NEW PARADIGMS FOR MUSIC RESEARCH:

Art, Society and Technology

Editors:

Adolf Murillo, Inés Monreal, Jesús Tejada & David Carabias

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INTRODUCTION

NEW PARADIGMS FOR MUSIC RESEARCH: ART, SOCIETY AND TECHNOLOGY

Adolf Murillo, Inés Monreal, Jesús Tejada, David Carabias

In June 2020, the Vienna Declaration shed light on the viability of artistic research with an identity of its own. In its introduction, it explicitly states the need to "guarantee and incorporate post-graduate studies based on practice, in higher arts education in all European countries, in order to further develop artistic research...". For the time being, there is no culture of initial training in the theoretical and practical bases of artistic research in Spain. This leads to a lack of initial training in artistic education that is not made up for by the more specialized Master's studies. This monograph aims to bring the reader closer to international research linked to artistic research and scientific research articles within the artistic field of a transdisciplinary nature. It is the result of the contributions of international researchers to the 1st International Conference: Intersection of Art, Society and Technology in Musical Innovation, held from the 3rd to the 5th of September 2021 and organised by the University of Valladolid and the Katarina Gurska Institute for Artistic Research (IKG), the latter being a body dependent on the Katarina Gurska Foundation for Education and Culture. The event brought together leading researchers from the field of avant-garde artistic research, and musical research, inspiring minds of the 21st century who produce knowledge through researchers that focus on music as a transversal and interdisciplinary axis: art, space, perception, performance, health, education, and society, among others.

The book, in monograph format, brings us closer to different lines of research linked to the field of musical culture, connects with environments of the digital era, always from a transdisciplinary perspective, innovates in emerging pedagogies within the artistic field, and all this from the hand

of prestigious professors, scientists, researchers and professionals from the world of music, who, with their relevant vision, enrich this book.

Based on these assumptions, the coordinators of this monograph thought of bringing together the most relevant researchers who participated in the International Congress and the result is as follows:

In the first chapter, "Soundwalking: Between Art and Non-Art", Marcel Cobussen presents an essay focusing on soundwalking as an art form that has developed for decades on the fringes of the academic art world. He addresses the resolution to the question "are there art forms in which both social and artistic-aesthetic requirements can be fulfilled?" The manuscript glimpses a strong focus on the artistic and aesthetic aspects of a product or process that may converge well with an equally strong focus on knowledge production and social relevance through Soundwalking.

In the second chapter, "Towards a New Paradigm for Music Research: Evidence from a Research Assemblage", Pamela Burnard sets the focus on a new paradigm within music research, recognising the importance of exploring different creative processes within the musical field, undertaking new interdisciplinary research more in line with 21st century society and its needs, and encouraging a rethinking and reformulation of emerging processes of music research and innovation.

In the third chapter, "Exploring innovations within music Education Research", Ana Lucía Frega and Julia Brook advocate the need to rethink the knowledge of different ways of developing various methods to contribute to the improvement of music education. They suggest how to promote innovation not always from the creation of new resources, but from the reassessment of all those elements we have in order to be able to address systematic, organisational and pedagogical changes within music education.

In the fourth chapter, "Narratives on the Musical Instrument. Musical Practice Between Action Theory and Media Theory", Elena Ungeheuer analyses the academic-theoretical considerations on the use of musical instruments and the media-theoretical considerations on media transformations and how they affect the instruments. In the field of media education, she approaches the concept of metaverse linked to musical environments with unlimited connectivity.

In the fifth chapter, "Hypermusic: New Musical Practices at the Crooroads of Music, Art and Thought", Paulo de Assis approaches the concept

of hypermusic as a tool for the generation of new musical practices and the connected deepening between art, philosophy and music. The importance of the article lies in understanding the potential of the concept of hypermusic as a challenge related to the role and function of musical creativity in our contemporary society. It theorises interpretative practices that will combine different modes of research, focusing especially on the emerging mode of practice-based research, which will contribute to the application of mixed methodologies within an artistic, aesthetic, and academic field of operations, and will enhance innovative approaches to performance and musical composition solidly anchored in research and critical thinking.

In the sixth chapter, "In search for Art's Relevance for Itself: Artistic Research and the Aesthetic Regime of Art", by Lucia D'Errico, we find an essay that focuses on the relationship with art, questioning whether art today is relevant for art itself. The article is based on three axes: the first refers to the analysis of the social, political, and technological conditions of the aesthetic regime, the second focuses on the individualisation and critique of current ways of being artists, and the third is linked to the proposal of artistic research as a reaction to neoliberal logics and as an advance towards a new understanding of the relevance of art itself.

In the seventh chapter, "Listener-Centred Sonification Practice As Transdisciplinary Experimental Artistic Engagement", Jorge Boehringer, Marcin Pietruszewski, John M. Bowers, Bennet Hogg, Joseph Newbold, Gerriet K. Sharma, Tim Shaw, and Paul Vickers present the Radical project, which is based on the research and practice of sonification as a transdisciplinary, listener-centred activity. The authors analyse sonification from the perspective of artistic and musical practice. Emphasis is placed on spatial listening, embodied experience and interaction with the environment and communication, resulting in a questioning of the methodology, objects and foundations often assumed for sonification. The reader is invited to apply an ethnographic ear to a roundtable presentation that investigates new sound and music practices that converge in a rethinking of sonification as an engaged aesthetic activity that produces and entails new technical and epistemic knowledge.

The monograph closes with the chapter "The Sciences and the Arts in Search of the New" by Hans-Jörg Rheinberger. It aims to show that the sciences and the arts, including music and sound research, operate

on a common ground. The sciences represent logic, while the arts embody intuition. In order to break this dichotomy, the article endeavours to challenge this one-sided image of the sciences from within and, in doing so, to show that each of the two fields, the sciences and the arts, have a part in the other. There is an element of the artistic in the sciences, as well as vice versa: there is also an irreducible element of the epistemic on the part of the arts.

The proposal presented in this monograph, made up of eight chapters, aims to bring the reader closer to new trends in artistic research as well as applied research and to make them reflect on music in different formats and contexts.

1

Towards a New Paradigm for Music Research: Evidence from a Research Assemblage

TOWARDS A NEW PARADIGM FOR MUSIC RESEARCH: EVIDENCE FROM A RESEARCH ASSEMBLAGE

Pamela Burnard
Cambridge University

ABSTRACT: Over the last decade, a proliferation of diverse music research and diverse research involving musical creativities has been influential around the world as a powerful means of exploring and discussing new ways of authoring music and knowledge creation. In the practices of music teachers, music academics and professional musicians, whether they work in the music industry as performing artists, composers, singer songwriters, originals bands, DJs, live coders, sound designers, or work as music teachers in educational or community music settings, the empirical evidence for the need for change agendas and change practice, is overwhelming. Identifying and developing new more inclusive practices and discourses, an imperative for ensuring creative sustained futures and future-making education, is central to a new paradigm in music research. This chapter explores what is distinctive and important about multiple musical creativities as a focused way of rethinking innovation and future-making in music research, teaching and learning. It invites both researchers and educators to think positively about change and to consider the implications and dilemmas that arise from stimulating and supporting multiple and diverse creativities in practice and for (re-)configuring new music research as more-than-human forces for change.

KEYWORDS: Diverse music creativities, posthumanism, co-productive methodologies, future making.

INTRODUCTION

There has been an historical neglect in music research generally and music education research specifically concerning pluralising practices, diversifying pedagogies and re-envisioning music creativities. Creativities in music research (and music education research) are often characterised by creative students of different age (developmental studies), the elements that co-influence creativity (confluence studies), the thought processes of the people involved in creative activity (cognitive studies) and creativity outputs (assessment studies) (Odena, 2001; Hickey, 2002; Odena and Welch, 2009; Burnard, 2007, 2012a). According to these categorizations, music creativity more often 'falls' into the category of studies exploring the experience of school pupils studying instrumental group music learning, which is culturally situated and fundamentally social, and into the category of 'confluence studies' as it unwraps the elements that co-influence creativity which are inextricable from the interactions and relationships in which creative activity takes place. As the verb 'to influence' has its origin in the Latin verb meaning 'to flow' or 'to flow into', the verb *co*-influence builds on it and emphasizes the collaborative nature of two or more elements that either flow together or come together to become one. Traditionally, confluence is used to describe the meeting of two or more bodies of water, especially rivers of approximately equal width. Metaphorically, confluence means the gathering, flowing, meeting or coming together of factors/elements at one juncture or point. In this chapter, I wish to explore the elements that have 'flowed' and 'come together' in receipt of ideas and responses as a form of co-authoring of music research and the power of collaborative research.

The phenomenon of creativities in music, whether it is creativity in general or creativity in instrumental music learning or classroom music and art education, gets convoluted due to tensions between multiple creativities i.e. *individual creativity* (Sefton-Green and Bresler, 2011), *collective creativity* (Vygotsky, 1978), *group or collaborative creativity* (Littleton and Mercer, 2012) and *communal creativity* (Lapidaki *et al*, 2012). There are many arguments against the historically linked and limited definitions of high-art orthodoxies that exalt the individual genius or where the focus is primarily on the creative individual. Drawing on Csikszentmihaly's Systems Model of Creativity (1999), multiple musical creativities can be constituted as practices within social, cultural and activity systems.

I take as my starting point for this chapter, therefore, the discussion of these assumptions, that is, the idea of diverse musical creativities which

include social production and cultural formations. The production of human culture, from science and technology to the arts, music and other social forms and institutions, invites us to advance rather different takes on these conceptions, and to explore music research through new materialist ontology, taking a posthuman focus which requires that we look at the contribution of non-human elements in the research-assemblage. I argue that what links human bodies to their physical and social environment, is the product of an affective flow between bodies, things, ideas and social institutions. All of these things matter. All of these things need re-thinking in terms of new points of departures for music research.

Over a decade ago, Odena (2012) reminded us that Csikszentmihaly (1994) spent many years studying *creative people*, only to come to the conclusion that the *context* in which creative people operate is of paramount importance. In music research, we often see extra-curricular instrumental group music learning rooted in and represented as people working together to express their needs, their hopes, their visions, about people being active and having fun together, and of self-respect of individuals and the community. We see, first hand, how instrumental music groups collaboratively create learning in communities of practice in which they can articulate their music learning space and music learning activity as something shared and collaboratively created. This lends itself to a conceptualisation of '*collaborative creativity'* in the context of group instrumental music learning as a shared learning experience where individual and social actions and activities coalesce. In one such study (Burnard and Dragovic, 2014) we determined what elements co-influence '*collaborative creativity'* in instrumental group music learning and whether those elements provide conditions for enabling '*collaborative creativity*' to flourish. But human societies and cultures are changing at an accelerated pace. Our efforts to address and understand these changes and the consequences for music research practices and for social transformation place different emphases on some important questions.

What do threshold concepts like 'research' mean? How is 'music' understood differently with new critical theorists and other theoretical perspectives (for example, critical race theory), where each new reading and new opportunity to think about aspects of these fundaments, from new lens such as sociology and the new materialism, or posthumanism, has a consequence for research practices and for social transformation?

Pre-pandemic we saw the live music sector, a strand of the wider music industry that stages shows, tours and festivals, thrive. Following nearly

two years of restrictions, through to Brexit, the cultural world has been at a virtual standstill in Europe. The creative industries sector needs those with creative and entrepreneurial talents who have also had the chance to develop real-world awareness, commercial know-how and know-who, self-efficacy and confidence to build successful new businesses and have an impact on existing ones. Increasingly, in an effort to upskill, specialist music teachers, and musicians in business associations as well as incubation and acceleration programmes (Comunian & Gilmore, 2016), this requires activism and activist practices, along with social entrepreneurship and cultural entrepreneurship, where more fluid and precarious forms of employment become the norm as do untraditional career paths. As a career with/in music evolves, as with music research, it does so in tandem with the highly competitive field of arts entrepreneurship which influences every level from finding jobs to gaining commissions (Bennett & Burnard, 2015).

So, there are many challenges to the practicalities of doing music research. The challenges of developing new research methodologies and methods of contributing to the production and politics of new knowledge of the social world, including social change and diversity and social inclusion and to subjectivity, on social views of embodiment and identity, are complex. The radical impact of new materialism on psychological and sociological concepts, and its capacity to cut across dualisms including culture/nature, structure/agency, human/nonhuman and mind/matter, is also complex. As with my own research trajectory and journeying over the past ten years, my questions, while still orbiting around understanding what differentiates diverse creativities in music, I have applied research methodologies rooted in psychology, sociology and now in materialist perspectives. Why? Because I have needed new and novel, and sometimes radical methods, for collecting, analyzing and presenting data. (See Burnard et al 2022 forthcoming '*Doing Rebellious Research in and beyond the Academy*). The shift towards a materialist foundation for music research also marks my move away from constructionist approaches to research and epistemological assumptions concerning how we may know the world and exist in that world and towards a concern with ontology.

One such change is seeing *research as an assemblage or as research-as-semblage.* From a materialist perspective, as argued by Fox and Alldred (2017):

> 'a research-assemblage comprises the bodies, things and abstractions that get caught up in social inquiry, including the events that are studied and the researchers...opening up the research process to reveal both the workings of the various 'research-machines' that underpin data collection, analysis, writing and dissemination, and also the micro-political interactions between researcher and researched' (p.152).

So, why should music research(ers) relook at music creativities and rework research as an assemblage?

What is it that stimulates diverse musical creativities? How should we assess diverse creativities in music? How are diverse creativities authored and co-authored differently to other arts domains? Musicians who have well-developed skills in diverse musical creativities often show leadership by motivating and collaborating with others. The capacity of self-aware musicians to be adaptive, to perceive change as both an opportunity and a challenge, to bridge the divide between tradition and innovation, and to move easily within a multiplicity of musical networks, is crucial in their rendering of musical creativities.

Historically linked and limited definitions of high art orthodoxies exalt the romantic view of individual creativity. The romantic conception of a singular creativity embedded in certain cultural hierarchies offers the idea of a 'great musician', a genius figure, having a 'divine spark' which serves to separate the great artist from ordinary musical mortals – an artist who is inspired and through whom the muse speaks. However, when considering ways to link the professional training of tomorrow's industry-savvy musicians to higher education reform today, we must first recognize what it is that the contemporary real world practices of professional musicians reveal – in a context where a multiplicity of musical creativities empower and characterize successful musicians for whom entrepreneurial creativity can act as a catalyst for an innovative and often experimental set of practices (Burnard, 2012, Burnard & Haddon, 2015; Haddon and Burnard (2017)).

Where innovation emerges from the interplay of ideas and experimentation to create something of value which is taken up in the public sphere (Roark, Daum & Abrahams, 2013), *entrepreneurial creativity* sparks learning from failures, animates thinking outside the box, going beyond

disciplinary and institutional comfort zones, taking risks, crossing boundaries and institutional borders, transcending traditions and conventional understandings and venturing beyond the expected. *Entrepreneurial creativity* involves a constant interplay of thinking and doing: passionate cycles of thinking, doing, failing, analyzing, rethinking and modifying, then doing again; a determination to find solutions infused by experiential learning (Bresler, 2013). It is, of course, possible to explore the meaning of entrepreneurial creativity through either the entry point of school music or higher education.

In a seminal study of creative scholars, authors and artists, Csikszentmihalyi (1996) characterized *entrepreneurial creativity* as 'dimensions of complexity' which included a dialectical dancing between being passionate yet objective, ambitious yet selfless, playful yet disciplined, divergent yet convergent. So, if we engage in a thought experiment to examine how both school music and higher music education courses negotiate and infuse entrepreneurial creativity in taught modules, what would we see? There would be a common currency of recognizing the need to set specific tasks and implement assessment strategies for projects that enable students to take risks and learn from failures: that is, projects that allow them to profess passion, enjoy animated experiential learning and activate *entrepreneurial creativity.* There would be principles of practice which involve exploratory, dialogical or participatory engagement and forms of authorship which encourage collective, communal, or collaborative questioning and challenging. For those working in a digital maker space, you might see *user-creativity* featured in a social space where pre-production and production cycles occur. For those learning to live code you might find the practice of real time scripting, which often results in creating a new genre generated by *performance creativity*. Then, again, you might simply see *compositional creativity* being the driver of composers' work and play space. In any case, the type of creativity in use would be promoted and foregrounded in terms of different forms of authorship, principles and mediating modalities. In other words, the need for acknowledging the pluralism and existence of multiple creativities, from school into post-compulsory education and on through to the creative industries, is an important element of the zeitgeist in global challenges.

By initiating these kinds of dialogues, interacting with ideas within broader inter- and trans-disciplinary contexts and opening up possibilities for knowledge creation, exchange and mobilisation, we remove the constraints that limit the ability for change. In the pages that follow, I will

argue for how some of the permeable practices of music research which focus on diverse musical creativities and entrepreneurship, both separately and synergistically, as developed by scholars, researchers and practitioners working in music institutions and schools, are challenging the biases and cultural assumptions that constrain and hinder redesign and institutional change.

MUSIC RESEARCH INITIATING CHANGE AGENDAS

Plato said that 'what is honoured in a society will emerge in that society'. To nurture creativities (in those pursuing a career in music, practicing and preparing for music performance and production, arts administration or music teaching, or any of a multitude of career options), music institutions need to be contemporary environments in which diverse creativities are embedded, cultivated, modelled and resourced. While we might regard the historical legacy of creativity as being concerned with domain specific musical processes, products and people, nevertheless, as will be argued in this chapter, a central ingredient in successful institutions is the ingredient of *leadership creativity*.

Music classrooms and music institutions will be regarded as environments in which teachers act as leaders and make decisions about people, programmes, practices and professionalism at a level of complexity that requires creativities to be championed in ways that provoke invention, originality, imagination, entrepreneurialism and innovation. Despite the proliferation of interest in creativity, the problem of what constitutes musical creativity in higher music education remains unresolved. This is what makes new perspectives on *who* is professionally making the music, *where* it is being made, and for *whom* as significant as the generative aspect inherent in practices such as sampling, re-sampling, mixing, mashups and songwriting and as important as composing, arranging, improvising and performing. What kinds of collaborative, communal or collective venturing underpin professional musicians' activity at the beginning of the third millennium?

An understanding of musical creativities which goes beyond the common forms of composition and improvisation and is both collective and individualized is an imperative (see Burnard, 2012a, 2012b, 2013; Burnard

& Haddon, 2015). The argument here concerns the expansion of the concept of 'music creativity' from its outmoded singular form to its manifestation as multiple 'creativities', and considers how institutional change can be enabled by diverse musical creativities (and entrepreneurship) in applying experimental sets of practices (as illustrated throughout this book) that aim to transform coursework and equip undergraduate music students – future professional musicians – to function more resourcefully, flexibly, adaptively, creatively and globally, in an ever-changing society. To accomplish this goal and to meet the societal needs of the twenty-first century, we need to understand and reflect on the musical networks in which musicians operate and which are critical to recasting the field of learning for musicians and the context of applied fields and industries.

We know that musical creativities arise within and depend upon the legitimizing frameworks of public opinion, conventions and gatekeepers. Professionals are constantly repositioning themselves across multiple fields. The common ground among social perspectives is that the rules of fields represent the lived meanings (remits, trends, dominant logics and locations of work across different industries) of musical culture and of diverse communities. There is, however, at the present time, little interaction or overlap between educational systems and the 'real world' practice of creativities of the professional musician working in the creative and cultural industries. Why is this? What can we do about this? How can and should we make connections between the real world and music education learning environments and communities? How can we spark interest and celebrate creative musicians as partners in entrepreneurial projects which contributes to pedagogy and curriculum, using imagination and experience, strategically collaborating over learning and teaching tasks.

COAUTHORING RESEARCH ON CREATIVITIES IN MUSIC: WHAT KIND OF KNOWLEDGE IS PRODUCED?

What distinguishes myriad musical forms of creativities is the diversity of actors and stakeholders in and across fields, along with myriad social systems that become powerful modalities of action. These modalities include social practices, social relations and the social mediations that take place in social spaces. They are tied to historical practices, as well as new global and

trans-national, national, regional and local practices. The gatekeepers may or may not have the breadth of knowledge required of them, and may be tied to singular and embedded historical *practice principles*. They may, nonetheless, be called on to navigate a multiplicity of domains driven by technological and powerful *mediating modalities* of temporal action that draw upon the digitization of music and art, and unprecedented shifts in *forms of authorship and co-authorship*.

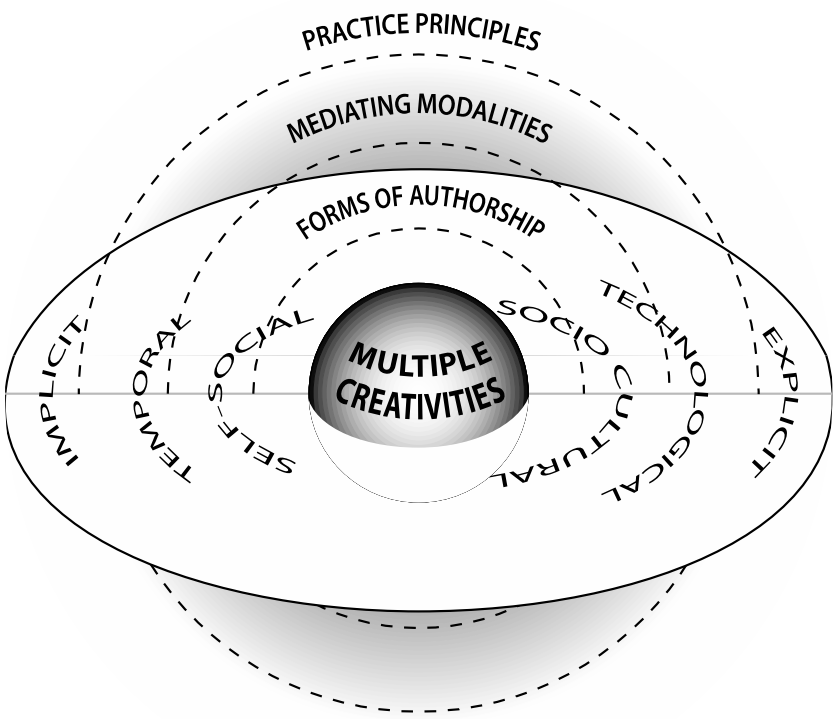

Figure 1: Ways of researching and understanding multiple creativities in music found in real-world settings (Burnard 2012).

INTRODUCING MUSIC RESEARCH EXEMPLAR 1: ENTREPRENEURSHIP AND ACTIVISM

In some music research which applies a sociological theoretical perspective, Pierre Bourdieu and Judith Butler are used to structure the analysis, specifically in relation to Bourdieu's approach to '**capital'** and Butler's conception of '**gender performativity**.' Both theorists have made significant contributions to theorising the threshold concept of 'practice', specifically how 'doing gender' is performed and how performances exist in relation to the field. In a sense we use both Bourdieu and Butler to support each other and, in an effort to work across them, we also elaborate on a revisionist take on Bourdieu that lends itself well to exploring gender – emotional capital (Reay, 2004).

There exists no singular reading of Bourdieu, but rather many different interpretations and ways of putting his 'theory into action' (Reay, 2004). Bourdieusian scholars often posit a cyclical relationship between structures and practices in which *objective structures* tend to produce *structured subjective dispositions* that, in turn, produce *structured actions* which will tend to reproduce *objective structures* (McLeod, 2005). Fields, as sites of production and circulation, according to Bourdieu, are where endless change occurs and "where agents and institutions constantly struggle according to the regularities and the rules constitutive of this space of play" and where there exists a set of 'logics' particular to each field (Bourdieu & Wacquant, 1992, p. 102). Within fields the positions held by individuals are competitive and subject to contestation; they seek to accumulate and exchange different forms of capital in order to secure and maintain their position.

The use of Bourdieu's framework to study music practices of capital mobilisation and acquisition within the professional lives of musicians provides insight into how individuals make sense of their capitals in increasingly competitive environments (Burnard, Hofvander Trulsson & Soderman, 2016 and Hofvander Trulsson and Burnard (2016)). Bourdieu's theoretical approach emphasises the capacity of the habitus to decipher the logic of the field and understand how best to play the game, in order to ensure one's advancement. According to Bourdieu (1984) theorising practice or action is: (habitus)(capital)] + field = practice. With this in mind, Bourdieu invites us to think differently about the actions we consider to be normative as well as the cultural norms we associate with certain spaces.

However, while some music researchers draw on Bourdieu (and Bourdieu-inspired work) to explore practices in music, it is worth noting

many have critiqued his work for not speaking to gender (see Dillabough, 2004). According to Butler (2004/2018) gender performativity is "a practice of improvisation within a scene of constraint" (p. 1), where performativity is "not a singular act', but 'a reiteration of a norm or a set of norms" (p. 12). The theory of gender performativity invokes a feminist impulse where Butler (1988) articulates the ways in which the ideological structures of gender regulate and are constituted through these practices. Butler (1988) argues "the personal is thus implicitly political inasmuch as it is conditioned by shared social structures" where gender is socially constituted (p. 522). Furthermore, Butler draws attention to how bodies and the heterosexual matrix articulates the ways in which normative gender identity confines heterosexual masculine and feminine identities. It is through reiterated acts, gestures and enactments, Butler (1990) argues that we "are *performative* in the sense that the essence of identity that they otherwise purport to express are *fabrications* manufactured through corporeal signs and other discursive means" (p. 136).

In the context of music research, Butler's work has implications for how we think about and research the performance of gender as discourses which are produced and re-produced through continual reiterations in music and diverse musics. In fact, according to Butler (1993): "If the power of discourse to produce that which it names is linked with the question of performativity, then the performance is one domain in which power acts *as* discourse … in its persistence and instability" (p. 225). Taking discourse one step further, Butler (1990) problematises a common claim of feminist theorists that "gender is the cultural interpretation of sex or that gender is culturally constructed" where Butler sees this as too deterministic (pp. 11–12).

