shakespeare's Globe Summer Season 2018

When Shakespeare's Globe shared the Sonic Story for *The Two Noble Kinsmen* on twitter, it received twenty-one retweets and forty-five likes (higher than average statistics for the Globe).[85]

Limitations

Several limitations of the final design were identified through discussions between the primary researcher and Access Manager. Firstly, the graphics are solely visual, their impact as accessibility provisions would increase if audio-embedded online versions were generated. Secondly, it is potentially difficult to gauge how loud or quiet different aspects of the graphics are. Although elements such as laughter and applause are included as auditory reference points, this is an area that could be developed in the future. Lastly, the process of capturing and visualising the data is lengthy. This could be streamlined through the development of a Sonic Story app which would automate the data capture and visualisation processes and make the format more easily available to other theatres.

5.5 Summary and Conclusions

This chapter has detailed three sonically inclusive design projects that, alongside the Inclusive Design residencies discussed in the previous chapters, function as the core practical components of this research. The three projects presented develop the practice-led opposition to the conception of the auditory normate. Building on Reeve (2012) we can understand that sonic exclusion is experienced through structural and psycho-emotional disablement. For a building to be accessible to d/Deaf and disabled people structural sonic barriers need to be removed. This might include installing assistive listening systems, audio-description, multimodal way-finding information, attending to acoustics in relation to the intended use of the space and adopting tools such as AELS to capture and share content in an accessible manner. But if the design of a socially public spaces aims to transcend structural considerations and create an environment that is socially inclusive and equitable to a wide a range of people, then the psycho-emotional experiences of the building must be considered. The three sonically inclusive design projects outlined above serve as a starting point in such an endeavour by attending to both structural and psycho-emotional experiences of d/Deaf and disabled people in socially public spaces. The following three chapters (six, seven and eight) continue this sonically inclusive trajectory by analysing the complexity of sonic inclusion in relation to three key areas: agency, affect and audibility. Each of these themes emerges from the

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[85] One respondent commented: 'The work being done by @The_Globe is world leading – I hope all theatres take their lead and bring themselves up to the same excellent standard' (Waring, 2018).

research events and data as a key component in understanding the meaning and embodied experiences of sonic in/exclusion. Specific research data is included within each chapter, selected for its relevance to the theme of analysis through discussion and reflection with research partner Touretteshero.

SONIC AGENCY

6.1 Introduction

Having outlined the research methodology, events and design projects that form the core of this practice-based design research in chapters three to five, the following three chapters will provide further discussion of three key themes: agency, audibility and affect. Each of the themes emerges from the research events and data and collectively they point towards new possibilities for a sonically inclusive approach to design. In exploring the themes as a sonic engagement grounded in the text-based form of the thesis, the intention is to use the following chapters to chart three textual phonographies (Voegelin, 2019) that unpack the intricacies of sonic in/exclusion in relation to d/Deaf and disabled people's experiences in socially public spaces. This chapter considers *sonic agency* as the initial component at the centre of a new understanding of sonic in/exclusion. The impossibility of closing our ears and the physical propagation of sound waves through objects, bodies and space dictates that sound is inherently out of our control. van Leeuwen (1999; 196) notes 'we have no ear-lids. As a result our will is less effectively imposed on hearing . . . We are will-nilly involved in and connected with the world of sounds and resonating with it, rather than remaining observers, detached and in control'. Many of the lived experiences relating to sound and social exclusion that were shared by collaborators during the research events point to a lack of sonic agency, either with regards to the soundscape of a public environment, the sounds an individual creates or the ways in which sounds are perceived. The chapter builds on these areas by exploring existing narratives of (sonic) agency within the fields of Design, Sound Studies and Disability Studies. The chapter adopts a multimodal framework to examine sonic agency within the research process, charting key moments in which sonic agency was present within the research events. The analysis suggests that by considering the different modal channels (spoken language, proximity etc.) through which high-level actions such as sonic agency is communicated within an Inclusive Design process, new forms of accountability can be created. Ultimately, the chapter contends that by situating methods from Sound Studies, within an Inclusive Design process, new perspectives on sonic agency arise in which citizens can utilise sonic agency to challenge oppression and discrimination.

6.2 Agency & Design

Design is inherently tied to issues of agency. Within the arena of Inclusive Design, agency can be understood as a central goal of design that aims to serve as an 'active, purposeful adaption method that people use to adjust their world to their needs' (Steinfeld and Maisel, 2012: 01). Sonic branding is an example of a sonic mechanism designed to control and influence the agency of consumers. Goodman (2010) describes this manipulation of agency through sonic branding as an agenda of

holosonic control that establishes 'a structure of allure for products for which you had no desire' (ibid, 2010: 186). Issues of agency also appear in the arena of devices and audible media, particularly in relation to specific user groups and social identity categories. For example, in discussing the conflict between simplicity and universality in design, Pullin (2009) outlines several instances in which sonic agency is disrupted and removed by design in relation to the use of audible media by people with sight loss. Pullin describes the harmony between the interface and medium of the iPod shuffle, in contrast to the dominance of visual displays in the modern radio. In this context we can understand that sonic agency is offered by designed objects in which the accessibility of the interface and accessibility of the medium are connected or dissolved when they are disconnected.

Other examples of design and sonic agency exist in devices such as the *Mosquito* which emits high frequency sound waves (around 17Khz) predominantly audible only by children and young people under the age of twenty-five. The equipment is marketed as an anti-loitering device to reduce or remove the agency of young people outside shops, near transport hubs or in any public environment in which a person may wish to 'disperse groups of troublesome teenagers' (compoundsecurity.co.uk).[86] More extreme examples of the interplay between sound, agency and design also exist, such as Aversive Audible Acoustic Devices (Volcler, 2013) which have been designed to reduce the agency of targeted individuals and groups since before the Second World War (Wiseman, 2018).

Beyond the scale of individual devices, sonic agency is contested in the design and management of the built environment. Perhaps the most frequently discussed in relation to acoustics in prisons, frequently described as noisy and sonically invasive (Carlton, 2007; Crawley, 2006; Jewkes and Johnston, 2007; Podmore, 2012).[87] Cusick (2013: 288) highlights how sound in prisons disrupts 'acoustical relationality' towards an 'absolute monopoly on acoustical agency'. Fairweather and McConville (2016) consider the relationships between oppressive sonic environments and inmate behaviour. However, not all studies frame sound design and acoustics in prisons as controlled by the prison staff and negative on the part of the inmates. Contrary to

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[86] The release of the Mosquito prompted teenagers around the world to set the auditory alerts on their mobile phones to the same high frequencies emitted by the anti-loitering device, creating the auditory world of teenage-only communication now known as the Mosquito Ringtone. This is a demonstration of how a sonic device designed to reduce the sonic agency of a specific group can be reimagined as a socially inclusive tool.

[87] There are numerous examples of the oppressive use of sound in prisons such as the US military technique of 'musical torture' adopted in Guantánamo Bay and detention centres on the Iraqi-Syrian border in which inmates are exposed to extremely loud music for long periods of time (Stafford-Smith, 2008). As well as the use of psychological sonic torture in Nazi concentration camps where inmates were forced to sing cheerfully as they were tortured and killed (Gilbert, 2015).

the view that sound and silence in prisons is solely associated with interrogation and confinement, Rice (2016) suggests that the acoustical agency of the prison environment is negotiated through a diversity of listening and sound-making practices adopted by staff and inmates. The Dóchas Centre - a medium security prison that opened in Dublin is an example of how auditory design in prisons can positively influence inmate agency. The centre includes design features such as a large water fountain aiming to reduce noise pollution from the nearby road (Cheliotis, 2016).

6.2.1 The Sonic Agency of Things

In addition to the practical examples above, there are several areas in which we encounter a coming together of theories of agency with theories of design. Particularly within Thing Theory and the conception of the 'agency of objects' (Henare et al, 2007; Knappett and Malafouris, 2008; Lamb, 2011; Latour and Weibel, 2005), as well as the 'theory of designed things' (Atzmon and Boradkar, 2017). Such approaches situate agency within cyclical processes in which design shapes the form of objects, subsequently creating or dissolving the agency of an object and consequently influencing the social and political culture within which the design take place (Lindinger, 1991). A notable example of an agentive design cycle (Noessel, 2017) is Chris Gosden's 'agency of objects' (Gosden, 2005) which develops an argument for the agency of objects through an examination of the effects of designed things on people. By situating auditory design within Gosden's cycle (figure 65) we can understand that auditory culture shapes design knowledge and activity, these elements shape the sonic form and affordance of things, this influences the agency of the object that, ultimately, shapes auditory culture.
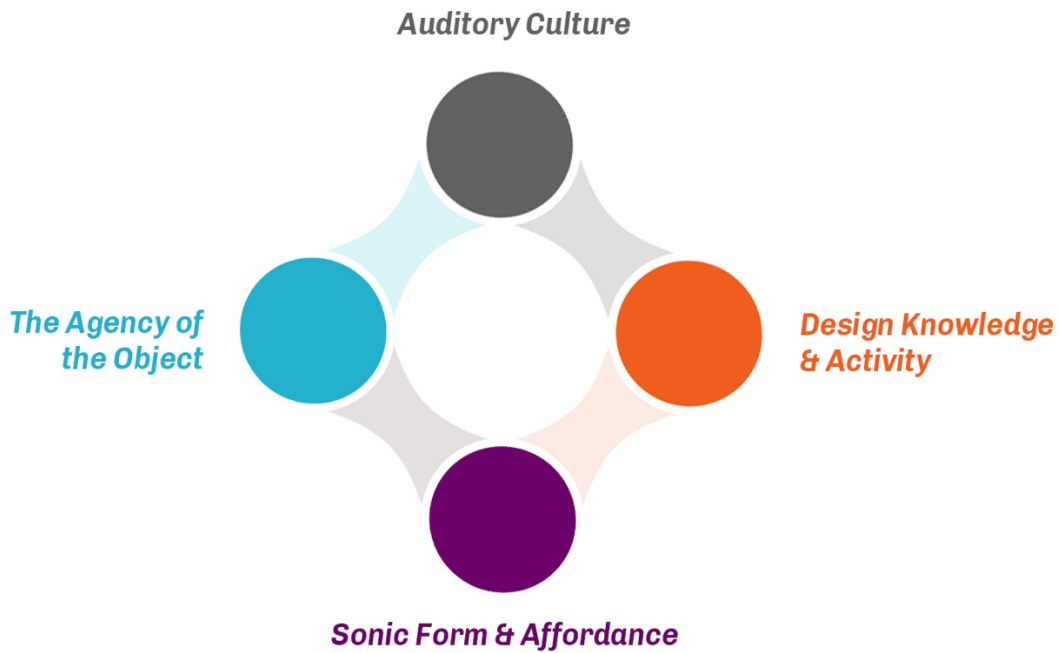
Figure 65. Situating Auditory Culture Within Gosden's (2005) 'Agency Of Objects'

Designed things in this regard are not silent and isolated objects but possessors of auditory power and significance that effect change through their sonic form and functioning. Things are not mute objects but 'active participants that change us and are likewise changed by us during our interactions with them' (Atzmon and Boradkar, 2017: 04). This positioning of the sonic agency of objects highlights how sonic agency is constantly distributed and contested between the ideology, knowledge and activity of designers, the things they create and the interaction between people and these things within the socio-cultural auditory landscape. In reading the theme of agency through existing discourses of Design we can theorise agency as a phenomenon constructed between people, things and society.
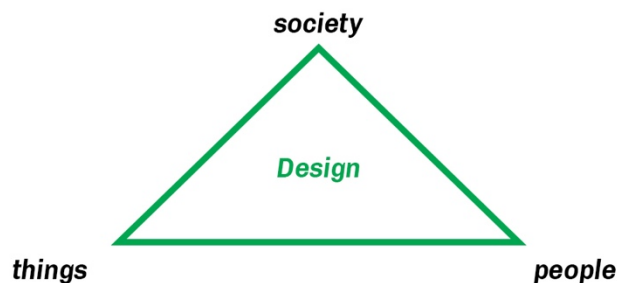
Figure 66. Contours of Agency in Design

6.3 Agency and Disability

'Simply expressed, an agent is one who acts. The power granted or effected through that action is the quality of agency'.

(Atzmon and Boradkar, 2017: 04)

Agency is a common theme is discourses arising from Disability Studies. Tobin Siebers contends that 'disabled people are often not allowed to have agency, sexual or otherwise. Rather they are pictured as abject beings, close to nothing, empty husks. To be disabled in the cultural imaginary is to cease to function' (Siebers, 2008: 160). Liddiard (2011: 139) notes that:

'disabled people remain without agency and autonomy in non-Western cultures – particularly, where little state-funded care provision and high rates of poverty together with a cultural reluctance towards non-familial (paid-for) care can mean disabled people remain infantilised within both family and wider networks'

A cultural model of disability (Gilson and DePoy, 2000; Linton, 1998) was developed in compliment to the established arc of the social model in order to situate disability as a 'site of cultural resistance to socially constructed conceptions of normality' (Berger and Lorenz, 2017: 01) and, consequently, the cultural model enables disability to be theorised as a 'source of cultural agency previously suppressed' (Snyder and Mitchell, 2006: 10). Disabled people's inherent lack of agency is one of several assumptions that collectively forge a dominant ableist imaginary (Campbell, 2009). In reading the theme of agency through existing discourses from Disability Studies we can theorise agency as a phenomenon constructed between people and people, and people and society.
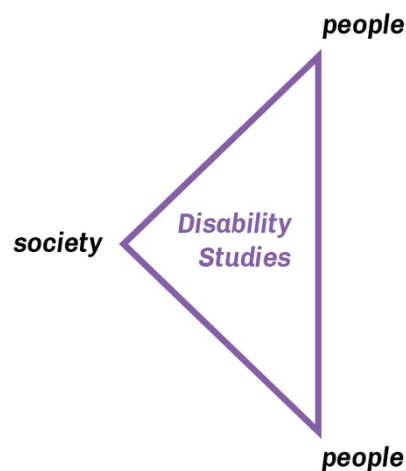
Figure 67. Contours of Agency in Disability Studies

6.4 Sonic Agency and Sound Studies

In order to position agency within the realm of Sound Studies, we can turn to the writing of Salome Voegelin (2014) and Brandon LaBelle (2018). In *Sonic Possible Worlds* (2014), Voegelin proposes a *sonic sensibility* in order to theorise a set of critical possibilities intended to disrupt or reframe the politics of visibility. Voegelin's sonic sensibility serves as a 'model for the creative rethinking and re-articulation of reality . . . to see not just what is, but how it is and how it might be' (Voegelin, 2019: 09). LaBelle (2018) develops the model through an emancipatory lens, considering forms of sonority through which people negotiate systems of normativity and power. LaBelle (2018: 04) introduces *sonic agency* as a means to reconceptualise the public sphere, considering:

> 'how particular subjects and bodies, individuals and collectives creatively negotiate systems of domination, gaining momentum and guidance through listening and being heard, sounding and unsounding particular acoustics of assembly and resistance'

Both Voegelin and LaBelle position their work in relation to the thinking of French philosopher Jacques Rancière (1999). In conceptualising sonic agency, LaBelle draws a particular focus to Rancière's conception of a 'wrench of equality' - understood as a socio-political force that interrupts the dominant order and thus 'politicizes' power (Rancière, 2012). This conception of sonic agency is also present in Frances Dyson's *The Tone of Our Times* (2014) in which Dyson describes a position of *sonic criticality* where practices of sounding and listening form the auditory building blocks through which to confront contemporary economic, ecological and socio-political crises. This positioning of sonic agency foregrounds the notion that citizens draw from their experiences of sound and divergent forms of sonority in order to join together against conditions of loss and powerlessness. We can draw on such theorisations to frame sonic agency as a key tool in the overarching objective of this thesis – to oppose auditory normalism in design through the lived experiences of d/Deaf and disabled people in socially public spaces. In reading the theme of agency through existing discourses from Sound Studies, we can theorise agency as a phenomenon constructed between people, sound and society.
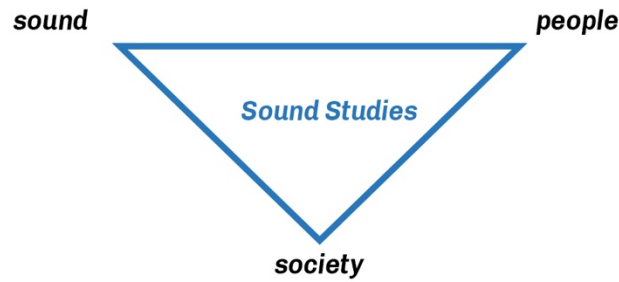
Figure 70. Contours of Agency in Sound Studies

6.5 Summary of Discussions on Sonic Agency

In charting the theme of (sonic) agency through existing discourses within Disability Studies, Design and Sound Studies we learn that disabled people often have restricted access to agency in their everyday lives (Siebers, 2008) within the overarching ableist assumption that disabled people lack the ability to maintain agency or are somehow 'unworthy' of an agential existence within the cultural imaginary (Campbell, 2009). The cultural model of disability (Gilson and DePoy, 2000) was developed in opposition to such claims and situates disability as a dominant source of cultural agency within the population (Snyder and Mitchell, 2006). We see that Inclusive Design is inherently tied to issues of agency and that auditory interventions can increase the agency of people (Cheliotis, 2016; Lacey, 2016). Recent scholarship in Sound Studies, grounded in new materialist perspectives (Voegelin, 2019; LaBelle, 2018), considers the potential of sonic agency to politicize the power of sound, reconceptualising the public sphere by contemplating how people negotiate systems of normativity and domination through listening and 'sounding and unsounding particular acoustics of assembly and resistance' (LaBelle, 2018:04). In reading the theme of agency through such discourses we can begin to theorise agency at the intersections of the three disciplines as a phenomenon constructed and contested between people, sound, things and society (figure 69).