We now call attention to a revisionist take on Bourdieu that lends itself well to not only exploring gender but working across both Bourdieu and Butler, specifically emotional capital (Reay, 2004). Inspired by Bourdieu, Nowotny (1981) first introduced the concept of *emotional capital* to address the bounds of affective familial relationships, where this capital is a private resource that women have in greater abundance than men. Reay (2004) furthered Nowotny's contribution to probe mothers' emotional engagement with their children's education, viewing emotional capital as a "stock of emotional resources" (Reay, 2004, p. 61). For Reay (2000), 'emotional capital' is not necessarily something that can be increased or exchanged; instead, Reay emphasises that it is gendered and contains a cost in terms of interpersonal relationships and personal wellbeing. More recent work investigating emotional capital and skill acquisition in the workplace

by Cottingham (2016) is more gender-neutral, as he emphasises that emotional capital is fostered for both men and women through their workplace practices. We are interested in the role of emotional capital and the practice of gender performativity places in this work and how it influences practice (in a Bourdieusian sense) and improvisation (in a Butlerian sense).

All of this opens to scrutiny concerning what kind of 'knowledge' music research produces and for whom? How are we understanding the concept of 'music' and 'practice' and the risk of distorting the very events that research tries to make sense of. When do researchers try, at least, to avoid the extremes and tensions between scientific construction and social construction of knowledges. When does music research assert the 'truth' of data from research tools and interpretations/coauthorings or mitigate against complexity by aggregating data in ways defined by the researcher or analyst?

In a recent case study of a British-based, South-African born, working-class female music composer, sonic artist, activist and arts entrepreneur, Mira Calix, co-researchers Burnard and Stahl (2021) put forward the theoretical work of both Butler and Bourdieu to decipher some of the ways gender performances are enacted within the patriarchal field of creative and cultural work. Calix's journey speaks to the experience of many female artists who question the normative and, in response, cultivate strategies which draw upon their entrepreneurial skills to move past perceived limitations. So, and this is a key point, that while certain expectations concerning gender can significantly shape professional experiences, opportunity creation and success, so does the acquisition and deployment of capital in the field of arts entrepreneurialism.

Calix acquires and co-creates new knowledge, skills and capitals to position herself successfully across national and disciplinary borders in order to co-create her art. This process of acquisition and co-creation involves negotiating gendered performances, practices and improvisation which are all integral to her adaptive process. Her enactment of 'emotional capital' along with a spectrum of other 'capitals' lies at the core of arts entrepreneurship. This is a social inquiry which offers new insights into the micropolitics and cultural forces at play in co-authorship and constructions of music in diverse settings in the responsive hybrid practice of a British sound artist working on a commission in China. The significance of this music research is the potential to rethink how new music manifests technological and sonic extensions of the body, through a range of social and technological matters.

INTRODUCING MUSIC RESEARCH EXEMPLAR 2: ASSESSING CREATIVITIES IN MUSIC

This chapter now narrows its focus. It turns to music research that specifically questions and challenges music curriculum, music pedagogies and the ways of defining how best to develop and assess students' music creativities. The significance of this section on music research that addresses assessment of creativities in music is that, while it continues to advance the notion of the existence of a spectrum of creativities for generating ubiquitous music practices and music research, the need for innovative forms of assessment is vital. Assessment of creativities in music needs to enables the freedom to create (including on the Internet and in the 'cloud') with original (novel, unexpected) and valued or useful (appropriate) outcomes. It also relates to the teacher's capacity to teach creatively while co-creating deliberative spaces for developing meaningful assessment which must anticipate the particular subjectivities, experiences and vantage points of diverse students.

Of all the cognitive abilities, creativities in music are arguably the most difficult to assess. We can determine what someone knows simply by asking for their recollection or application of knowledge (declarative knowledge). We can assess understanding by asking for a response which explains or rewords, or which shows how the knowledge can be applied (procedural knowledge). It is, however, a different matter to capture, document, show, amplify, represent or even visualise routes to creativity and analyse creative practices.

How the diversification of multiple musical creativities works in practice is implicit in the different ways in which musicians generate and produce certain types of music in the social spaces which provide the basis for its production and reproduction. As shown in Figure 1 (displayed earlier) these are:

(i) self-social and	(ii) socio-cultural forms of authorship
(iii) temporal and	(iv) technological mediating modalities
(v) explicit and	(vi) implicit practice principles

Figure 1, which maps the attributes and diversification of musical creativities in practice (see Burnard, 2012 where the essence of musical creativities and their related practices are evidenced and elaborated), illustrates why

assessing creativity is a challenge given the number and significance of social, temporal, technological and practice dimensions. How creative *products* are judged within society varies considerably, as do the ways creativity is understood in terms of assessing the creative *process*.

Of crucial importance to assessment is the myriad of dimensions expressed in the characterisations of musical creativities. Many of music's principles of production, whether explicit or implicit, are by their nature generalisations from practical experience, and are justified by their results, whether assessed by performances, products, or processes. *What* teachers should be assessing and in relation to *which* creativities, *how* the specific creativity is embodied in the assessment practice, and *what* challenges and opportunities are given for 'creativeness' to be assessed, surely require an awareness of how the innovatory product was conceived? And, of course, the persons best placed to make such an informed judgement, concerning the 'how' of creativity, are the creative persons themselves, and, in educational settings, the discourse is dominated by policy and teachers. Reconciling students', teachers' and professionals' repertoires in music education settings, means that criteria are considered to be necessary. The community needs to decide upon the criteria for assessment, but also need to ensure that the learner's own criteria be used. This can be a challenge when the community or class is usually many more than two people. Yet the principal means by which students can actively engage and teachers constructively co-construct assessment practice rarely a precise process and almost always involves some level of approximation given the importance of guarding against formulating criteria that provide merely the illusion of common understanding and agreement with no basis in actual practice.

In real-world practice, judges or evaluators are not asked to explain or defend their ratings, or to provide feedback to artists about criteria such as: whether they exemplify the highest forms of human creativity; whether they contribute to the culture, creativity and wealth of contemporary societies; how they build or subvert traditions and conventions; or the roles and status of a multiplicity of creativities in various societies and cultures. Yet one of the most pressing challenges for implementing music curricula and its assessment is that the nature and value placed on creativities is not sufficiently understood. It is not that, in general terms, the assessment of music creativities are seen as unimportant. Assessment is seen as integral to curricula, to teaching and learning, and to arts creativities of all kinds the world over. For example, assessment rubrics for music composition

(Hickey, 1999; Leong et al., 2009) and music performance (Latimer et al., 2010) are undertaken and associated with culturally authorised tastes, consumption patterns, technology expertise, specialist attributes, skills and values (Bresler, 2007).

The challenge concerns the recognition of the plurality of creativities and ways of facilitating diverse yet suitable forms of assessment of creativities that promote particular practices and foster the recognition of new practices, such as a willingness to work with digital technologies and cloud-based solutions, and designing new evaluation opportunities. This would enhance the collaborative dimensions of teaching and learning that form part of creative music making, and lead to consensual assessment, resource building and sharing evaluation practices (for example, devising digital ways to represent, express and share intentions), which could lead to the development of new ways of documenting views on what went well and what could be improved. Consequently questions could also be developed that demonstrate increased awareness and understanding of the *methods* (for example, observation, classroom assessment by teachers, practice tasks, examinations, testing); *processes* (for example, gathering, recording, interpreting, using, communicating); *functions* of assessments (for example, as part of effective planning or on how pupils learn), and depending on the learner, the *context* (for example, the desired goal, the present position and ways to close the gap between the two). Recognising and valuing a range of music creativities and the range of differences in practice among students from different backgrounds is a central consideration for educators if they are to engage learners in authentic learning and assessing experiences. The learning environment itself needs to embrace such diversity and create a climate where the work in the classroom is valued and nurtured, and where individual taste is also respected. We do know, from analysis of real-world practice, that diverse and multiple creativities that underscore music practices are differentiated in the acts of composing, improvising and arranging, and are implicated in the construction of performance and listening.

The possibilities of transforming practice in assessing creativities in music

Creativity assessment research and practice in partnership contexts with primary and secondary school arts teachers and tertiary sector arts lecturers has developed and expanded rapidly in the last ten years (Ellis et al., 2007).

This intensification is due, in part, to the perception by policymakers that creativity in education can have beneficial impacts. It is also indicative of the ongoing commitment in educational practice to the making of judgements about pupils' attainments, the debates and distinction between formative uses of assessment (to facilitate learning and to help pupils understand how to progress their own learning) and the summative uses of assessment data (to record the results of learning which have been assembled for various purposes). Questions about how assessment plays a key role within arts learning, the mechanics of actually doing formative assessment (Black et al., 2004), the relationship between performativity and creativity standards agendas, the standardisation of creative learning in the arts and the assumptions and aspirations for progression all impact in varying ways on the field of arts in education.

Researching the assessment of creativities in music research is a difficult and passionately debated issue (Fautley & Colwell, 2012). Despite the long-standing challenges of classroom-based assessment of creativity in music and the visual arts, the development of a systematic approach to the assessment of creativity by primary and secondary teachers remains a slippery, highly contested and under-researched area. In the absence of adequate research we do not know with any precision what we are talking about, or looking at; neither do we know what constructs primary and secondary teachers use in assessing creativity in pupils' work, nor the extent to which these constructs are modified for different arts subjects and school sectors.

There is a small body of literature providing clear and concrete evidence of English primary teachers' constructs of creativity in their *assessment practices* of children's paintings, compositions and creative writing. In a seminal study called the DELTA Project (Development of Learning and Teaching in the Arts), Hargreaves and Galton (1996) devised a methodology which claimed to make explicit the implicit criteria which teachers used to make judgments about children's products. The findings for music made ground in helping to develop a language of assessment.

Composing can be considered as a prime musical example of the creative act. Composing in the lower secondary school in England is often undertaken in the form of group work, and the group composing process has been deconstructed in terms of the stages pupils work through (Fautley, 2005). Composition in the upper secondary school tends to be largely an individual activity and has been less rigorously explored in recent research in England (Savage & Fautley, 2011).

Alongside composing, assessment is a key area of interest in contemporary educational discourse. The notion of assessment in England encompasses more than a simple notion of testing, with key differences between formative and summative assessment being explored, including ways in which the boundaries between them have become blurred, and how teachers' day to practice of formative assessment could be considered as being in fact 'mini-summative' assessments. An important distinction relevant to teaching and learning composing is that drawn by Black et al. (2004), who write of the 'formative use of summative assessment', a key concept in the context of curricular creativity and music-learning assessment in England. Regarding the role of formative assessment, its place in raising standards has been well documented (Black & Wiliam, 2006). Summative assessment, too, has been researched, and its role in 'high-stakes' assessment discussed (Stobart, 2008).

Assessment of creativity in the arts, and particularly assessment of diverse creativities in music research, is a hotly debated and difficult issue for teachers and learners. Despite the long-standing challenges of classroom assessment of creativity and teachers' conceptions and classroom practices of assessing arts activities, whether in music, art, drama, dance or media, the development of a systematic assessment of creativity, and the constructs used by teachers in assessing a spectrum of learners' creativities, remains a problem yet should be part and parcel of every educator's repertoire of professional activities.

It is both useful and important to disentangle what is meant by the term *assessment* in our context. There are international understandings which equate assessment with testing; however, this is not what we are talking about in this chapter.

The requirement for schools to promote 'thinking skills' and enable pupils 'to think creatively' and 'become creative' is explicitly and globally presented in educational policy across Europe. In England, when music becomes an optional subject at age 14+, qualifications are provided by one of three national Awarding Bodies, which implement nationally-based subject criteria for music. Standards of attainment at this stage become driven by the quality of students' work in relation to performance descriptors describing minimum standards at key 'grade' points. Hence, the policy context for music education in England can be considered to be nationally prescribed and working within a tightly controlled quality framework. Music teachers are therefore being asked to enhance and develop pupils' creativities through music whilst not being required to

explicitly or formally assess the creative aspects of their work. However, some teachers are addressing the assessment of creativities in music and challenging assumptions about their own and their students' preconceived notions and the many sidedness of creativity by asking what are we assessing in music? And in what forms do musical creativities display themselves within the music classroom?

In a publication collaboratively authored by Burnard and Fautley, they **draw** on research projects that were carried out in England that illustrate the orientation of teachers in regard to assessing creativity, how we must become reflective with regard to our own discourses concerning how we recognise and distinguish creativities in music and how novel forms of assessment practices can arise when co-authored by teachers and students. Manifesting technological and sonic extensions of what constitutes 'music', this research arises within a new discourse of music research which offers key, radical and related ideas about matter, dialectics and agency, along with an exploration of the interconnectedness of aspects of musical material and materiality. In other words, a language for discussing and inviting new forms of assessment in music.

INTRODUCING MUSIC RESEARCH EXEMPLAR 3:

The emergence of a multiplicity of new forms of music provides an urgent context as well as fertile sites for new music research. In a recent study on diversity and inclusive practice of hip hop as a music genre and its immense importance to music educators 'contemporary urban musics', which include hip hop, grime, contemporary R&B, house, techno and more, were analysed. Given that hip hop is arguably the most listened to music in the world, the inclusion of hip hop in mainstream music curricula is an imperative as a welcomed force. How music research might encourage the introduction of hip hop into mainstream music curricula remains the question.

Hip hop is a culture and art movement born out of the need to express and create. According to Nielsen Music, hip hop is also the most popular music genre in the United States (Jones, 2020). The appreciation and popularity of hip hop music and its widespread geographical reach is not new. Spotify has generated a live musical map of the world which

is updated bi-weekly. Analysing nearly 20 billion tracks to show localised listening trends for over 1000 cities, the data identifies music that is 'distinctive' to each area – meaning songs that are listened to frequently in specific cities that are not frequently listened to in others – and listeners' loyalty to musicians from their own cities. However, the most interesting finding is that hip hop is the world's top genre, showing up on playlists more than all others, regardless of geography or language (Hooton, 2015). Furthermore, the effusive rhythmic styles (especially those centred on speech) are identified with a certain representation of urban life, and from its very earliest history, like rap music, it was designed for moving a crowd, making them dance, and creating or continuing a 'groove' and a mood (Krims, 2000).

Whilst the influence of hip hop is huge, there are some urban musics which do not count as hip hop. Grime, for example, is often counted as being quite distinct from hip hop, although both feature rapping. Grime, created and popularised by acts such as Dizzee Rascal, Wiley and Stormzy, differs from certain music genre codes found in hip hop. Dance/electronic musics should also be regarded as distinct from hip hop. The main point here is that hip hop is not a satisfactory umbrella term for the full range of contemporary 'urban musics'. Post-grime genres such as drill and trap, often the object of discriminatory politics (Fatsis, 2019), are certainly related to hip hop but they are not synonymous with it. Electronic Dance Music, or EDM, has its own history distinct from hip hop to dubstep via house, trance, rave and so forth. EDM is certainly contemporary urban music but it is not hip hop. All of these contemporary urban musics are important, but in this chapter we focus primarily on hip hop as a mode of music making which includes DJing, MCing, beat making and beatboxing. These practices are recognised, at least in the UK, by leading examination boards such as Assessment and Qualifications Alliance (AQA), an awarding body in England, Wales and Northern Ireland and Edexcel (another British multinational education and examination body whose name is a portmanteau term combining the words education and excellence) for the General Certificate of Secondary Education (GCSE) qualification, yet few teachers use this music in practice. Many teachers still feel very uncertain about how to assess hip hop compared with the more familiar assessment strategies around traditional instruments (Burnard, 2018).

The presence of hip hop in America's classrooms is not new. It would appear that, while many high school teachers in the US, including

mathematics and science teachers, embrace a form of teaching known as hip hop pedagogy[1] to reach students who might otherwise not find a subject relevant (Jones, 2020), there are still many teachers who assume that hip hop is not part of the music curriculum and that it is inappropriate to diversify music curricula (Hone, 2017). Many music educators believe that hip hop music clashes with the culture of formal educational institutions (Kallio, 2015). Yet the process by which hip hop musicians learn, according to Kruse (2018) who found several 'elements of self-teaching; learning through listening, creating, competing, and collaborating' (p. 317), requires an unpacking of teachers' prejudices and misunderstandings of hip hop. Through this reconsideration, music educators might more closely align hip hop with the curriculum and translate it into confident practice in formal educational contexts, particularly school music (Hone, 2017).

A range of academic articles and books on hip hop have been produced over the past 40 years, for example, *The hip-hop studies reader* containing classic hip hop articles (Forman & Neal, 2004). There is also *The Cambridge companion to hip-hop* (Williams, 2015), which provides evidence of diverse practices, skills, originality and musicianship framed and functioning in contemporary narratives that are multi-layered and embodied as well as the product of diverse creativities underpinning encounters of inclusivity, social engagement and connectedness. Following similarly is #HipHopEd: The Compilation of Hip Hop Education, volumes 1 (Emdin & Adjapong, 2018) and 2 (Levy & Adjapong, 2020), with ground-breaking insights into Hip Hop integrated strategies within educational settings. Indeed, the literature in this area is too vast to be summarised here and grows year on year.

Music sociologist Lucy Green argued as early as 2008 that hip hop–related practices such as DJing are 'much further removed from the popular

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1] Hip hop pedagogy is a form of teaching that takes the most popular genre of music in the US and uses it to foster success in the classroom. For example, hip hop pedagogy offers a way of authentically and practically incorporating the creative elements of hip hop into teaching by inviting students to have a connection with the content while meeting them on their cultural turf, by teaching to and through their realities and experiences. Critical Hip Hop Pedagogy (CHHP) addresses deep-rooted ideologies to social inequities and social injustice by creating a space in teacher education courses for prospective teachers to re-examine their knowledge of hip hop as it intersects with class, gender, sexuality, religion, nationality, race and racism and intersects with other forms of oppression.

music into which [music] teachers were themselves encultured' (Green, 2008, p. 48), causing DJing, rapping and the like to be highly uncommon in schools. It is true that DJing, MCing/rapping and 'making beats' with technology involve a very different musical approach to classical music and most popular music[2].

Classical music education and popular music within education settings tends to eschew improvisation and focus on recreating a canon that already exists. Electronic musical production often tends to be individual, initially at least, and often starts with improvisation. Even before we get to issues around teachers' confidence around the fast-paced development of styles and technology, this group orientated 'cover version' focussed approach can be challenging to adapt to electronic production environments.

With over a decade of experience organising hip hop and urban arts spaces across the United States, a former high school teacher and present Professor of Education at Lincoln University in Pennsylvania, Emery Petchauer (2012), in his book entitled *Hip-hop culture in college students' lives*, describes how hip hop became an important topic of study for education and educational research. He describes how hip hop culture entered academia through dissertations, academic conferences, courses and university programs. Perhaps it is not surprising that academic institutions, such as universities, colleges and K–12 schools, became interested in hip hop culture. Afrika Bambaataa, a founding father of the hip hop movement, stressed that *knowledge* and its emancipatory aspects are cornerstones of the culture (Rawis & Petchauer, 2020). *Social activism and education* have been associated with hip hop culture since its origin in New York almost fifty years ago.

Navigating between the field of hip hop culture with its deep cultural logic outside academia and the expectations inside the academy (particularly universities) is what Söderman (2013) refers to as 'Hip-Hop Academicus' or the academisation of hip hop. Building on this, Snell and Söderman mix and remix educational orthodoxies into a whole new pedagogical strategy in their 2015 book *Hip-hop within and without the academy* which

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2] For examples of how these practices are embedded with digital technology see CEO/Founder Simon Glenister's, award winning social enterprise *Noise Solution* which leverages the power of digital music technology to teach DJing, MCing/rapping and making beats (see https://virtual.digileaders.com/talks/digital-youthwork-a-case-study-of-noise-solutions-sector-leading-work-in-digital-youthwork-now-and-in-opportunities-in-the-future/).

explores why hip hop has become such a meaningful musical genre and how educators can include and embrace hip hop's authenticity and appeal to young people to help them express their ideas and opinions Global hip hop culture allows young people with different cultural backgrounds to connect and interact in multicultural suburbs. It even provides a global kinship, representing an alternative counter-nation and global hip-hop nation (Söderman & Sernhede, 2016).

A music research study of hip hop was conducted at the University of Sydney Conservatorium of Music in 2016 by James Humberstone (a teacher-composer-producer) and Caitlin Sandiford (a student-improviser-performer) (reported in full in this compendium; see also Sydney Conservatorium of Music, 2016). Hip hop was used to open traditional conservatory students (trained in Western art music) to a very different yet highly sophisticated musical culture. This was described as an 'activist pluralist' project, where pluralism was defined philosophically through Isaiah Berlin's work as well as pedagogically through established traditions in the music education degree at the institution. A collaborative hip hop residency was established and a creative work with elements of slam poetry, rap, electronic beats, orchestral and choral music, and cinematography, with social justice themes, called *Odysseus: Live* was premiered in June 2016 as the culmination of the project. Humberstone and Sandiford came together as teacher and student at the conservatory, before setting out their very deliberate methods including how they propose to develop a model of activist pluralism as a viable pedagogy for a more diverse and inclusive model of music education in the twenty-first century. With more than one hundred students involved, and an aspiration to de-centre the traditional conservatory worldview on what counts as music and effective pedagogy, the purpose of the project was to act as a way into the contribution to tertiary music education of hip hop.

As part of a doctoral study in 2018, Kimberly Stuart conducted an ethnography of hip hop as music. She specifically investigated the independent and thriving hip hop music scene in Sydney. Using in-depth interviews with forty independent Sydney hip hop musicians, that is, MCs, producers, beatboxers and vocalists, she also completed observations of more than one hundred and thirty fieldwork experiences of live hip hop shows, local music institutions including independent stores, independent record labels, live music venues, conferences, festivals, exhibitions and documentary screenings. One of her key insights was that the hip hop music scene does not always align itself with the mainstream music industry, but rather

with an independent network of dedicated local hip hop musicians who also engage with local music institutions to keep their scene going. These 'institutions' did not feature higher music education or school programmes (Stuart, 2018).

Literatures which describe the teaching and learning of hip hop and its documentation, evaluation and/or impact, such as the burgeoning and discursive body of hip hop scholarship informing the field of education as exemplified by Petchauer (2009) and Bridges (2011), offer analyses of social, educational and cultural experiences. A key focus is the capacities of institutions to foreground hip hop in terms of the multiplicity of affective relations and impacts that bind these practices together as a profound genre that significantly influences learners as much as they are influencing it. Bridges (2011) highlights three organising principles drawn from hip hop culture: (a) a call to service, (b) a commitment to self-awareness and (c) resistance to social injustice, all of which profoundly shape the teaching identifies of the Black male K–12 teachers featured in his study.

Hip hop works as a context for subject knowledge, as a cultural experience and as a cultural space which involves having an audience beyond the teacher. It leaves room for unexpected knowledge, emphasising the skill of language and the temporality of the relationship between language and the embodied practice of hip hop as a performative event where all objects – human, environmental or inscribed – are entangled in the exploration of an idea and the expression of its discovery. The 'animacy' of performance and compositional creativities are critical to hip hop. Recognising and naming the diversification of musical practices, genre codes and lyric registers requires us to ask what and who do we need to change and is it really possible to change the system to incorporate contemporary embodied practices such as hip hop into contemporary mainstream music curricula? If, as music educators and curricula designers, we were to include hip hop as the prominent genre of contemporary music that it is, we stand to enact transformative effects on young people in terms of not only musical learning/understanding but also self-confidence, mental wellbeing and much more. There is an urgent need, which is well documented, for music education and schools in general, as well as extra-educational institutions, to recognise urban music, and particularly hip hop, for what it is, arguably the most popular music in the world in the twenty-first century, and certainly a hugely important cultural and musical field. This music and culture immensely important to large numbers of young people today but are minimally recognised by the mainstream educational establishment. Given

that educators need to harness student voice to inform mental health and wellbeing issues, experiences and approaches in school – even before the COVID-19 crisis, the most pressing issue facing the education sector – we need now more than ever to open up to, to share and to pursue diversity and inclusivity through transformative hip hop music practices, allowing room for the different creativities and diverse cultural knowledges implicit in students' experiences of learning in music classrooms.

What these music researchers and their discourses tell us is the need for a new paradigm that inspires this type of openness, capacity and possibilities for erupting the sediment of history, for expanding in, and of working across diverse sites, settings and creativities that enable us to gain a vital understanding of what constitute 'musics' in 'music research' for future-making in the C21st. In this section of the chapter, most of the research was written by the founders themselves who describe their own practices and their attempts to develop and classify key elements of the transformative impact of hip hop. The sites of these entanglements manifest practice-as-research, which emphasises the interconnectedness of sonic and musical ecologies.

A NEW PARADIGM OR JUST SOCIAL ACTION?

The capacity of self-aware musicians to be adaptive, to perceive change as both an opportunity and a challenge, to bridge the divide between tradition and innovation, and to move easily within a multiplicity of musical networks, is crucial in their rendering of new music research.

Our ability to imagine and invent new worlds is one of our greatest assets and the origin of all human achievement; yet the recognition and importance of music research provides the driving force for musicians at all stages in their careers to become independent and self-determined. Music research is too often unrecognized, under-appreciated and under-reported in scholastic views of higher music education programmes, undergraduate curricula and coursework projects that supposedly prepare students for the professional worlds they must navigate and inhabit and future-make (Smilde, 2008; Karlsen & Vakeva, 2012; Partti, 2012).

This chapter expresses a call to music researchers to develop new and leading-edge practices, to co-author innovative research, teaching and

other activities that mobilise research-evidenced practices which activate and develop specific creativities, such as *entrepreneurial creativity* which sparks learning from failures, animates thinking outside the box, going beyond disciplinary and institutional comfort zones, taking risks, crossing boundaries and institutional borders, transcending traditions and conventional understandings and venturing beyond the expected. *Entrepreneurial creativity* involves a constant interplay of thinking and doing: passionate cycles of thinking, doing, failing, analyzing, rethinking and modifying, then doing again; a determination to find solutions which often manifests through two related concerns: firstly, the sites of these entanglements and secondly, the autonomy of these sites with respect to the wider world. For those working in a digital maker space, they most likely will value *user-creativity* featured in a social space where pre-production and production cycles occur. For those learning to live code you might find the practice of real time scripting, which often results in creating a new genre generated by *performance creativity*. Then, again, you might simply see *compositional creativity* being the driver of composers' work and play space. In any case, the type of creativity in use would be promoted and foregrounded in terms of different forms of authorship, principles and mediating modalities. In other words, the need for acknowledging the pluralism and existence of multiple creativities, from school into post-compulsory education and on through to the creative industries, is an important element of the zeitgeist in music research.