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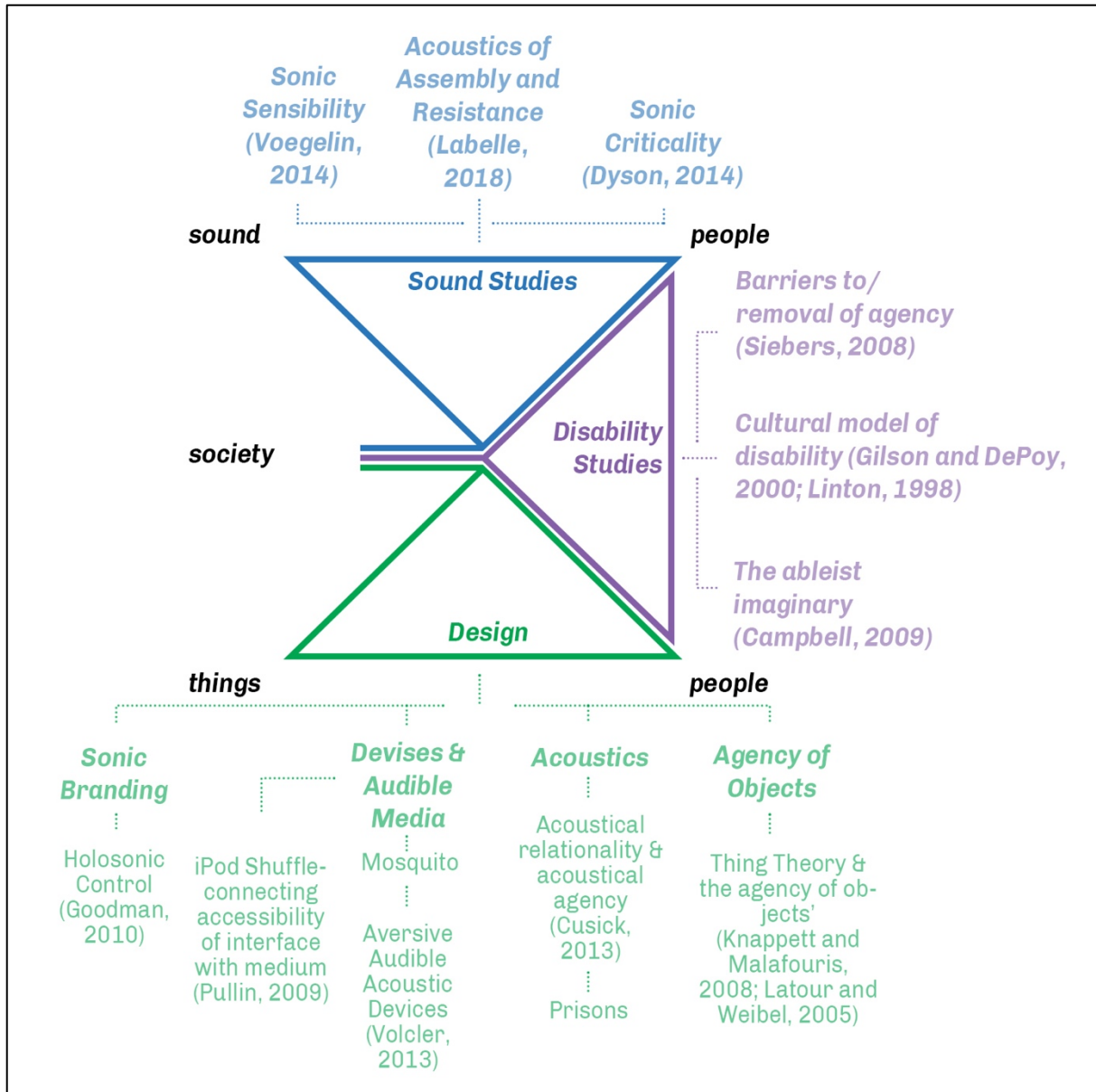
Figure 69. Contours of Agency

6.6 Analysis: Inclusive Design and the Sonic Agency of Research Collaborators

The rest of this chapter will adopt a multimodal framework for discourse analysis (introduced in chapter three) to examine sonic agency within this research process. The intention here is to draw focus to areas within the research in which sonic agency was present and examine how the meaning of such sonically agentic experiences is communicated through different modes within the multimodal ensemble. The analysis foregrounds a social semiotic approach (Andersen *et al*, 2015; Bezemer and Jewitt, 2010) in order to position the meaning of sonic agency in the social, real-life experiences of the collaborators who contributed to the research. The research aimed to enable d/Deaf and disabled people to share their

lived experiences of sonic in/exclusion in socially public places with the primary researcher, in their own words and on their own terms. The multimodal transcriptions below draw on data gathered during research event three. Here the higher-level action of the workshop is comprised of a multiplicity of chained lower-level actions communicated through different modes, such as spoken language and proxemics, within a communicative system of representation (Kress and Van Leeuwen, 2001). Three d/Deaf or disabled collaborators took part in the event. An hour-long, one to one conversation with each collaborator was recorded. The initial phase of multimodal transcription highlights how each of the collaborators employed high modal density as a result of the high intensity action of spoken language. Norris (2004) notes that although spoken language is a communicative mode often organized sequentially – with layers of smaller parts contributing to a larger whole - the mode can also be utilized simultaneously. Initially, the analysis of sonic agency considers who is speaking, rather than what is said. Figure 70 charts the decibel level of collaborators' and researchers' voices over time - highlighting that, on average, the research collaborators spoke for 75% of the conversations recorded.
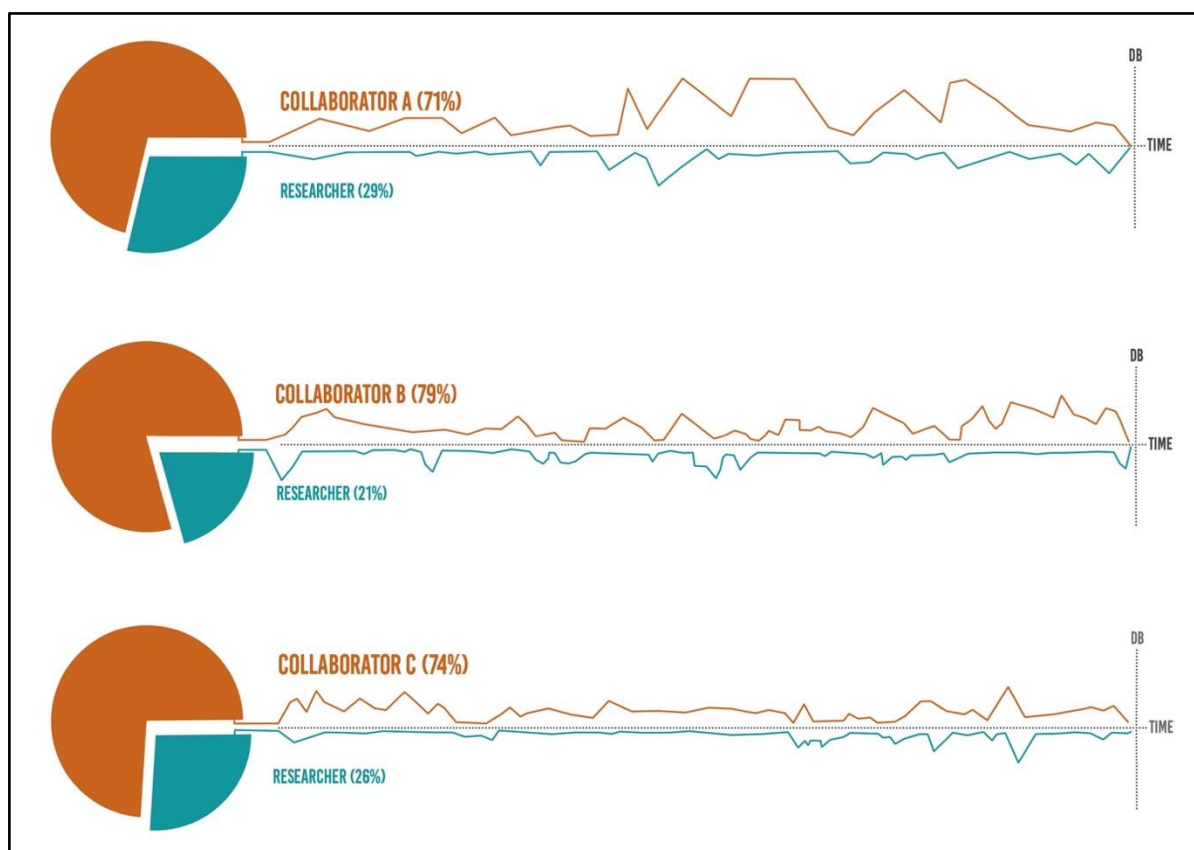
Figure 70. Voice Maps – Event Three

Sonic agency in relation to this stage of the transcription refers to the freedom granted to the collaborator to move between speaking and listening. Listening to the

primary researcher, as well as the sounds of the environment. The second phase of multimodal transcription considers the communicative mode of layout. The research collaborators were shown a map of the BAC building and encouraged to move freely between any of the public and private rooms in the building. Figures 71 - 73 detail the chained lower-level actions of walking and pausing that each research collaborator drew upon during the event in order to construct their individual workshop layouts.
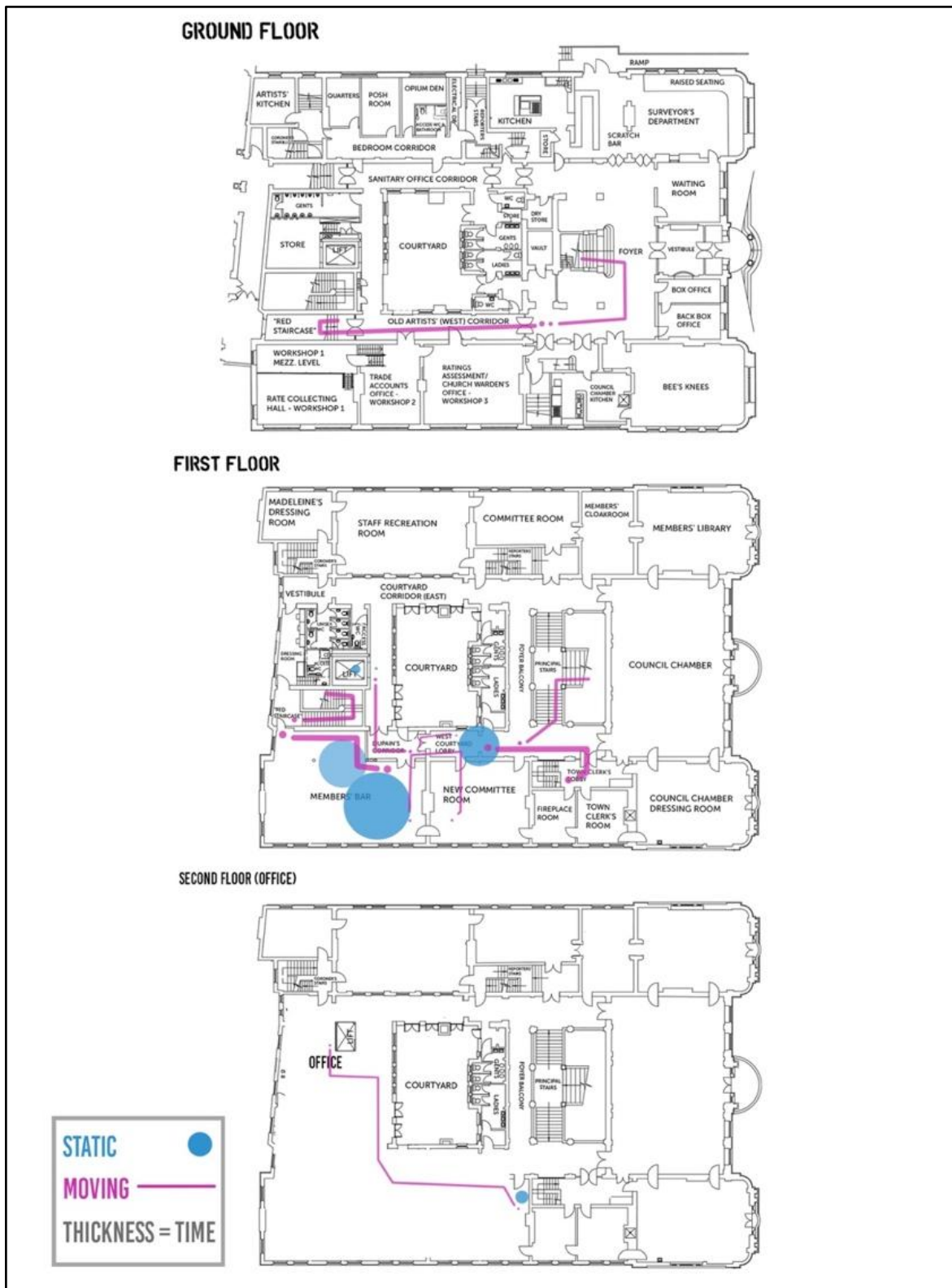
Figure 71. Collaborator A Workshop Layout - Event Three

Collaborator A chose to move between all three floors of the building. There were six moments in which they chose to stop walking and undertake a conversation from a static position (highlighted by blue circles), two of these moments occurred in the

same space - *the members bar* (a quiet theatre space unoccupied at the time of the conversation). Collaborator A spent 19% of the conversation walking and 81% in a fixed or static location. The entirety of the conversation took place in the west half of the building. Other than a short walk through the foyer, collaborator A chose not to conduct any of the conversation in the public areas of the building.
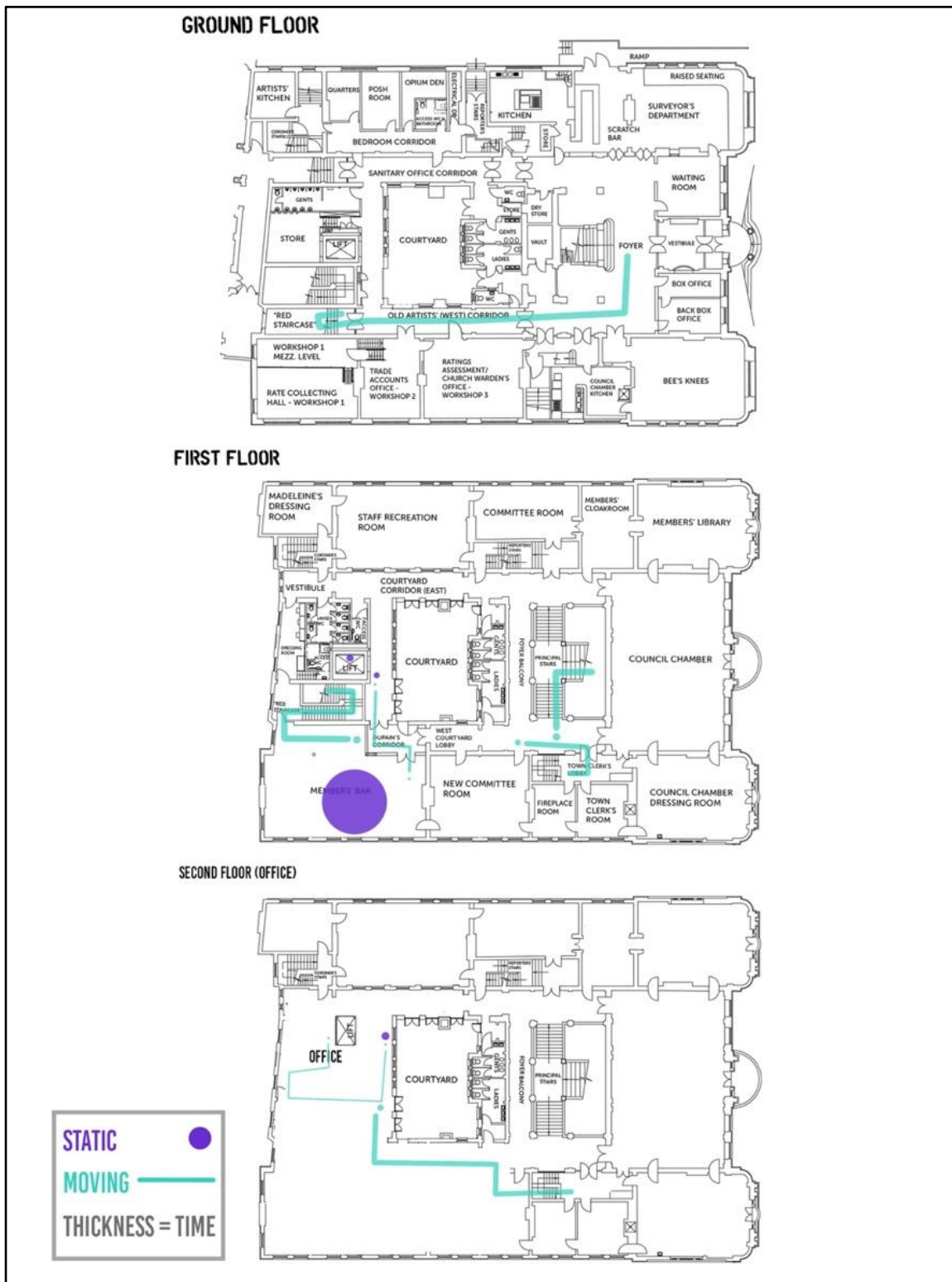
Figure 72. Collaborator B Workshop Layout - Event Three