We are seeing a global development for the advancement of diverse creativities and entrepreneurship; this is bringing change and challenges to school and studio music education[3] and higher music institutions by producing hybrid for-profit and not-for-profit initiatives. Yet there is little training based on leading-edge entrepreneurship models in any of these sectors. This recognition opens up possibilities for new paradigms that bridge (and cross borders) between creative industries and sciences within music institutions, where partnerships are creatively forged with corporate and social sectors.

As Plato said, 'what is honoured in a society will emerge in that society'. To nurture multiple creativities (in music research and with those pursuing a career in music, practicing and preparing for music performance and production, arts administration or music teaching, or any of a multitude of career options), music institutions need to be contemporary

3] Studio music education is also known as instrumental music teaching contexts.

environments in which creativities are embedded, cultivated, modelled and resourced. While we might regard the historical legacy of creativity as being concerned with domain specific musical processes, products and people, nevertheless, a central ingredient in successful institutions is the ingredient of leadership creativity to lead the way in supporting new music research.

This chapter proposes that a new paradigm for music research has intrinsic value in sounding the cries of what matters for children and young people, in doing more than hoping to prepare young learners for the demands of the C21st, but rather future-making research as forces for change. The diversity of creativities in music is a key issue in innovating music research. Being mindful of the fact that engagement with radical change and radical ways of rethinking and reflecting - that is, new paradigms - need to remain a priority for music research, as with music education, especially in these recent challenging times of a global pandemic.

QUESTIONS FOR CONSIDERATION

1. How might music research and music researchers go about developing radically new co-authorships with future-making professionals who are working successfully co-authoring real-world creativities? What element in the system changes in relation to a change in that environment and their practices?
2. How might music researchers engage in new ways of documenting who/what/how/when students learn from diverse creativities in music practice?
3. What is music research doing to address the gathering of contemporary currents that underline the reciprocations and iterations of composer-performer-technological-collaborations in real-world practices?

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2

Hypermusic: New Musical Practices at the Crossroads of Music, Art and Thought

HYPERMUSIC: NEW MUSICAL PRACTICES AT THE CROSSROADS OF MUSIC, ART AND THOUGHT

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ABSTRACT: This chapter presents the concept of *hypermusic*, which is intended as a concrete tool for the generation of new musical practices and for the exploration of fertile encounters between music, art, and philosophy. *Hypermusic* happens at the intersection of two realities: the actually sounding configuration of sonic events (what one usually labels as "music"), and the virtual aesthetico-epistemic constellation of texts, images, ideas, cultural references, and further non-musical components that are integral part of musical works, even if not explicitly conveyed in their performances. *Hypermusic* might refer to compositions, performances, installations, or other modes of musical expression, including digital objects. Moving beyond strict disciplinary divisions and media compartmentations, the concept of *hypermusic* instigates new musical practices that respond to the conditions and affordances of contemporary society, opening up the artistic and conceptual horizon towards expanded fields of activity and expression.

KEYWORDS: Hypermusic, Assemblage Theory, Hyperobjects, Composition, Performance

INTRODUCTION

This essay presents the concept of hypermusic, which is intended as a concrete operative tool for the generation of new musical practices and for the exploration of fertile encounters between music, art and philosophy. While music has always related to other fields of artistic practice and to other modes of thought, the possibilities to foster musical practices via transdisciplinary and transversal connectors across composition, performance, visual arts, and contemporary philosophy have never been so rich as in our time of accelerated transformations in culture, politics, and technology. If one thinks beyond strict disciplinary divisions, new definitions of music and future musical practices that better respond to the conditions and affordances of contemporary society become possible, opening up the artistic and conceptual horizons towards expanded fields of activity and expression.

Hypermusical objects might refer to compositions, performances, installations, or any other mode of musical expression, including digital and virtual entities. As a starting definition, one could say that *hypermusic* is music that factually (and not only implicitly) includes component parts that go beyond music itself; music with multiple dimensions, many of which remain inaccessible to the listener. Hypermusic happens at the intersection of two realities: the actually sounding configuration of sonic events (what one usually labels as "music"), and the virtual aesthetico-epistemic constellation of texts, images, ideas, cultural references, and further non-musical components that are integral part of (hyper)musical works, even if not explicitly conveyed in their performances. Critically, these virtual components are real, they are concrete parts of the whole, and they can be found and traced in the score, script, or extended materials relating to the piece. In this sense, hypermusic can have an intentional non-disclosure of all its constitutive components. It might combine live music, pre-recorded sounds, live-electronics, noises, soundscapes, speeches, texts, digital images, film or video clips. It might involve motion and displacements of both the performers and the audience, and it might be better suited for performance on wide flat spaces or *ad hoc* constructions, using space in order to reconfigure it, to transform it into a "musictectural" (musical + architectural) four-dimensional reality. Moreover, the concept of *hypermusic* can be used both to refer to the design of totally new musical entities ("compositions") and to creative explorations of past musical objects ("performances"), critically contributing to new modes of expression and communication.

More than providing final research results or any form of conclusive knowledge, this essay is intended as a gate opener for future research and for the generation of future musical objects. In this sense, it is a proposal for a type of discourse that focusses more on the future than on the past, reversing the conventional temporal directionality of most music research. The essay is organized in five sections, presenting the genesis of the concept of hypermusic, some of its musical precursors, its potential for new performative and compositional practices, and articulating the relation of music to other areas of contemporary thought and knowledge production. Section 1 briefly reviews the music ontological move from the classical paradigm (with its central notion of the work-concept) towards assemblage theory in music (based upon the multilayered notion of musical-work-as-assemblage). Section 2 presents the genesis of the concept, which results from the merging of two originally separated "theories," namely my own assemblage theory for music [de Assis, 2018] and Timothy Morton's concept of *hyperobjects* [2013]. Section 3 refers to selected examples of musical "works" from the past that can be seen as precursors of hypermusic, including compositions by Bernd Alois Zimmermann, Luigi Nono, Helmut Lachenmann, and John Cage. Section 4 presents methodological tools for the generation of music performances as hypermusic, while Section 5 suggests some concrete possibilities for future compositional work based upon the concept. Finally, the Conclusion offers an opening towards other fields of practice and knowledge production that can contribute to further extensions of musical practices beyond music itself.

FROM THE WORK-CONCEPT TO ASSEMBLAGE THEORY IN MUSIC

The majority of currently observable musical practices associated with notated Western art music, even if making use of highly advanced technologies and marketing strategies, are fundamentally rooted in compositional, performative, and interpretative traditions that find their origins in the late 19th century, traditions that relate to what art philosopher David Davies [2011] labels "the classical paradigm," whose central notion is the "work-concept" as thoroughly discussed by Lydia Goehr in 1992 [2007]. Goehr's analysis of the regulative force of the work concept, its historically situated emergence, and its powerful impact on the legitimation of certain

musical practices, was a major attempt to break down dominant modes of thinking, particularly in the face of several innovative musical practices that were demolishing concepts and conventions, in a period (the late 1980s) when musicians and aestheticians seemed to have no hold on their concepts. Today, entering the third decade of the twenty-first century, musical practices are demolishing the ontological establishment even more than in the late 1980s, particularly due to the digitization of culture and society, with an exponential growth of available sources, editions, recordings, secondary literature, and online platforms. Such a complex combination of superposed materials reflects the overwhelming amount of information in our "network society" [van Dijk, 2005], and the complexity of relations and connectors of the "information age" [Castells 2000, 2009, 2010, 2010a, Floridi 2014, 2015], in which hyper-text, hyper-archives, hyper-information, hyper-technology, hyper-history, hyper-connectivity, and hyper-communication are revolutionizing the ways in which society is structured and organized. All these changes have an impact on the modes in which music is made, performed, communicated and disseminated. In this sense, I believe that composers, performers, and musicologists can greatly benefit from innovative creative strategies and new music-ontological perspectives that concretely challenge not only the work-concept, but "the classical paradigm" of music creation and reception as a whole.

An important step in this direction has been made between 2013 and 2018 in the framework of an artistic research project led by myself (musicexperiment21.eu), which aimed (among other things) at replacing the term "work" (substantive) by "work" (verb), leading to an understanding of musical-works-as-assemblages [De Assis 2018]. Deeply rooted in the differential ontology of Gilles Deleuze[1], this research project enabled a first definition of a new image of musical objects, considering them as made of innumerable constructive component parts (material and immaterial) that emerge in the real world at specific times and places, which are the result of intensive processes of generation, and which continue to undergo redefinitions, changes, and transformations throughout time. Anyone with experience in preparing editions of musical works (for print), or in research on sketches (in archives) knows that any fixed "definition" of a work is highly problematic, open to criticism, and the object of change over time. Not only do traditions of musical practice and reception change, but the

1] For a detailed account on Deleuze's concepts and their impact on my proposed ontological view, see [de Assis 2018, 52-66].

very definition of a musical text is constantly shifting [Grier 1996, de Assis, 2009]. Musical works from the past have been different entities in different times. From this perspective, it becomes central to look at the intensive energetic processes that lead to the factual production of sketches, scores, editions, recordings, analyses, and theoretical reflections on a given "work." Before gaining their "identity," their "enduring character," or their "aura," musical works are constituted through energetic processes that generate complex "proto-objects" [Schwab 2015]: sketches, manuscripts, scores, editions, recordings, transcriptions, treatises, manuals, instruments, diagrams, analytical charts, theoretical essays, articles, books, CDs, DVDs, and digital modes of existence. All these numerous objects have been historically produced at some precise point in time, and they persist, remaining modally and temporally flexible. Any single item from the list presented above can be differently interpreted, presented, or re-arranged as part of a new performance, scholarly essay, music edition, lecture, installation, or any other thinkable format. What has traditionally been labelled as "musical works" appear thus as specific arrangements of partial elements and components of something bigger, that can be more aptly described in terms of musical *assemblages* [de Assis 2018] or as *hypermusic*, terms to which I now turn.

FROM ASSEMBLAGE THEORY TO HYPERMUSIC

In the last decades, the concept of assemblage has emerged as central for addressing problems of stability, instability, determination, and, most importantly, transformations regarding social, political, economic, philosophical, and aesthetic phenomena. As with previous concepts from philosophy and the social sciences, such as "complexity," "chaos," "fractals," "turbulence," "emergence," or "multiplicity," it has been developed as a way to move beyond the notion of "structure," which has dominated many discourses in the human and social sciences in the second half of the 20th century. "Structure" and structuralism clearly obtained important results and were able to explain many problems and phenomena, but they seemed to fail in the face of complex systems, especially when rapid changes, mutations, and transformations led to unforeseen and unpredictable events. Instead of being fixed and resistant to change, complex systems (like musical works) operate in permanent processes of becoming and individuation,

which contribute to their resilience. Thus, the notion of assemblage, with its interplay between structure and contingency, organization and chance, "can be seen as a relay concept, linking the problematic of structure with that of change and far-from-equilibrium systems" [Venn 2006, p.107]. In music, especially under the dominant model of the "classical paradigm," modes of making and thinking music preferentially insist on stable formations and well-defined sonic (and social) entities. The heterogeneity of available materials is acknowledged, but the goal is to recapture such heterogeneity in a homogeneous and unitarian whole (the work). Contingency is also accepted, but as "noise," as undesired events that distract from the "essence" of musical artworks. In this sense, the notion of assemblage, with its focus on the fluidity of matter, materials, signs, and functions, appears to be extremely powerful in enhancing creative explorations of new modes of conceiving musical objects and practices. It places research within a framework that considers musical works as being made of complex arrangements of aesthetico-epistemic components, forces, intensities, and signs, which establish several superposed networks of historical, cultural, material, symbolic, and psychological dimensions. Under this light, musical works cease to be conceived as sets of instructions or as ontologically well-defined structures. They become reservoirs of forces and intensities, dynamic systems characterized by meta-stability and transductive powers, affording unpredictable future reconfigurations. Not only have they been the object of changes in the past, but they will also continue to undergo mutations and transformations in the future.

Moving beyond ontological queries that deal with questions of being and identity, and insisting on an approach to musical entities that privileges processes of continuous change and transformation, the "image-of-work as assemblage" [de Assis, 2018] enables investigations of musical works not so much from a conventional ontological perspective, but rather in terms of *ontogenesis* [Simondon, 2013], and of productive operations with historically inherited materials. Thus, the problem shifts from ontology to epistemology, and to the modes according to which musical works can be apprehended in the real world.

Musical works are perceived and known always through concrete performative operations that (re)construct them anew every single time one is facing them. Such operations might bring to the fore some sort of "structures," but also, and more importantly, zones of indeterminacy, grey spots, cracks in the structure that no identity-based ontology is able to explain. Additionally, musical assemblages cannot be supposed to appear in

the world independently of their environment. On the contrary, they permanently emerge in the field of the visible and of the audible through new social, aesthetic, and cultural takes on them, which are also permanently changing and evolving from one state to the next. Thus, the proposed image of work addresses ever-changing constitutions and perspectives of such musical entities, as well as the corresponding subject positions from where they are perceived, received, or criticized. The object is changing, the environment where it is posited is changing, and the subject-receiver is changing. This requires new ways of conceiving the overall ecological network of objects and concepts around any possible formalization of a musical work, taking into account its various components and privileging the notion of permanent transformation.

This view of "musical-works-as-assemblages" can be further developed when linked to Timothy Morton's eco-philosophical concept of *hyperobjects*. Morton presented the concept for the first time in his book *The Ecological Thought* [Morton, 2010], where it refers to things that are massively distributed in time and space relative to humans, that is: things whose life span is much longer than that of humans. One could claim that hyperobjects are special cases of assemblages, keeping in mind that "assemblages" (as defined above) do not refer to collections, superpositions, or arrangements of other things. Assemblages, like hyperobjects, include human and non-human component parts, and have emergent properties, making them irreducible both to their material constitutive parts and to their abstract modes of functioning. Additionally, one can only see parts of a hyperobject at any one moment. Like the emergent properties of an assemblage, hyperobjects are objects that "seem to contain more than themselves" [p.78], and they continuously reveal further objects pertaining to them: "when you approach an object, more and more objects emerge" [p.54].

According to Morton, hyperobjects have five common properties, which can be transposed to or appropriated for musical works: *viscosity*, *nonlocality*, *temporal undulation*, *phasing*, and *interobjectivity*. Hyperobjects are *viscous*, "which means that they 'stick' to beings that are involved with them" [p.67]. They are *nonlocal* in the sense that any "local manifestation" of a hyperobject is not directly the hyperobject. They reveal or manifest different temporalities (temporal undulation), they are extended "into" the future "from" the past, revealing that more than existing "on time," they emit spacetime, accelerating or slowing down events around them. They can only be apprehended partially, requiring different phases to be perceived (phasing). Finally, they exhibit their effects interobjectively, "that is,

they can be detected in a space that consists of interrelationships between aesthetic properties of objects" (p.2).

These five properties enable a transposition of Morton's concept to music, especially under the light of the notion of the musical-work-as-assemblage. Morton himself centrally includes art and aesthetics in his writings, and he concretely makes reference to composers such as John Cage, Keith Rowe, and Francisco López. After discussing the long march of the "-isms" in the arts, which moved "from one form of Romanticism after another: Romanticism, Realism, Impressionism, Expressionism" [p.107], he concludes that we are now in a totally different situation, especially because "We know more than we can embody and we can't put the [romantic] genie back in the bottle" [p.163]. This is a crucial point: the hyper-text, hyper-archives, hyper-information, hyper-technology, hyper-communication, and hyper-history mentioned above—which are concrete manifestations of the Information Age we are living in—are symptomatic expressions of that infinite knowledge that we can no longer embody. A performer knows much more about any given piece than what can possibly be rendered in one performance; a composer develops many more materials than those that will enter the "final" composition; and a musicologist knows infinitely more on a given work than what ends up as a written essay. To make music, be it as performer or composer, is to deal with entities that are bigger than our capacity of timely-bound expression. Such entities require series of events, taking place at different times in different spaces, and using different media. Timothy Morton's concept and ideas open up a promising field for musical practice and reflection, for a profound investigation of musical entities as hyperobjects that has not been made yet. Beyond the few examples of musical pieces that Morton himself briefly discusses, one needs a much more fundamental study, crucially including different times, epochs, and styles. Moreover, such investigations can benefit from being made by investigators who are music practitioners themselves, focusing on state-of-the-art musical challenges, generating aesthetically convincing examples, and exposing the results of the investigations in-and-through the making of music.

The next three sections will briefly expose some examples of hyper-music *avant la lettre*, (Section 3), possible avenues for experimental performance practices (Section 4), and speculative openings toward future musical entities (Section 5).

HYPERMUSIC *ANTE LITTERAM*: SOME PRECURSORS

If I would have to name one piece that encapsulates most (if not all) the characteristics of hypermusic *ante litteram*, I would refer to Bernd Alois Zimmermann's *requiem für einen jungen dichter* (1967/69), a work that sometimes is described as "extended composition" for obvious lack of a better word. It features an enormous variety of music (originally composed, quoted, arranged, recorded) and of non-musical material. Labelled by the composer as a "lingual", the *requiem* is constructed upon a highly elaborated "meta-text" that juxtaposes the Latin Mass for the Dead with literary, philosophical, religious and political texts. In addition to the texts spoken and sung, Zimmermann uses taped recordings in the style of a radio drama including the voices of the philosopher Ludwig Wittgenstein, Pope John XXIII, James Joyce, Alexander Dubček, Hitler, Chamberlain, Georgios Papandreou, Ezra Pound, Kurt Schwitters, Albert Camus and Sándor Weöres, as well as reports from newspapers. Quoted music includes fragments from Wagner's *Tristan und Isolde* (1859), Milhaud's *La création du monde* (1923), Messiaen's *L'ascension* (1933) and The Beatles' *Hey Jude* (1968). In the section "Dona nobis pacem," excerpts from Beethoven's Ninth Symphony are dramatically (and painfully for the listener) contrasted with texts by Joachim von Ribbentrop, Stalin, Goebbels, Churchill and Bayer. Rather than trying to describe the *requiem* as a cantata, an oratorio, or an audio play, I propose to label it as hypermusic, indicating the multiple dimensions of its constitutive parts and complexly articulated relations. As van Deurzen [2008] writes, "not everything in the requiem — or perhaps almost nothing — is comprehensible."(p.9). The superposition of different semantic and semiotic layers creates a sonic situation with two levels, one direct, the other indirect. In the direct level, there are some words and sentences that one understands, such as the profoundly disturbing text *der sechste sinn* ("Worauf warten?") by Konrad Bayer, which is elaborated in a multiple-channels section in the "Ricercar" (Requiem I, 29:03-33:13), or the second text by Bayer ("Wie jeder weiss..."), that concludes the work with a radically dramatic and hopeless view on the construction of "knowledge," especially in politics, but also in science and academia. The indirect level is presented and achieved through the complex montage of fragments of texts and music, "through which a network of intertwining links is formed between the texts used and the writers, politicians and historical context" [van Deuzen 2008, p.9]. To what an extent this network of relations and links should be communicated

to the audience remains a matter of debate, which could be creatively explored in future performances of the piece. From a music-architectural point of view, the *requiem* is equally challenging, requiring a huge space with the capacity to position the orchestra, the three choirs, the jazz combo ensemble, the soloists and speakers, as well as the loudspeakers, all around the audience. While this is not something "new" today (and it wasn't new already at the time of the composition), this is an aspect that deserves further consideration and that might lead to even more spatially expanded performances.

Another piece with a monumental kaleidoscopic montage of texts, and with a major architectural component is Luigi Nono's *Prometeo, tragedia dell'ascolto* (1981-84) for singers, speakers, chorus, solo strings, solo winds, glasses, orchestral groups, and live electronics. In this case, the premiere of the work was even done in a specially constructed wooden structure (designed by the architect Renzo Piano) that hosted the musicians, the sound technicians, and the audience. Whereas Zimmermann's *requiem* ends with a devastating and hopeless view on the future, Nono's *tragedia* concludes with suggestion of the emergence of "a new utopia out of the rubble of cultural history" [Jeschke, 2007, p.21]. In both cases, there is a profound reflection on historical events, philosophical and ideological positions, as well as composite aesthetic modes of expression, merging instrumental and electronically modified sounds, using the voice both for singing and speaking. Moreover, both pieces "create" new musical forms: Zimmermann makes a requiem that is a "lingual", Nono an opera that is a "tragedy of listening," thus, both refuse conventional genre and formal schemes, favoring the definition of unclassifiable aesthetic formats. Nono, in collaboration with philosopher Massimo Cacciari, borrows texts from Hesiod to Walter Benjamin, from Aeschylus, Hesychius, and Sophocles to Hölderlin and Cacciari himself. Musical quotations—always hidden and actually not recognizable for the listener—, range from Giuseppe Verdi to Arnold Schoenberg, from Robert Schumann to Gustav Mahler. They are present not for the sake of music alone, but "in terms of their contribution to an awareness of history that points to the future" [Jeschke, 2007, p.21]. In terms of performance, it is important to mention the fact that every single performance requires site-specific musical decisions, making of it an exclusive and unique event that cannot be exactly replicated anywhere else. This is mainly due to technical requirements and to very specific instrumental techniques that have to be learned and experimented over long stretches of time. Nono's late music (not only *Prometeo*) cannot be "just

played" from the score, it requires a whole process of full immersion into and deep understanding of his musical and aesthetic world.

Another example could be Helmut Lachenmann's *Das Mädchen mit den Schwefelhölzern* (1990-96), a work that problematizes the notion of "opera" by defining a musical object that is not officially labeled as such, but as "music with images" (even if it was commissioned as an opera). The text materials are fragmented and pulverized in different levels: there is the tale *The Little Match Girl* by Hans Christian Andersen, which serves as unspoken (and unsung) dramaturgical foundation of the whole musical composition; there is a text by Leonard Da Vinci from the *Codex Arundel*, some few words form Nietzsche's *Zarathustra* (Mitternacht), and a letter written from the prison in 1975 by Gudrun Ensslin, a convicted member of the terrorist group Baader-Meinhof who had set a department store on fire in 1968 in Frankfurt (which provides a direct link to the matches in Andersen's story). On a subterranean level, there are many other texts, some of which very long, which are almost never heard, and never semantically presented. These texts are recorded in CDs that are "played" by musicians just like any other instrument—that is: the CD performers have a simple potentiometer that opens and closes the output of the CD track and that regulates its volume level, following a fully notated score. Thus, all those texts function like sonic material and are audible only at the level of their acoustic (not semantic) reality. This is a unique feature of this piece, and I must mention that I only came to know about this when I was participating in a performance of this piece as one of the CD players (Madrid, Teatro Monumental, 2008). This was the only opportunity to hear one of the CDs in full-length (the one I had to "play"), which I heard at home while "practicing" my part. It contained a text on the making of pianos, specifically of Steinway instruments, certainly an activity that implies the functioning of advanced forms of capitalism, which might be the link to the little girl's story of social oppression and human coldness. The music includes some very short musical quotations from Igor Stravinsky (*The Rite of Spring*), Ludwig van Beethoven (*Coriolan Overture*), Arnold Schoenberg (*Variations for Orchestra*), Pierre Boulez (*pli selon pli*), Gustav Mahler (Sixth Symphony), and Alban Berg (one chord from *Wozzeck*), all of which appear in an unrecognizable, estranged way. In short, Lachenmann's *The Little Match Girl* provides yet another compelling example of hypermusic *avant la lettre*, with its manifold and heterogeneous superpositions of materials, with its subterranean textual dimension, its musical complexity, with the inclusion of extra-European instruments (Shô, a Japanese mouth

organ, and Dobachi, a Japanese bowl gong) that are used in a way that estranges them from their traditional practices, and with hyperconnections to different times and geographies (the times of Leonard, Nineteenth Century Europe, post-World War II Germany, and the mental spaces of South Italy, Scandinavia, Japan, other-worlds, etc.).

One could further think of other pieces, like John Cage and Lejarren Hiller's *HPSCHD* (1967-69) for seven amplified harpsichords, 52 tape machines, 6.400 slides and 40 films, that shows John Cage's interest in bringing together a wide range of different elements for audience members to experience simultaneously, and in which to immerse themselves. All these pieces could be the object of detailed studies in relation to the notion of hypermusic. For the purposes of the present essay, I simply wanted to mention them as a way to convey my understanding of the notion of hypermusic, and how it can be traced back to some musical experiences from the past.

EXPERIMENTAL PERFORMANCE PRACTICES AND NEW RESEARCH METHODOLOGIES

For all those operating in the field of artistic research, the most interesting aspect of the notion of hypermusic is that it has the potential to foster unprecedented creative practices both for music performance and for composition. Artistic research is conducted by artists, by practitioners that configure and reconfigure the materials of their artistic area of activity. Thus, in addition to music analytical studies of past musical works that can be read as hypermusic *ante* litteram (as suggested above), the concept of hypermusic affords innovative practices and research methodologies.

From the perspective of creative performance practices undertaken within the framework of artistic research, the central question is: how can the performance of music, considered as a field of research in its own right, expose the complexity of materials and practices that characterize existing musical works if regarded as hypermusic? How to articulate the dimension of "archive" (the collection of traces and inscriptions that constitute the material sedimentations of musical works) with the dimension of the "diagram" (the ever-changing constellations of material and immaterial connectors between the archival components)? How to challenge existing

models and working methodologies in order to generate innovative performances, installations, recordings, online manifestations, but also new kinds of publications and further modes of communication?

In order to address such questions, I have developed a working methodology, which has been specifically designed for arts-based research in music [Assis, 2018]. It is a tripartite methodology, involving philological investigations, inter-textual studies, and arts-based problematizations.

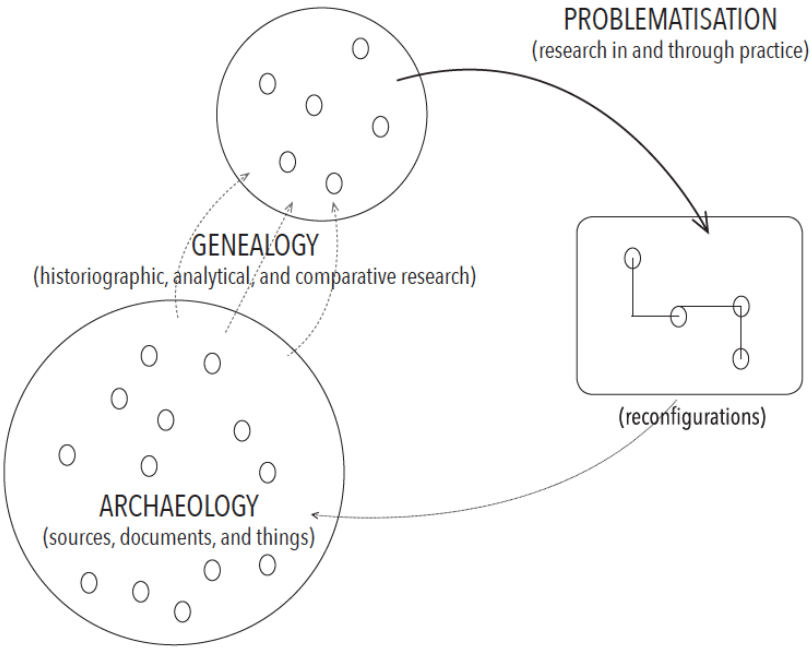

Figure 1. *Working methodology for artistic research in music.*

First, the innumerable material traces and things that construct any given musical work are "archaeologically" identified and scrutinized for further consideration. Next, the relations and connectors they entertain with one another, as well as their transmission over time, are studied in terms of a "genealogy," disclosing special passages (also from the sketches and early versions), particular points that can be read as especially rich in terms of aesthetic potential. Finally, specific selections of such singularities are brought together as new combinations or reconfigurations that

problematize them anew. This methodology has several relevant features. Firstly, it allows the integration into performance of diverse materials that go beyond the score (sketches, texts, images, and videos), offering a broader contextualization of works within a transdisciplinary horizon. Secondly, it fosters new modes of conducting research in music, overcoming traditional divisions and boundaries between music theory and creative practices—the practitioner becomes profoundly rooted in scholarly research, and this research is a meaningful and integral part of the artistic results. Thirdly, it creates the conditions for a unifying approach to performance and composition, as the three steps and their respective operations are very similar for both composers and performers. Fourthly, it makes graspable the potential of performance and composition to operate as knowledge-producing activities. Lastly, beyond the (re)creation or (re)production of a musical "work," it enables an understanding of musical components as objects for thought through performative or compositional devices.

The "archaeological" moment relates to conventional scholarly research, including archival and source studies; the "genealogical" phase calls for interpretation, semiotics, and transtextuality; and "problematization" happens by constructing new and experimental arrangements. With the latter, the artistic dimension becomes inescapable, requiring a kind of artist and researcher who cohabit in one single person. It is in this phase of the research process that the notion of arts-based research becomes particularly relevant and fruitful. The circularity of this research methodology facilitates the realization of series of performances and installations based upon a restricted group of starting materials, leading to the generation of "differential repetition" and to the proliferation of research results.

As an example of such practices and their outcomes, I would like to mention the research project Rasch-X, conducted by my research team at Orpheus Institute between 2013 and 2018. This project[2] has been constructed around Robert Schumann's *Kreisleriana* op. 16 (1838), and Roland Barthes's essays on the music of Schumann, particularly focusing on 'Rasch' (1975), a text exclusively dedicated to *Kreisleriana*. To these materials other components have been added for every single particular version: visual elements (pictures, videos), other texts, or further aural elements (recordings

2] For an overview see: https://orpheusinstituut.be/en/projects/raschx-schumanns-somathemes.
For further details and online presentations of all versions: https://www.researchcatalogue.net/view/64319/64320.

or live-electronics). The project generated a series of mutational modes of appearances (performances, lectures, installations), which enabled and enhanced an intricate network of aesthetico-epistemic cross-references, through which the listener was invited to focus on different layers of perception: be it on the music, on the texts being projected or read, on the images, or on the voices. Situated beyond 'interpretation', 'hermeneutics', and 'aesthetics,' Rasch-X can be seen as part of a wider research on what might be labelled as "experimental performance practices", which productively deviate from conventional (repetitive and reproductive) performative strategies and that invite the audience to actively engage with the performative moment, transforming familiar artistic objects into objects for thought.

Focusing on the intertwining of traditionally strictly separated functions (the performer, the composer, the listener, the scholar) this project proactively merges all of them in the figure of the artist-researcher, an artistic and academic operator that has the capacity to enact and embrace a constructive critique of current modes of thinking and making music.

FUTURAL MUSIC ASSEMBLAGES

As for the generation of totally new musical entities, the question is how to relate to the concept of hypermusic in order to create artworks that move beyond the notion of "work," investigating new definitions of what composition means, and exploring innovative musical practices altogether. How to invent new sonic agencies that are sustained by practice-based research and that aim at the simultaneous generation of scholarly and artistic outputs, including compositions, performances, installations, recordings, arts-based websites, as well as texts and essays? How to detect and capture the "futural" powers of contemporary signs, symbols, and acoustic realities, in a way that might contribute to a horizon widening of musical composition for the 21st century? In what follows, I suggest four starting lines of inquiry, which are neither intended as exhaustive nor as independent from each other. They indicate possible paths for future compositional practices, focusing on a specific research topic at a time. These topics are:
(1) *temporal undulation*, (2) *superpositions/polyworks*, (3) *non-human sounds*, and (4) *self-organizing musical hyperobjects*.

(1) The notion of *temporal undulation* relates to the study and invention of new temporal and metrical properties for new musical entities, aiming at generating sonic objects that contain and manifest different temporalities, and not—as in the classical paradigm—one single, common tempo to all musical parts. Multiple temporalities can become an important characteristic of future musical objects, raising issues of coordination between the performing musicians and of unified perception at the listener's end. How to build such different temporalities in the musical fabric itself? How to establish coherent, but not totally predetermined relations between them? This research topic can lead to musical entities that manifest different temporalities, including sonic objects that can be rendered at different paces (absolute and relative to each other). Building upon already done scholarly and artistic work on multiple temporalities [Assis, 2013, 2017], this topic can be expanded by investigating Timothy Morton's philosophical notion of *temporal undulation*, which serves as an important inspiration for this desirable research endeavor.

(2) *Superpositions* and *polyworks* refer to musical objects ("works") that are made of several other musical "works," which can be rendered either together (superposed) or independently from each other. This is a fertile field for compositional practices, especially in view of the number and variety of currently available modes of musical performance. Moreover, there are already numerous examples of composers already working in this direction.[3] One suggestive example, is Klaus Huber's *Schattenblätter* ['Shadow Leaves'] for bass clarinet, piano, and cello, which can be performed both as a trio and, "like a tree losing its leaves," in any other combination of the single parts: clarinet and piano, cello and piano, clarinet and cello, even solo piano, in which case the title changes to *Blätterlos* ['Without Leaves']. Another interesting example is his piece *Plainte – Die umgepflügte Zeit. In memoriam Luigi Nono* (1990), which uses the same idea: it can be performed in its full score or in four other modes of appearance, without the solo voices, without the viola d'amore (which seems central in the full score), and even with the option of replacing some instruments by others. Such constructions resonate with Morton's notion of *phasing*, the fact that hyperobjects can only be apprehended partially. Polyworks, even if played "together," generate a perceptual overflow that makes it difficult

3] Among others, one can mention composers such as Chaya Czernowin, Julio Estrada, Vinko Globokar, Georg Friedrich Haas, Adriana Hölszky, Claus-Steffen Mahnkopf [see Hiekel 2016], and Klaus Huber (1924-2017).

to grasp them in their "integrity." In addition to musicological studies on these pieces [Hiekel, 2016], one can undertake creative investigations from an arts-based research perspective, through the making of musical objects that are constituted by several other objects, which can be rendered either together (in superposition) or independently from each other.

(3) Another topic that will probably gain further centrality in the next decades is the study and artistic work with *non-human produced sounds*. This will allow and enhance a move from subject-oriented text-based inscriptions to object-oriented sonic-based inscriptions, especially focusing on the sounds in and around us. While the paradigm of absolute music relied primarily on musical works that resulted from human invention, a widening of our ears reveals immense alternative sonic worlds. Non-humanly produced sonic agencies can be investigated as musical objects in their own right. The notion of "expressivity" has for too long been considered as emanating only from humans or from human activity, but realist and new-materialist accounts insist on the expressivity of matter [DeLanda, 2002, 2006, 2016] and things [Bennett, 2010], shifting the focus from the human experience of things to things themselves. After decades of field and experimental sound recordings of natural sonorities of the earth, recent developments make it plausible to think of musical hyperobjects totally construed on the sole basis of non-human engendered sonic objects. Timothy Morton offers one reference to such works, done by the sound artist Francisco López, whose *La Selva* [1998] is an impressive example that "evokes the hyperobject in an object-oriented way… The result [of which] is far from an ambient rendering or simulation of the real" [Morton 2013, p.184]. What one hears in López's CD *La Selva* (the music piece) is not a representation of 'La Selva' (the natural reserve in Costa Rica), even if it "contains elements that can be understood as representational, but the essence of the creation of this sound work… is rooted on a 'sound matter' conception, as opposed to any documentative approach" [López, 1998]. In this sense, an artistic research investigation on non-humanly produced sounds shall not aim at representing sounds of the nature *per se*. It shall much more move beyond subject-oriented inventions to object-oriented sonic-based explorations, especially focusing on the non-human expressivity of nature, technology, and all the sounds (natural and artificial) that surround us.

(4) Lastly, the emergent area of research on *self-organizing music* deserves attention and dedicated projects. This area of activity builds upon systems theory [Bertalanffy, 1968] and in it composer-researchers investi-

gate different forms of self-organizing music interfaces, including "intelligent" sonic systems characterized by autonomy, distributed/decentralized feedback processes, and environmental awareness. According to Phivos-Angelos Kollias [2018, p.2], self-organizing music interfaces are "interfaces composed by generative music processes directly influenced by their sonic environment." Processes of capture are done through microphones (acting as sensory organs), elaboration of responses happens through algorithmic controllers (including Digital Signal Processing and Control Signal Processing), and the exposure of results is mediated via loudspeakers. The move from *self-organizing music* to *self-organizing hypermusic* will enhance these practices, possibly leading to the generation of musical objects that are ever-different and changing, reacting to their environment, and having (potentially) infinite duration, thus breaking the notions of beginning and end.

TRANSDISCIPLINARY WEBBINGS

To conclude, I would like to stress that the concept of hypermusic has the potential to articulate an important challenge that relates to the role and function of musical creativity in our contemporary society. Beyond music itself, the concept and practice of hypermusic enables the relation and connection of music to other areas of contemporary thought and knowledge production, particularly to critical thought, contemporary philosophy and practice-based epistemologies. Such intricate networks of cross-references and cross-pollinations have the capacity to engender transdisciplinary webbings. More than asking what an artwork was, or how it has been assembled in the past, such webbings indicate a constructivist approach that interrogates how things are constantly dis- and re-assembled. This research gesture resituates musical practices in their relation to other practices and systems of knowledge production. If one understands hypermusic as music made of concrete particles and dynamic structuring forces, it is thinkable that other modes of thought—in spite of their disciplinary specificity—share similar structures. Intrinsically related to the ongoing information and digital revolutions, hypermusical investigations offer an opportunity for future musical practices, which have to be scholarly and artistically grounded, that use different modes of research (basic, applied, critical,

arts-based), and that include researchers from different fields of knowledge production (composers, performers, musicologists, philosophers). Such practices will combine different modes of research, particularly focusing on the emergent mode of practice-based research; they will contribute to the implementation of cross-pollinating methodologies within an artistic, aesthetic, and scholarly field of operations, and they will enhance innovative approaches to music performance and composition solidly anchored in research and critical thought.

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3

Soundwalking: Between Art and Non-Art

SOUNDWALKING: BETWEEN ART AND NON-ART

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ABSTRACT: Over the past few years, there has been a growing pressure on the arts to legitimize themselves through a verifiable societal impact. According to some representatives of the art world, this emphasis on societal impact has been detrimental for the attention to innovation and significance of the arts themselves. This essay deals with the question whether a form of reconciliation between these two opinions or positions is possible. In other words, are there art forms in which both the societal and artistic-aesthetic requirements can be met? This question will be investigated by focusing on an art form which has developed over the years in the margins of the art world: the soundwalk. Soundwalking, it is claimed, can be regarded as an act of re-sensitization, taking place in a zone between art and non-art, in direct contact with everyday life and simultaneously separated from it. As such, the soundwalk can have both artistic and societal significance.

KEYWORDS: Soundwalking, augmented listening, mobile technology, in-betweenness, societal and artistic impact

INTRODUCTION

Aside from the currently frequently heard notion –predominantly uttered by politicians, officials, and subsidy providers– that in order to be entitled to receive public aid, art institutions and individual artists should be able to prove that they can attract a diverse audience –according to age, gender, ethnic descent, or socio-cultural class– the same institutions and artists are also frequently requested to produce and distribute art that somehow has societal relevance. Key factors are therefore *valorization* and *impact*: art should, in one way or another, contribute to, solve, or at least address urgent contemporary issues, varying from environmental changes to ethnic profiling, or from reflecting on religious-inspired activism to addressing ethical irregularities. Today, the value of art –especially subsidized art– seems to need to be measured and justified by criteria that are in some sense extrinsic to art "itself."

Although it is certainly not unusual for contemporary artists to act on or react to topical subjects, art world theoreticians, policy makers, and other representatives have argued that complying with the demands of certain political ideologies, the economic whims of the market or any extra-artistic justification for producing art works, might be problematic as it is based on a limited perspective of the role and significance of the arts. Demonstrating successful cultural entrepreneurship or producing concrete and popular "deliverables" threatens the more intrinsic artistic values: creative innovation and provoking new experiences. In other words, what seems to be at stake here and defended by the art world is a twenty-first-century implementation of the early nineteenth-century slogan, *l'art pour l'art* (art for art's sake), namely, the idea that the significance of art first of all lies outside its potentially societal, political or utilitarian roles, functions, and influence; art should not be assessed or appraised on its instrumental contributions, but mainly on its development within the (necessarily hard to capture) borders of the art world itself.

Taking these allegedly opposed ideas as point of departure, I will investigate whether a kind of reconciliation or at least an encounter, can be achieved between the two positions. An important reason for this endeavor is that I understand and to a certain extent sympathize with both points of view. On the one hand, art should never be at the mercy of social, political, economic, ethnic, religious, or other interest groups; it should be able to develop itself *relatively* independently from other societal and/or technological trends, changes, regulations or dogmas. Impact and relevance should

at least also be assessed by peers such as fellow artists, art historians, art philosophers or art journalists. On the other hand, especially when artists depend on community funds, they should be able to reflect on their creative activities and considerations, not by *explaining* their artistic production or processes through texts or lectures but, for example, by contextualizing their work, by situating it in relation to other artistic or extra-artistic developments, by not being content with complacent inward looking. Without challenging art's relative autonomy and the artists' creative decisions, a society or organization that by some means invests in art, should at least have the right to ask how these provided means have been expended, not (primarily) as a control mechanism, but out of pure interest and curiosity, and to gain more understanding.

In order to somehow connect the societal and artistic ideas with concrete actions regarding impact and innovation, I will concentrate on an event which itself already oscillates between the socio-political, the artistic, the ecological, and the aesthetic: the *soundwalk*. Soundwalks are mostly situated at the periphery of more established artistic domains, often happening in the space between art and non-art, between entertainment and work (e.g., as a qualitative research method to collect data[1]), between servitude and being a goal in itself, between the useful and the useless, whereby the latter should definitely not be considered pejoratively; useless activities can be very useful in their usefulness!

After a brief introduction and overview of various forms and aspects of soundwalks, I will concentrate on a specific soundwalk that I am currently developing (and that is developing alongside the writing of this essay), before concluding with some reflections on both the artistic and more general societal roles and significance of soundwalking.

THEORETICAL AND PRACTICAL CONTEXT

Going for a walk is one way by which people explore, engage, and (re)gain contact with their environment; it certainly evokes a distinct experience compared to driving a car or traveling by train. Walking is one particular way

1] According to soundscape researcher Antonella Radicchi soundwalks can be regarded as one of the most appropriate tools for analyzing and evaluating a city (Radicchi 2017: 70).

to "know the world through the body, and the body through the world"; ideally, it is a state "in which the mind, the body, and the world are aligned" (Solnit 2001: 5, 29).[2] A *sound*walk is an exploration of a certain site through walking, with listening as the primary source of information; it connects the ordinary activity of walking with a specific focus on listening (not unlike the listening attitude with which one attends a concert) in order to allow someone to experience and reflect upon their sonic environment, and also, potentially, about the role, function, and influence that sounds have in a specific situation at a specific site. According to the sound ecologist Hildegard Westerkamp, a soundwalk is "any excursion whose main purpose is listening to the environment. It is exposing our ears to every sound around us" (Westerkamp 2007 [1974]: 49).[3]

Whereas a soundwalk, from the description thus far, can be considered as rather contingent and executed without any mobile auditory devices, it can also be actively "composed" and undertaken using headphones.[4] When composed, usually by a sound artist, the soundwalker is frequently

2] As the researcher Elena Biserna makes clear, walking is not just a practice to become immersed in a specific space. Referring to Henri Lefebvre, Michel de Certeau, and Jean-François Augoyard, she states that walking also *produces* and *appropriates* space. A space is activated and actualized by the practices of those who cross them (Biserna 2021: 299-300).

3] Continuing the subject of footnote 2, a soundwalker never has an external position to a site; they always participate – whether or not on purpose – in the emergence of the soundscape they are listening to. In turn, the material and acoustic features of the environment reshape the sounds of the walker. Soundwalking is thus always also sound *making* while the (sonic) environment acts as an acoustically and socio-politically organizing force (Biserna 2021: 301-304). Human and nonhuman agents relate (sonically as well as otherwise) to the aural organization, polyrhythms, and acoustics of a particular environment. Therefore, in and through their interactions, humans, nonhumans, and environments all have agency; in their capacity of affecting and being affected they all have an equal role. Instead of regarding matter, nature, and objects instrumentally, one should rather examine what they enable humans to do. Humans, nonhumans, and environments are interdependent, and this interdependence becomes the basis of their connectivity.

4] R. Murray Schafer differentiates between listening walks, that focus on listening, and soundwalks, that explore a soundscape using a score or map as a guide (Schafer 1994: 212–213). Other sources (for example, Drever 2009) differentiate between a soundwalk (without headphones) and an augmented or audio walk (with headphones). I prefer to use one general term (soundwalk) for these and other subdivisions. For me, any soundwalk is meant to mostly focus on listening while walking, no matter where the sound

not completely free to choose their own itinerary: it is the sound artist who somehow leads, directs, offers suggestions, or manipulates the soundwalker's movements and listening. Nevertheless, the sound artist can almost never claim a clear and complete authorship of a composed soundwalk as the soundwalker carries out the (hierarchical) roles of (co-)composer, performer, and audience simultaneously.[5] As the sound artist shapes the soundwalk, the soundwalker at least partly embodies the experience that the sound artist had before them.

The sound artist can basically choose between closed-back or open-back headphones. The former completely block the soundwalker's sonic contact with the environment, while the latter enable recorded and live sounds to mingle. In both cases, the recorded sounds might not only lead to some form of detachment (either positively or negatively valued) but it could equally add unexpected new layers of interaction to an urban experience. Furthermore, the sound artist can decide to compose the soundwalk with or without a narrative, with or without vocals, with or without synthetic sounds, with or without sounds recorded in the walking space, with or without normally inaudible but nevertheless natural sounds. Every decision affects the way the soundwalker will perceive and relate to a site; every decision adds an extra element to the "real" environment through which the soundwalker navigates.

Concerning listening: Soundwalking can be described as attentive listening to an environment while walking. This listening attitude bares comparison with, for example, attending a classical concert. However, crossing the threshold of the concert hall almost simultaneously means adapting oneself to the rituals and conventions of a particular kind of music, including social behavior and mode of listening. Soundwalking, on the other hand, (usually) takes place outside, in an everyday environment which (therefore) calls for or elicits everyday conduct. The discernment between musical and non-musical sounds, between foreground and background, between functional and aesthetic sounds, between audience and performer, between what (probably) belongs to the soundwalk and what (probably) does not, becomes a matter of shifting attitudes and sensitivities as the customary focal point of a concert experience is basically absent (Drever

comes from or how the soundwalk is organized or structured.

5] "When the soundwalker is instructed to listen to the soundscape, he is audience; when he is asked to participate with it, he becomes composer-performer" (Schafer 1994: 213).

2009: 164, 179).[6] This opens up the possibility of different kinds or forms of listening besides the one that is comparable to the way one often listens to music, that is, with a strong focus on the musical qualities and characteristics of an environment such as the present pitches, rhythms, and/or harmonies. Sound artist and researcher Andra McCartney distinguishes between various other forms of listening during a soundwalk: listening to the sounds the soundwalker's body makes in relation to the environmental sounds is such an alternative option. Applying a historical listening attitude, the soundwalker imagines how the environment sounded or could have sounded in the past. Listening becomes more politically, socially or ethically oriented when one asks questions such as: Who is occupying this site sonically? Which sounds are dominant, and which ones masked or absent? Who or what is sonically excluded? Finally, letting memories, associations or fantasies codetermine one's perception and experience leads to what McCartney calls "an evocative listening" (McCartney 2010: 1-2).

From this brief and inadvertently incomplete description of what soundwalks can be, it might already be apparent that they combine art and non-art, the extra-ordinary and the everyday, the institutional and the non-institutional, the sensible-corporeal and the contemplative-cognitive, the functional and the art's for art's sake, etc. Soundwalks can be done in a group or individually; they can be pre-organized or done spontaneously; they can provide useful information, for example to (re)design a site, or they can have a purely aesthetic purpose (Kant's purposiveness without a purpose). Their valorization and impact can thus pertain to both the art world and society at large, often in tandem with each other.

6] In 1952 John Cage brought environmental sounds into the concert hall in his (in) famous piece *4'33"*. Using almost all the conventions of a regular music performance, Cage's composition consists of all sounds that can be heard within the concert venue during that particular time span. Fourteen years later, Max Neuhaus started organizing his listening excursions named LISTEN in New York City. Instead of bringing sounds into the performance space, LISTEN was meant to do the opposite, namely, to take people out – "a demonstration in situ" (Neuhaus 1990: 63-67). In 1971, Cage responded to Neuhaus' initiative by organizing a similar event entitled "Demonstration of the Sounds of the Environment," a soundwalk through the campus of the University of Wisconsin in Milwaukee. Through the artistic practices of Cage and Neuhaus (among many others), the borders between music and sounds per se have become porous, not depending any more on the intrinsic qualities of the sounds "themselves" but rather on the (institutional) context in which they are presented and perceived.

METHODOLOGY: DEVELOPING A NEW SOUNDWALK

Together with sound artist and theorist Sharon Stewart, I am developing a soundwalk in the city of Leiden, the Netherlands, in the context of *Leiden City of Science 2022* (see Leiden 2022 | Leiden2022). The rationale behind this soundwalk is that by walking in and listening to the city, one's knowledge of Leiden expands, changes, deepens. Our soundwalk is above all an artistic and aesthetic product, that is, a product meant to be enjoyed by the senses; besides the obvious emphasis on listening, this certainly also includes the visual and the tactile, perhaps even the olfactory. However, it simultaneously has educational, ecological, social, political, and perhaps even ethical aims: one learns about the city, about its present, its past, and even its future. One learns through walking and/while listening, listening through (open-back) headphones to environmental as well as pre-recorded sounds.[7] In a way the soundwalk can be regarded as a complement to other, mostly cognitive forms of knowledge that are presented at this 365-day Leiden City of Science 2022 festival: in addition to cognitive knowledge, the soundwalk produces situated, affective, embodied, and aesthetic types of knowledge.

What is the added value of using an app and headphones for this soundwalk? The answer is quite simple: it enables access to sounds that otherwise cannot be heard, either because they cannot be heard at the time one is doing the soundwalk, or because the sounds are inaudible to the human ear anyway. However, before enlarging upon our plan to concentrate the soundwalk around these unheard or concealed sounds, let us first take a few moments to explain how we came up with this idea. Instead of sticking to the beaten track – the major tourist attractions such as Rembrandt's birthplace or the botanical gardens – we first allowed ourselves to be informed by some people who have an extensive knowledge of Leiden and its history, in order to collect ideas about interesting but lesser known sites and events that could be incorporated in the soundwalk. Here are just

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7] Besides being equipped with headphones, you are required to install a specific application on your mobile phone in order to do the soundwalk. Through GPS tracking the mobile phone "knows," more or less, the exact location of the soundwalker; they can then listen to the specific sounds (sometimes preceded or accompanied by spoken text) gathered, recorded, and composed in direct relation to the site. This should lead to multi-sensorial experiences incorporating mobile and sedentary conceptions of places and their (mostly cultural) histories, developments, changes, and potentialities.

two brief examples of what the interviewees told us[8]: The building that currently houses the Law Faculty of Leiden University is the former laboratory of the Dutch physicist and Nobel laureate Heike Kamerlingh Onnes (1853-1926). In 1908, he became famous as the first person to liquify helium, using pumps which, actually, were quite noisy. In the same building, at around the same time, physiologist Willem Einthoven (1860-1927), similarly a Nobel laureate, invented the first practical electrocardiograph (ECG) to measure the activity of the heart. His instrument consisted of a very thin filament of conductive wire passing between exceedingly strong electromagnets. When the current passed through the filament, the magnetic fields created by the current would cause the string to move. An interesting (sonic) contrast; contrary to Kamerlingh Onnes, Einthoven worked in almost complete silence. The second example is contemporary: some of the people interviewed mentioned Aaf Verkade, who works for the city of Leiden as a city moat consultant. In that capacity she often goes diving in one of Leiden's canals, for example to clean them, to fish out bikes and shopping carts, or to observe and scrutinize the fish stock and other marine life.[9]

What could we do with this information? How could we make it productive and applicable for the envisaged soundwalk? As many of the ideas that we collected through the interviews only indirectly related to sounds, we decided to have the inaudible or the unheard as the central theme of our project. The soundwalk will be an encounter with sounds that cannot be heard anymore, with somewhat unusual and often unnoticed sounds, or with sounds that exceed the range of human hearing.