Collaborator B chose to move between all three floors of the building. There were four moments in which they chose to stop walking and undertake a conversation from a static position (highlighted by purple circles), the longest of these moments

occurred in the *members bar* (a quiet theatre space unoccupied at the time of the conversation). Collaborator B spent 25% of the conversation walking and 75% in a fixed or static location. The entirety of the conversation took place in the west half of the building. Other than a short walk through the foyer, collaborator B chose not to conduct any of the conversation in the public areas of the building.
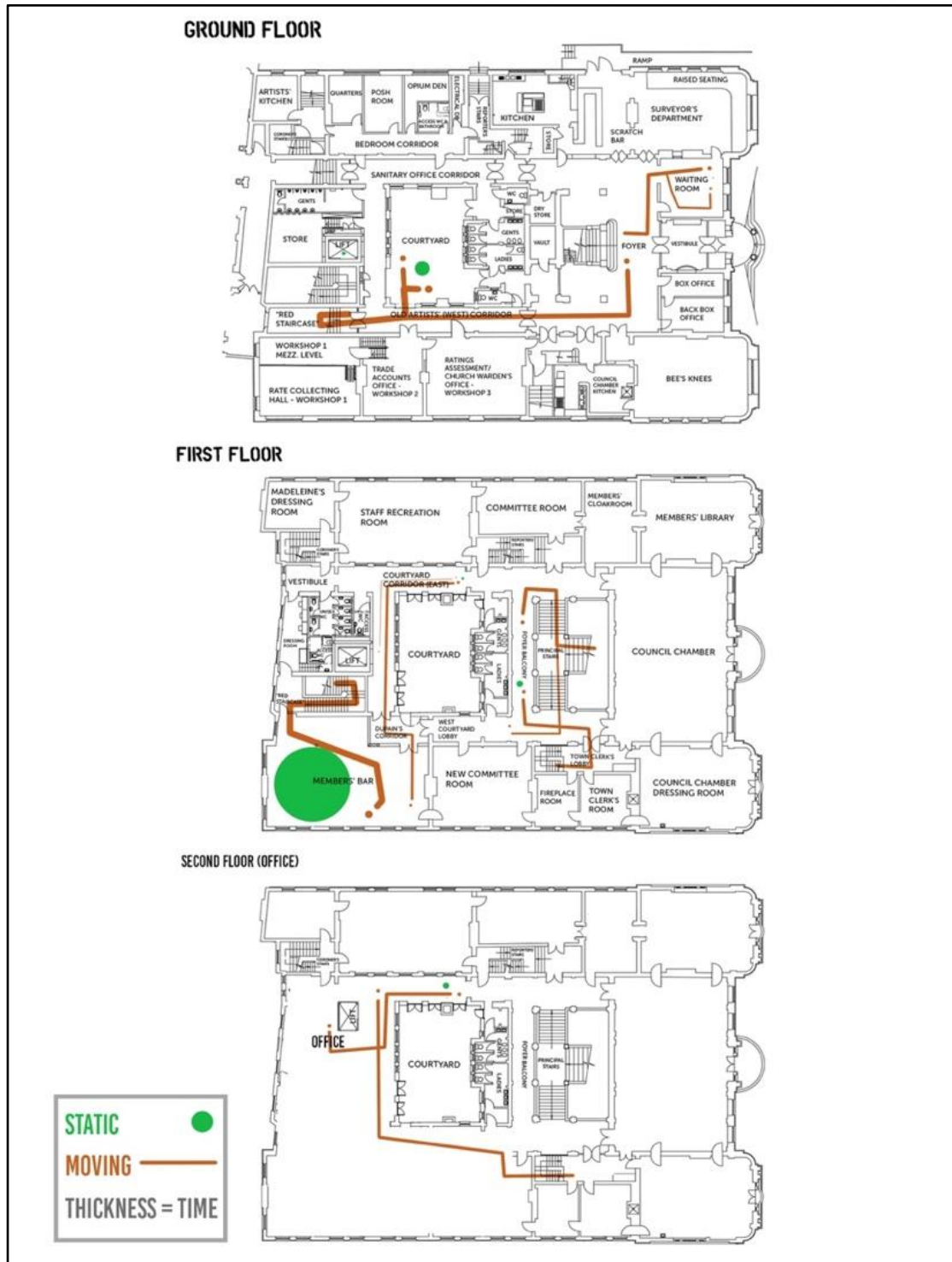
Figure 73. Collaborator C Workshop Layout - Event Three

Collaborator C chose to move between all three floors of the building. There were seven moments in which they chose to stop walking and undertake a conversation from a static position (highlighted by green circles), the longest of these moments occurred in the *members bar* (a quiet theatre space unoccupied at the time of the conversation). Collaborator C spent 28% of the conversation walking and 72% in a fixed or static location. They moved between public areas (such as the *Waiting Room* and *Courtyard*) and private areas (such as the *office*).

Though the format of the binaural soundwalking workshop encouraged conversation whilst walking, on average, the collaborators held 75% of their conversations in a fixed or static location. Two of the three collaborators chose to occupy solely non-public spaces, perhaps due to the personal nature of the conversations and the lived experiences being shared.

6.6.1 Analytical Conclusions

The analysis above considers collaborator agency in three key areas. Firstly, they could choose to talk or listen, secondly, they could move between public and private areas and finally they could conduct the conversation from moving or static locations. Here the communicative modes of spoken language, listening and proximity are mapped. It is clear that sonic agency in this context is different for different collaborators. What we can take from this is that in order to grant sonic agency to research collaborators, thus embeding flexibility in the design/research method has direct implications for the agentic experience created. Implementing techniques such as simple auditory analysis within an Inclusive Design process can utilise the qualitative potential of sound (Daza and Gershon, 2015). Analysing the different modal channels (such as spoken language and proximity) through which high-level actions like sonic agency are communicated within an Inclusive Design process can encourage new forms of accountability. For example, figure 74 summarise the multimodal transcripts detailed above by mapping the communicative modes of spoken language (talking and listening), layout (public and private) and physicality (moving or static).
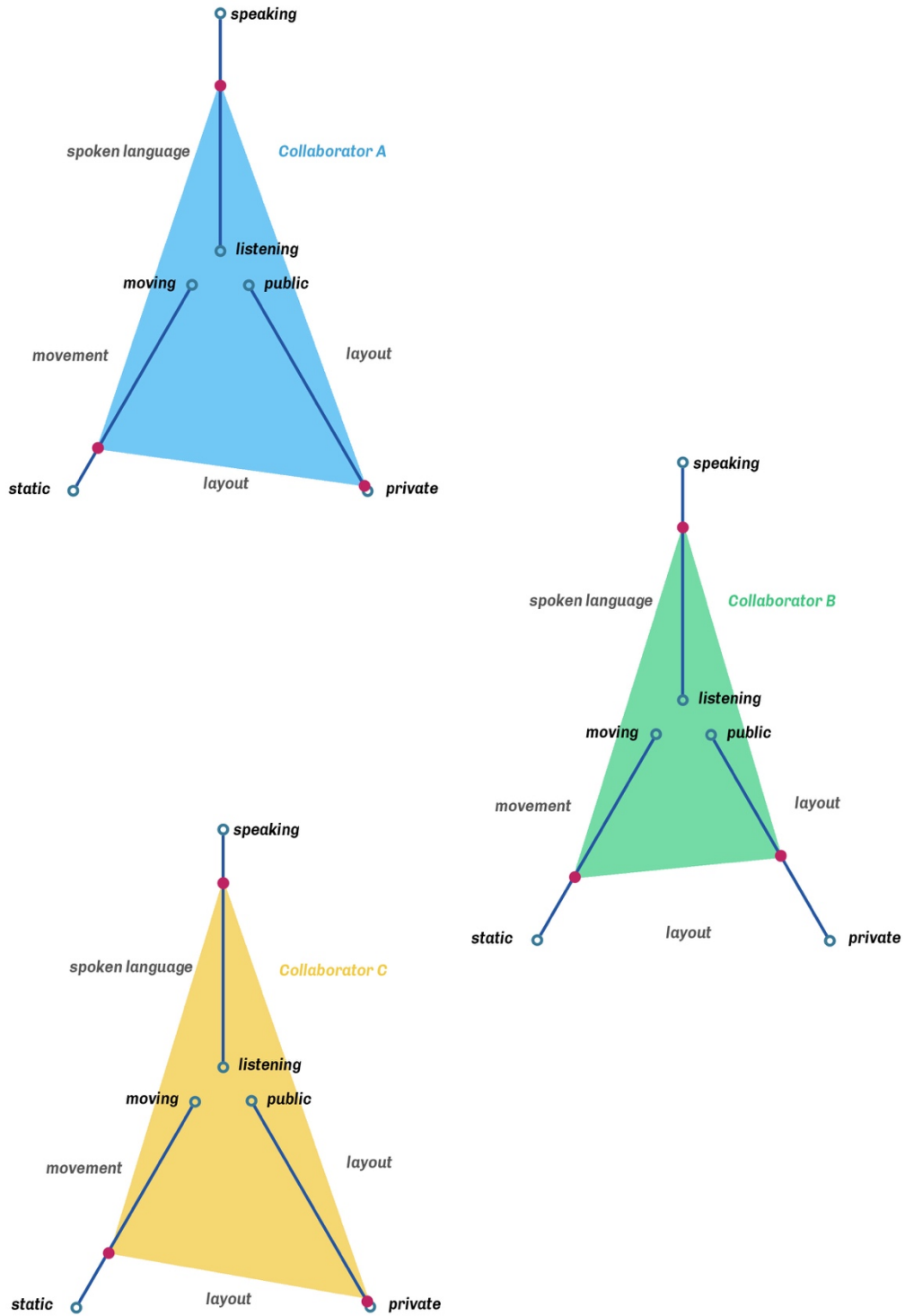
Figure 74. Mapping Sonic Agency Through Language, Layout and Movement

6.7 Summary and Conclusions

By applying a textual phonography (Voegelin, 2019) of sonic agency this chapter responds to the practical components of the research by unpacking the intricacies of sonic in/exclusion in relation to d/Deaf and disabled people's experiences in socially public spaces. Many of the lived experiences relating to sound and social exclusion that were shared by collaborators during the research events point to a lack of sonic agency, either with regards to the soundscape of a public environment, the sounds an individual creates, or the ways in which such individual sounds are perceived by others. The chapter contextualised such experiences by examining existing examples of (sonic) agency within the fields of Design, Sound Studies and Disability Studies. Through such contextualisation we learn that disabled people often have restricted access to agency in their everyday lives (Siebers, 2008) within the overarching ableist assumption that disabled people lack the ability to maintain agency or are somehow 'unworthy' of an agential existence within the cultural imaginary (Campbell, 2009). Inclusive Design is inherently tied to issues of agency – with successful Inclusive Design projects creating agency of application for users. The analysis above highlights that by positioning existing sound studies methods -such as soundwalking, binaural recording or audio analysis - within an Inclusive Design process, new opportunities to increase and analyse higher-level actions such as sonic agency can emerge. The multimodal framework for analysis adopted is a useful tool in this endeavour as it allows us to consider the presence, absence and meaning of sonic agency within a research process by observing different communicative modes (such as layout or movement).

Recent scholarship in Sound Studies, foregrounding new materialist perspectives (Voegelin, 2019; LaBelle, 2018), considers the potential of sonic agency to politicize the power of sound, reconceptualising the public sphere by contemplating how people negotiate systems of normativity and domination through listening and 'sounding and unsounding particular acoustics of assembly and resistance' (LaBelle, 2018:04). This new materialist frame foregrounds the importance of increasing the sonic agency of d/Deaf and disabled people in relation to the primary focus (and title) of this thesis – to oppose auditory normalism in design. The following chapter will introduce the second textual phonography and multimodal analysis undertaken focusing on the theme of the audibility of difference.

THE AUDIBILITY OF DIFFERENCE

7.1 Introduction

Having considered ideas of sonic agency in relation to Inclusive Design in chapter six, this chapter details the second textual phonography (Voegelin, 2019) relating to the audibility of difference. The chapter introduces the matters of audibility and voice, giving specific attention to issues of audibility and social identity. The chapter develops an understanding of the non-normative voice by considering the practice of disabled artists Gemma Nash and Jess Thom as well as the field of Dysfluency Studies (Eagle, 2014). The chapter situates the non-normative voice within the established discourse of (in)visibility within Disability Studies (Hughes and Paterson, 1997; Mintz, 2015) in order to consider increases in the audibility of difference as an opportunity to disrupt the politics of visibility and challenge societal perceptions driven by the oppressive ideals of the auditory normate proposed in chapter two. The final section of the chapter adopts the multimodal framework for analysis introduced in chapter three to analyse the differing ways that the audibility of non-normative voices was increased within socially public spaces during the research process.

The chapter focuses less on scientific and quantitative definitions of audibility from fields such as psychoacoustics, audiology and hearing science.[88] As discussed in chapter two, scientific and quantitative approaches to hearing and audibility have been critiqued for their normative favouritism (Drever, 2017; Renel, 2018) and have subsequently been discredited within Inclusive Design research that foregrounds non-normative hearing profiles (Rychtarikova et al, 2012; Herssens et al, 2011; Heylighen et al, 2009; 2010). The framing of audibility within this chapter, then, is primarily concerned with the social experience and political potential of audibility in relation to d/Deaf and disabled people's interactions with the world.

7.2 Audibility and Voice

> 'When one says "nothing about us without us", who is *us?* Who speaks? Who is spoken for? Who Speaks for whom?'

> (Berger, 2019: 211)

The affective capacity of a voice (its ability to affect and be affected) is influenced continuously by a multiplicity of social, cultural, technological and spatial issues. Beyond the transfer of information, voices shape and are shaped by spaces and,

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[88] Such approaches are primarily concerned with definitions of audibility as the ability of humans to receive and perceive vibrational signals through systems of interlocking auditory thresholds across the frequency spectrum within the hearing modality (Dijk et al, 2016; Warren, 1982; Sahley and Musiek, 2015).

consequently, the (in)audibility of a voice can reveal a web of interconnections between communication and power in and through space (Butler, 2007). Weidman (2010: 240) contends that 'voice as a sonic and material phenomenon is inevitably embedded in social relations that shape how voices are produced, felt, and heard'. As discussed in chapter two, the physical design of an environment[89] can create hierarchies of audibility in which different voices are continuously produced and reproduced, prioritised and silenced by design in different contexts. The 'voice revolution' and the turn to 'voice-first computing' (Hennig, 2018) through digital assistive systems such as Apple's Siri and Amazon's Alexa, as well as the widespread development of voice control systems within vehicle design (Boudette and Wingfield, 2017), present new ethical questions within contemporary discussions of voice and audibility. Despite the fact that assistive systems such as Siri use voice-recognition algorithms to 'categorize your voice into its database of regional dialects and accents' (Sadun and Sande, 2014: 22), they have been critiqued for privileging certain accents and failing to understand others (Harwell, 2018; Albin, 2016; Field et al, 2018). As Paul (2017) suggests 'voice is the next big thing, unless you have an accent'. It is clear that the design of the contemporary sonic world (be it spatial, technological or otherwise) serves as a communicative vessel for the ideologies and priorities of those who made it. Thus, the opportunity for diverse and non-normative voices to be audible within Inclusive Design must develop and expand as an arena of interest if designers wish to shape societies, technologies and spaces that account for the diversity of human experience.

7.3 Audibility and Identity

Within the frame of Western modernity audibility most often functions as a sign of identity and presence of the subject - to be audible is to be significant (Scott, 1990; Weidman, 2010). Therefore, inaudibility implies an active politics of domination and nonparticipation (Gautier, 2015). As presented in chapter two, direct and cultural forms of oppression may hold entire communities within a culture of silence (Freire, 1973) in which the voices of individuals may be literally audible, but the nature of such audibility is lacking in critical quality within the cultural imaginary. The voices within a culture of silence consequently fail to be considered within the development of dominant social and political orders. There is a growing research interest in examining audibility, the voice and social identity in relation to power and class, race and gender (Boland, 2010; Stoever, 2016; Valentine *et al*, 2008; Watson, 2006). However, it is clear that the significance of audibility within the relationship between identity and voice is not a static but rather a fluctuating matter of concern. Illustrated by Thomas Page McBee's article *My Voice Got Deeper Suddenly, People Listened* in which McBee considers the changing perceptions of his voice during his

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[89] The height of service counters, placement of intercoms etc.

gender transition. In an article included in HuffPost UK's *Being Non-Binary* series, disability activist Phoenix Gray discusses the intersectional resonance of (sometimes involuntary) audibility and social identity, commenting:

> 'I cannot separate my Black identity and my genderqueer identity from my disabled identity . . . My multiple neurodivergences affect the ways that I use pronouns, even the way in which I name myself . . . the words that my OCD, Tourette's and dyspraxia make leave my mouth affect my relationship with my gender and my body'

<div align="right">(Gray, 2018)</div>

Within the Inclusive Design arena, organisations such as Forsman and Bodenfors (forsman.co) are beginning to consider the impact of different auditory identities in their work.[90] These examples, whether lived experiences of designed functionality, position a non-normative perspective as a central issue of significance for contemporary discussions of audibility, voice and identity.

7.4 Non-Normative Voices

Dysfluency Studies (Eagle, 2014) posits that the human voice, like human hearing, is influenced by an abundance of factors that fluctuate from day to day and throughout our lives. These factors include specific conditions such as Aspasia or Tourettes but also temporary factors such as throat infections, colds and coughs. The current trajectory of Dysfluency Studies as a developing field can be contextualised within 'first wave' identity politics (Davis, 2006).[91] Eagle (2014: 02) notes that although there is a growing interest in the Humanities and popular culture in relation to the identity of those with non-normative voices,[92] speech pathologies have 'tended to occupy a liminal position in relation to fields like literary theory, philosophy of language, medical humanities, disability studies, sociolinguistics, etc'. In addition, representations of non-normative voices in films and theatre, have been criticised as instances of 'cripping up' (Sandahl, 2010) in which non-disabled actors play disabled roles. Thom (2015) and others (Birkett, 2015; Ryan, 2015; Fox and Sandahl, 2018) contend that imitations of impairments do not reflect what it means to be disabled and that if narratives relating to disability continue to be written, created and performed by non-disabled people they're at risk of rehashing boring clichés about

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[90] The interface of their navigational system Slow Down GPS changes from an adult's voice to a child's voice when driving near schools or other areas where it's more likely for children to be around.

[91] Concerned with the formation of a coherent identity for non-normative voices against existing societal definitions that are forged predominantly from oppressive and normative values.

[92] Eagle references the success of films such as The King's Speech, Rocket Science and The Diving Bell and The Butterfly.

disability that engender social divisions and continue to position disabled people as outsiders. Non-normative voices have been considered in relation to specific impairments and perspectives (Bobrick, 1995; Crichton-Smith et al, 2003; Shell, 2005), though Marks (2012) suggests that such singular positioning has led to the identity of non-normative speakers becoming an isolated and fragmented area of concern.

There are a number of disabled artists who are exploring non-normative voices within their practice, including artist and digital story teller Gemma Nash and writer and performer Jess Thom. Nash's work focuses on 're-imagining the "othered" body and the complex relationship between medicine, disability and ethics' (gemmanashartist.com). Nash developed *The Non-Normative Speaking Clock* as a creative interruption to the hegemony of the normative voice embedded in the iconic British Telecom speaking clock service. *The Non-Normative Speaking Clock* is a freeware desktop application that foregrounds Nash's non-normative voice and challenges the discretionary point of view that understands the 'voices of learning disabled people, or those with speech impairments or augmentation as subhuman' (gemmanashartist.com). Thom is a writer and performer as well as the co-founder of Touretteshero. In 2017 Touretteshero developed a neurodiverse presentation of Samuel Beckett's *Not I* (figure 75) – a short play delivered by the character Mouth (Thom) who is a woman that has been voiceless for some time but then suddenly speaks. Thom comments:

> 'We're claiming Mouth as a disabled character . . . Mouth is a character experiencing an, 'urgent need to tell'. I feel a similar urgent need to find creative ways to open up discussions, share perspectives, and make work that challenges assumptions about disability at a time when many disabled people are under intense pressure and hard-won equalities are being eroded'
>
> (Thom, 2017b)

The audibility of a non-normative voice within Beckett's text raises important questions about cultural curation and which voices are audible in performance and society. Gardner (2017) contends that the audibility of a non-normative voice in Touretteshero's *Not I* 'reminds us that it is the silenced who often have the stories most worth hearing'.

Figure 75. Jess Thom as Mouth in Touretteshero's 'Not I' (James Lyndsay)

7.5 The Audibility of Difference

The political mantra of 'the visibility of difference' has a long and resonant history in Disability Studies and disability activism, discussed in relation to the lack of visual representation of disabled people in the media (Barnes, 1992; Haller, 1995), theatre (Wilshaw, 2017), museums (Niciu, 2018) and academia (Brown and Leigh, 2018). Thom (2016c) contends that it is through 'increased visibility of difference, whether in our communities or on screen, that discrimination and stereotypes will be broken down and equality of opportunity made achievable and sustainable'. Disability Studies suggests that invisibility refers to 'the absence of disability from the conversations and activities that establish the way a society functions, encompassing social relationships, intellectual and artistic work, and politics' (Mintz, 2015: 113). Ensuring that difference is not only visible but also audible is key to any agenda which intends to dismantle the construction of normalcy in society. The audibility of difference is discussed in Disability Studies through several standpoints including methods for involving different voices in qualitative research (Ashby, 2011), vocal representation for disabled people who use augmentative communication (Wickenden, 2011) and the disabled voice as a desirable practice in hip-hop performance (Porco, 2014). It is notable that considerations of the audibility of difference, and the impact that designing for increased audibility might have in relation to social inclusion, is lacking in Inclusive Design research and practice that is grounded in 'the primacy of ocular values' (Imrie, 2015: 172).

7.5.1 Audibility as Exclusion

The discussion of the audibility of difference above posits that to be inaudible is to lack socio-political legitimacy and, thus, being or becoming audible would suggest gaining a measure of significance via positive activities in personal or professional life. However, audibility can also be problematic in relation to d/Deaf and disabled people's experiences and may become a site of social exclusion. Vocal audibility may be an impossibility for someone who is mute, increased audibility may bare no political significance to people who are d/Deaf for whom visibility *is* audibility, and people whose impairments make them involuntarily audible (such as those with Tourettes) may be subject to staring (Garland-Thompson, 2009) and excluded from spaces that are assumed to be quiet or silent (Simpson, 2018). This doctoral research therefore aimed to increase the audibility of non-normative voices whilst ensuring that increasing the audibility of research collaborators voices was on their terms, resonating with the theme of the previous chapter – sonic agency.

7.6 Analysis: Inclusive Design and The Audibility of Difference

The following section uses a multimodal framework for discourse analysis to consider the differing ways that the audibility of non-normative voices was increased within socially public spaces during the research process. The analysis positions increases in the audibility of non-normative voices as a catalyst for change with regards to the inclusivity and accessibility of public space. The section focuses on research event five, a two-day co-creation workshop at Shakespeare's Globe. The event was attended by seven young disabled adults with Tourettes aged between 16-25. The chapter builds on existing perspectives, notably van Leeuwen (1999) and Schafer (1977), that frame the relational aspects of audibility through foreground-background continuums of aural perspective. Schafer (1977: 157) provides an example by quoting the three-stage spectrum proposed by radio engineer A. E. Beeby in which a soundscape is deconstructed into three core parts: Immediate, Support, and Background. Sound engineer Walter Murch proposes a similar three-stage framework, adopting the terms 'foreground', 'midground' and 'background' (Weis and Belton, 1985). Schafer introduces his own three-stage terminology using the terms 'Figure', 'Ground' and 'Field' to detail aural perspectives in relation to a 'dynamic listening place from foreground to horizon which makes focused listening possible' (Schafer, 1977: 157). Schafer's terms are adapted by van Leeuwen (1999) who creates a hierarchical three-stage structure of aural perspective that applies to both literal (e.g. buildings) and symbolic (e.g. music) spaces. van Leeuwen's terms are particularly relevant to this investigation of audibility within Inclusive Design research as they are grounded in a social semiotic perspective. They are adopted throughout this chapter. Van Leeuwen (1999: 23) defines the terms as:

> *Figure* - If a sound or group of sounds is positioned as Figure, it is thereby treated as the most important sound, the sound which the listener must identify with, and/or react to and/or act upon.

> *Ground* – If a sound or group of sounds is positioned as Ground, it is thereby treated as still part of the listener's social world, but only in a minor and less involved way. We are to treat it as we would treat familiar faces we see every day and the familiar places we move through every day, in other words, as a context we take for granted and only notice when it is not there any longer.

> *Field* – If a sound or group of sounds is positioned as Field, it is thereby treated as existing, not in the listener's social, but in his or her physical world. We are to treat it as we would treat the people that crowd the streets through which we walk, or the trees that populate the forest past which we drive.

Though this framework provides a structure through which to unpack the meaning of sounds through their relations with the listener, it gives less attention to the role of the speaker. In listening to the recordings from research event five, observing photographs of the event and generating proximity maps (discussed later in the chapter) four categories of audibility were identified: passive, direct, multimodal and compound (figure 76).

CATEGORIES OF AUDIBILITY

PASSIVE — AUDIBILITY THROUGH AN INTERRUPTED SPEAKER-LISTENER RELATIONSHIP (E.G. LISTENING TO AN AUDIO RECORDING)

DIRECT — AUDIBILITY THROUGH AN UNINTERRUPTED SPEAKER-LISTENER RELATIONSHIP (E.G. A DIRECT CONVERSATION BETWEEN PEOPLE)

NON-AUDITORY — AUDIBILITY THROUGH NON-AUDITORY COMMUNICATIVE MODES (E.G. A VISUALISATION OF A DISCUSSION)

COMPOUND — AUDIBILITY THROUGH MULTIPLE FORMS OF AUDIBILITY (E.G. DIRECT AND PASSIVE SUCH AS AN EXHIBITION WITH LIVE AND RECORDED AUDIO)

Figure 76. Categories of Audibility

The following section combines this register of audibility with van Leeuwen's aural perspective terminology to analyse several the research event event. The event was deconstructed into seven key stages (figure 77) identified through consultation and reflection with partner Touretteshero who co-designed and delivered the event.[93]

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[93] An analysis of this kind could be laid out in numerous ways, the priority here is to isolate key moments within the workshop in which the audibility of non-normative voices was increased, and to better understand the meaning of such moments using the two systems above.

PRE-EVENT   ●   PRE-EVENT INFORMATION

DAY ONE   ●   COLLABORATORS AGREEMENT

             ●   TIC VISUALISATION

DAY TWO   ●   PERFORMANCE

             ●   ACTOR CONVERSATION

             ●   EXHIBITION

POST-EVENT   ●   POST-EVENT BLOG
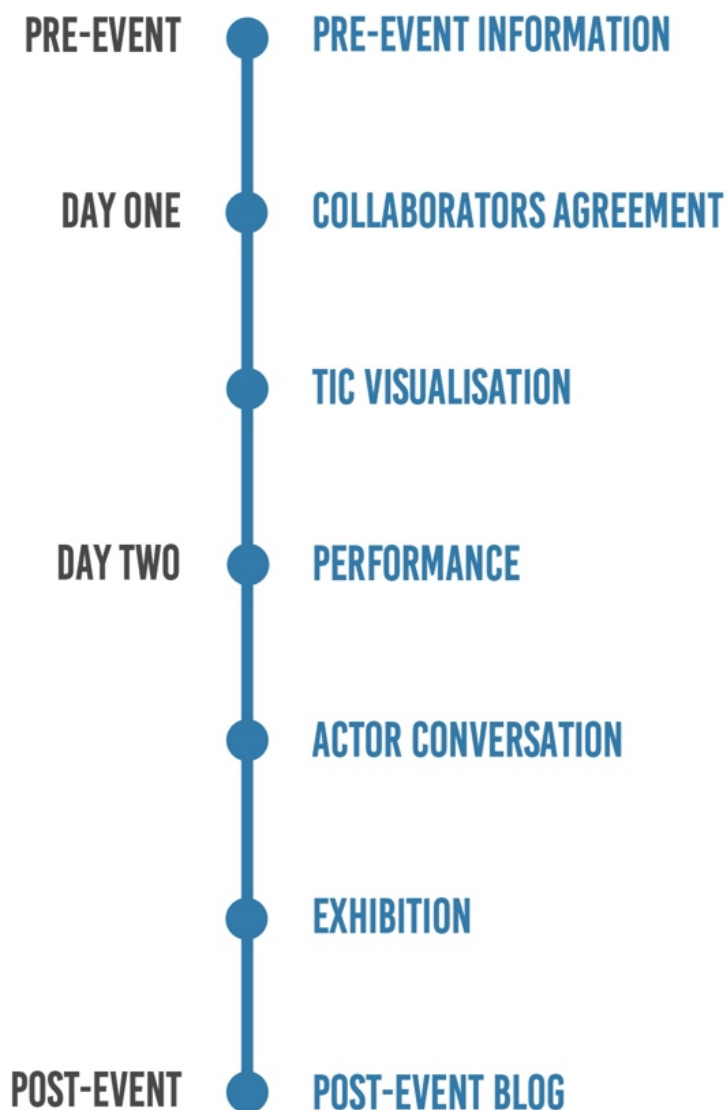
Figure 77. Key Stages of Event Five, Shakespeare's Globe

Pre-Event Information

Prior to the workshop attendees were invited to share their access needs and communication preferences with the primary researcher via a workshop participation form. Attendees were invited to submit this as written, audio or video information. All the collaborators elected to use the written format. Feedback from the forms included:

'I've never actually met someone else with tourettes or any type of tic'

'Some coprolalia[1] '

'I don't believe I have any specific support needs apart from an understanding that I am ticcing and cannot help it'

(Direct Correspondence with the primary researcher, August 2018)

The pre-event stage can be understood as providing both passive and non-auditory opportunities for non-normative voices to be audible within the research process. Passive in the sense that the access requirements of the collaborators could become audible without a direct conversation and non-auditory as information was unanimously provided as written information. This stage can be understood as an instance of *Figure* as the information provided by the collaborators was treated as important and acted upon by the primary researcher. The audibility of the collaborators access requirements enabled the individual and collective needs of the group to be positioned at the heart of the workshop format.

Day One – Collaborators Agreement

During this opening phase of the workshop the co-creation of a collaborator's agreement enabled direct forms of audibility to arise between the different members of the group. This activity enabled the group to hear each other's voices and to share how they wanted to work together as a group. This activity can be contextualised by the aural perspective of *Figure*, as the voices of the collaborators were identified with and reacted to by others in the group. Two of the agreements ('respond naturally to tics' and 'it's fine to wear headphones') relate directly to non-normative audibility and what specific support a group of non-normative speakers might need in order to work together.

Day One – Tic Visualisation

Throughout the workshop, and with the permission of everyone in the group, a live illustrator created visualisations of humorous vocal tics. This phase creates a direct register of audibility between the voices of the group and the live illustrator as well as a non-auditory register of audibility in the visualisations of tics. The visualisation operates fluidly along a spectrum of *Figure*, *Ground* and *Field* in that involuntary words are sometimes treated as the most important sound (Figure) and visualized, sometimes understood as part of the listener's and speakers' social worlds and treated as you would treat a familiar face (Ground) and sometimes ignored completely, treated as a tree in a forest that you drive past (Field). The ability of the group to relate to the involuntary words and noises of others fluidly is key to the inclusivity of the environment. Thus, a fluid approach to the relations between sound

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and the listener is identified as an important factor within a sonically inclusive environment.

Day One - Performance

The group attended a performance in the Globe Theatre. A pre-show announcement written by the director (appendix 3) provided a context through which the audience could understand the involuntary noises and words made by the research collaborators throughout the performance. This announcement encouraged the audience to position the tics as *Field* – acknowledged as existing within the same physical space but predominantly ignored and not prompting an action or interaction. The actors on stage ignored the majority of involuntary words and noises from the group, positioning them as *Ground* or *Field*. However, the actors were also attentively listening to the things that the group were saying and would respond at certain times, momentarily repositioning the vocal tics as *Figure* by using improvisation to integrate them into the performance.   Examples include:

> Actor: *why would she not love me*
> Audience member with Tourettes: *She's just not into you!*
> Actor: *ah ok!*

And during the closing scene in which Beatrice and Benedick hold a long pause before the final kiss:

> Audience member with Tourettes: *just kiss her!*
> Actor: *Ok, thanks! [kisses her]*

This balance of foregrounding and ignoring the vocal tics was acknowledged in a blog post by the research collaborators after the event.[94] It was also acknowledged in a letter written by an anonymous audience member sent to the director after the event (appendix 4). This example suggests that the ability to move fluidly between different perspectives on audibility and aural perspective can play an important role in establishing a sonically inclusive environment. Here, the fluidity of listening approaches adopted by the cast and other audience members reclaimed the theatre as a site for sonic inclusion (Simpson, 2018). This stands in direct opposition to the

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[94] 'Our tics continued to be celebrated as part of the dialogue that theatre provides, with a highly professional and talented cast maintaining a fine balance between when to acknowledge a tic, and when the play was the thing . . . Tics and Shakespeare's sharp wit ricocheted around the theatre, much like the stage guns which would delight and startle in equal measure . . . the needs of the audience were reflected by those who had control over the space, and this was communicated clearly, and engagingly' (Thom et al, 2017).

values of the auditory normate in which the sonic rules of a socially public space operate as a sonically excluding force (Whitfield and Fels, 2013; Kitchin, 1998; Simpson, 2018) or instances in which involuntary audibility is mocked and individuals are singled out by performers in relation to the specifics of their social identity (Thom, 2016d).

Day Two - Actor Conversation

The research collaborators were invited to discuss their experience of the performance with members of the cast in the Globe Theatre. Figure 78 details the change in proximity between the research collaborators and Globe cast during the first and second days of the workshop.
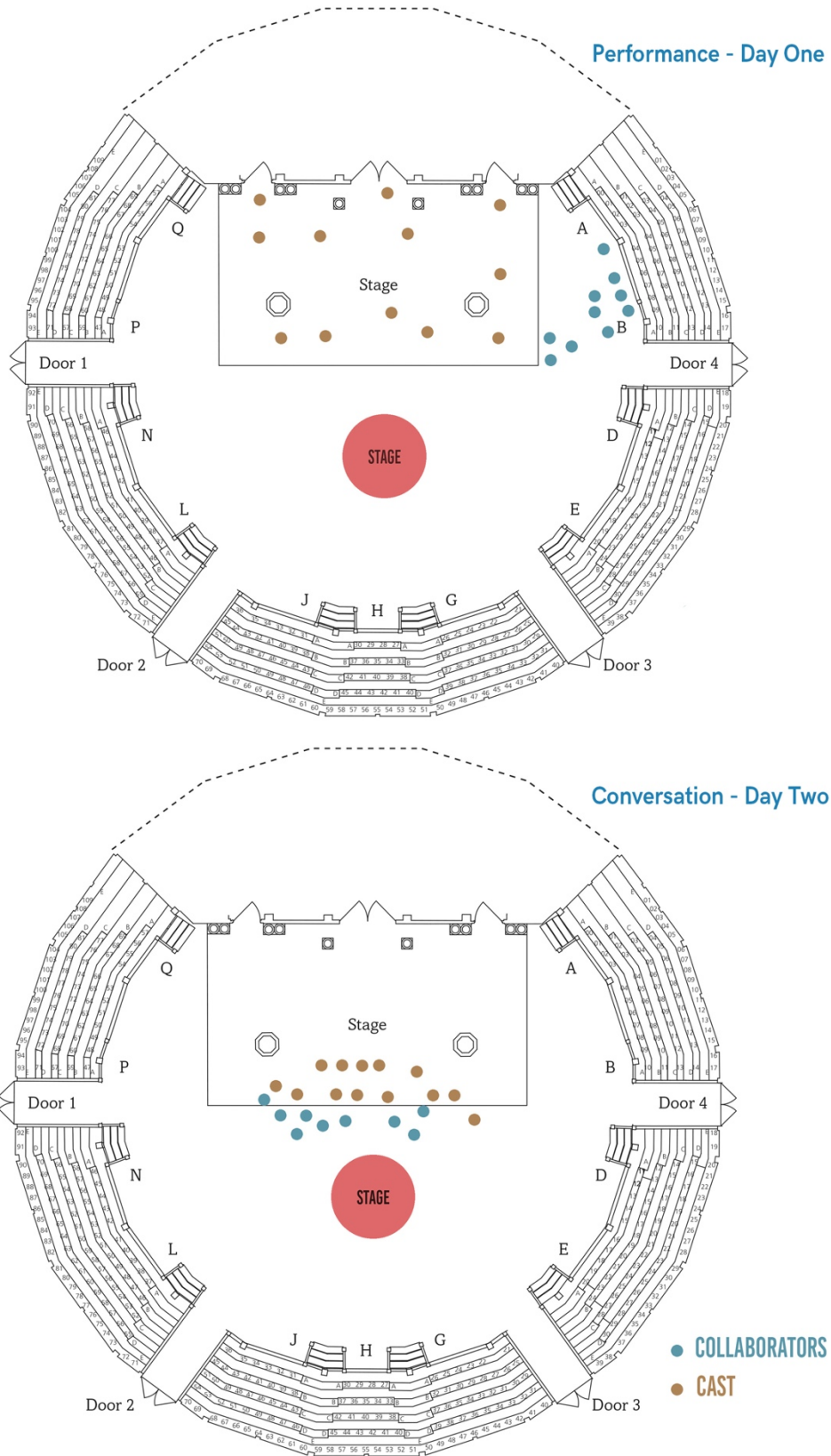
Figure 78. Proximity Between Research Collaborators & Globe Cast - Event Five

Figures 78 - 79 highlight how the workshop enabled the group to transition from what Hall (1966) describes as 'public distance' to 'personal distance'.[95] Figure 79 shows the collaborators and cast are in close proximity to each other (personal distance), adopting the aural perspective of *Figure* by positioning the voices of the group as important, identified with, and reacted to.