Besides gathering information from the inhabitants of Leiden and experts by interviewing them, we of course also walked the city ourselves many times, planning an appropriate route, listening to the existing sounds,

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8] Strictly speaking, our initiative to consult with these experts on Leiden cannot be classified under the heading of *Citizen Science*; this would imply that we should qualify them as nonprofessional scientists and to involve them more directly in our project. However, by using a slightly broader definition of Citizen Science, namely as the participation of citizen scientists in the collection of data, I do think this could count as a justifiable example.

9] Other input from our interviewees ranged from the Leiden gunpowder disaster in 1807 (a ship carrying hundreds of barrels of black powder exploded in the city center, killing over 150 people), to bowling alleys in a gentlemen's club that still exists, and from a city garden producing vegetables and fruits for a foodbank, to a bomb shelter from World War II.

and making audio recordings. Developing the soundwalk can thus be understood as practice-based research that is not only *about* sound but takes place *in* and *through* sound; it takes place in a space between fieldwork and arts practice (Drever 2009: 164), between the artistic and the academic, between the sensible and the rational, between the emotional and the technological. Therefore, we employed a methodological pluralism of, among others, participant observation, open interviews, and artistic experimentation that resulted in detailed and diverse information about sites and valuable insights into ways in which people engage or interact with these sites, as well as how they perceive and memorize them.

DEVELOPMENT: THE ROLE OF TECHNOLOGY

As should be clear from the Introduction, art and society are always already intricately connected. Developments in art and other societal fields are often intertwined. The economic, political, and social organization of a society has a direct influence on the content, production, distribution, and reception of art. Conversely, art's existence to a certain extent codetermines the structure of a society, its norms and values, its kind and level of (cultural) prosperity (or lack thereof). This also (and perhaps explicitly) applies to the relation between technology and art. Technological innovations often find their way to artists, leading to the production of new artworks and practices (think, for example, of electronic and electro-acoustic music or the development of any musical instrument), but artistic experiments may equally lead to the development of new technological devices, or at least to alternative forms of use of certain technologies (for example, music composed on and by a computer without any human input or intervention, or devices with which one can get audible access to electro-magnetic fields).

Developing a soundwalk based around an app, that is listened to on a mobile device using open- or closed-back headphones (or ear plugs, by the way) provides the opportunity to let physical environments interact with digitally presented information. It is in and through technological innovations that a merging of physical and digital spheres becomes possible, making them coexistent in the same environment, creating hybrid experiences, and affording novel ways of inhabiting urban spaces (Talianni

and Charitos 2013: 2-3). The interaction between the soundwalker and their physical as well as social environment, is enhanced through the use of such mobile technology. The (augmented) soundwalk creates a sonic layer on top of or next to the already existing soundscape. However, it is neither commercialized nor individualistic. In that sense, it differs from listening to music on a mobile phone; instead of disconnecting and separating the listener from their environment soundwalking provides a *hyperconnection*; through the added layers of normally inaudible sounds the soundwalker can make new or extra imaginative associations to a place in an embodied, active, and multisensory way (Talianni and Charitos 2013: 7). Disclosing sounds that do or did belong to specific sites but that most often remain unheard, disposes these sites of their familiarity or everydayness without them ever becoming completely foreign, thereby instigating new cognitive and affective experiences, unexpected new engagements between the soundwalker and their environment.

As media studies scholars Katerina Talianni and Dimitris Charistos write:

> With the aid of mobile pervasive and locative media, space is being hybridized as the mediated spatial experience that is mapped onto the physical urban environment, allows for new kinds of collaborative activities and social interaction. Thus, the experience of urban space may be augmented by multiple layers of multisensory stimuli and information. (Talianni and Charistos 2013: 9)

Augmented aurality and mixed reality – as provided through our soundwalk – not only lead to an alternative for a linear experience of time, or a common, static understanding of space. They also incite new knowledge-making processes, simultaneously imbued with and highlighting a variability of meanings; being able to listen to the underwater sounds of the Leiden canals, the sounds of electromagnetic fields of billboards, cash machines and charging stations, or the sounds of events from the past enable a re-orientation, diversion, and re-appropriation of a space. The extra sonic layers made accessible by using this technology while traversing the streets, give rise to another engagement with the environment, while simultaneously disrupting the distinction between an active artist and a passive audience: the soundwalker listens while performing and traversing their urban trajectory. Past auditory traces reframe a particular

encounter with the same site today;[10] bringing sounds that are normally inaudible to the surface provokes a dialogue between the "real" and the "virtual." The soundwalker is invited to interact with their physical as well as technologically-mediated environment in new, unexpected ways, actively participating in the de- and re-construction of everyday life and public urban spaces.

DISCUSSION: BETWEEN ART AND EPISTEMOLOGY

Soundwalking means "playing" the city. Physical, social, aesthetic, historical, and/or ecological dimensions of the city become both the context and the material of this play, of this playful wandering through a city's diverse sites and sides. Soundwalks thereby often escape the binary "either-or" opposition in favor of the inclusivity of the "and-and." A soundwalk celebrates art's autonomy and idiosyncrasy, and simultaneously establishes a connection to everyday life and ordinary environments. A soundwalk can,

10] In 2007, historian Toby Butler introduced the term "memoryscapes" for soundwalks using mobile media which, besides recorded sounds, contained spoken memories. Soundwalkers were invited and able to experience places in new ways, as the present and the past were, "present(ed)" simultaneously: the temporal past re-emerged through the recorded memories and merged with the contemporary spatial experience of the soundwalker. Together with the physicality of walking, listening to the memories of some locals deepened as well as multiplied the possible connections to specific sites (Butler 2007). In this sense, soundwalks such as the ones Butler refers to and the one Sharon and I are currently developing, extend the ears of the soundwalkers into the soundscape of a community remote by either location or time, and thereby activate processes in which often disparate things are connected in creative and multi-sensorial ways. In other words, soundwalks offer another possibility to make sense of the past, present, and future.

In a similar vein to Butler, communication scholar Jennifer Schine explored how the practice of soundwalking can be a tool to create memories that are remembered in the mind and felt within the body (Schine 2016). Interesting and relevant here is her use of the word "create," indicating that "the past" is always a (present-day) construct. Some parts of the soundwalk Sharon and I are developing provide an aural peek into particular moments or events from the past, creating an arbitrary link between present and past, a contemporary construct made possible by recently developed technologies.

upon its completion, commonly be considered as an end in itself, while at the same time acting as a means for something else, for example, a research method to collect information about a specific area or era. In other words, a soundwalk is not artistic *or* educational; it is both artistic *and* educational. Better yet, the artistic and the epistemological slide together: the artistic *becomes* epistemological and the epistemological *articulates* itself in and through the artistic.

However, simultaneous with the "and-and," soundwalking is also a "neither-nor." As sound studies scholar John Levack Drever states, although soundwalking takes place in and even merges with the everyday, it is not of the everyday. It is a liminal activity, where the common practices of everyday life are temporarily suspended in favor of partaking in a special event while performing everyday routines such as walking and listening in an everyday environment and situation (Drever 2009: 4); soundwalking can be regarded as an act of re-sensitization, taking place in a zone between art and non-art.[11] Through a soundwalk, the everyday gets cleansed of its ordinariness without this resulting in a completely alienated experience, as the soundwalker is still in dialogue with the city's architectural fabric and "normal" social life. Although walking whilst receiving auditory impulses via headphones could be taken to mean being cut off from one's immediate or contiguous environment (Drever 2009: 5), this supposed dislocation actually converges with an enhanced and augmented awareness and experience of the very same environment.

CONCLUSION

It is time to return to the supposed oppositions mentioned in the Introduction. Is a reconciliation possible between artistic integrity, innovation, and autonomy on the one hand, and social pressure on artists due to concepts such as valorization and impact on the other? Are these two points of view

11] Coined by Allen Kaprow in 1993, the term "non-art" refers to *art-like* phenomena that are often not considered (or consecrated as Pierre Bourdieu would say) as real artworks; that is, they do not gain the same status. A soundwalk, taking place in the very margins of the art world, can in most cases be considered an *undecidable*, neither art *nor* non-art, and both art *and* non-art.

indeed antagonistic, or can artistic and societal criteria both be met? By taking soundwalking and located media as an example, I have tried to argue that a strong focus on the artistic and aesthetic aspects of a product or process can converge extremely well with an equally strong focus on knowledge production and societal relevance. Actually, in many soundwalks – including the one that Sharon and I are preparing – a clear distinction can hardly be perceived between these two facets: it is in and through an artistic work that an enriched experience with one's physical environment is, or can be, established. The readjusting of possible interactions between a site and a visitor does not only take place on a cognitive and mental level, but also happens on a multi-sensorial and embodied level by means of active participation in the emergence of an artwork. Soundwalking can therefore be a source of techno-aesthetic awareness in combination with cultural-locational knowledge; it provides a way for people to think through the cultural, political, sonic, and social meanings of everyday environments, everyday situations, everyday life (McCartney 2012: 1). It is precisely through such artistic interventions or interferences that the everyday loses a bit of its everydayness, thereby becoming interesting and a potential source of knowledge and pleasure again.

In this sense, soundwalking comes very close to what ethnomusicologist and anthropologist Steven Feld calls *acoustemology*: exploring environments and connecting with sites in new ways through listening – a sonic way of knowing and being in the world. This sonic way of knowing is a knowing-in-action, situated and relational.

> Knowing through relations insists that one does not simply 'acquire' knowledge but, rather, that one knows through an ongoing cumulative and interactive process of participation and reflection […] The kind of knowing that acoustemology tracks in and through sound and sounding is always experiential, contextual, fallible, changeable, contingent, emergent, opportune, subjective, constructed, selective […] acoustemology favors inquiry that centralizes situated listening in engagements with place and space-time. (Feld 2015: 13-5)

Walking through and listening to a space implies a constantly changing interacting with the environment, its objects, and its events, that are for their part, also interacting both among themselves and with the soundwalker. Environment, objects, events, and the soundwalk offer a wanderer-listener the possibility to respond and position themselves: literally, by

moving through a space and thereby experiencing it, and metaphorically, by reflecting on what it means to be amidst these nonhuman agents and how to relate to them. It is only in and through the artistic societal-technological event of soundwalking, that sense unfolds itself; in other words, this sense is not predetermined but emerges in a permanent process of connectivity with the present, past, and even future of a specific environment (Barad 2013; Haraway 2016).

Perhaps it is precisely here that contemporary art finds one of its biggest social challenges: in presenting, in making perceptible, in proposing "other" worlds, values, meaning, and sense. This "otherness" should not only be understood as an alternative to an already existing reality, a phantasy world or chimera, a product of an artist's fertile imagination; the otherness I am thinking of here, an otherness which is also disclosed in many soundwalks, refers to a multiplicity and multiplying of reality, a true existence of other, unknown, audible or inaudible worlds. This is why it is necessary that artists intervene in our everyday lives, in our assumed reality; this is why we need the imagination of creative doing-thinking to perpetually shape and reshape the worlds we live in. Many contemporary art forms, including soundwalks and sound art, prove that this shaping and reshaping does not have to take place in secluded spaces, such as museums, concert halls, galleries, and other art venues. In many soundwalks, art, technology, and societal issues converge without the artistic values being forsaken or worn down. Art still has an important role to play in our contemporary society, albeit, sometimes, an "other" art.

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4

Exploring Innovations within Music Education Research

EXPLORING INNOVATIONS WITHIN MUSIC EDUCATION RESEARCH [1]

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ABSTRACT: There is a growing sentiment that our practices need to change: we must innovate to improve our practices to increase students' engagement, expand their abilities, increase access, increase cultural relevance, etc. There seem to be perpetual calls for innovation or change. But do all these changes address the key issues? In this paper, we take a step back and examine how we determine what innovations are needed and explore the ways that research can help us both examine problems and identify and test various solutions. We examine the various aims that education can have. We then explore the role that research can play in leading change but also caution that research evidence and findings need to be relevant to the key questions, thus calling for the need to expand our research communities as well as our research questions and methodologies.

KEYWORDS: interdisciplinary, music education, research methodologies, aims of education.

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INTRODUCTION

There is a growing sentiment that our practices need to change: we must innovate to improve our practices to increase students' engagement, expand their abilities, increase access, increase the cultural relevance, etc. We seem to be perpetual calls for innovation or change. In this paper, we take a step back and examine how we determine what innovations are needed and explore the ways that research can help us both examine problems and identify and test various solutions. We argue that research-based evidence must inform our decisions, and for stakeholders to rely on research evidence, its validity needs to be applicable to the stakeholders' context and align with their needs. We explore ways that we can innovate or adjust various aspects of music education research including the selection methodologies, we also explore ways that aims and practices are developed at both the praxis and systems level. We then examine how we need to innovate or expand our research communities and the ways that we include diverse voices in all aspects of the research process. We close by arguing innovation within our research practices is the key to a robust music education.

DEVELOPING RESEARCH DESIGN

In most aspects of music education research, we have moved past the 'qualitative-quantitative' arguments as both research approaches have been accepted in the research field (e.g., Colwell, 2012; Conway, 2014). There is now a common understanding that qualitative methods including case study, phenomenology, grounded theory, narrative inquiry, or action research, among others stand alongside or along with quantitative—randomized control trials, other experimental designs, large-scale surveys or measurement or big data studies have been used to examine aspects of music listening, performance, or creation. Other longstanding methodologies such as historical, philosophical, and comparative approaches along with various literature review methodologies help us answer our research questions and more recently neuroimaging studies, machine learning and VR have been used to address our research questions (e.g., Bowman & Frega, 2012; Elliott et al., 2019; González-Moreno, 2012; Hovde, 2019; McPherson & Welch, 2012; Orman et al., 2017; Pando-Naude et al., 2021).

Each of these methodologies is grounded in its own traditions and has its own scope of practice, and it is beyond the scope of this paper to argue the merits of one over the other, rather, we note this cadre of methodologies to illuminate the different tools that we can use to examine our research questions. Innovation within music education could include using an established methodologies to explore a particular set of questions. What we need to remember as we develop innovate our methodologies is to continue to align our research questions with our methodologies: The questions that we aim to address must drive our design and not the other way around. For many, we identify our research program by our preferred methodologies; however, we must continue to develop our understanding of various methodologies so that we can continue to serve our communities by addressing research questions that may require new approaches. This expansion of research ability will likely require additional time and resources to learn and understanding both the methodologies and their associated epistemologies. Building research collaborations both within and across disciplinary perspectives may be key to building our research capacity, but that, too will require a shared understanding of the phenomenon under investigation, music education.

AIMS OF MUSIC EDUCATION

Understanding the aim(s) of music education that are the focus of a research project is also an important component of the research process. Aims of music education could relate to technical or expressive excellence, cultural transmission and/or transformation, transfer of skills across domains, enhanced individual or community participation or cohesion, behavioural or mood regulation and/or economic gain. Each of these aims can be appropriate, laudable or could equally not address the pressing needs of the students. Music education advocates often leverage the outcomes that result when some learning aims are achieved, to illuminate the benefits of music education. For example, different research studies have illuminated how teaching students' songs or pieces that they can share with other members of their community helps to build cultural continuity and cohesions (e.g., Brook, 2016; Yerichuk, 2007). Engaging in song writing or musical creation can contribute to increased feelings of well-being including a sense of

accomplishment (Creech et al., 2020; Croom, 2015) or performing, listening, or creating music can help individuals in a number of different personal, social or academic domains (Hallam, 2015). These relationships are important research findings, but improved abilities in other areas may not be the main of music education in some context, thus new advocacy tools may need to be created to better reflect the variety of educational aims that are being achieved. One such aim could be improved access to participation in culture. Access to culture is a human right: "Everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits" (Article 27 of the Universal Declaration of Human Rights) (The United Nations, 1948). New or different educational practices that are more reflective of the musicking practices in these cultures may be needed (De Couve et al., 2014; Lucas et al., 2016; Queiroz, 2021).

Our aims of education are achieved through various acts of musicking: performing, creating, listening and within these different genres and activities are used. Differing aims and/or praxis may affect the transferability of research aims from one context to another. This may seem like an obvious statement, but too often these activities are used without fully realizing their suitability. We too easily assume that 'best practices' can be universally applied, despite context. As Sadler, so aptly noted almost one hundred years ago:

> We cannot wander at pleasure among the educational systems of the world, like a child strolling through a garden and pick off a flower from one bush and some leaves from another, and then expect that if we stick what we have gathered into the soil at home, we shall have a living plant. (Sadler 1900/1964).

A lack of rooting can limit the growth or even survival of various methodologies or pedagogies. In music education best practices includes the instructional sequence as well as the types of instruments and/or genres that are the focus on instruction. One example of inappropriate transfer of best practices may be evidenced in the proliferation of Sistema-inspired orchestral programs across the globe. El Sistema Nacional de Orquestas y Coros Juveniles e Infantiles de Venezuela was a youth orchestra program established in Venezuela in the 1970s. In this context "El Sistema Nacional" refers to a state-run system or organization, thus the funding and charter for the program was provided by the Venezuelan government (Frega & Limongi, 2019). The Youth Orchestra program also originally focused on

performance, that is training students to be able to perform advanced orchestral music. Over time the touring youth orchestra, the Simón Bolívar Orchestra, travelled and performed internationally, including at the famous British music festival, the Proms. This exposure to high level performance of these Venezuelan youth enhanced the profile of the program. Some alumni from this orchestra were able to gain seats in several prominent orchestras including Gustavo Dudamel who is now an internationally acclaimed conductor.

Over time, this Venezuelan program also espoused a social justice component by providing opportunities through music to lift children out of poverty. This new aim was amplified when the program's founder, José Antonio Abreu, was invited to deliver a TED talk highlighting the power of music (Baker, 2014; Baker & Frega, 2018, Logan, 2016). The performances of the youth orchestra on the world stage along with the compelling claims by the founder led to the proliferation of similar programs around the globe (Tunstall & Booth, 2016). However, research about this original program as well as other iterations of this youth orchestra program have shown a disconnect between what was presented on the world stage and the day-to-day activities of the program, in particularly noting the lack of ability for students to transfer music learning across repertoire, inequitable treatment of students who were not part of the travelling orchestra, exclusion of local musics for repertoire written by European composers, among others (Baker, 2014; Baker, 2018; Baker & Frega, 2018; Frega & Limongi, 2019). Researchers have also commented that this orchestral program did not espouse or disseminate a set of guiding principles nor best practices, nor where the educational aims articulated, although they were understood to be performance driven (Baker & Frega, 2018; Brook & Cui, 2021; Frega & Limongi, 2019).

Nevertheless, many programs around the world aligned themselves with this movement now global movement, which now includes a social justice component (Creech et al., 2016). The lack of articulated method allowed programs to enact programs of varied structures and modes for children around the world (e.g., Brook & Cui, 2021; Brook & Frega, forthcoming; Mota et al., 2016; Garnham & Hawkins, 2017; Osborne et al, 2016). Brook and Frega (2021) conducted an analysis of El-Sistema or Sistema-inspired programs in Canada and Argentina and found that the music educators had adapted their pedagogical practices to suit the needs of the community, but despite the shared program name, these programs were no longer reflective of the original Venezuelan program.

This example highlights how music educators innovate within their communities to provide rich music educational opportunities for their youth, but perhaps by starting with the "El Sistema" model, were inadvertently adopting a notion that was not well-suited to their environment, nor well-grounded in any type of sound pedagogical evidence or ideas. These findings highlight the importance of supporting educators and policy makers in developing their abilities to discern and describe their educational goals and further illuminates the ideas espoused by comparative researchers (e.g., Frega, 1995; Stafford, 1900/1964; Steigelman & Elliott, 2019) that our understanding of both educational practices and their contexts are necessary as we consider the fit of different others' innovations for our own contexts.

If we wish to innovate, we must ensure that the alignment between our aims and practices remains intact. Change in one of these components may change the alignment with the others. And may in fact change the efficacy of the practice, even if it is evidence-informed or novel. The adoption of the El-Sistema programs has not been the only example of borrowing and changing in music education. Arguably, educators may not have fully leveraged the musical interests, traditions and/or needs within the local context, rather teachers implement what they know or like or what they think they need to be doing or what they believed to be best practices (Frega, 1995). This could include in an over-reliance on the merits of a particular methodology, rather than an examination of the prudence or even an overinterpretation of the benefits or universal applicability of the research findings about musical practices. For example, some of the more common sequential learning methods, such as Orff and Kodaly, may be idea in one area and not applicable in all jurisdictions. That is, both the repertoire and/or the sequencing format relying on direct instruction may not be the most relevant focus. Other innovative methodologies, such as informal learning, digital-based or internet based musicking, too, may not develop long-standing skills as envisions in all settings.

Schweisfurth and Elliott (2019) argued that the general trajectory and espousing learner-centred educational practices across the globe, with its political or cultural underpinnings or understandings of the nature of knowledge. They argued that learner-centred education was underpinned by the following three tenants: 1. A relationship between personal emancipation in schooling and the enhancement of personal freedoms and more democratic societies; 2. a belief in constructivist ideals that control over the topic of exploration will support one's motivation and interest in learning;

and 3. a belief these modes and learning processes will better prepare students for participation in the knowledge economy (Schweisfurth, 2013; Schweisfurth & Elliott, 2019). However, evidence that confirms these relationships is weak (Schweisfurth & Elliott, 2019) and it is also unknown if these very 'western' values are applicable or feasible in other cultures (Schweisfurth, 2011). The illumination of these tenants and the potential limited applicability of learner-centred pedagogies underpins the need for additional points of view to frame and examine different aims and philosophy of education and music education.

As researchers and teacher educators our research and dissemination strategies, including the research and practices shared in our post-secondary programs, must help stakeholders understand the relationship between aims, practices and outcomes, and the fit or appropriate nature of different educational practices for their context. Recognizing that while music is a universal and that our musicking practices are diverse and, in some cases, disparate, thus resources research studies, aims, and praxis must clearly identify these components. By building a diverse praxis and using research to illuminate these praxes, we will amplify the diverse aims and rationales for music education.

INNOVATE TO CHANGE OR ADAPT OR MUSIC EDUCATION SYSTEMS

In addition to professional development and access to materials to help students make music, research is needed to examine our educational systems and the ways that these components are serving educational aims. Much of the contemporary research in music education relates to classroom practice, but music education researchers are also needed to contribute to research at the macro level: research about our educational systems and overarching aims of education. In our respective countries (Argentina and Canada) there are many demands on our educational systems namely an increasing population, which means more students needing educational services. At the same time our ability to create increased infrastructure or hire appropriate number of teachers is limited. These strains on our educational structure along with other demands to diversify our educational offerings may require changes in policies and systemic practices and

music education scholars need to be part of this interdisciplinary research. Innovation at this level may require rethinking various aims and our praxis of schooling itself. For example, in our respective jurisdictions of Argentina and Canada, which may involve research that examines research questions around a sustainable scope of compulsory schooling that may need to be adapted to reflect new population sizes and distributions across the lifespan along with new economic strains that limited available funding for education as well as teacher education and teacher retention. Each of these components will manifest in a variety of ways in each jurisdiction. For example, teacher education and retention may have a different sense of urgency, different set of circumstances that led to this gap and thus different types of solutions.

In her detailed keynote address at the IKG conference Pamela Burnard challenged listeners to embrace opportunities that are possible by expanding our collaborations and scopes through transdisciplinary research (Burnard, 2021). This is a very innovative and inspiring idea that will allow for the cross-pollination and development of ideas and strategies in new ways, but we also caution that before different jurisdiction adopt this practice, they also examine the efficacy of the practice as a way of meeting their innovation and interdisciplinary aims. As noted above our shared goals and understanding of aims are necessary to ensure cohesion of goals and processes.

Continued innovation within our research community is needed to increase our understanding of the differences across jurisdictions. This increased diversity of research perspectives and findings can create a more equitable environment where we are better able to examine findings and apply them. Understanding these different perspectives through research will lead to a better knowledge of musicking traditions, as well as a better understanding of our communities and educational systems.

To illuminate the different demographic and educational contexts, we compared our own jurisdictions (Argentina and Canada) in Table 1. These demographic differences include an increasing population at different rates, with Argentina's population growing a faster rate than Canada's. Argentina's growth is mostly due to births, while more of Canada's growth is due to migration rather than the birth rate. This increasing population will require increased educational capacity to *maintain* the established educational offerings in Argentina and Canada. Innovation at the systemic level in creation of or mergers of schools, length of compulsory education, and teacher education programs may require change, while adhering to cultural expectations

around education. In Argentina, for example, the cultural expectation is for free elementary, secondary and post-secondary education. At the same time, Argentina has been criticized for the proportion of the government's budget that is allocated to education (Monroy, 2018), thus straining a system that is required to meet increasing demands.

In Canada, there is a cultural expectation of inclusion, where all students of the same age are part of the same learning environment/class. Thus, increasing language diversity along with other learning differences may be present in the same classroom requiring teachers to adapt their instruction to meet a wide swath of learning needs. Canada may face similar strains, although their population growth rate is lower and a higher proportion of population growth is due to migration but given their more stable financial situation the types of tools that they must address these strains will be different than Argentina. Nevertheless, in both situations there is a need for more or different resources, thus requiring innovation in our educational systems at the macro level.

Curriculum changes to meet population or individual needs may also be necessary, and different schooling structures may also affect the ways ideas or practices can be shared across contexts. For example, in Argentina students are more likely to select a specialized stream, where this is less likely across Canada, which may point to differences in the scope of music education opportunities that are available at the secondary level. At the post-secondary level, Argentinian preservice music teachers do not complete a content degree, while Canadian preservice teachers do. While these changes may seem inconsequential, they do illuminate the difference emphasis that Argentinian researcher have placed on the importance of teacher professional development. These differences are of course added to different cultural communities and traditions that woven into the fabric of each context (Frega & Brook, submitted).