Figure 79. Conversation Between Research Collaborators & Globe Cast - Event Five

As van Leeuwen (1999: 13) notes, the vertical angle of perspective literally and figuratively makes people look up at or down upon a scene and is therefore 'connected to imaginary power relations, be it the power of the viewer over what is represented, or the power of what is represented over the viewer'. Figure 79 shows that during the second day of the workshop, the power dynamics of the vertical perspective - established through the conventional use of the theatrical stage - have started to be dissolved or reframed. Many of the cast are sitting on the stage, bringing their bodies and voices closer to those of the research collaborators. One of the collaborators has joined the cast on stage and is sitting informally. Through an increase in proximity between the collaborators and the cast, non-normative voices were reframed beyond the established audience/performer relationship.

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[95] From the distance kept between people who will ultimately remain strangers (public) to the distance at which you can touch the other person (personal).

Day Two – Exhibition

To close the second day of the workshop, the group curated a small exhibition in the Sackler Studios at Shakespeare's Globe in order to 'make public' (Latour and Weibel, 2005) the outputs of the workshop and spark further opportunities for the voices of the research collaborators to become audible to members of the public and staff from Shakespeare's Globe. The group read poetry written by the collaborators during the event about their experiences of the weekend (appendix 5), shared recordings of their voices via three interactive sound maps and discussed the visualisations created throughout the weekend. The exhibition serves as an example of compound audibility by merging direct, passive and non-auditory perspectives. The audibility of non-normative voices provided an innovative and accessible way for Shakespeare's Globe staff to engage with the accessibility of their building.[96]

Post-Event Blog

Two of the collaborators wrote a guest blog post for the Touretteshero website (Thom et al, 2017). This final stage foregrounds blogging as an 'accessible activist practice' (Keller, 2016) through which the collaborators mobilise their identity as disabled people and increase the audibility of non-normative voices through passive and non-auditory registers of audibility. The blog is positioned within the aural perspective of *Figure* as the voices of the collaborators are treated as important and can be identified with by the reader.

7.6.1 Analytical Conclusions

The examples above highlight the multiple ways that non-normative voices can become audible during an Inclusive Design process. The passive audibility of the group could have been a source of exclusion (as highlighted earlier in the chapter) but was supported by the fluidity in aural perspective sustained throughout the weekend. This fluidity enabled the involuntary words and noises to move between the perspectives of *Figure*, *Ground* and *Field* – from significant, humorous and celebrated language to ignored sounds understood solely as part of the individual's identity. Through an increase in proximity between the collaborators and the cast, non-normative voices were reframed beyond the established audience/performer

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[96] The Access Manager from Shakespeare's Globe commented: 'I think it's just good for us, as an organisation, to be aware that we are not just a visual site. We look around our site and we think we understand all of it, but some people are approaching this very much with sound as the primary aspect of their experience for engaging with our spaces . . . I think we need to start thinking as an organisation about how sound is very much part of the lived experience of the staff, the visitors, the students and the audience' (Direct spoken correspondence with the primary researcher, 03.09.17).

relationship and, consequently, created a new form of inclusive audibility within socially public space. The humour and creativity of non-normative voices was celebrated in the visualisation of the group's vocal tics. Here, difference is audible but transcends sonic representation, entering the visual modality and gaining significance through new socially coded modal resources in relation to layout and colour. The visualisations construct an ensemble of modes in order to communicate the meaning intended. The visual modality enables the voices of the collaborators to become audible in new ways. Finally, the exhibition enabled the voices of the collaborators to function through different registers of audibility, furthered in the distribution of the guest blog post. Figure 80 summarises the analysis of the workshop – charting the registers of audibility, aural perspective and significance of each of the seven key moments in the event.

TIME	DESCRIPTION	REGISTER OF AUDIBILITY	AURAL PERSPECTIVE	SIGNIFICANCE
Pre Event	Collection of collaborator access requirements	Passive & Non-Auditory	Figure	Collaborator access requirements positioned at the heart of the workshop design
Day One	Co-creation of a collaborator's agreement	Direct	Figure	As above & collective non-normative voices identified with and reacted to by the group
Day One	Visualisation of tics	Compound: Direct & Non-Auditory	Figure, Ground & Field	Making normal the usually Othered, celebrate the humor and creativity of Tourettes, fluidity in aural perspective = sonic inclusion
Day One	Performance	Compound: Direct & Passive	Figure, Ground & Field	New opportunities to include the often excluded in the theatre, fluidity in aural perspective = sonic inclusion
Day Two	Conversation with actors	Direct	Figure, Ground & Field	Reframe the performer/audience relationship, new opportunities to include the often excluded in the theatre
Day Two	Exhibition	Compound: Direct, Passive & Non-Auditory	Figure, Ground & Field	Non-normative voices positioned at the heart of inclusive change within organisation, new opportunities to discus and oppose sonic exclusion
Post Event	Guest blog post	Compound: Passive & Non-Auditory	Figure	Collaborators given control over the ways in which their voices were distributed to the public , increased opportunities for non-normative voices to be experienced by the public

Figure 80. Network of Audibility and Aural Perspective - Event Five

7.7 Summary and Conclusions

This chapter has created a textual phonography of the audibility of difference – a central theme in the development of new knowledge and understanding of sonic in/exclusion primarily concerned with the social experience and political potential of audibility in relation to d/Deaf and disabled people's interactions with socially public spaces. By considering issues of audibility and social identify we can observe that the way in which our voices sound within the cultural imaginary creates links and connections that accentuate individual identities as a relational project. The audibility of the voice is inescapably tied to issues of listening practices that operate through constructed ideological systems that (re)produce and regulate cultural ideas about sound and identity (Stoever, 2016; Goodman, 2010). In short, our voices shape and are shaped by our social identities. It is clear that the design of the contemporary sonic world serves as a communicative vessel for the ideologies of those who made it. Therefore, increases in the audibility of non-normative voices within design processes can be positioned as opportunities to diversify designed outputs, acknowledging the diversity of the population which, in turn, leads to increase in social inclusion.

By adopting a multimodal framework for discourse analysis the chapter considers the differing ways that the audibility of non-normative voices was increased within socially public spaces during the research process. This approach isolated key moments within the research process in which the audibility of non-normative voices was increased, focusing on proximity, registers of audibility and aural perspective to reveal a host of socially inclusive repercussions that occurred when the audibility of non-normative voices was increased. These are listed below.

Increasing the audibility of non-normative voices during the research process enabled:

- Collaborator access requirements to be positioned at the heart of the workshop design

- People with similar experiences to meet and share experiences

- New opportunities to discus and oppose sonic exclusion to be created

- A space to be created in which elements of disabled people's social identities that might often be positioned as different, to become the norm

- The humour and creativity of neurodiversity to be acknowledged and celebrated

- New opportunities to include disabled people in the theatre to be created

- Collaborators to have control over the ways in which their voices were distributed to the public

- New opportunities for non-normative voices to be experienced by the public to be established

Ultimately, the analysis suggests that a sonically inclusive environment is one in which non-normative voices are framed simply as voices and in which the mode or aural perspective (which frames how voices are listened to and contextualised) is fluid. Such sonically inclusive spaces were created during the research and propose that an output of this work, perhaps unforeseen at the outset, was to design a series of sonically inclusive spaces in which d/Deaf and disabled people could share their experiences of sonic inclusion honestly and openly. Such sonically inclusive spaces speak to the notion of an 'acoustic politics of voice' (Kanngieser, 2011) in which people adopt attentive listening practices to contextualise the content of speech and the ways in which communication operates under the heavy influence of social identities. This compliments LaBelle's conception of an 'acoustics of assembly and resistance' (2018) in which the voices of citizens negotiate systems of auditory normativity and power towards the opening of 'new spaces that can challenge the capitalist appropriations of communication and discourse, to find ways for us to speak in common, with conviviality and with care' (Kanngieser, 2011: 13). The following chapter will introduce the final textual phonography and multimodal analysis focusing on the theme of sonic affect to examine the affective power of sound in relation to social inclusion in socially public spaces.

SONIC AFFECT

8.1 Introduction

Having considered the audibility of difference in chapter seven, this chapter examines sonic affect as the third and final area in which the thesis unpacks the complexities of sonic in/exclusion in socially public space. The chapter builds upon the 'affective turn' in the humanities and social sciences (Sedgwick and Frank, 1995a; Massumi, 1995) by situating the lived experiences of d/Deaf and disabled people within existing considerations of affect theory in Sound Studies and Disability studies. The chapter details an 'affective sonic ecology' in order to generate new knowledge of the divergent and non-normative affective power of sound in socially public spaces. The chapter considers 'auraldiversity' a recent paradigm emerging at the intersections of Inclusive Design and Sound Studies that acknowledges the diversity of human hearing and the multitude of factors that position the hearing modality in a state of constant flux (Drever, 2017; Renel, 2018). Chapter eight concludes by analysing examples from the research data of the divergent and non-normative affective power that sound has on d/Deaf and disabled people. This analysis includes a multimodal investigation of the impact of the sonic environment of BAC on the involuntary noises and words of a research collaborator with Tourettes during research event three.

8.1.1 The Affective Turn

Affect is not grounded in a single or binary concept but rather relates to a multiplicity of theoretical approaches often with conflicting definitions and applications across diverse disciplinary landscapes including feminist theory, queer theory, cultural studies and psychology (Clough and Halley, 2007; Wehrs and Blake, 2017). Affect theory is often applied to better understand the meaning of somatic experiences - beyond the limitations of critical interpretation - framing human experience through the realms of causality and interaction to illuminate 'our power to affect the world around us and our power to be affected by it, along with the relationship between these two powers' (Hardt, 2007: viii). The 'affective turn' in the humanities and social sciences (Sedgwick and Frank, 1995a; Massumi, 1995) was born from a dissatisfaction with positioning forms of embodiment experienced beyond the sphere of language and communication within cultural theory. The turn offers critical engagements with the body, particularly informed by approaches in feminist and queer theories (Pedwell and Whitehead, 2012; Johnson and McRuer, 2014). Wetherell (2015: 140), describes the turn to affect as a positive repercussion of a renewed 'interest in the ways in which bodies are pushed and pulled in contemporary social formations, in the 'engineering' of affective responses, and in how workers and citizens become emotionally engaged and affectively interpellated'.

8.2 Affect and Sound

A longstanding interest in the affective potential of the auditory is held within the field of Sound Studies. Southworth (1969) - often credited with the first academic use of the term soundscape (Foale, 2014; Pijanowski, 2011) - advocates increased sociological research into sound and affect, suggesting that the (affective) design of the soundscape might make the city less stressful.[97] The field of Acoustic Ecology, critiqued for its prioritisation of the 'hi-fi' rural soundscape,[98] provides a historical reference in framings of auditory affect. In developing a communications model of Acoustic Ecology Truax (1978) describes the field as 'the study of the effects of the acoustic environment, or soundscape, on the physical responses or behavioural characteristics of those living within it'. Historical entanglements of sonic affect have foregrounded phenomenological approaches (Ihde, 2007) and have to some degree followed the prejudices of Acoustic Ecology by focusing on the negative effects of noise on people (Kryter, 1970; 1994). The affective turn, however, has enabled affect theory to resonate in new ways within the field of Sound Studies (Goodman, 2010; Keizer, 2010; LaBelle, 2010; Thompson and Biddle, 2013) transcending phenomenological approaches to encompass new materialist perspectives (Thompson, 2017; Voegelin, 2011). The affective potential of sound in relation to psychological and sociological relationships between humans and their environment is gaining momentum, primarily in areas of productivity (Errett et al., 2006; Nachtegaal et al., 2011; Treasure, 2011) and wellbeing (Goodard et al., 2012; Yeh, 2016). What is lacking from the application of theories of affect within the arena of Sound Studies is a clear line of inquiry that investigates the capacity of the auditory to affect and be affected by d/Deaf and disabled people.

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[97] Southworth notes: 'the visual experience of cities is closely related to the sounds that accompany it. If this point is supported by further research, it has real significance to city design . . . the sonic environment may have effects on an entire community's mental health, although it has not yet been established that this is the case. In many situations design of the soundscape alone may be a way of making the city less stressful, but more delightful and informative to its users' (Southworth, 1969: 65).

[98] Acoustic Ecology, in particular R. Murray Schafer's *The Soundscape: Our Sonic Environment and The Tuning of the World (*1977), is critiqued for its bias towards rural, natural soundscapes -those with a low ambient noise levels and high signal-to-noise ratios. Schafer presents the urban, city soundscape as 'lo-fi' and inferior to the rural 'hi-fi' soundscape. This soundscape favouritism is naturally born out of Schafer's fears that the growing noise levels in cities, and lack of consideration being given to the soundscape in urban planning, would have huge repercussions on societal factors such as public health, education and wellbeing.

8.3 Affect and Disability

Disability Studies has drawn on theories of affect to better understand how feelings are produced, hidden and amplified beyond the realms of embodiment grounded in spoken language and communication. Disability Studies scholars have used Hochschild's *The Managed Heart* (1983) to critically engage with disabling forms of emotional labour [99] (see Goodley 2016; Runswick-Cole 2010). Tomkins' categories of affect (2008) and writing on shame (Sedgwick and Frank, 1995a) are also commonly cited in work that connects affect theory to Disability Studies (Garland-Thomson, 2009), particularly those grounded in feminist approaches that question how the affective power of shame is negotiated beyond language (see Morris, 1991; 1996). Recent work in Critical Disability Studies (Goodley et al, 2018) begins to chart the connections of theoretical orientations and trajectories between affect theory and Critical Disability Studies.[100]

The lens of Critical Disability Studies enables affect and emotion to be theorised as corporeal thoughts and embodied processes that influence and are influenced by social values, bonds, behaviours and rules. This position is of value to this investigation which considers how lived experiences of sonic in/exclusion are negotiated between embodied processes and the values and rules of the auditory normate outlined in chapter two. Such critical framings of affect theory, which consider the values and behaviours of sociality, are discussed throughout Blackman and Venn's special 'Affect' issue of *Body & Society* (2010). In the final paper of the journal Patricia Clough (2010) considers the future of affect studies as a rethinking of the privileges of social sciences and the humanities - specifically in relation to political-economic power, cultural difference, semiotic chains of identity and linguistic-based structures of meaning making. Clough's text tackles the 'difficult question' of affect, subjectivity and sociality. This empiricism of sensation is at the forefront of affect theory and Disability Studies and resonates within wider affective discourse of influence to this investigation (Clough, 2009; Parisi, 2009; Meillassoux, 2008). The meeting of Critical Disability Studies and affect theory enables critical perspectives of embodiment and affect to be considered within what Hardt and

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[99] Hochschild's emotional labour refers to moments in which an individual operates in ways that fit the expectations of others, or in which a person manages their emotions in a way that priorities the requirements of an external element such as a job.

[100] Goodley et al (2018: 206) note: 'Just as feminism can claim a long historical alignment with affect through 'the personal is political', so critical disability studies can also point to a body of literature that has been engaged with the affective experiences of disability . . . Critical disability studies is a nascent field of scholarship and activism that explicitly engages with transformative fields of inquiry including queer, postcolonial, indigenous and feminist studies. Theories of affect sit at the intersections of these different spaces of theorisation'.

Negri (2004) describe as an *affective register* that is distributed through a complex web of socio-cultural relationships, strongly tied to intersectional issues of identity.

8.3.1 An Affective Sonic Ecology

This chapter builds on the perspectives above by situating the lived and embodied experiences of d/Deaf and disabled people between the pillars of affect, sound and disability, considering the affective power of sound (it's capacity to affect and be affected) within socially public spaces. The chapter draws a particular influence from the understanding of sonic affect introduced by Jordan Lacey in his book *Sonic Rapture: A Practice-led Approach to Urban Soundscape Design* (2016). Lacey's work draws on established theories of affect including *Autonomy of Affect* (Massumi,1995; 2002), *affective politics* (Thift, 2008) and Steve Goodman's (2010) analysis of affective sonic environments and the mobilisation of social bodies. According to Lacey:

> 'sonic affect considers the capacity of the urban soundscape to shape the physical and emotional expressions of the collective social body, and, importantly, the capacity of the social body to experience what we might term mythic, imaginative and poetic relationships within the affective environments in which they are immersed'

(Lacey, 2016: 03)

Lacey's conception is relevant to this investigation for several reasons. Firstly, his work on sonic affect is practice-led, grounded in a similar methodological position to this investigation. Secondly, Lacey contextualises his investigation by discussing the homogenized affects produced in urban soundscapes design, dominated by functionalist imperatives.[101] This backdrop of a homogenized affective sonic ecology through which the contemporary city is design resonates with the construct of the auditory normate (discussed in chapter two). Finally, Lacey's text has interventional or solution-driven objectives, he contends that by 'diversifying the affective capacity of our urban sonic ecologies the possibilities for creative encounters and imaginative evocations are increased' (ibid, 2016: 35). This speaks to the overarching oppositional framework of this investigation. Building on Lacey's work this chapter proposes an affective sonic politics that aims to diversify the affective power and potential of socially public spaces towards increases in social inclusion for d/Deaf and disabled people. In considering the sonic environment as affective in this way, the urban soundscape becomes a material that can be shaped and reshaped into new embodied experiences of sonic inclusion, dissolving feelings of isolation,

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[101] Lacey (2016: 35) describes the sonic expression of functionalist imperatives 'as the unerring noise of traffic, air conditioners, sirens and construction work'.

exclusion and oppression and, ultimately, opposing the values and behaviours of the auditory normate.