TABLE 1

Demographic Comparison

	Argentina	Canada
Population	Over 45.8 million (World Population Review, 2022a)	Over 38.2 million (World Population Review, 2022b)
Median Age	37.1 (World Population Review, 2021)	41.1 (Statistics Canada, 2017)
Population Density	17 persons/km^2 (World Population Review, 2022a)	4 persons/km^2 (World Population Review, 2022b)
Population over 65 years old (%)	11 (World Population Review, 2022a)	17.2 (Statistics Canada, 2017)
Population under 15 years old (%)	26 (World Population Review, 2022a)	16.1 (Statistics Canada, 2017)
Net population change per day (births + migration – deaths)	Increase of 1,121 individuals per day. (World Population Review, 2022a)	Increase of 897 individuals per day. (World Population Review, 2022b)

INNOVATIONS IN RESEARCH SUPPORT AND DISSEMINATION

We have illuminated some new types of research questions and ways that established a new research methodology can address these questions. In this section we explore the need to support the diversification of the research community and in particular, the need to support research development and dissemination in under-represented communities and countries. In its entirety, music education research needs to serve the entire globe, but each piece of research may not be universally relevant. Rather than having a singular or source of knowledge, we need to develop an infrastructure where a robust research community can exist and where these individuals can easily share their findings globally. This notion goes beyond the generalizability of findings, but rather the efficacy and applicability of the research question within the various contexts.

The International Society for Music Education (ISME) Research Commission hosts a biennial global seminar about music education research as a precursor to the ISME world conference. Conferences, such as this one, are important ways to foster communication and collaboration among researchers around the globe (Moreno, 2014). The ISME Research Commission began in 1966 and the geographic representation involved mainly first world countries largely in the northern hemisphere with the addition of Australia and New Zealand. Most if not all of these had English as a primary or secondary language. Representation then broadened to Latin America, Japan, and Africa. This expansion continued and is still in progress. An historical examination of the papers presented at the conference over its first fifty years or twenty-seven meetings (Orman & Frega, 2021) found that forty-two countries or specific regions mentioned in titles and forty-seven different countries of affiliation for all authors. When evaluated against the total number of countries represented in ISME today ($N = 87$) with thirty-two of those having only one member, we find the research commission manuscript authors represent 54% of all countries in ISME, 85.45% of all those that presently have two or more members and 100% of the ten countries that comprise the highest membership participation in ISME. These findings highlight the global participation in a long-standing conference, but also illuminates how more representation particularly from the global south, Asia and Africa is necessary. We need to find ways to innovate to enhance research capacity and participation around the globe. Increasing participation across jurisdictions involves both investing and collaborating in research studies highlighting a variety of geographical, cultural, methodological research at international

panels and conferences. Inviting researchers from outside our borders or established networks will not only amplify their research programs and further support music education in these areas, but it will also provide novel insights that may be relevant in other places.

Dissemination of research findings also involves the need for researchers to better find more ways to share their findings to professional and general audiences. These innovations could be increasing our research team capacity to include more resources for dissemination through professional articles, webinars, or conference. It could also include increasing opportunities for practitioners to attend at academic conferences. In this way, perhaps the move to more online conferences over the past few years has made for more equitable access to the research community as those with a stable and fast internet connection were able to attend conferences without having to travel. However, if this trend is to continue, universal access to high-speed internet is essential.

CONCLUSIONS

The purpose of this chapter was to explore some ways that we can develop new or different ideas, methods, or devices to support music education. We argue that the newness or novelty of the innovation should not be the primary motivation for change. Rather, the innovation should be driven by the essential needs of our communities. Innovation does not always need to mean a novel invention or digital tool, rather new and different uses of the resources surrounding us may result in meaningful change. Moreover, identifying key issues that are limiting opportunities our outcomes in music education that may be systemic in nature, may not produce a replicable or tangible solution, but nevertheless improve an aspect of music education. Innovation that includes addressing systemic, organizational, or pedagogical changes are all necessary. All these facets require examination to ensure that they are facilitating the aims of the discipline. As we reflect on the different components of music education practices and its role in our various systems of education, we must be committed to addressing both simple and complex problems. It may be tempting to convince ourselves that some complex issues are beyond our scope, but we argue that if we work together to identify and describe issues it may be fruitful for us to

come up with a variety of solutions that together can make lasting change. Some of these solutions may be tangential to pedagogical practices of music education, such as timetabling or addressing issues related to internet access, or years of compulsory schooling but may nevertheless have a profound effect on the capacity, access, and sustainability of the discipline or even schooling in genera. Music education researchers needs to have a role in these conversations and explorations.

Research has an important role in identifying and examining innovation. Both established and new ways of systemically examining various phenomenon can lead to a better understanding of the nature and efficacy of music education and the various components of it. Often in music education, the scope of our inquiry is centered on aspects around teaching and learning, most often teaching methodology. Others have learned that the quality of learning is directly related to the quality of the teaching processes. We have also studied that there are no "miraculous methods", that generally there are no "dogmatic truths", that what works with some of our students will not always be adequate for others. Best practices are not a one-size fits all, but are customized approaches that consider aims of education, principles of teaching and learning and the contextual needs of the students and their contexts. Our innovations therefore need to emerge out of our desire to integrate these in meaningful and ethical ways, and our dissemination reports need to contextualize these findings, so others can discern their applicability.

Innovation that support the expansion of our of the number and type of researchers seized with music education is also an important component of research. This expansion includes a more active participation for our stakeholders in all aspects of the research and dissemination processes. Participation needs to reflect those from traditionally underrepresented groups including those from so called 'developing' countries, so their context and ideas can be considered throughout the research process. By having multiple voices around the table, we can better frame our research questions and subsequent methods. This plurality can increase the validity of our findings to various setting, thus ensuring that practitioners and policy makers have access to relevant findings that are reflective of their individuals needs and contexts.

Interdisciplinary research can also play an important role, and these partnerships can involve both other disciplines to study the various phenomena around miskicking but similarly, music education researchers can also play an important role in addressing research question in other

disciplines (e.g., educational policy, assessment, health, etc.). As researchers we need to invite others to help us identify and solve problems and we must also be bold to sit at others' table to better envision ways that music education can inform research issues in these areas.

These are exciting time to imagine something new and different and more importantly we aim to cast our gaze forward and inward to examining what is beyond the horizon and how we can best use that which we have and those who are around us to move forward in an effective and equitable and ethical manner.

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5

The Sciences and the Arts in Search of the New

THE SCIENCES AND THE ARTS IN SEARCH OF THE NEW

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ABSTRACT: The paper is concerned with the core of the research process, that is, its venture into the unknown. It aims to show that the sciences and the arts, including music and sound research, are operating on a common ground in this respect. In ordinary perception, the sciences stand for logicity, whereas the arts embody intuition. To break up this dichotomy, the paper makes an effort to question this one-sided image of the sciences *from within* and with that, to show that each of the two camps, the sciences and the arts, have a share in the other. There is an element of the artistic in the sciences, as well as the other way around: there is an irreducible element of the epistemic on the part of the arts as well.

KEYWORDS: Wild thought; abstraction; concretion; *bricolage*; rhythm; art in science; science in art.

INTRODUCTION

My lecture will revolve around what can be called the "wild kernel" of research, that is, its venture into the unknown, and I will try to show that the sciences and the arts, including music and sound research, are operating on a common ground in this respect. In ordinary perception, the sciences stand for rigidity, straightforwardness, and logicity, whereas the arts embody intuition, surprise, and the enigmatic. The only chance to break

up this clear-cut, but fallacious dichotomy is, on the one hand, to question these two contrasting images *from within*, and on the other hand, to show that each of them is actually part, and essentially so, of the other. In the following, I will try to do this from the perspective of the sciences by showing that there is an irreducible element of the artistic on the part of the sciences. But I hope that doing so will contribute to the complementary task as well, that is, to point out that there is an irreducible element of the epistemic on the part of the arts.

I will begin with a reminiscence of the French anthropologist Claude Lévi-Strauss who remains unforgotten in his sensitivity to matters of science and of art. In the Introduction to *The Raw and the Cooked*, the first volume of his monumental tetralogy with the overall title *Introduction to a Science of Mythology*, a book actually conceived as a musical panopticon from "Ouverture" to "Coda," Lévi-Strauss states: "In a subject such as this, scientific knowledge advances haltingly and is stimulated by contention and doubt. Unlike metaphysics it does not insist on all or nothing. […] I shall be satisfied if it is credited with the modest achievement of having left a difficult problem in a rather less unsatisfactory state than it was before. Nor must we forget that in science there are no final truths. The scientific mind does not so much provide the right answers as [learn to] ask the right questions" (Lévi-Strauss, 1969, p. 7). And then, Lévi-Strauss compares his anthropological "project" as he calls it, explicitly with an "experiment": He sees it spreading "like a nebula, without ever bringing together in any lasting or systematic way the sum total of the elements from which it blindly derives its substance, being confident that reality will be its guide and show it a surer road than any it might have invented. […] It follows that as the nebula gradually spreads, its nucleus condenses and becomes more organized. Loose threads join up with one another, gaps are closed, connections are established, and something resembling order is to be seen emerging from chaos" (Lévi-Strauss, 1969, pp. 2-3).

What can be called the *situation of research* could not be better formulated. The description holds not only for anthropology but also for the natural sciences in the narrower sense of the word, a fact amply confirmed by the French molecular biologist and Nobel Prize Winner François Jacob, who forcefully reminded us of the fact that the research process follows a logic of its own, one that must not be confounded with the logic of representing its eventual results (Jacob, 1998). If the sciences were indeed the ultra-rationalistic endeavor that its apologists sometimes present us with, its best minds would probably find them uninteresting. They would

no longer be a particular challenge, an intellectual adventure one joyfully would like to get involved in. So, it is necessary to bow out of the current image of the sciences and, looking at the deeds, not the words of the scientists, to work on an alternative image of what it means to practice science, and particularly to do research. For research is the concrete core and irreplaceable motor of all scientific knowledge, and in the center of research there is the experiment.

THINKING THE WILD

Again, it was Lévi-Strauss who, more than half a century ago, provided a striking example for such an attempt with his path-breaking book on *Wild Thought*. I am, however, less interested here in characterizing what has been called the savage mind in and of itself than in finding an appropriate way to think the wild kernel, the irreducible moment of the wild *within* the sciences. Although Lévi-Strauss never wrote a systematic epistemological disquisition, he added elements to an epistemology that would position itself beyond the dichotomy between the natural sciences and the humanities, as well as that between the sciences and the arts for that matter.

The book on *Wild Thought* from 1962 can be regarded as a phenomenological prelude to Lévi-Strauss's *Introduction to the Science of Mythology*, which appeared in four successive volumes in the following years. *Wild Thought* pleads for the appreciation of so-called mythical thinking as a rational form of thinking in its own right. There we read: "Magical thought is not a beginning, a start, a sketch, part of an as yet unrealized whole; it forms a well-articulated system […]. Instead, then, of opposing magic and science, we would do better to view them as parallel, as two modes of knowledge, unequal insofar as their theoretical and practical results are concerned […], but not in the kind of mental operations on which the two draw, and which differ less in nature than as a function of the types of phenomena to which they are applied" (Lévi-Strauss, 2021, p. 16). And Lévi-Strauss refers to what he calls the "Neolithic paradox": The great civilizational arts of pottery, weaving, metal working, urban construction, jewelry as well as agriculture and livestock farming did not flow from the sciences in their modern manifestation; the sciences only made their appearance another ten thousand years after the Neolithic revolution. The

shapers of the latter were nevertheless driven by what Lévi-Strauss calls a "taste for knowledge"– an "appetite for objective knowledge", an "appetite for knowing and for the pleasure of knowing" –, (Lévi-Strauss, 2021, pp. 3-18) for which he preferred to use the epithet "first" instead of "primitive" (Lévi-Strauss, 2021, p. 20).

In the eyes of the ethnologist, magic thinking in its orientation toward the objects of the world is distinguished from scientific thinking primarily in that the former plays out at the level of the concrete, the surface of the phenomena, while the latter operates at the level of the abstract, behind and beneath the surface of the phenomena. The former can therefore also be called phenomenological, in contrast to the latter's noumenological thinking. However, unlike traditional phenomenology, this thought does not proceed from the perspective of the subject, but from that of the object, the world. Echoing Paul Ricoeur and with reference to Roger Bastide, Lévi-Strauss therefore calls it a "combinative, categorizing unconscious," a "categorizing system unconnected with a thinking subject"[1] (Lévi-Strauss, 1969, p. 11). According to him, the concrete mind and its "science of the concrete" (Lévi-Strauss, 2021) is not at all something like the long-abandoned antecedent of the abstract mind. He does his utmost to strip this form of thought of its illusionary, animistic, and hylozoistic connotations. Historically predating abstract thinking, it later entered into coexistence with it as a parallel form of disclosing the world, as a form of cognitive engagement with the world that is still indispensable to us today. Here, Lévi-Strauss meets up with Ernst Cassirer's *Philosophy of Symbolic Forms*, (Cassirer, 1955) in particular with the latter's plea for a co-presence of myth as a form of thinking, intuiting, and living, and scientific knowledge, in their respective necessity and irreducibility to each other.

So far so good. I would like, however, to take a critical step further at this point and regard concrete thought not only in its own domain, distinguished from and even opposed to scientific thought, but at work in the innermost core of the scientific research process, exactly at the point where

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1] Lévi-Strauss, *The Raw and the Cooked*, p. 11, footnote 3. There, Lévi-Strauss quotes Ricoeur (1963), Symbole et temporalité. In *Archivio di Filosofía 1-2*, 5-41, pp. 9-10, and refers to Bastide, R. (1961), La nature humaine: Le point de vue du sociologue et de l'ethnologue. In *La Nature humaine. Actes du XIe Congrès des sociétés de philosophie de langue française (Montpellier, 4-6 septembre 1961)*, 65-79.

the exploration of what cannot be preempted scientifically takes place. Therefore, what needs to be shown is that concrete and abstract thinking do not stand in opposition – or even in exclusion – to each other, but that, in the practice of research, they presuppose and support each other.

ABSTRACTION AND CONCRETION

At this point, let me turn to Gaston Bachelard. The French historical epistemologist and somewhat elder contemporary of Lévi-Strauss also proceeded from the assumption that the savage mind – the concrete mind – has to lay claim to a place in the center of the scientific research process. I shall present his arguments in a brief aside before returning to Lévi-Strauss and his *Wild Thought*. *Applied Rationalism*, one of Bachelard's late books on the philosophy of science from the time after World War II, attributes what he calls a complex and composite, "*abstract-concrete* mentality" to modern physics in particular and to the modern sciences in general.[2] He sees the physical sciences, as a paragon of natural science, entangled in a permanent "double action of abstraction and concretization"[3](Bachelard, 1949, p. 1). These are not static attributions but categories of process, as Bachelard stresses by using performative nouns. Abstracting and concretizing characterizes the *activity* of a "field of thought" – *champ de pensée* – that emerged from the "conjunction" of mathematics and experiment, as Bachelard puts it. "To summarize," he stresses, "no empty rationality thus, no incoherent empiricism – these are the two philosophical obligations that ground the tight and precise synthesis of theory and experience, of theory and experiment in contemporary physics" (Bachelard, 1949, p. 3). And Bachelard is harking back to his remarks on the relation between subject and object in the process of knowledge generation in his earlier book on *The New Scientific Spirit* as of 1934, when he states: "If one has to assure oneself of an object of scientific knowledge, one cannot confide in the immediacy of

2] I have dealt more comprehensively with Bachelard's reflections on a dialectic of abstraction and concretion in my book *The Hand of the Engraver*, devoted to Bachelard's collaboration with the copper engraver Albert Flocon (Rheinberger, 2018).

3] Emphasis in the original. See also Gayon, J. (1994). *Gaston Bachelard: le rationalisme appliqué*. Centre National d'Enseignement à Distance-Presses Universitaires de France.

a non-ego facing an ego" (Bachelard, 1949, pp. 50-51). He spoke, in this context, of a "strong *coupling*" of both moments, "ideas and experiments"[4] (Bachelard, 1949, p. 10).

However, this also means that the actually valid standards of the experimental proceedings are on trial in every act of experimentation. It is not enough for the scientifically minded researcher to "receive" impressions according to the accepted method, he or she must "receptionize" them, (Bachelard, 1949, p. 43) to borrow Bachelard's neologism for this activity. He found even stronger words for such a necessity in his little, but highly important text on "surrationalism" published in 1936, where he states that an experiment in which one does not risk one's reason is not worth being carried out (Bachelard, 1936, pp- 1-6). We could also formulate it as follows: Scientific reasoning is bound to transcend itself, to leave behind its – always preliminary – current state of affairs. But scientific reasoning is not capable of doing so in and of itself, it must deliver itself to its objects, it must try its hand on them. The German philosopher and art historian Edgar Wind has pointedly addressed the two "illusions" contradicting this insight: "[…] on the one hand, the ghost of perfected science, the phantom of a logical cloud-cuckoo-land […], on the other hand, there is the image of the human spirit which, without knowing its goal, wanders with all the confidence of the somnambulant through the sequence of stages that leads to that very cloud-cuckoo-land"[5] (Wind, 2001, p. 9). Echoing Bachelard, Wind states: "We thus cannot escape the conclusion that the ultimate purpose of the experiment is to test its own presupposition" (Wind, 2001, p. 19). The researcher must enter into this feedback loop in which a form of contingency characteristic for the scientific research process plays out its role. It is a form of contingency due to that peculiar mixture of proximity and distance with which scientists must approach their materials if they are to recognize new aspects and orient and reorient their thinking with respect to these materials.

4] Emphasis in the original.

5] For Wind, see also Horst Bredekamp, Bernhard Buschendorf, Freia Hartung and John Krois 1999) (eds.). *Edgar Wind. Kunsthistoriker und Philosop*h. Akademie Verlag.

BRICOLAGE

In a well-known passage from the first chapter of *Wild Thought*, Lévi-Strauss introduces the term *bricolage*, "tinkering" with the following sentences: "[…] a form of activity still subsists among us that, on the technical plane, gives a fairly good idea of what, on the plane of speculation, might have represented what I would call a ‚first science' rather than a primitive science: it is what is commonly designated by the French term *bricolage*. […] The rule of his [the *bricoleur*'s] game is always to make do with ‚what-ever is at hand' – that is to say, a set of tools and materials that is finite at each moment, as well as heterogeneous, because the composition of the set is not related to the current project, nor indeed to any given project, but is the contingent result of all the occasions that have presented themselves for renewing or enriching his stock, or for maintaining it with leftovers from earlier constructions and destructions"(Lévi-Strauss, 2021, pp. 20-21). And he contrasts the tinkerer with the image of the engineer who stands for modern analytical thinking, and who – at least in principle – is seen to take each of his steps under the command of a strategic plan.

Of course, we can ask whether this image principally presents engineers in the proper light. In any event, tinkering, fiddling around, improvising and tweaking are certainly not foreign to them. Above all, however, I would like to claim that the modern researcher who pursues – and promotes – a science in its empirical details at the forefront of research cannot be seen as a theory-guided engineer but instead rather resembles a tinkerer. The appeal of a part of contemporary synthetic biology to the spirit of the engineer, to give an example, is thus thoroughly misleading[6] (see O'Malley, 2009; Kastenhofer, 2013). At stake is the appreciation of a moment of the *wild*, the untamable, the unpredictable, and the unruly, at the core of scientific thought and action. The art of experimentation requires nothing less than integrating chance and necessity. If an experiment is conducted in such a way that it can do nothing but either corroborate or refute an assumption – which in the end makes no big difference operationally – then the experimenter remains a prisoner of the narrowness of his or her actual theoretical framework. One has to experiment in such a way that moments

6] See, e.g., O'Malley, M. (2009). "Making knowledge in synthetic biology: Design meets kludge." *Biological Theory 4*. 378-389. Kastenhofer, K. (2013). Synthetic biology as understanding, control, construction, and creation? Techno-epistemic and socio-political implications of different stances in talking and doing technoscience. *Futures 48*. 13-22.

of the unexpected can occur. In other words, a space has to be created in which epistemic events can happen. An event in the strict sense of the word is an incident that cannot straightforwardly be deduced from what is given. Where they do research, the sciences are event-driven forms of knowledge generation. The heteroclitic composition of the materials and the technical instruments that enter into an experimental set-up favor the eventfulness of experimental action. To quote Edgar Wind once again, this time in relation to the experimenter and the events he or she provokes, in his book on the *Experiment and Metaphysics*: "For, although we *know the meaning* of these occurrences only in terms of the preconceived system, we cannot predict their *occurrence*. What they reveal to us is the answer to a question which we have presented in logical terms, but which we cannot answer by logical means. […] The method of his [here: the physicist's] art consists in testing a purely logical conception by provoking an *entirely meta-logical act*" (Wind, 2001, pp. 21-22).

WORKING ON KNOWLEDGE

Similar to Wind, Bachelard sees the generation of knowledge as an activity that constitutes and diversifies itself in a historical trajectory, and into which the structure of the knowledge apparatus is as deeply involved as the whole cognizant person, each of them in their varying epistemic relations. The process of knowledge generation is therefore *work* on knowledge in the form of overcoming or removing what Bachelard calls "epistemological obstacles." They are at the center of his phenomenology of the effort of knowing (Bachelard, 2002). These obstacles, such as the over-complexity of the world or the physical and physiological limits of our senses, do not accumulate from outside. Epistemological obstacles arise, again and again, within the process of knowledge generation itself, to the extent that new insights congeal into matters of course, lose their preliminary character, and become unquestioned. Bachelard formulates it as follows: "It is at the very heart of the act of cognition that, by some kind of functional necessity, sluggishness and disturbances arise" (Bachelard, 2002, p. 24). These languors and turbidities are not simply some primary delusions that have to be overcome and that eventually can be left behind completely. In a kind of structural necessity, they delay the process of knowledge acquisition on the

one hand while keeping it going on the other. Immediacy has no place in this process, nor has belief in immediacy: "Reality is never ‚what we might believe it to be': it is always what we ought to have thought. Empirical thought is clear *in retrospect*, when the apparatus of reason has been developed" (Bachelard, 2002, p. 24). The temporal structure of knowledge acquisition is therefore that of a future past. Paul Feyerabend once formulated this as follows: "Theories become clear and 'reasonable' only *after* incoherent parts of them have been used for a long time" (Feyerabend, 1993, p. 17). And in the revised German version of his book *Against Method* he added: "*Understanding always only comes after the event* and is rarely ever one of the causes of its occurrence"[7] (Feyerabend, 1976, p. 39).

Let me concretize this by an example. Bachelard devoted a whole chapter of his book on the *Formation of the Scientific Spirit* to a particular historical instantiation of an epistemological obstacle. It pervaded natural philosophy in the seventeenth and the eighteenth centuries: It is the imagery of the sponge – *l'éponge*. The sponge, as we know and use it in daily life, appears to us as something very obvious and empirically immediate and evident. Its structure is porous, and the fibers it consists of, while firmly woven together, harbor a net of cavities. For that reason, a sponge is able to absorb other materials, in particular gases and fluids, and to become soaked with them while retaining its structural integrity. For René Descartes, as Bachelard points out, the sponge is the paragon of a "rarefied" body, that is, a body whose compactness is aerated and whose properties are defined by this airy quality. "In other words" thus Bachelard, „a sponge shows us sponginess. It shows us how one particular kind of matter ‚is filled' with another. This lesson in heterogeneous fullness suffices to explain everything. The metaphysics of space in Descartes is the metaphysics of the sponge" (Bachelard, 2002, p. 86). This example neatly shows why Bachelard described this kind of epistemological obstacle that everyday knowledge presents to scientific knowledge, as a "verbal obstacle" (Bachelard, 2002, p. 81). For in the end, it consists of a tautology: the sponginess of the sponge. The history of medicine in the early modern period is full of explanations of this kind. But they are also multiple in physics, as Bachelard shows in his chapter on the sponge. As a prominent example, he quotes René Antoine de Réaumur, who explained the compressibility of the air as follows: The air is a sponge, but one even spongier than an ordinary sponge, with which the air may readily be compared: whence its extraordinary elastic properties.

7] Emphasis in the original.

From this example, according to Bachelard, we can see what is meant by a "*generalized image*, which is expressed by a single word, the leitmotif of a worthless intuition" (Bachelard, 2002, p. 82).

SCIENCE, ART

The acquisition of new knowledge remains thus in the realm of a certain imponderability, of trying out, of groping, of erring. In contrast to many of their contemporaries such as Karl Popper or Hans Reichenbach, epistemologists such as Cassirer, Bachelard or Wind do not exclude this opaque space – or so-called context of discovery – from the domain of epistemology. Rather, they declare it as its center. Nothing is forbidden here, nothing goes at all without the opportunism of the concrete act in which knowledge is acquired. If it is true that, in the words of Lévi-Strauss, the engineer at the level of technology – and the scientist at the level of theory – "always seeks to open a way through and situate himself *beyond* the constraints that make up a given state of civilization, while the *bricoleur*, willingly or by necessity, remains *on this side* of those constraints" (Lévi-Strauss, 2001, p. 23), Bachelard points to the fact that the *beyond* of the scientist can always only be gained through the *this-sidedness* of the tinkerer, that the lucidity of the concept is always the result of a belated process of clarification. At a practical level, the scientific objects, as objects of research, remain marked by an opaque residue that makes itself felt as a permanent challenge.

In many respects thus, Bachelard's conception of research coincides with the image that Lévi-Strauss has sketched of artistic creation in *Wild Thought*. For the ethnologist, art inserts itself "midway between scientific knowledge and mythical or magical thinking. For everyone knows that an artist is both something of a scientist and something of a *bricoleur*: with the materials and skills of a craftsman, he fashions a material object that is at the same time an object of knowledge" (Lévi-Strauss, 2001, p. 26). The scientist and the *bricoleur* differ, according to Lévi-Strauss, in relation to the position that "event" and "structure," respectively, occupy in their work. Scientists induce events by means of structures – of experimental systems for instance. Conversely, tinkerers make use of events in order to build structures (Lévi-Strauss, 2001, p. 26). But Lévi-Strauss also suspected that the situation is more complex than that suggested by this simple inversion,

when elsewhere he postulates that scientific explanation "does not consist in the passage from complexity to simplicity" – that is, from the concrete to the abstract –, "but in the substitution of a more intelligible complexity for one that is less so" (Lévi-Strauss, 2001, p. 282). In turn, Bachelard not only ranked the science of the concrete reciprocally in line with the science of the abstract. For him, concrete thinking was the driving moment of abstraction. With that, he restored the grounding to epistemology long before Bruno Latour missed it so sorely, – the grounding that Latour called for in *We Have Never Been Modern*, with these inimitable words: "When we amend the Constitution we continue to believe in the sciences, but instead of taking in their objectivity, their truth, their coldness, their extraterritoriality – qualities they have never had, except after the arbitrary withdrawal of epistemology – we retain what has always been most interesting about them: their daring, their experimentation, their uncertainty, their warmth, their incongruous blend of hybrids, their crazy ability to reconstitute the social contract"(Latour, 1993, p. 142). We need to track down that moment of the wild in scientific thinking. It cannot be revealed in its ready-mades, but only in its ways of making.

In place of a summary and conclusion, let us look at the remarkable vital whirl of the elements carved by a copper engraver. The picture shows an engraving by Albert Flocon, a Bauhaus student in Dessau and later engraver and teacher at the Académie des Beaux Arts in Paris, and a close friend of Gaston Bachelard. Although the image carries no title, it is easy to see that we are dealing with the traditional four elements fire, water, air and earth, to whose literary images Bachelard had devoted a number of books. These elements are engaged here in a unique, breathless vortex.

The picture is dominated by the Nautilus spiral of an unbridled metamorphosis of the elements engendering countless little spirals everywhere. It unleashes the elements into the whirl of life and sucks them up at the same time. It seizes the human beings and animals that get caught in it from outside and drive it forward at the same time. It catches the tree with its gnarly twigs that tries to defy it, all the while being swept along, leaving little trees and twigs in its wake.

Battered by the tornado of the elements, shaken by it and at the same time resisting it, we see the contours of the clear straight lines of a construction delineate itself that pushes its way out of the whirl toward the sky. The interpenetration of spiral and vertical axis, of a vital vortex and of geometry, of an all-engulfing knot and a constructive effort dominates Flocon's engraving and shows itself in the apocalyptic circle in a

surrealistically tapered apotheosis. Although the black and white figures in the foreground of the image appear to be swallowed by an enormous wave, it hurls them upwards at the same time, toward the sun. They are captivated in the eternal rhythm of life and death, of illumination and obfuscation, of deluge and radiant sunshine.

This gives us the keyword: it is rhythm. In his book on the *Dialectic of Duration*, Gaston Bachelard took up the concept of rhythmanalysis that goes back to the Portuguese philosopher Lúcio Alberto Pinheiro dos Santos (1931), and used it to characterize his reflections on the basic figure of all the experience of time – and every experimentation with it – as "vibrating time:" "For us, the first form of time is time that vibrates" (Bachelard, 2000, p. 138).

Vibrating time integrally belongs to the whirls of subatomic, microphysical matter, the phenomena of life, individual experience, and the cultural manifestations of human activity. The experimental production of knowledge in particular follows temporal rhythms. Knowledge, too, can be extracted from reality only in waves that simultaneously expose and engulf, split and join.

Postscript: These ideas are extracted from my forthcoming new book *Split and Splice* (to appear in 2023), where they are further developed.

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6

In Search for Art's Relevance for Itself: Artistic Research and the Aesthetic Regime of Art

IN SEARCH FOR ART'S RELEVANCE FOR ITSELF: ARTISTIC RESEARCH AND THE AESTHETIC REGIME OF ART

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ABSTRACT: This article addresses the recent issue expressed by the German term *Systemrelevanz* (system-relevance) in relation to art by proposing a reversal in the question it raises: today, artists should not ask themselves whether art is relevant to a pre-given techno-socio-political- system, but rather whether what they do is relevant to the changes they want to pursue. The question changes from "is art today system-relevant?" to "is art today still art-relevant?"

The article develops around three moments: 1) the analysis of a series of social, political, and technological conditions that lead to today's impasse of the "aesthetic regime" (Ranciére, 2006)—conditions that are heavily marked by neo-liberal understandings of production and enjoyment; 2) the individuation and criticism of three current modes of being for artists, which can be considered the product of such impasse; 3) the proposal of artistic research as a reaction to neo-liberal logics, and as a move forward towards a new understanding of art's relevance for itself. The passage across these three steps can be identified in a shift from *self-design* to *self-institution*. The conclusions will recapitulate the central themes, putting forward the possibility of a new relationship between art and society (especially in the form of an audience) through art's newfound self-relevance.

KEYWORDS: Artistic research, system-relevance, aesthetic regime, audience, self-institution.

INTRODUCTION

In the wake of the recent outbreak of the Corona pandemics, a term has begun to circulate with particular frequentness in German-speaking countries: *Systemrelevanz* (system-relevance). Indicating "the relevance (i.e. the significance or importance in a specific context) that states, organisations, companies, products, services and professional groups (or their members) have for the operation and maintenance of a system" (Bendel 2021), the term is being used to differentiate between professional areas that are deemed essential, and therefore deserve to be economically supported by the system itself, and areas that are on the contrary irrelevant, meaning they might be considered passible of an economic and social amputation in times of crisis. I have been made aware of the circulation of this term in the context of a discussion internal to my own institution, the Mozarteum University of Salzburg, following recent declarations around the system-relevance of art by the Austrian government. Such term seems to strike a particularly sensitive nerve in artists and musicians, whose relationship to society more than often inhabits the slippery terrains of paradox and ambiguity (at least since Kant's notorious formulation of the "purposeless purposiveness" of art).

I would like to contribute to the topic of this volume—the relationship between music, society, and technology today—by proposing a reversal in the approach to the issue of the "system-relevance" of art. The question of whether art is relevant or not today is being asked from the point of view of a socio-political "system" that not only regards itself as an enclosed organism with a clearly set agenda defining the standards for relevance, but which also excludes *de facto* artists from contributing to such standards as a minority that is not (or not enough) financially productive. Artists therefore may struggle with their own answers as to whether what they do is relevant or not to such system; but I propose here that we should rather start from a different question. Were artists to outsource the setting of criteria for relevance to an already self-defined socio-political system, this would mean not only renouncing the responsibility of participating in such definition of values, but also taking for granted the position of marginalization that such system has already prearranged for artists. By consequence, in order to survive "within the system" art is forced to incorporate the system's logic, and to measure up to that alone. I suggest that artists and musicians take a dramatic but necessary step in reflecting on whether what they do is relevant for an altogether different "system," one that they themselves are central in defining. The answer to the question of art's relevance has to begin by asking under which conditions is art practice effective in producing

a desired reconfiguration in its own techno-socio-political premises. Otherwise said: "is today's art still *art-relevant*?"

This text is composed of two critical steps and a constitutive one. Through the first step I will suggest that the present time is witnessing the accomplishment, and at the same time the saturation, of the political promise put forward by what, following Jacques Ranciére, we can name "the aesthetic regime of art" (2006). Such saturation culminates in the imperative to self-design that not only artists, but every single human being on the planet, are urged to perform under neoliberal conditions of production and fruition. The second critical step is dedicated to the analysis of how such economic and political conditions have cornered artists on the ropes of three equally unsustainable modes of being, which I have named "the entertainer," "the provocateur," and "the schoolmaster." The third, constitutive step is a proposal for how the notion and practice of artistic research can, under certain premises, provide a way out of the aesthetic impasse, and perhaps indicate a new artistic "regime" ruled by different understandings of relevance. Such premises imply a fundamental passage from *self-design* to *self-institution*. Finally, possible future directions will be indicated in what I deem the most urgent task for artists today: the building of an audience to come.

FACING THE OBVIOUS: *EVERYONE IS AN ARTWORK*

In a short text from 2019, composer and sound artist Francisco López presents his readers with a revelation that sounds as shocking as it is obvious and quotidian: today's most ground-breaking creative sound practices take place in a socio-technological environment that sees an unprecedented artist: audience ratio of 1:1, that is, one listener for each sound producer. López is referring specifically to what he names a "revolutionary shift" in sound art and music, namely a process of socialization that is "technical and aesthetic, as well as organizational and philosophical" (2019, p.1). Thousands of artists worldwide organize themselves and their audiences at the margins of the big (or even medium) musical or academic circuits, occupying distributed, rhizomatic, and unpredictable spaces of representation that largely rely on the internet and on platforms of digital mediation and sociality. Whereas López's observation stems from practices that are culturally and aesthetically rooted—or even niche—, such observation

helps us realize that, even in other aesthetic and social domains, the king is naked: mainstream channels for the production and dissemination of art and culture are not only unable to measure up with the buoyant availability and proliferation of current creative practices, but in many cases (even if with notable exceptions) they also seem unable or unwilling to champion the most forward-looking among them, often reiterating social and commercial models of production and fruition that derive from the 20th century (and in some cases, as in classical music concerts, even the 19th century). To this we add that, following Boris Groys, not only are we witnessing a shift from mass art consumption to mass art production, but the latter even seems to increasingly manifest itself as "self-design" (2010). Quotidianly, each of us is subject to the overflowing surge of this phenomenon through the massive permeation of social media, where potentially every single person on the planet has the means to aestheticize their own lives and personages, and to digitally perform them in front of the world-wide "audience." It is not enough to acknowledge, as Joseph Beuys famously announced, that "everyone is an artist" (and whoever maintains the contrary will just need a short YouTube browse to be convinced thereof): today, *everyone is an artwork*.

Under an optimistic light, this situation might seem to corroborate the emancipatory power of what Jacques Ranciére names "the aesthetic regime of art," and which according to him still regulates art today. In such regime, ignited by the great 18th century revolutions, art is "freed from any specific rule, from any hierarchy of the arts, subject matter, and genres" (2006, p.23). By configuring a new "distribution of the sensible" where neither the subject of art nor its modes of appearance are anymore anchored to previous systems of power, such as were the court or the church, the aesthetic regime is first and foremost a political one. The "free play of the imagination" distinctive of the aesthetic attitude is what allows for a different reality to be indicated at the core of, and in contrast with, everyday reality. The premise of aesthetics lies precisely in this separation and asynchrony between art and life, and by consequence also between the artist as maker and the spectator as observer. According to Ranciére (who here seems to echo some key aspects of Marcuse's political understanding of the "aesthetic dimension" [cf. 1979]), in such apparent detachment lies the power of art to act upon the world; this in spite of the disfavor that aesthetic spectacularization has always raised on side of many illustrious artists and thinkers who have regarded it as source of sterility and indolence, starting with Nietzsche and proceeding through as many anti-art movements as can be named. Today, the technical means and the know-how necessary to produce and disseminate art are almost universally democratized and

affordable; but most importantly, the percolation of aestheticization down to each and every aspect of life—everything from clothing to food, down to the most insignificant details of daily routine, are massively choreographed on the world-wide stage of social media—seems to mark the saturation, or perhaps even the accomplishment of the aesthetic regime's promise. Has the distinction between art and life eventually collapsed, as wished for both by the promoters and by the detractors of aesthetics? On a less bright note, while we are left to a somehow dismal evaluation of the effective political consequences of such saturation, artists are faced with an unprecedented and disturbing circumstance, where spectacle is everywhere but there are no more spectators. The enormous plethora of available content has a visibility close to zero (López's 1:1 ratio), which goes hand in hand with a structural quandary for professional artists on how (or even why) to survive according to unsustainable economic and social models. In a world where the competition for attention is saturated and, consequently, new currencies and even professional figures have emerged based on visibility (e.g., the "youtuber," "instagrammer," or "influencer"), the artist is left with a critical choice: succumb, adapt, or evolve?

THE AESTHETIC DISCONTENT: THREE MODELS

As an artist born at the beginning of the 1980s, I had the occasion to bear witness to a time when the political power of the aesthetic regime still had a strong hold on concrete experience. Moreover, and more importantly, my own artistic and personal convictions have been structurally shaped by innumerable micro-encounters with the revolutionary charge of art's aesthetic function. It is therefore with extreme reluctance, and despite myself, that over the last decades I have gradually grown my own "discontent" (Ranciére, 2004) towards aesthetics. My urgency of overcoming aesthetics' current standstill is therefore not so much *against* it: as Ranciére clearly argues, "[t]he discontent with aesthetics is as old as aesthetics itself" (p. 11), namely it is still part of aesthetics' own attitude to recognize itself as insufficient, to generate a power of action in the world that resides precisely in art's detachment and incommensurability with everyday reality. It is therefore important for me to state that the criticism I'd like to perform here is *both with and beyond* the power of aesthetics (and both with, against, and beyond my own artistic individuality).

My main point of criticism is the exacerbation operated by the aesthetic attitude in the relationship between spectator and artist under neoliberal modes of production, to the point that the artist's function has been captured into the deadlock of three disturbing personae, which I name here "the entertainer," "the provocateur," and "the schoolmaster." It is hard not to regard these as the last, glowing breath of the aesthetic regime's dying star, which attempts to reiterate its relevance while succumbing in a disproportionate struggle against its own subsumption under the neoliberal double imperative of enjoyment and production. These three models are the extreme consequence of the structural fact that in the aesthetic regime it is the act of perception and reception (or *aesthesis*) that pronounces the success or failure of the artistic enterprise. Or, rephrased more pessimistically with Groys, "[t]he subject of the aesthetic attitude is a master, while the artist is a servant" (2010, p.11). All of these personae are in this respect "servants" to a spectator and therefore to an audience, even in case they are complicit, manipulative, or rebellious versions of such servant. And, under the all-pervading appropriation of art on the side of the neoliberal "system," audience always equals costumer, even (and deplorably so) in the special case of audiences as the recipients of art education. In this respect, in my proposal of criticism around the question of "system-relevance," I would like to briefly analyze these three personae, and suggest that a first step towards the establishment of a new standard in art's relevance for itself is the proposition of a model that can overcome those.

The entertainer is the natural continuation of a 18th and 19th century tradition, especially permeating in music and the performing arts, where the stage, the museum, or the gallery are arenas for the production of wonder, excitement, passion, rapture, and sublimation (the feeling, still today very much treasured by audiences, of "being carried away"). Art's spectacle here provides a detachment from real life that is the necessary counterbalance of a relationship with modes of production based on separation and alienation. In the face of the audience's meaningless and dull daily grind, the entertainer's function is to contrive a consolatory fictional space able to provide comfort, distraction, and escape. Even early 20th century avant-garde art is not immune from the capture in a form of entertainment, however elaborate and rarefied—what appears especially evident in its late 20th and early 21st century mass commodification (the unfailing "exit through the gift shop").

The persona of the provocateur can be best described as the development of the Baudelairean alienated artist into a cynicized vestige of the early 20th century modernist artist. The latter, conscious of its position within

the fragmentary and hybrid post-modern condition, recognizes themselves as unsustainable and engages in a strategic self-play with the limitations and stereotyped images of their own past. They are a "fallen" version of the model of the entertainer, or perhaps the other side of its coin: tired of complying with the patronizing and clientelist figure of the spectator, they decide to rebelliously scorn and disparage it. Such artists' work always starts from the meta-level, usually involving a harsh criticism of consumerism and commodified art, often marrying extreme kitsch or symbols of neoliberal capitalism with "high art." The problem with such celebrated figure however is that, as Preziosi and Farago point out referring to Damien Hirst's infamous platinum and diamond skull, "[i]t's difficult to think that anything remains of the aesthetic quality of art except from a cerebral point of reference for a cultural form that depends on the capitalist system for its transcendental value" (2012, n.p.). This short-circuit is further exasperated—and convincingly so—in Hirst's recent collection "The Currency" (2021), based on NFT. Nonetheless, according to the such logic, capitalist assumptions get corroborated exactly where the provocateur claims to undermine them.

The entertainer and the provocateur share some structural similarities in their relationship with the audience. It might be even possible to conceive of the one as "the negative" (in photographic sense) of the other: whereas the entertainer complies with the tastes of the audience, the provocateur insists in mocking and deflating such taste, often explicitly invoking bad taste. By contrast the third figure, that of the schoolmaster, seems to occupy a distinctly different zone. Lending itself to be mistaken for an antidote to the previous two models, and even with the proposal that I myself am going to put forward later in this article, it is a figure that I deem difficult to clearly define and detect. It is therefore all the more "dangerous." The schoolmaster can take on different roles, thereby camouflaging themselves throughout manifold modes of appearance. However, in all of these manifestations, they keep a constant feature: using art to teach something.

In its most obvious form, the schoolmaster openly delivers some form of knowledge to their audience. Under this function we can subsume the various forms of "infotainment" that pervade modern museums and art institutions, as well as artistic-academic formats such as the performance-presentation, even bordering with the doubling of artists as academic practitioners in fields such as art/music history, art/music philosophy, performance and theatre studies, applied musicology, a.o. But the schoolmaster can also deal with topics of public interest, therefore complying with the self-confirmatory need of today's democratic audiences to "be told" how to distinguish the right from the wrong. Under this function

falls the perseverance of Marxist aesthetics, so harshly criticized by Herbert Marcuse (1979), according to which art should represent class struggle. In the absence of a real proletariat, today the "classes" in need of such representation are social and political minorities–down to the minority of all minorities represented by the endangered "environment." Whereas on a merely political plain one can only subscribe to the agenda of such an artistic figure, on an artistic-political level it remains highly problematic: the schoolmaster ends up having some disturbing traits in common with the entertainer, because they aestheticize political and social aspects, and therefore enhance the ornamental function of art precisely where they would hope to lay bare its social and political relevance. In this, while inhabiting the aesthetic function, the politicized schoolmaster undermines it, exactly because they seek to eliminate the distance between art and everyday life (the socio-political "theme") upon which the aesthetic regime bases its political efficacy.

Yet another facet of the schoolmaster concerns the artist's role in most forms of participatory art. In too many examples of such artistic bundle of practices, which are allegedly aimed at blurring the boundaries between artist and spectator and to involve the "everyman" in the process of creation, the artist still positions themselves on a plane of separation and superiority, not only reiterating an imbalance with their audience on the level of technicality, know-how, and formal supervision, but all too often (and perhaps unavoidably) on a level of power: through such process the artist reaffirms their own individuality and socio-political supremacy as "subject," to the detriment of the mass audience, which remains anonymous, passive, and ultimately unrecognized. Therefore, such an apparent rebuff of authority on the artist's side culminates in the foremost authoritative act, whereby the artist confirms their own position as the (albeit benevolent) gatekeeper of the space of art—who, of course, performs such munificent duty at their own conditions and under their own name.

LACK AND SELF-INSTITUTION: THE ARTIST-RESEARCHER

In this section, I would like to advance a twofold proposal for a different kind of artistic attitude: 1) the model of the artist-researcher and 2) the process of research as self-institution of the artist; or, as Esa Kirkkopelto convincingly formulates (2018), artistic research as a practice of *instituting*.

To explain the transformative operation that the artist-researcher can bring about, I would like to start from what the three personae of the entertainer, the provocateur, and the schoolmaster have in common, namely a specific relationship with their audience. I suggest that the overcoming of the aesthetic impasse has to be sought not so much in a different attitude towards existing audiences, but rather in a kind of posture that can ultimately project a new understanding of audience, one that today we are still unable to fully anticipate.

All of the three criticized personae are united by the fact that they are *in possession* of something, and that they want to share this possession with their spectators. Such possession can be skill, sensitivity, genius (in the case of the entertainer); know-how, information, expertise, knowledge, moral or ethical guidance (in the case of the schoolmaster); or even the endowment of an "outlaw" position through which the artist is able to take distance from the world and to better understand it and criticize it (such is the case of the provocateur). The artist-researcher reverses this logic from the ground up: instead of starting from possession, they start from a position of lack. In this position, the accumulation of knowledge, technical skills, etc. reverses its function: it is not an established territory to be inhabited, cherished, and exposed to an audience, but rather the outpost from which the artist looks towards what their practice *is not*, *might become*, or perhaps even *will never be*. Far from constituting a frustrating and masochistic attitude, this negative attraction initiated by lack is vivifying and invigorating, critically questioning common sense and reconfiguring the role of expertise, of knowledge, and of art alike: not the securement of intellectual possession, but the production of *a desire*. In the search for unexpected emergencies that they cannot anticipate, the artist-researcher embraces their own artistic process as a practice of enquiry, of exploration, and of experimentation. This comes with a series of implications. First of all, their "work" does not come into being as a sedimentation of prearranged possessions (again, skill, sensitivity, know-how, information, etc.), nor does it eventually settle into yet another possession to be presented (and, crucially, sold) to the audience. The "work" by contrast is their verb, the "things they do" in order to explore and constitute, every day, the world anew. Secondly, in accepting his/her own position of lack, the artist-researcher opens up the "work" to a society of peers that is willing to accompany them through the uncertainties of this process of formation and world-making. The researcher in this respect does not have to camouflage the results of the artistic process as marketable artifacts, but is rather willing to rehearse, time and again, the incompleteness and even the flimsiness of such results—precisely as parts of a process.

At the same time, the "audience" of peers of the researcher becomes actively involved in the research trajectory by participating discursively in the same critical and constructive exploratory process, thereby obliterating the specular (and spectacular) distance enacted by the aesthetic contemplation. Thirdly, and most importantly, the researcher can also reconfigure currently promoted images of research, such as result-oriented academic models which in turn respond all too often to neoliberal imperatives of production, innovation, and storage/accumulation (and a short browsing through the websites of most European research funding bodies will suffice in providing evidence for the ubiquitousness of such neoliberal rhetoric). Therefore, the artist-researcher's understanding of knowledge differs radically from the schoolmaster's (or perhaps it can be closer to Ranciére's "ignorant schoolmaster's" [1991]?), in that it is not destined to be re-administered and transferred, once accomplished and well packaged, to a clientelist version of its recipients. Such knowledge can rather be understood as a neo-Socratic gesture of affirmation and emancipation of *ignorance* (again, the position of lack) in order to elicit a "love of knowledge" (here as the etymological sense of the word "philosophy") where love does not coincide—nor it ever will—with its object, but rather envelops it together with the margins of its impossibility. Artistic research starts from the acceptance that knowledge is always intimately crossed by the rift of the unknown.

Such an attitude towards art's practice is by no means new. Innumerable and illustrious examples in the history of world art can be ascribed to the frame of mind of the researcher, and perhaps I can cite as a case in point among many the bundle of musical practices active in the mid 20th century in North America and Europe commonly labeled as "experimental music." What is then the difference between an art that (as many claim) "has always been research" and my proposition to regard the 30-or-so-year-old phenomenon of artistic research as a move beyond art's current aesthetic stalemate, and ultimately a way-opener for a new understanding of art's relevance for itself? Here I would like to come to the second, necessary step of my proposition, namely *self-institution*, following what Kirkkopelto (2018) proposes by reflecting on the term "institution" not as a passive voice (a sedimented and already defined entity) but as an active one, as the process of *instituting*. The artist researcher not only has to take care of how their own practice changes if considered as a process of knowledge and experimentation, but also to envelop in such practice the wider horizon of the conditions under which art can be apprehended as research. By doing so, they cease to regard previous institutions (starting from the art market, passing through academia, and reaching out to wider discursive,

cultural, political, and epistemic horizons) as static concretions that they can decide whether or not to subscribe to, but rather crosses them transversally, sweeping them up in this movement of self-transformation. By failing to perform this second step, or by not insisting enough on the centrality of its thematization, previous artistic endeavors oriented towards open-ended experimentation have been spontaneously re-absorbed by the endemic attitude of the audience-governed aesthetic regime—that is, by aesthetics as a cultural and political "institution." And we could even go as far as stating that, by rehearsing the same mistake, all too many understandings of artistic research today risk falling prey to the same aesthetic re-appropriation, and to miss the opportunity of instituting new and urgent modes of being for art practices. As Kirkkopelto formulates, "[u]nlike an artwork, the result of an artistic research project therefore has to explain its existence; that is, it has to establish itself discursively, in relation to other, already existing (artistic) practices […] and the discourses supporting them" (p. 137). Crucially, the discursive dimension of artistic research has not to be mistaken for the pretension of art to become more "informed" about itself (such would rather be the schoolmaster's aspiration), or even to be welcomed into an academic territory regarded as an unchanging, predefined institution (here in the passive voice) in search for further legitimation. Discourse is rather the vehicle through which this process of opening, of self-positioning, and of self-institution is made possible, the carrier which can propel art away from the saturated premises of aesthetics and toward the constitution of an "audience" to come. In this respect, unaffiliated artist-researchers share the opportunity and challenge of instituting themselves together with artists working in and for an existing "institution." With the difference that the latter have the double duty not only to institute themselves as critical and creative artists through research and discourse, but also to enfold their own institution in such a process of self-renegotiation.

CONCLUSION

My proposition for the establishment of a new "relevance" of art for itself requires from artists the double move of inhabiting a position of lack and of instituting oneself. This double move would ward off outdated images of both art and academia as territories for intellectual possession and securement, for imaginative stock and accumulation, and for financialized cultural

production. What remains still underdeveloped, and is a task for the present but especially for future generations, is to actively conceive and implement a new understanding of audience, one that it is difficult to anticipate today, under imaginative conditions which are still so strongly shaped by the power of the aesthetic regime. I would like to conclude this article with a thought experiment that can hopefully provide a starting point for future reflection and action.

As early as 1989, the then director of the Venice Biennale theatre section, actor and stage director Carmelo Bene, decided to take a radical stance: for two editions of the event, the audience would not be allowed to participate. The theatrical experience would take place in the form of a laboratory as a process of research independent from its own spectacularization. This decision encountered such resistance from the press, the public, as well as from the directorial board of the Biennale that eventually Bene relieved himself of his position as director. However, beyond the legal and economic polemic raised by this episode, the relevance and innovativeness of Bene's approach shines as a promise that today is still unexplored. Such relevance lies in a vision of art as producing both a knowledge and an experience that can and must be independent from its spectacular side, and ultimately even from the need to relate to a traditional audience expecting aesthetic fruition.