8.4 Auraldiversity

The paradigm of 'auraldiversity' is an important contextual component in the exploration of sonic affect in relation to sonic in/exclusion. Auraldiversity emerges at the intersections of Inclusive Design and Sound Studies to acknowledge the diversity of human hearing and the multitude of factors that position the hearing modality in a state of constant flux (Renel, 2018). The paradigm contends that human hearing diverges continuously under a multiplicity of influences described by Drever (2017) as the 'actual variety of (often less than ideal) hearing that we experience throughout a normal day and through-out our lives'. Factors that influence the auraldiversity of the population include:

- Age
- Neurological conditions
- Hearing loss
- Auditory conditions such as Hyperacusis and Misophonia
- Non-auditory conditions such as Hypertension, social anxiety and post-traumatic stress disorder
- Sight loss
- Temporary factors such as cold, flu, allergic reaction and Otitis externa (ear infection)

Renel (2018) and Drever (2017) collectively chart a non-exhaustive list of conditions and factors that influence the auraldiversity of the population which are summarised in figure 81.
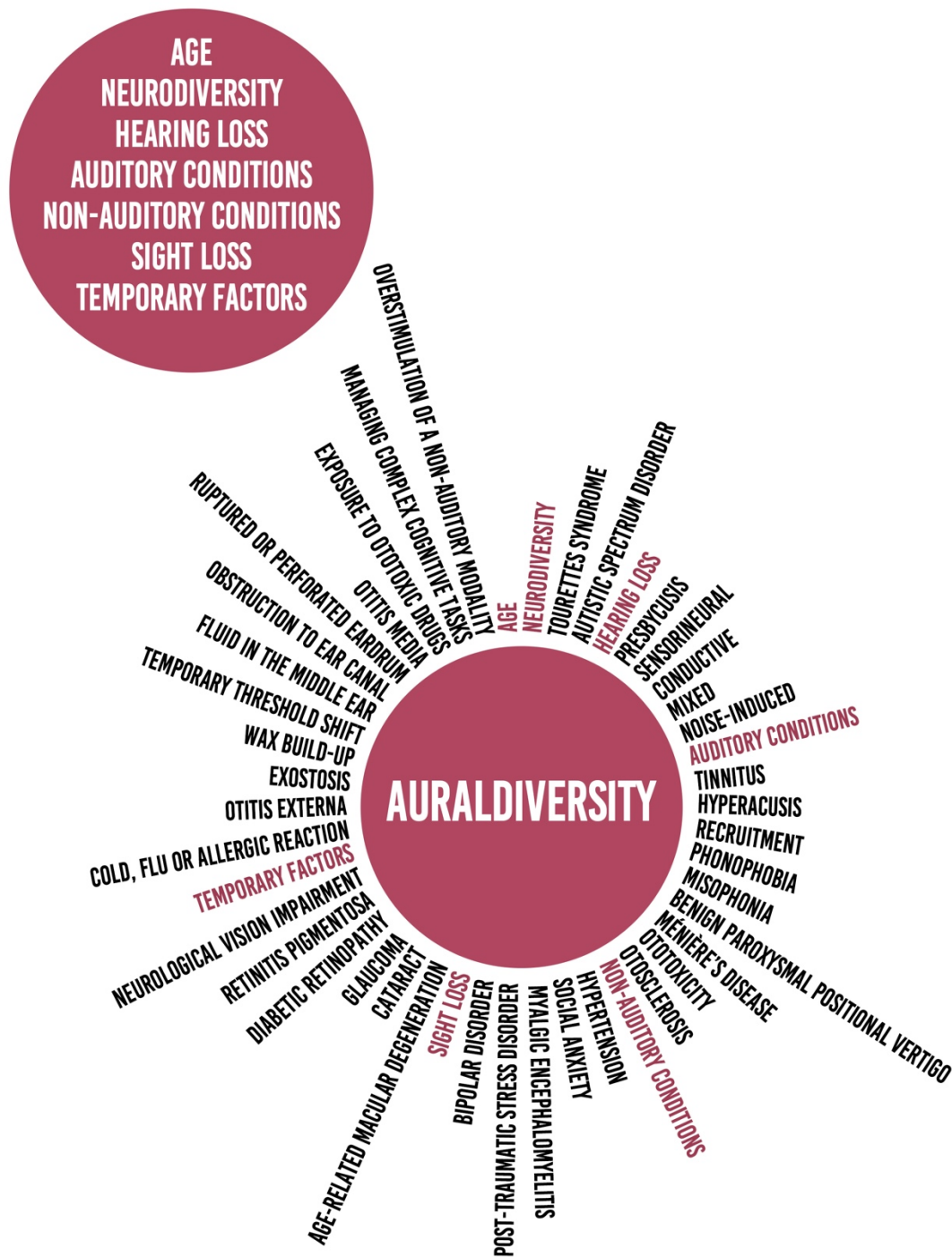
Figure 81. Auraldiversity - Factors of Influence. Adapted from (Drever, 2017; Renel, 2018)

Renel (2018) also situates Nick Walker's terminological framework of neurodiversity (Walker, 2014) within an auditory realm to establish the start of a terminological lexicon through which the auraldiversity paradigm can be framed:

- *Auraldiversity*: the variety and diversity of human hearing – the infinite variation in auditory functioning within our species.

- *The Auraldiversity Paradigm*: a specific perspective on auraldiversity. The auraldiversity paradigm provides a theoretical foundation to be expanded and explored through research and practice.

- *Auraltypical*: having hearing that functions within the dominant societal standards. Auraltypicality is the state from which auraldivergent people diverge.

- *Auraldivergent*: having hearing that functions in ways that diverges significantly from the dominant societal standards of 'auraltypical' hearing.

- *Auraldiverse*: a group of people is auraldiverse if the hearing of one or more members of the group differs substantially from other members. An individual cannot be auraldiverse – an individual can diverge, but diversity is a property of groups.

The auraldiversity paradigm is relevant to this chapter as it foregrounds the multiplicity of ways that sound can affect individuals via the divergent hearing profiles present within the population. However, as will be apparent in the analysis of research data below, the divergent capacity of sonic affect within socially public spaces transcends hearing as a singular modality and operates within a multimodal context.

8.5 Divergent Embodiments of Sonic Affect

The following section details several experiences shared by research collaborators that relate to divergent embodiments of sonic affect. Perhaps an exemplar of what Sterne (2015) describes as the creeping normalism of Sound Studies, the divergent capacity of sonic affect in relation to d/Deaf and disabled people's experiences remains underrepresented within Inclusive Design, Sound Studies and Disability Studies. *Sonic Experience* (Augoyard and Torgue, 2005) attempts to bridge theoretical and practical understandings of sonic affect by cataloguing eighty-two sonic effects, where they occur, and how they are contextualized culturally, towards a new understanding of the affective potential of sound in space. The text provides a welcome update to soundscape terminology - building on renowned works by R. Murray Schafer and Pierre Schaeffer (Schafer, 1994; Schaeffer, 2012). Through an in-depth thematic reading list the text serves as a treasure trove of auditory information applicable across multiple disciplines. However, the text has been

critiqued for neglecting a Spinozist approach (Spinoza, 1996)[102] in favour of a phenomenological, anthropocentric grounding (Thompson and Biddle, 2013; Thompson, 2017). This leads to *Sonic Experience* giving a lack of a critical consideration to the affective power of communicative systems within groups, crowds, or sequences of (human and non-human) sounds. Apart from a brief acknowledgement of tinnitus,[103] the text makes almost no mention of the divergent capacity of sound to affect and be affected by the lived experiences of impairment. New perspectives on sonic affect cultivated through an increased understanding of the divergent capacity of sound to affect and be affected in relation to d/Deaf and disabled people's experiences therefore enable us to ask important questions about what kinds of 'sound' and 'social' designers choose to produce and, in turn, what new kinds of sonic politics, values and actions are created.

8.5.1 Examples of Divergent Embodiments

During a research event three, a collaborator with Tourettes (collaborator A) discussed their sensitivity to sound and the range of sonic effects that they experience specifically because of their condition:

> *'I would say like, over the years, I have kind of noticed that I am quite sensitive to sound and touch. They affect my tics more than I would kind of give Tourettes credit for. Hey. Before I just kind of thought it was personal preferences that I didn't like people too close to me ... but certain noises and flashing lights make me, ha-ho, more tic-y than others. Also, noises can make me quite agitated and I find that quite hard to place myself like physically'*

Collaborator A described sound as a 'maze' and that public spaces with a high ambient noise threshold create a physical structure within the space that they then must navigate:

> *'It's weird because sound isn't physical. But I find it almost like a physical thing I'm trying to make my way through, and I find that it's almost like a maze when I hear like too much sound'*

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[102] A Spinozist approach frames affect as initiated at the intersections of encounters between subjects, objects, and environments.

[103] The authors note: 'we must mention tinnitus, a hearing perception that is not linked to external stimuli (such as ringing or buzzing), which creates an internal masking that can prevent reception of external sound messages' (Augoyard and Torgue, 2005: 71).
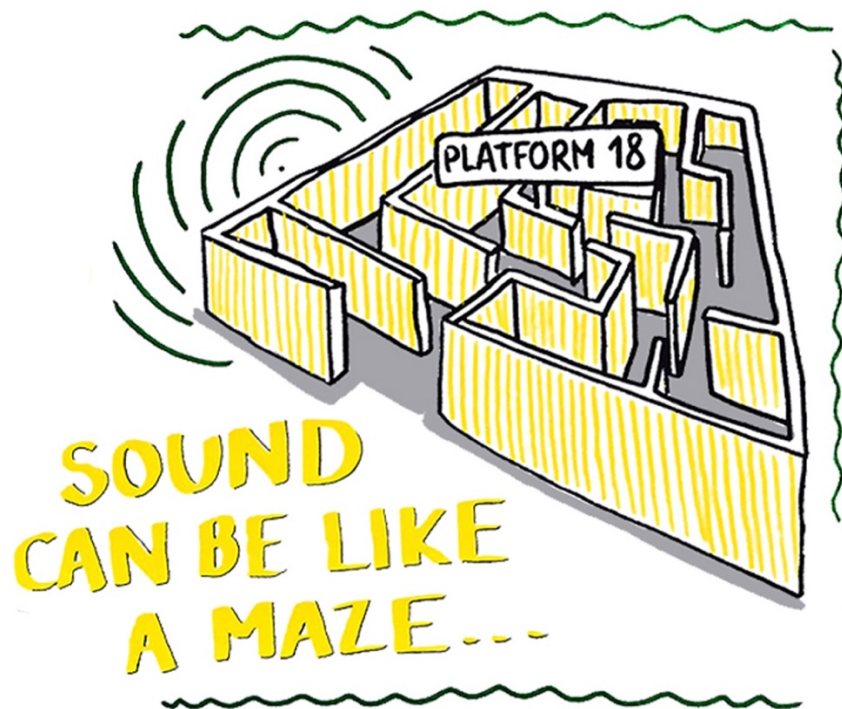
Figure 82. Sound Can Be Like a Maze – Event Three

Collaborator A also commented on the effect that the design of the binaural soundwalking workshop had on their tics. The dialogue below was recorded in the *West Courtyard Lobby* – an open space with high ambient noise threshold and long reverberation time at BAC:

> 'Echo is a huge thing, I have echolalia but also, hi, like being in here and it just booms. So, I just, I just really love being outside . . . if you're outdoors, there is nothing to [influence my tics] It's kind of beautiful. I don't feel claustrophobic in any way. Fuck off. And I can kind of just zone in or zone out'

Sonic affect within the event was also discussed by a collaborator with profound sensorineural progressive deafness (Collaborator B), who commented:

> 'It's interesting actually, I was thinking about it when we were walking through there, because it definitely got very echo-y and that makes it difficult to understand you as well, because there's a lot of reverberation'

Collaborator B concluded their feedback during the workshop by stating that:

> 'acoustics can affect everyone differently but, the perspectives of d/Deaf and disabled people and how sound affects them is generally underrepresented or at least misunderstood in the design of spaces'

Figure 83. Acoustics Affect People Differently – Event Three

8.6 Analysis: Inclusive Design and Divergent Embodiments of Sonic Affect

The aim of this section is to consider the divergent ways in which an acoustic environment or soundscape might affect a person. The experience of collaborator A (who has Tourettes, bipolar and ADHD) is analysed within a framework of mediated actions (Norris, 2004) to contend that the higher-level action of sonic affect is made from multiple chains of lower-level actions, embodied communicative modes (such as vocal tics, movement and posture) and disembodied modes (such as the ambient noise levels in a space). Collaborator A notes that their involuntary movements and noises have an 'eternal conversation' with the sonic environment. It was observed that collaborator A made noticeably more involuntary noises during passages of the conversation in areas with a high ambient noise threshold and/or long reverberation time. The first stage of the multimodal transcription considers the mode of spoken language and specifically the lower-level action of involuntary words and noises. Of Collaborators A's 3,617 spoken words during the workshop, sixty-three (1.7%) were tics (figure 84).
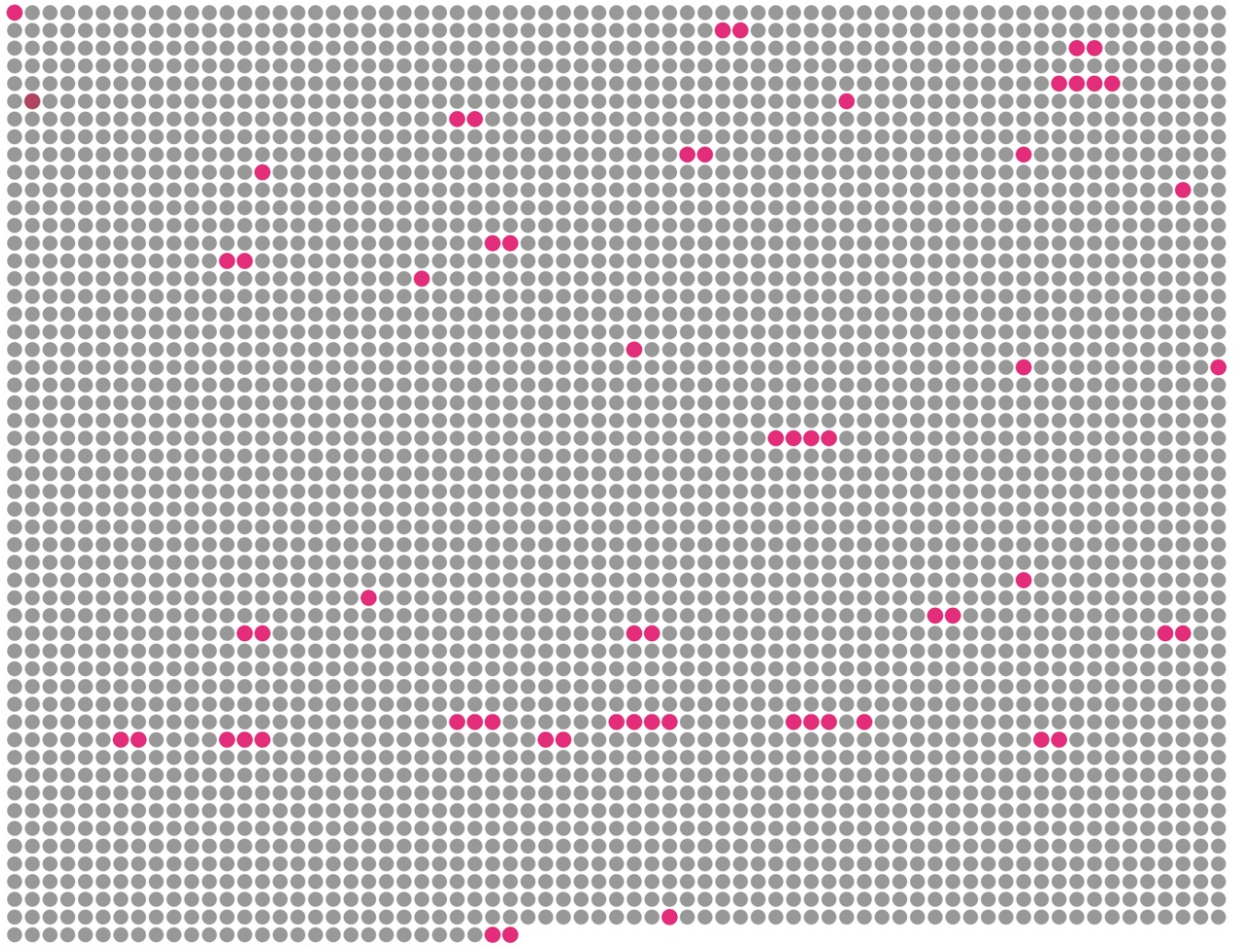
Figure 84. Frequency of Vocal Tics – Event Three

Figure 84 highlights a low modal density[104] with regards to the lower-level action of involuntary spoken language within the high modal density of voluntary language - summarised by figure 85.

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[104] As noted in chapter three, when modal density is high the focus of the individual is the higher-level actions constructed. When modal density is low, the individual will background the higher-level action though may remain aware of it.
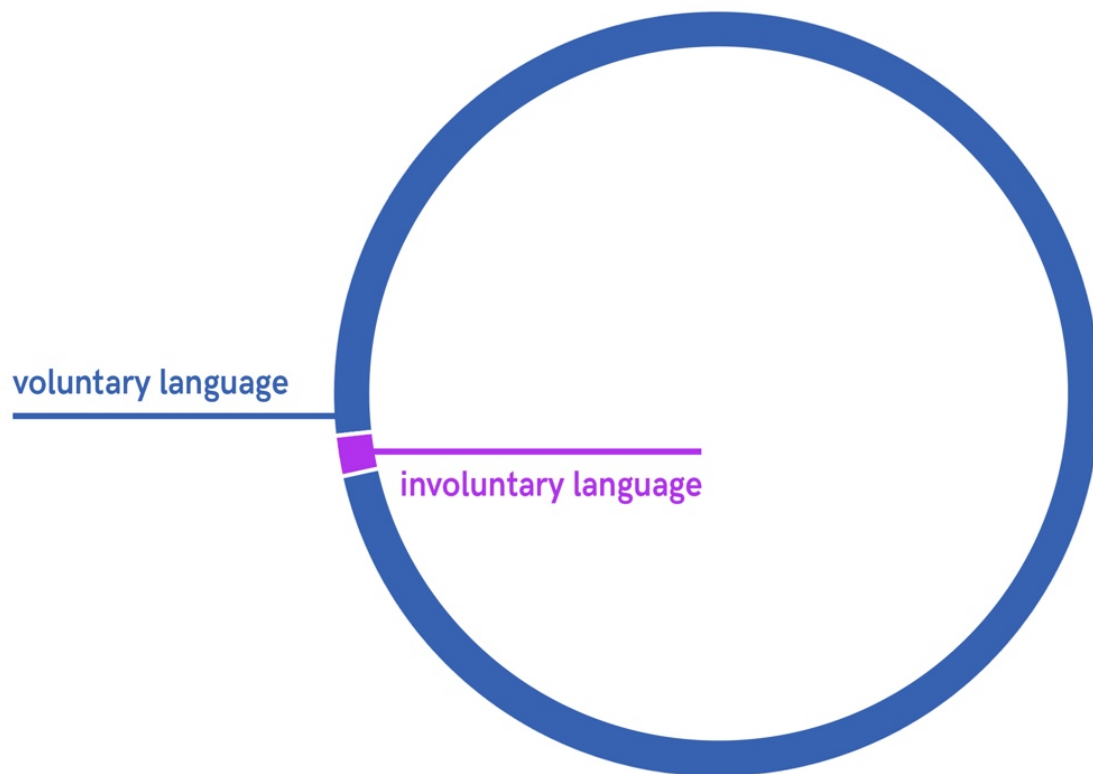
Figure 85. The Modal Density of Voluntary/Involuntary Spoken Language – Event Three

The second stage of the transcription considers the lower-level actions of involuntary spoken language and voluntarily language but also introduces the disembodied mode of changes in the sonic environment. Of the sixty-three involuntarily spoken words, sixteen (25%) occurred when the sonic environment changed.[105] Figure 86 represents the three lower-level actions: voluntary and involuntary spoken language and involuntary language triggered by changes in the sonic environment.

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[105] Changes included moving into a quiet corridor with an extremely low-ambient noise threshold, moving into a corridor and stairwell with long reverberation time and moving into the foyer and onto the stairs by the main entrance both of which have a high ambient noise threshold and background music.
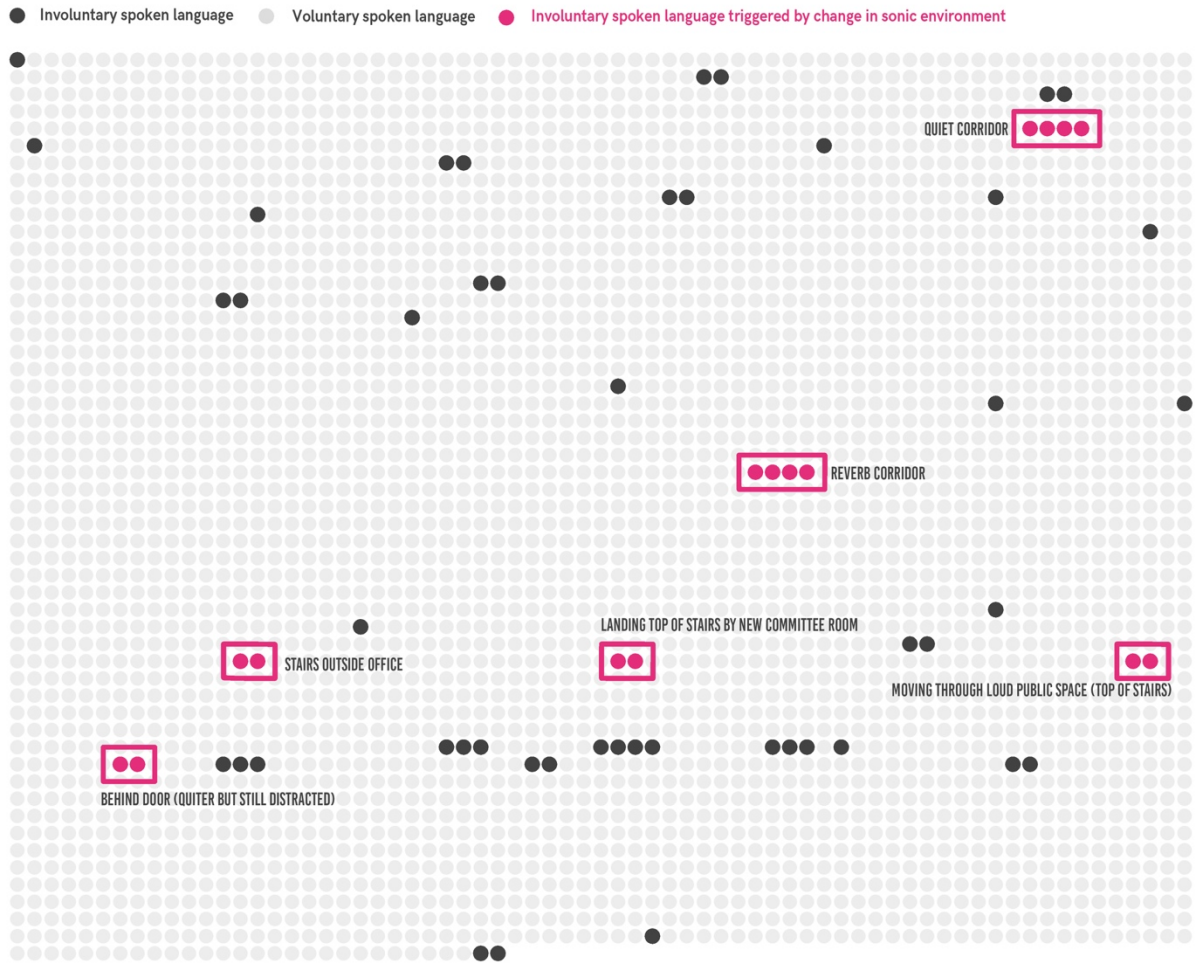
Figure 86. Involuntary Language vs Changes in the Sonic Environment

Figure 86 highlights a quarter of the modal density with regards to the lower-level actions of involuntary spoken language is applied to involuntary spoken language triggered by changes in the sonic environment, summarised in the graph below (Figure 87). In short, moving into different sonic spaces (be they loud, quiet or reverberant) has a significant (25%) impact on the number of involuntary words that Collaborator A produces.
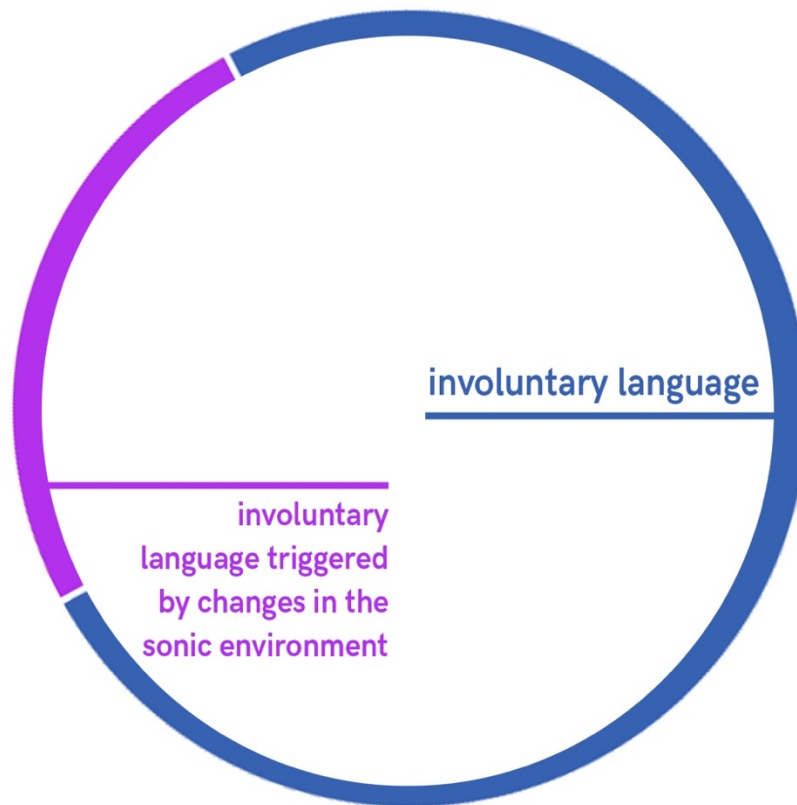
Figure 87. The Modal Density of Involuntary Spoken Language Triggered by Changes in The Sonic Environment – Event Three

Of the sixty-six involuntarily spoken words, twenty (30%) occurred in a specific location - the *Old Artist' West Corridor.*[106] During this period collaborator A became very distracted by the noise and eventually asked to move the conversation on to a quiet space. Highlighted in the transcript from the conversation:

> *'Um, can we move? Ho, cause, fuck off, I am just, I am finding that the sound, ho, in here is making me tic and I can't concentrate on where we are or what we are saying'*

This intensification of the affect of the sonic environment on collaborator A's involuntary spoken language is evident in figure 88 which shows the majority of involuntary words occurring between long passages of voluntary speech, thus creating low-modal density for the involuntary language as highlighted earlier in this chapter.

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[106] The Old Artist' West Corridor is an area near several of the public spaces at BAC which has a large echo and long reverberation time due to numerous hard surfaces, tiled floor and open-plan layout).
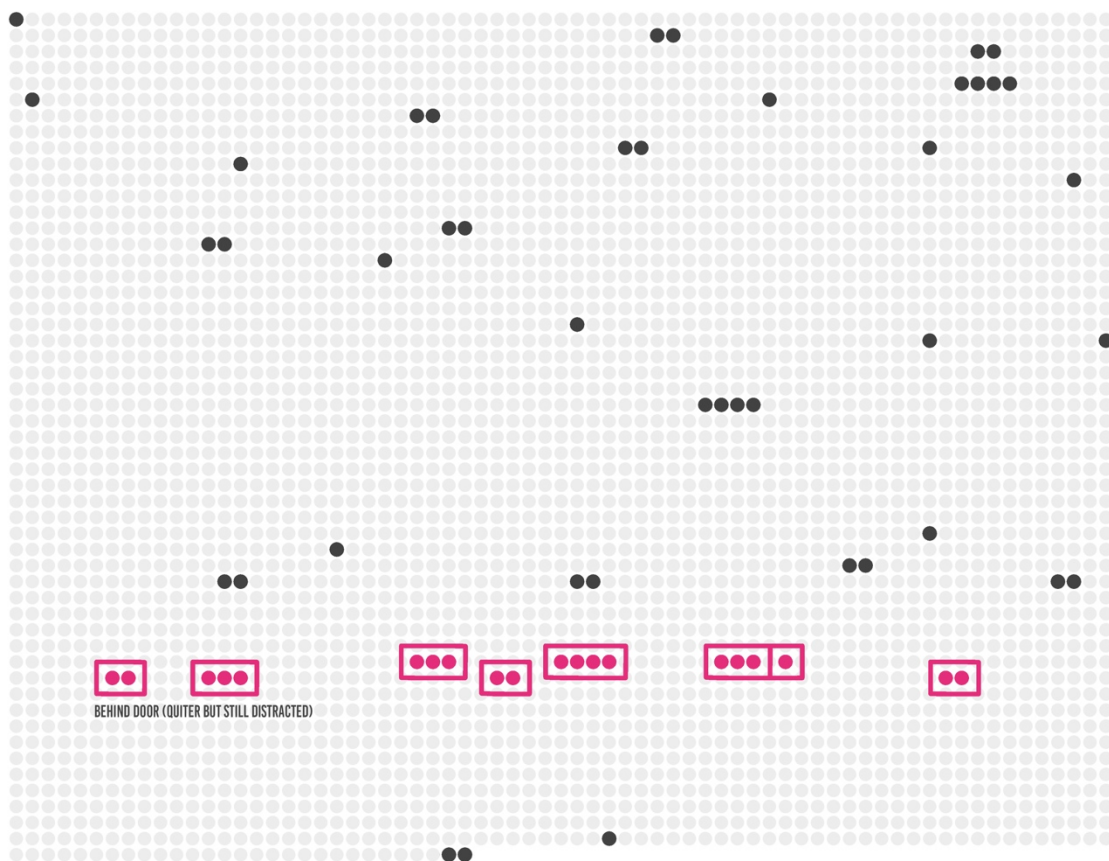
Figure 88. Intensification of Sonic Affect – Event Three

What this passage of increased involuntary spoken words highlights is the ability for sound to quickly affect the language of Collaborator A, moving involuntary language from a lower-level action with low modal density with little or no impact on the conversation to an action with high modal density that disrupts the conversation, causes discomfort for collaborator A and causes the conversation to be moved to a quieter location.

8.7 Summary and Conclusions

This chapter has created a textual phonography of sonic affect, identified as a central theme in the development of new knowledge and understanding of sonic in/exclusion, concerned with the affective power of sound in relation to d/Deaf and disabled people's experiences of socially public spaces. Building on the 'affective turn' in the humanities and social sciences (Sedgwick and Frank, 1995a; Massumi, 1995) the chapter detailed an 'affective sonic ecology' in order to better understand the divergent and non-normative affective power of sound in socially public spaces. This is discussed in relation to stories of divergent embodiments of sonic affect shared by research collaborators during the research process. The chapter further

discusses divergent sonic affect by introducing the emerging paradigm of auraldiversity that acknowledges the diversity of human hearing and the multitude of factors that position the hearing modality in a state of constant flux (Drever, 2017). By adopting a multimodal framework of mediated actions (Norris, 2004) the chapter analyses the affective capacity of the sonic environment of a theatre on the involuntary noises and words of a research collaborator with Tourettes. The analysis highlights the significance that moving through different sonic spaces has on the number of involuntary words that the collaborator make. Ultimately, this analysis suggests that a sonically inclusive environment is one that is designed to acknowledge and accommodate the diversity of ways that sound impacts people. By generating new knowledge and understanding of the divergent capacities of sound to affect and be affected by people in space the chapter opens up new possibilities of socially and sonically inclusive practice. The following chapter will provide a conclusion to the thesis by charting key findings, limitations and the opportunities that arise for future research and development.

CONCLUSION

9.1 Introduction

Having analysed and discussed the research data in the previous three chapters, this concluding chapter provides a summary of key findings from the research and their impact within the disciplinary fields of Inclusive Design, Sound Studies and Disability Studies. The chapter outlines the limitations of the study and the opportunities that arise for future research and development.

9.2 Summary of Key Findings

This practice-led PhD aimed to make original contributions to knowledge and understanding within the field of Inclusive Design through three primary channels: discourse and theory, methodology and design. The following section will describe contributions within these areas.

9.2.1 Discourse and Theory

In positioning the production of discourse and theory as a primary contribution that this investigation makes to original knowledge, the research responds to calls for a critical approach to Inclusive Design (Hamraie, 2016; 2017). As Inclusive Design continues to expand as a socially inclusive practice (Gheerawo, 2016), increasingly applied by the commercial sector and incorporated into government legislation (Holmes, 2018), it is in danger of becoming theoretically diluted and depoliticised; a box-ticking process or term to make an organisation 'look good'. Accepting Inclusive Design simply as common-sense, good design for all 'elides the frictioned struggles and strategic interventions that accessible design produces and therefore tells us little about the critical work of negotiating, contesting, and remaking access-knowledge' (Hamraie, 2017: 259). In response, this thesis develops two key discourses: 'the auditory normate' and 'Sonic Inclusion'. The thesis defines the auditory normate as an ableist system of designed oppression composed of auditory values and practices that produce and reinforce normative hearing and communication, thereby sculpting auraldivergence and auditory difference as devalued states of existence. By listening to and analysing the lived experiences of d/Deaf and disabled people in socially public spaces, the thesis defines sonic inclusion as the ways in which sound includes people in society. This relates to Inclusive Design initially through the design and management of structural components such as assistive listening systems, audio description and wayfinding information. The development of new discourse relating to sonic inclusion also raises important questions about how Inclusive Design might counter sonic exclusion experienced within environments that are governed by particular sonic rules such as lifts, cinemas, theatres, galleries, libraries and museums, many of which prioritise

the normative perspective of the silent or quiet patron (Whitfield and Fels, 2013; Kitchin, 1998; McGrath, 1996). Further implementing and expanding the discourses of sonic inclusion and the auditory normate generated in this thesis within future Inclusive Design research is understood as key to the development of more socially and sonically inclusive design.

9.2.2 Methodology

As noted in chapter three, a challenge for contemporary inclusive designers is to provide innovative and accessible design *methods* through which an increasingly diverse set of people can be engaged in the design process towards an increasingly diverse set of goals. In response, the sonically inclusive methodology developed through this research at the intersections of Inclusive Design, Sound Studies and Disability Studies creates increased opportunities to distribute elements of the practices and principles inherent within these fields in diverse disciplinary contexts. The perspective of (Critical) Disability Studies (Ellis et al, 2019; Goodley, 2012) provides the methodology with a critical framing of disability and impairment that extends a constructivist approach to foreground the materiality of the disabled body, and its embeddedness in the world. Broadly, Sound Studies brings to the methodology a conscious understanding of the diversity of ways that sound impacts individual and collective experiences of space (Schafer, 1994; Truax, 1984; Gershon, 2012; Arkette, 2004; Ihde, 2007). Specifically, in architectural contexts (Blesser and Salter, 2009) and the increasing application of soundscape research within the design of the built environment (Lappin et al, 2018; Ouzounian and Lappin, 2014; Kang and Schulte-Fortkamp, 2016; Cain et al, 2008; Davies et al, 2007). The political potential of sound is also embedded within the methodology through recent Sound Studies scholarship grounded in feminist and new materialist perspectives (Voegelin, 2019; LaBelle, 2018) which contemplates how people negotiate systems of normativity and domination through 'sounding and unsounding particular acoustics of assembly and resistance' (LaBelle, 2018: 04). Inclusive Design positions a human-centred approach (Giacomin, 2014) at the heart of the methodology, acknowledging the importance of human diversity within a design process (Fletcher, 2006) that strives towards simple, flexible solutions to social and societal issues (Waller et al, 2015).

Existing Inclusive Design methodologies have predominantly used sound as a method of data collection, towards other modes of visual or text-based analysis, interpretation and representation (Rychtáriková et al, 2012; Heylighen et al, 2009). In contrast, the methodology of this study has embedded sonic theory and practice throughout - from diverse data collection methods including binaural and omnidirectional recording (see chapter three) that are uncommon or absent within Inclusive Design, to methods of sound-focused multimodal analysis that consider the

presence, absence and meaning of sonic agency within the research process (chapter six). Existing theoretical framings of sound and hearing within Inclusive Design methodologies are grounded in a position of auraltypicality (Renel, 2018; Heylighen et al, 2010) that fails to recognise the diversity of human hearing or foregrounds specific perspectives such as sight loss or hearing loss (Herssens et al, 2011; Heylighen and Herssens, 2009; 2014). By understanding the 'actual variety of (often less than ideal) hearing that we experience throughout a normal day and through-out our lives' (Drever, 2017), the methodology counters existing limited framings of sound and hearing within Inclusive Design and contributes to the emerging paradigm of auraldiversity (Drever, 2017; Renel, 2018). This interdisciplinary methodology is situated as a key contribution to knowledge and understanding that the research makes within the field of Inclusive Design.

9.2.3 Design

We can understand from the lived experiences of research collaborators sonic exclusion is experienced through two forms of social oppression: structural and psycho-emotional disablement (Reeve, 2012). If a building strives to be accessible to d/Deaf and disabled visitors, then structural considerations need to be made to attend to the sonic barriers that the design and management of the building inherits or creates. But if a socially public space aims to transcend accessibility and create an environment that is both socially inclusive and socially equitable (Bichard, 2018), then the psycho-emotional sonic experiences of a space must be considered. Three sonically inclusive design projects were initiated as part of the research to attend to both structural and psycho-emotional auditory disablement: non-visual navigation, Audio-Embedded Live Scribing (AELS) and the Sonic Story.

The non-visual orientation and navigational system consisted of twenty-five earcons and a high contrast tactile floor map co-designed by a collaborator with sight loss and installed at the *Devoted and Disgruntled* conference in Warren Street, January 2018. The final design created increased opportunities for blind and partially sighted people to navigate confidently and independently. The design also increased non-visual experiences and interactions with the event leading to the highest number of attendees who self-identified as having sight loss in the history of the conference. AELS is a multi-sensory digital tool for sharing research data. The AELS features integrated audio description and captioning - positioning accessibility at the heart of the interface and meeting the requirements of both the British Standards *Web Accessibility Code of Practice* (BS 8878, 2010) and the World Wide Web Consortium (W3C) standards for *Web Content Accessibility Guidelines 2.1* (W3C, 2018). The AELS design project was initiated primarily to utilise digital tools in order to 'make sense' (Coffey and Atkinson, 1996) of the large amount of multimodal research data collected during the research events and to generate accessible avenues through

which research collaborators could engage with the findings of the research beyond the written thesis. The tool offers a multimodal engagement with research data and resonates with the principals of contemporary data visualization and data driven design (Krum, 2014; McCandless, 2009; Kirk, 2016) by delivering an easy to understand system that communicates a complex data set through a simple interface. AELS generates multiple sensory points of interaction taking into account different cognitive preferences and communication needs. The Sonic Story is a visual representation of an environment or event that highlights the key elements of auditory significance. The method, developed at Shakespeare's Globe, is not purposefully designed to include one set of lived experiences but can be particularly useful for anyone who might benefit from increased information about a sensory environment prior to or during their visit, such as a person with a learning disability or a person who experiences social anxiety. The three sonically inclusive design projects, and their success in overcoming both structural and psycho-emotional auditory barriers through their application in socially public spaces, are positioned alongside the methodology detailed above as a key contribution to knowledge and understanding that the research makes within the field of Inclusive Design.

9.3 Limitations

This section will discuss the limitations of the research.

Environment

The research was undertaken within socially public spaces in the UK, specifically Battersea Arts Centre and Shakespeare's Globe in London. These environments were identified as excluding of disabled people (see chapter 1). The research does not consider the issues of sonic in/exclusion in similar environments in other areas of the UK or internationally. The research is also limited to cultural institutions, and therefore does not consider the implications of sonic in/exclusion in other environmental settings such as public transport, hospitals or digital/online.

Thesis Format

The primary researcher planned to create an audiobook of the thesis in which chapters would be read by research collaborators with non-normative voices. This would increase the accessibility of the thesis for anyone who would prefer to receive the work as a non-textual document. A non-textual thesis would also raise critical questions about the sonic in/exclusivity of the academy, which could be further reflected in the work. Recording an audio thesis with research collaborators would have extended the collaborative nature of the research and the development of a co-

authored, non-normative audio thesis is therefore identified as a key priority for future development.

9.4 Future directions

This section details the future directions of the research. The primary researcher has a number of forth coming publications that relate to sonic inclusion, including in *Curator: The Museum Journal* and *Architecture and Society.* The primary researcher has been awarded funding by *Unlimited* (weareunlimited.org.uk)[107] to develop an interactive sound installation exploring sonic inclusion in partnership with *Touretteshero* and a collaborator with Tourettes who attended several of the research events. The primary researcher has been awarded a Postdoctoral Innovation Placement from LDoc to continue work with *Touretteshero* in the arena of inclusive knowledge exchange and practice. The primary research continues to work with Shakespeare's Globe to develop Sonic Stories for all of their relaxed performances and will work with the Access Manager in 2019 to develop a Sonic Story of the Globe building, expanding the format from a performance-specific, visual-only graphic to a building-wide interactive multi-sensory tool.

9.5 A Sonically In/Exclusive Closing

Sound is everywhere and is political. As this thesis has shown, the diverse ways we speak and listen as well as the divergent affects that sound has on us as we move through space is socially, politically and culturally informed and plays a vital role in defining our place in society. For many, sound, and attitudes towards sound, can dictate whether a public space is inclusive or exclusive, accessible or non-accessible. Yet physical and visual concerns have dominated Inclusive Design historically, leading to the prioritisation of people with physical and visual impairments and leaving invisible, cognitive and auditory concerns as devalued states of being. However, recent developments in standards, legislation and Inclusive Design research are beginning to signal an important move towards more a sonically inclusive future. The British Accessibility Standard *Design of an Accessible and Inclusive Built Environment Part 2* (BS8300-2 2018: 154) recommends a dedicated quiet space within built environments in which 'individuals might find peace and calm in order to manage sensory/neurological processing needs.' The standard also promotes the provision of multimodal information and way-finding according to the principle of at *least two senses*. The International Standard *Definition and Conceptual Framework of Soundscape* (ISO 12913-1 2014) acknowledges that

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[107] Unlimited are a disabled-led organisation that supports ambitious, creative projects by outstanding disabled artists and companies.

factors such as hearing loss will cause human hearing to diverge and should therefore be considered in the design and management of public soundscapes. Drever (2017) describes this as a 'sea change' in how an acoustics standard regards hearing, beyond a fixed sense to a divergent and fluctuating modality. The European Cooperation in Science and Technology action TD0804 - *Soundscape of European Cities and Landscapes* (Kang et al, 2013) represents a critical shift in acoustics - transcending the prioritisation of physical acoustic measurements to include methods from human and social sciences to account for the diversity of soundscapes in the built environment. The action foregrounds the developing holistic approach in urban soundscape design and management which frames environmental sounds as a resource rather than a waste (Kang, 2013; Kang and Schulte-Fortkamp 2016). Finally, the emerging paradigm of auraldiversity (Drever 2017; Renel 2018) positions the perspective of divergent hearing at the centre of Inclusive Design thinking and practice.

What each of these perspectives highlight is that if Inclusive Design aims to create public spaces that are open, accessible and equitable, then sound and sonic inclusion needs to be pushed to the forefront and explored in new and innovative ways. By imagining a sonically inclusive future, in which the political and social value of d/Deaf and disability embodiment is foregrounded, the constraints of the auditory normate can start to be undone. This thesis contends that the opposition of auditory normalism in design, led by d/Deaf and disabled people, must continue to grow and expand as an arena of interest and inquiry - the social inclusion of the sonic citizens of the future depends on it.

APPENDICES

Appendix 1: Royal College of Art RE1 Form – Ethics Approval

Form RE 1

Research Ethics Checklist and Consent

- **To be completed by the researcher, and submitted to the Research Office.**

Name of Researcher: William Renel

Title of Research Project: Sonic Inclusion: exploring the relationship between sound and social inclusion in creative urban environments

Department: Helen Hamlyn Centre for Design

Research Ethics Checklist

Researchers should consider the parameters of their intended research and its potential impact. Should any of the following elements be involved in the proposed research, advice from the Research Ethics Committee must be sought before the research is undertaken.

An indicative list of those affected by potential risks follows:

☐ Active involvement of other participants
☐ Passive involvement of other participants
☐ Colleagues and staff within other higher education institutions
☐ Members of the public
☐ Children, young and other vulnerable persons
☐ Animals
☐ External bodies

Potential influencing factors:

☐ Potential adverse impact on the environment
☐ Moral obligations
☐ Legal liabilities
☐ Insurance
☐ Health and safety

If any of the above elements are present in the research, Researchers are required to complete this form, providing details of the methods and procedures to be adopted in undertaking the project. This form should be returned to the Research Office which will, in turn, submit it to the Research Ethics Committee for consideration.

1. Project funded by? *(If applicable)*

London Doctoral Design Centre – LDoC **(**ldoc-cdt.ac.uk)

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2. Summary of proposed research and brief description of outcomes:

Hearing and listening affect everyone, they're not niche issues. For many, such as people with sensory sensitivities, those affected by sight or hearing loss or those with conditions such as Tourettes, Misophonia or Hyperacusis, sound and hearing can dictate whether an environment is socially inclusive or exclusive, accessible or non-accessible. Yet sonic inclusion - the ways in which sound enables people to be socially included in society - remains under-researched in design and narrowly represented in access legislation. The research works in collaboration with *Battersea Arts Centre* and community interest company *Touretteshero,* with support from *Shakespeare's Globe,* to explore these issues.

Drawing on the people-centred design ethos of the Helen Hamlyn Centre for Design, the research works in collaboration with individuals and communities with lived experience of sonic in/exclusion in public spaces. The collaboration will involve co-definition meetings with research partners and co-design workshops with communities who identify as sonically excluded. Collaborative research will take place during the academic year 2016/17.

Ultimately, the research aims to situate the historical perspectives of acoustic ecology, aural phenomenology and sonic ethnography within the contemporary trajectory of inclusive design practice, towards the development of a new framework for 'sonically inclusive design'.

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3. Participants involved in Research:

Partner organisations:
- Battersea Arts Centre (www.bac.org.uk)
- Touretteshero (www.touretteshero.com)

Supported by:
- Shakespeare's Globe (www.shakespearesglobe.com)

Collaborators with lived experience of sonic in/exclusion:
- People who are Blind/affected by sight loss
- People who are D/deaf / affected by hearing loss
- People with Tourettes Syndrome
- People with Hyperacusis
- People with Misophonia
- People with Sensory Processing Disorder
- People with Autistic Spectrum Disorder

5. Describe the estimated risks of the proposed Research *[including Health and Safety, moral and legal obligations and liabilities]*:

- **Consent & Confidentially** – considerations with regards to consent and confidentially have been made – see sections below
- **Accessible Venue** – co-design workshops will only take place at venues which are fully accessible
- **Multi-sensory Information –** information circulated prior to and at all co-design events shall meet the communication needs of all participants. In addition to text, this may include: large format, audio-flyer, BSL interpretation, STTR palantyped.
- **Venue Risk Assessment** – a risk assessment relating to all co-design events shall be agreed with the workshop venue prior to activity
- **Accessible Materials & Methods -** a materials and methods access audit will be developed to ensure that the content of the co-design workshop series meets the needs and interests of the attendees (to be agreed by research partners and supervisory team prior to activity)

6. Describe your plan for obtaining informed Consent from participants in the Research *(please attach copy of information sheet and consent form)*:

Consent will be obtained from all participants prior to their engagement with the research. Consent for research surveys and participation in workshops will be obtained using the *Survey & Workshop Consent Form* and *Information Sheet* (see 'WR_Research Consent Form' attached).

Participation in the survey and workshop series is entirely voluntary. Participants may withdraw from any research activity at any time.

7. Describe the steps you will take to ensure the Confidentiality of the data you collect:

- All surveys conducted will be anonymised.
- Any images or audio files in which participants can be clearly identified will be used only with participant's consent.
- All information gathered during the research will be stored securely
- The opinions of participants will be accurately represented.
- Once the data has been analysed all original research materials will be destroyed.
- At no time will any individual be identified in any reports resulting from this research.

Signed by the Researcher

Researcher

Print Name: Will Renel

Signature:

Date: 01/05/17

Once completed, please return this form to the Research Office

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Signed by Chair of the Research Ethics Committee

The Research Ethics Committee has agreed that the research described in this application conforms to the RCA guidelines on Research Ethics].

Chair of Research Ethics Committee

Print Name

APPROVED

Date:

Appendix 2: Information Sheet and Consent Form (template)

Royal College of Art

RESEARCH&
INNOVATION

For further information please contact:
Will Renel:
william.renel@network.rca.ac.uk *or*
Supervisor:
Jo-Anne Bichard
jo-anne.bichard@rca.ac.uk

add date here

<u>Research Information Sheet</u>

Sonic Inclusion: Opposing Auditory Normalism in Design through the Lived
Experiences of d/Deaf and Disabled People in Socially Public Spaces

insert workshop or event information here

Complaints Clause:
This project follows the guidelines laid out by the Research Ethics Code of the Royal College of Art.

If you should have any concerns about your rights as a participant in this research, or you have a
complaint about the manner in which this research is conducted, it may be given to the researcher or
their supervisor (named at the top of this document) or if an independent person is preferred,
addressed to the Research Ethics Committee of the Royal College of Art at the above address.

THE HELEN
HAMLYN
CENTRE **Royal College of Art**
FOR DESIGN

London
Doctoral
Design
Centre

Arts & Humanities
Research Council

add date here

Workshop Consent Form

Sonic Inclusion: Opposing Auditory Normalism in Design through the Lived Experiences of d/Deaf and Disabled People in Socially Public Spaces

I *(please print)*………………………………….have read the information sheet for the research project *Sonic Inclusion*: which is to be conducted by Will Renel and the Royal College of Art, and all queries have been answered to my satisfaction. I agree to voluntarily participate in this research and give my consent freely. I understand that the project will be conducted in accordance with the Information Sheet, a copy of which I have retained.

I understand that I can withdraw from the project at any time, without penalty, and do not have to give any reason for withdrawing. I consent to:

Add event specific information here

I understand that all information gathered from the conversation will be stored securely and that my opinions will be accurately represented. Any images or audio files in which I can be clearly identified will be used in the public domain only with my consent.

Print Name:………………………………………………………………..

Signature………………………………………………………………….

Date: ……………………………………………………………………

This project will is conducted in compliance with the Research Ethics Code of the Royal College of Art.

Appendix 3: Pre-Show Announcement

Description: Pre-show announcement written by Matthew Dunster, director. Read by cast member at *Much Ado About Nothing*
Date: Saturday 2ns September 2017
Venue: Shakespeare's Globe Theatre, London

Hello Ladies and Gentleman,

In the audience today/tonight we have a group of people with Tourette's Syndrome.

We only mention this because the group have, generously and sensitively, asked us to make the rest of the audience aware.

A symptom of Tourette's Syndrome can be involuntary vocal tics, meaning that members of the group may shout out random things at random times. But this is the Globe so we may not notice anything different! This is the Globe - where everyone is welcome and anything can happen.

We thank the group for sharing this information with us and hope you all enjoy the show. Thank you.

Appendix 4: Letter to Director

Dear Matthew Dunster,

Thank you to **ALL** the cast and crew for a most memorable and entertaining performance of 'Much Ado About Nothing' on Saturday 2nd Sept.

In a world which sadly, is becoming more exclusive and perhaps less tolerant, it was lovely to welcome and include audience members with tourette's. And what a performance it was!

The quick witted and unguarded audience comments (obviously with no barriers!) and the interaction between the actors and these comments were both engaging and entertaining. To be able to improvise and keep a performance going (despite sometimes being upstaged!) requires a huge amount of acting talent and professionalism, both of which shone through.

At times, there were two performances, linked together by the skills and timing of the actors. Favourite moments include:
'Why would she not love me?" – SHE'S JUST NOT INTO YOU!
"And find a word the opposite of scorn?" - PORN!
"For you have just his bleat." – BAHHH, BAAAH, BAAAH!
And in the long awaited intimate moment in the closing scene – JUST KISS HER!

And so we were all included, with or without tourette's. This was not an exclusive performance, it was one that we could all enjoy, together. Thank you!

Appendix 5: Collaborator Poem

Description: The poem 'Remix' below was written and performed by a collaborator with Tourettes as a response to their experience of research event five - Co-Creation Workshop Weekend
Date: September 2017
Venue: Shakespeare's Globe Theatre, London

Remix

Make a remix with my tics
Wittier that Benedick
I like a play, can't stand a flick
Especially when there are so many dicks
Walk into a sound strobe Globe make magic happen with a toad and a newt eye,
Minutiae details and tails mean we don't derail or go stale
So make conversations, bring hands together to end with ovations
The bars tough enough with the right words
We want to hear and be heard
To sweat in a suit in the shard
Squeeze your tubes round the globe and hope that the futures a bright one
not Hove
Better bet we'll tic
We're not bluffing
So, vamos ala Much Ado About Nothing

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