If regarded from the perspective of the aesthetic regime, this move appears self-referential, if not overtly self-murdering: audience fruition seems to be both the indispensable premise and the sole goal in our modern understanding of art making. Yet, if we try to stay with Bene's proposal beyond its surface absurdity, something strange and new happens: while we are deprived of the benefit of the audience, we are at the same time relieved of its burden. Artists without an audience (even the imaginary one that already occupies the preparatory space of the rehearsal or the studio) would have to inhabit the artistic territory with a completely different energy. Gradually it becomes clear that such a situation is by no means without an audience: a community of peers is witnessing each other's work. Once the umbilical cord between the space of art and the space of its consumption is severed, art starts developing itself as its own reality (or system?)—not as a mirroring of a supposedly existent external reality (representation), nor as the activity of a specialized guild which claim rights on such a given reality as a part of it (activism). The artist of the present and of the future has perhaps to start from this point: the understanding of their position within a collective, distributed assemblage interested in opening up their own work and knowledge to each other. This is the wish

I have for the future of academic communities of artist researchers, and for the crucial role that doctoral programmes in the arts might and should play—and to some extent are already playing. Could we imagine ways for this new energy to spread to the wider public, for the reality of art to affect other realities? It is my hope, and my wish for future artistic research.

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7

Narratives on the Musical Instrument Musical Practice Between Action Theory and Media Theory

NARRATIVES ON THE MUSICAL INSTRUMENT. MUSICAL PRACTICE BETWEEN ACTION THEORY AND MEDIA THEORY

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ABSTRACT: When people talk about musical instruments, they usually conjure up the idea of an artfully crafted, beautiful-looking and expensive object that is lavishly cared for and guarded as a sanctuary. Over the centuries, as historiography wants to tell us, there has been a development of ever more refined instrument-making practice that meanwhile is generating jewels of bourgeois high culture. This may explain today's difficulty in recognizing MP3 players, contact microphones, toy pianos or simply algorithms as musical instruments. In the form of musical instruments, social, technological, scientific, industrial, and artistic ideas intersect. This article traces this struggle on an etymological, scientific-theoretical, action-theoretical, and media-theoretical level. The concluding look at the metaverse of the near future, highlights the need to update narratives about the musical instrument.

KEYWORDS: Musical instruments, narratives, action-theory, media-theory, instrumentalization, metaverse

INTRODUCTION

When we talk about musical instruments, we usually evoke the idea of an artfully crafted, beautiful-looking, and expensive object that is lavishly cared for and guarded as a sanctuary. Historiography, which dominates numerous academic disciplines, has contributed a great deal to defining the present through centuries of teleological progress. Centuries of high-quality instrument making has been refined over generations. This idea of development is also pursued in ethnographic studies, stating that what has emerged in tradition par excellence can hardly be assessed otherwise than as the pinnacle of a historically provable cultural artistry. This may explain why, in view of current musical practices with MP3 players, contact microphones, toy pianos or – quite abstractly – with algorithms, the question is raised as to the current validity of the concept of musical instrument. In the form of musical instruments, social, technological, scientific, industrial, and artistic assumptions about what is good and right intersect. When the question of definitional sovereignty is raised regarding the musical instrument, narratives about what music is are in competition. This article pursues this struggle on the plateaus of etymology, philosophy of science, action-theory, and media-theory. In the process, action-theoretical considerations prove to be groundbreaking, illuminating the semantic polarisation of "instrument" and "instrumentalisation" present in many languages. The final look at the metaverse, underlines the sense and necessity of updating narratives to the musical instrument.

"INSTRUMENT" – ETYMOLOGY

In the year 37 a. D., the well-read Roman landowner Marcus Terentius Varro summarised everything worth knowing that he assumed was necessary for a well-functioning agriculture. This three-volume textbook *De Re Rustica*, written in dialogue form, establishes a hierarchical classification of the farmer's tools:

> De fundi quattuor partibus, quae cum solo haerent, et alteris quattuor, quae extra fundum sunt et ad culturam pertinent, dixi. Nunc dicam, agri quibus rebus colantur. Quas res alii dividunt in duas par-

> tes, in homines et adminicula hominum, sine quibus rebus colere non possunt; alii in tres partes, instrumenti genus vocale et semivocale et mutum, vocale, in quo sunt servi, semivocale, in quo sunt boves, mutum, in quo sunt plaustra. (Cato et al., 1934, p. 224)[1]

In the further course of the text, Varro explicitly evaluates common measures of physically chastising slaves – i.e., vocalised instruments – as uneconomical and emphasises how important it is to cognitively instruct, educate, train the *instrumenta vocalia*. This, in turn, justifies – Varro continues – why foremen, for their part, should be recruited from an educated class, because only in this way would they acquire the expertise to exert an educative influence on slaves in the first place. The concept of a higher-quality tool that is developed, built up and set up over a longer period and requires corresponding knowledge on the part of the toolmaker clearly emerges here and shapes the history of the concept of an instrument. The root word "struere" includes the meanings "construct", "prepare", "arrange"; it establishes today's terms such as structure, construction, industry (WordSense.eu). The prefix "in" insinuates said influence, which charges the instrument from outside. In the Latin language, *instrumenta* were then also used to refer to tools in court in today's sense of evidence, which require special expertise to be convincingly inserted into legal argumentations. From the juridical context, the use of the term *instrumentum* as a document has developed further, which in turn reflects the characteristic of the artistic artefact. Cicero already speaks of *instrumentum publicum* as a public document (see Wikipedia, 2021). In late antiquity, *instrumentum* also means testament. In the Latin Middle Ages, the word is predominantly used in the sense of deed, certificate. The reading as instruction is also widespread. *Instruere* has meant "to teach" since antiquity, but in the Middle Ages it almost exclusively means "to instruct", which is still reflected in words such as instruction. This history of meaning substantiates the entries on the

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1] English translation of Loeb Classical Library modified by Elena Ungeheuer "I have now discussed the four divisions of the estate which are concerned with the soil, and the second four, which are exterior to the soil but concern its cultivation; now I turn to the means by which land is tilled. Some divide these into two parts: men, and those aids to men without which they cannot cultivate; others into three: the class of instruments which is articulate, the semi-articulate, and the mute; the articulate comprising the slaves, the semi-articulate comprising the cattle, and the mute comprising the vehicles." (Cato et al. 1934, p. 225).

overview of meanings provided by the Cambridge Dictionary Online on "instrument", namely

> 1. an object, such as a piano, guitar, or drum, that is played to produce musical sounds.
> 2. a tool or other device, especially one without electrical power, used for performing a particular piece of work.
> 3. a type of investment in a company or in government debt that can be traded on the financial markets. (Cambridge Dictionary Online)

MUSICAL INSTRUMENTS IN THE 21ST CENTURY

The compendium *Musical Instruments in the 21st Century* (Bovermann et al., 2017) is to be commended for focusing on the diversity of musical instruments today in order to identify their practical and conceptual specificities.[2] In doing so, most of the authors set up a polarisation whereas one pole is assumed to be the definition of musical instrument in the past and the other is assumed to be the definition of musical instruments in the present. Common to the comparisons is the evaluation of the traditional definition as narrow, limited, and static and the present definition as wide, unbounded, and dynamic. Here are three examples:

Paul Théberge's explanations of today's musical instruments is based on the idea of networks of relationships in the sense of assemblage:

> Traditional analysis and classification of musical instruments is often based on an account of the material characteristics of instruments as physical objects. In this sense, their material basis as a kind of purpose-built technology is the primary focus of concern. This chapter

2] There has also been repeated discussion of whether loudspeakers are musical instruments, e.g. in the following article published shortly after and based on the Bovermann et al. compendium: Sharma, Gerriet K. & Schultz, Frank (2017): *Are Loudspeaker Arrays Musical Instruments?* Online access: https://www.researchgate.net/publication/315808259_Perception_of_Spatial_Sound_Phenomena_Created_by_the_Icosahedral_Loudspeaker

> takes the position that musical instruments are better understood in terms of their place in a network of relationships—an 'assemblage'—with other objects, practices, institutions and social discourses. (Théberge, 2017, p. 59)

Deniz Peters develops his contribution explicitly following the essay "The Instrumentality of Music" by Philip Alperson. In the wording of Alperson quoted by Peters, the traditional definition of musical instruments reads like this:

> Philip Alperson, in his 'The Instrumentality of Music', elucidates how questions such as these have led him to problematise and qualify the 'commonsense view of musical instruments', according to which 'musical instruments are devices that performers use to make music. (Peters, 2017, p. 68)

The fact that Peters judges this conception of musical instrument with Alperson to be too narrow becomes clear in his summary of Alperson's approach, which speaks of mere mechanical sound production that would be suggested by that definition: "music making is not the sheer mechanic activity of producing a sound" (Peters, 2017, p. 68). Even though Alperson does not eliminate the concept of object altogether, he understands the object boundaries as softened.

> This activity includes the body in a way that 'in some cases, it is difficult to know where the body ends and where the instrument begins', so that 'the performer's musical instrument is better understood as an amalgam of material object, the performer's body, and bodily dispositions as habituated by the developments of various musically related skills. (Peters, 2017, p. 68)

Furthermore, musical instruments are no longer specific objects whose status of being a musical instrument can immediately be seen.

> Things that might not appear to be instruments at first sight turn out to be instruments after all through their use by people who are not classically thought of as musical performers, but who use them musically: composers, conductors, recital hall acousticians and technicians, and listeners using sound reproduction devices. Alperson

> shows that it makes sense to include composition software, batons, performance spaces and mobile audio devices (given the musical intentions by those using them) in the category of instruments, very much like ''natural' and 'found' instruments' such as 'conch shells, grass reeds, stones […] a typewriter, a steamboat whistle' and so on. All these can become musical instruments when one essential condition is met: 'What counts is that an object takes its place in the world of musical practice. (Peters, 2017, p. 68)

Alperson also seeks to assert the expansion of intentionality, specifically: the expansion of the circle of those who create intentionality, for contemporary musical instruments.

Deniz Peters suggests that the concept of instrumentality as a fluid concept is preferable to the rigid concept of instrument, making three further extensions:

> I shall argue towards three points of differentiation, nuancing, and extension: (1) instrumentality can be distributed in the sense that it can be established across various instruments and various players; (2) instrumentality is not limited to the cultural domain but may also include the (natural) environment; (3) a crucial part of hearing the work-in-performance — next to hearing and appreciating the work and the performer's artistic accomplishment — is the appreciation of the interpersonal accomplishment within the work-in-performance whenever there is more than one performer. (Peters, 2017, p. 69)

Sarah Hardjowirogo begins by asking the rhetorical question of why Hornbostel's definition of a musical instrument should not suffice:

> Why should it not be sufficient to define a musical instrument as, say, 'any object that produces sound', just like several (musicological and general) encyclopaedias do, following Hornbostel's statement that '[f]or purposes of research everything must count as a musical instrument with which sound can be produced intentionally. (Hardjowirogo, 2017, p. 10)

The author summarises her extensive remarks on the answer at the beginning of the conclusion as follows, implicitly serving the juxtaposition

of "narrow" and "wide": "that musical instruments are a lot more than just arbitrary objects that produce sound" (Hardjowirogo, 2017, p. 22).

The dynamising extensions Hardjowirogo proposes are also based on the notion of instrumentality.

> Instrumentality in this sense represents a complex, culturally and temporally shaped structure of actions, knowledge, and meaning associated with things that can be used to produce sound. However, as also suggested by the findings of Cance et al., the term must not be understood as denoting a property an object per se has or has not, but it is rather intended as a means of capturing the instrumental potential of a given artefact. Also, it must not be conceived as a constant, but rather a graduable, dynamic term which means that an object may be more or less instrumental, according to its expression of the characteristics associated with instrumentality. (Hardjowirogo, 2017, p. 17)

In the conclusion, she deduces the identity of the musical instrument.

> They are complex, culturally freighted artefacts allowing for particular ways of interaction that result in particular sounds. Their identity as musical instruments—their instrumentality—is constructed in the interplay of various criteria, among the most relevant of which seem to be those mentioned above. If the underlying principles of this interplay were better understood, they could inform the design process of new musical instruments and thus contribute to the development of instruments with a characteristic and coherent identity. But above all, they would provide general insights about how processes of culturalisation work: how arbitrary objects turn into meaningful things with a well-determined function—such as, for example, musical instruments. (Hardjowirogo, 2017, p. 22)

"OBJECT" – PHILOSOPHY OF SCIENCE

By distancing themselves from the object concept, the contributions to the compendium on today's musical instruments bear the signature of current practice-oriented academic discourses that have increasingly linked

disciplines in the humanities and social sciences since the 1980s. In particular, praxeological manifestations of sociology, cultural studies, communication studies, art studies and musicology have created a new vocabulary and new sensibilities on academic ground in order to take a look at dealing with things and cultural interactions in the sense of pragmatic science.[3] Praxeological research sees itself enriched by interdisciplinary theories of action, by ethnographically informed actor analyses that force the multiplication of agents (actor network theories) (see Krieger & Belliger, 2014), by ecological environment/context analyses that since Gibson's concept of affordance (Gibson, 1950) has experienced an unbridled upswing. Projects of artistic research complement praxeological discourses with artistic expertise. The broad spectrum of methods of these research approaches can be found under the collective term of qualitative media analysis. Philosophical support is provided by contemporary formulations of phenomenology, which are based on living conditions like time, space, perception, and corporeality (today: embodiment).

Processual practice research shows no interest in a methodological stylisation of the concept of object. Scientific objectivism and the underlying attitudes of positivism are considered a stumbling block for all the process-oriented science movements mentioned above. These praxeological and pragmatic research movements wanted to counter deterministic scientific theorems, the arbitrariness of researchers and the ideological manipulability of limited systems with scientific alternatives. The historiographically derived Foucaultian discourse analysis also starts here and reveals strategic intentions: It is about power in the sense of definitional sovereignty, of institutionalised discourse styles, of conceptually established hegemonies (e.g. Foucault, 2005, p. 256).

Where the rhetoric is about softening the object, ethical dimensions are also served. With the help of the aforementioned scientific-theoretical positioning, the compendium contributions strive for morally charged narratives of music by opposing deterministic tendencies on the level of the object question (the musical instrument must not predetermine the music), on the level of the subject question against intentionality, at least against one-sided intentionality (the instrument maker must not predetermine the

3] The professional literature is now manifold. There are also publishers who specialise in scientific practice research. Here is a selection: Bieger (2018), Böhm-Schnitker and Hartner (2022), Martin (2017), Krieger and Belliger (2014), Houben (2019), Seifert et al. (2008), Bräuchler and Postill (2010).

music via the musical instrument) and at the level of the act against instrumentalisation (a purposive and unidirectional use of musical instruments must not determine musical practice).

"MUSICAL INSTRUMENT" – THEORY OF ACTION

Questioning the musical instrument cannot be separated from questioning musical action – this is the tenor of the compendium contributions. This direction will be pursued further here by also posing the subjacent question of musical action, specifically the significance of instruments for musical action. The small excursus on action theory that follows is due to this intention:

Action-theoretical considerations of art or creativity in general usually leave it open whether a clear intention, a clear goal, a singular subject of action can be identified (Ungeheuer, 2008). In this way, for example, collective acts, non-intentional predetermined interactions, and non-goal-oriented creative processes of finding can be included in the research. What all action-theoretical approaches have in common, however, is the sensitivity to which extent objects can be included in the creative act. If one can agree on the maximally reduced working definition of action, that there is an impulse to act that instigates a certain engagement with the external world and/or the internal world in the sense of a real implementation of the impulse within the given conditions of time and space, then objects are those phenomena that characterise the world that agents engage with. In this context, the acting interaction with these objects represents a (more or less extensive) partial aspect of the overall action. Bound to the relation "in order to", the handling of an object of action can be projected back to the overall action at any time: The Object is handled in a specific way in order to execute the subjacent action project. Every integration of an object into an action holds the potential for the object to become an instrument. In this sense, it can be said that every action instrumentalises.

Instruments, as the etymology summarised at the beginning of this article shows, are special objects of action. Their high value lies not least in their artefact character. This does not necessarily mean that they were constructed by human hands. Instruments are artefacts because they are charged with meaning, with knowledge, with experience, with practical

interest by acting people. As chosen objects, instruments have positive connotations. Sometimes the use of language allows evaluations of the same root word to be diametrically opposed in different grammatical turns of phrase. While instruments are valued positively, the act of "instrumentalising" is generally considered reprehensible, dastardly, and worthy of punishment.[4] The verbs "instrumentalisieren", "instrumentalisar", "instrumentaliser" outline the semantic field of exploit, abuse, illegitimately use as an instrument.[5] The rhetorical ellipsis that takes place here is remarkable: the actually relevant derivation of the negative evaluation is not linguistically supplied. It is not the fact that something is used as an instrument that can be evaluated as negative in and of itself, since the use of instruments for actions is generally accepted. If one speaks of an act of instrumentalisation, one rather wants to deny someone the right to use something for one's own purposes. The accusation of instrumentalisation is therefore tantamount to an accusation of encroachment.

This excursion into a legal theory of action, which probably seems strange, is highly relevant to the question of the definition of a musical instrument that is valid for the present. For in the book's tendency to polarise musical instrument as object (tradition) and musical instrument as interactive process (today) cannot really justify the difference between history and the present, given the anthropological basis of action. Again, an argumentative ellipsis can be discerned here that hides the essential intermediate step. The real difference, which is tacitly asserted in the expert contributions for the juxtaposition of tradition and present, lies in the legal interpretation, that is: in the interpretation of the definitional sovereignty over what music is and consequently which objects may be instrumentalised as musical instruments.

For traditional musical instruments, a number of agents can be immediately identified that claim a social sovereignty of definition over music: Instrument makers, institutionalised music care (e.g. orchestral houses), teaching institutions (e.g. music colleges) and the instrumentalists shaped by them, instrumental schools (incl. learning methods and corresponding

4] This is certainly true for German and Romance languages. In English, the verb "to instrumentalise" is not very common.

5] In the German language, the negatively connoted "instrumentalising" differs verbally hardly at all but semantically strictly from the neutral term "instrumentieren", which is used, for example, in music theory to designate the practical performance arrangement of a composition with orchestral instruments.

music-psychological research), historical musicology and its canonisation measures, and last but not least the majority opinions in mass media and on the street. The area of coverage between these definitions is comparatively large and forms an overall opinion that is precisely reflected in the structure, design, marketing, nimbus, and cultural concept of these musical instruments. This thoroughly multi-layered concept includes socially relevant values such as craftsmanship, virtuosity, high-quality appearance, sound strength, monetary value, and stage effectiveness, to name but a few.

All these features result in a narrative of music that is oriented towards classical-romantic music. Added to this are inner-musical features inscribed in the design of the musical instrument such as tempered tuning, tonal stylistics, or articulation options. Alperson, and with him Peters, takes this into account when he formulates:

> Not only is the manipulation of the instrument an intentional activity, however, but also do instruments themselves become what they are through being part of a practice and should thus not be conceived as separate entities from that practice. In Alperson's words, 'we must understand musical instruments as culturally freighted objects, that is, as objects that arise in the context of the history of musical practice. (Peters, 2017, p. 68)

Erich von Hornbostel, in his 1933 essay describing musical instruments, also provides a narrative of music that reflects cultures and also the ethnographic view of them.

> The fact of their giving forth sound classes them at once among 'live' objects and lends them an effect akin to that of speech and song. That their sounds are not those of the human voice invests them with a mysterious and superhuman potency. It would be hard to find a sound-instrument which had not served for an indefinite period as a secular amusement for adults before being finally passed on to the children. Ritual use is always therefore an indication of great antiquity. On the other hand, objects which are indiscriminately used at any time and by any person may be suspected of dating from a later period, or of having been imported from without. Musical instruments have not only a ritual but a sociological significance. For instance, in the social organization of the south-eastern Australians, which is

> based on sex-totems, a pair of bull-roarers represents the tribal ancestors. Very frequently the use of an instrument is limited to one sex, while it is strictly tabu for the other. Even apart from their acoustic properties, their variety of form, careful workmanship, wealth of technical invention, and artistic ornamentation, make instruments a gratifying object for comparative study. (Hornbostel, 1933, pp. 129–130)

In order to substantiate the classification made by Sachs, Hornbostel emphasises above all internal differentiations of musical instruments that are located on another level, which reveal themselves to be media-theoretical.

> For the research-student the information that 'flutes' are in use among a certain tribe is valueless. It is necessary for him to know whether the instrument has an arrangement for conducting air through a tube towards an orifice in its wall (blockflutes); whether it receives the current of air by the mouth or by the nose, from the end or from the side; if it is provided with finger-holes, their number and the order in which they are disposed; whether the upper end is sharpened, or notched, etc. In fact, there must be no doubt that the object in question is a flute and not a reed-instrument (or whatever kind) or a trumpet, the sounds of which are produced by lip-vibration. When, ruther, the sound-instruments have developed into musical instruments, in the stricter sense of the word, they acquire an almost unparalleled importance not only for musical research but also for ethnology. (Hornbostel, 1933, p. 130)

"MUSICAL INSTRUMENT" – MEDIA THEORY

With his insistence on a careful consideration of the material conditions and the energetic processes of sound production, Hornbostel opens the door to a media-theoretical classification. The focus lies on medial transformation, i.e., the translation of one medial modality of being (for example, as physical impulses that set matter in motion) into another (for example, as a periodically vibrating column of air) into yet another (for example, as

a moving wooden body) and so on. In their classification of musical instruments, Hornbostel and Sachs are largely oriented towards the material conditions and their potentials, activated by means of musical actions, to translate something into something else.

If the present contribution has already followed the subliminal tendency not to reject the definition of musical instrument as a sound-producing object of musical practice, but to read it in a purposefully expanded way, then it is now time to make this message explicit. On the level of media theory, it becomes clear that if we want to talk about instruments of music-making, we must talk about the respective radius of medial transformations. The emphasis of this call is due to the basic character of sound: Sound is ephemeral and, beyond material objects (including higher-quality instruments), absolutely not producible, audible, distributable, processable, storable. Conversely, this means that the definitional formulation "sound-producing object" cannot imply that sound always becomes audible. Many media transformations of sound production take place entirely without the manifestation of perceptible sound.

This medial struggle for the permanence of the sound is involuntarily incited by the anthropological circumstance of the special, namely the generative power of the acoustic (see Ungeheuer, 2022). Hearing makes power by generating something through hearing. Hearing generates the vital spatiotemporal foundation for the individual human-world relationship, which is able to adapt flexibly to situational requirements. The ear functions as a double spatial organ. The sense of balance is directly adjacent to the sense of hearing; they share the same membrane and the same developmental biological origin. Thus, the ear is equally responsible for the self-location of the hearing person and for his or her location of the world. Anthropologically speaking, the ear is the organ of cognition that sets the foundations for the overall system of a living being. The generative power of hearing, which is not to be underestimated, lies in the double generation of the world, which determines and situationally regulates the radius of action of the living being outside as well as inside itself. The magic of sound is based on this dual power of synthesis of space and identity formation. This is how the tense task of life arises, that under conditions of inescapable fleetingness and in the dynamics of constant medial transformations, stability and security are constituted through hearing and defended through narration.

THE METAVERSE – DE-BOUNDED AND YET AT THE CENTRE

Even if many media theories – above all McLuhan's narratives, which were subsequently granted theory status – mix up the levels of argumentation: It is worthwhile to separate action-theoretical considerations on the use of instruments from media-theoretical considerations on media transformations. This becomes particularly clear when it comes to the metaverse as the ultimate all-rounder instrument and the limitless connectivity of all conceivable real and virtual objects.

The metaverse can be seen as a gigantic project of the 'near future' type. Its architecture is based on the pillars of digital networking, capital-centricity, subversiveness, and exclusivity. The entertainment industry, specifically: gaming, is its promotional hit. Imagination, narrative, and power are its humus.

The metaverse is not a future virtual counterpart to the old supposedly real world. It has long been optimised under the protection of exclusive laboratories and in the seclusion of nerd forges. Visionary milestones of literary dystopia[6] have shone a light on it.

In terms of action theory, one could argue as follows: Whoever enters the metaverse is fascinated by the infinity of possibility. Unleashed creativity generates an incalculable number of artful instruments that offer themselves to action, especially to selling and consuming action. The meta-business of the metaverse, so present is the near future already, reveals above all a need for action: Rights must be renegotiated. Where everything is networked with everyone and can take on any appearance, in principle no personal rights or copyrights, no licensing agreements, no price fixing, no cartel rights, no human rights, no rights over ownership apply for the time being. In the form of networked data, the tether is cut that binds the association of data to that for which the data once stood. In the sense described above, the negotiation of shaping the world via instruments and the unlawful use of instruments (called "instrumentalisation" in everyday language) is the big issue. Said rhetorical ellipses, which fade out the offensive discussion about one's own and others' ideas of rights, have a fatal effect, especially when young people are so blinded by the entertainment value of the metaverse's shining instruments of the metaverse that their path to an awareness of legal issues, that is: to an awareness of possible long-term

6] like Orwell's "1984" (see Orwell (1949)

limitations of their own legal options, is made even more difficult. Whether artists will be able to escape the market-strategic pressure of the metaverse in the long term to give their art/music as free or barely remunerated loss-leader goods to streaming providers, who make their profits via other ties (for example, through advertising revenue) than the art they claim to manage, remains questionable. It is possible that the caesura between paid and free "hobbyist" artistic interactions is radicalising further, so that apart from a handful of flagship artists who see themselves firmly embedded in national or institutional systems, there are hardly any professional artists left.

In terms of media theory, the metaverse proves to be an ideal-typical manifestation of unlimited media transformations. The conceptual origin of the idea that everything can be connected with everything in the minds of many artists worldwide can hardly be denied and is historically proven. In view of the media-technical necessity and versatility of the processes of creating, processing, listening to and distributing sound, I would go so far as to see music as the artistic mother of the concept of the metaverse. If one adds the aforementioned anthropological significance of the ear as a double organ of spatial experience and its functions for the genesis of identity, it becomes clear why spatialising audio technologies have become particularly important as instruments for the gaming industry and why the integration of the reflection of contemporary musical practices into the discourses on musical instruments is absolutely necessary.

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8

Listener-Centred sonification practice as transdisciplinary experimental artistic engagement

LISTENER-CENTRED SONIFICATION PRACTICE AS TRANSDISCIPLINARY EXPERIMENTAL ARTISTIC ENGAGEMENT

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ABSTRACT: Project RADICAL presents sonification research and practice as a listener-centred, transdisciplinary activity. In this chapter, authors discuss sonification from perspectives of artistic and musical practice. Particular emphasis is placed on spatial listening, embodied experience, environmental interaction, and communication, resulting in an interrogation of methodology, objects and foundations often assumed for sonification. The reader is invited to apply an ethnographic ear to a roundtable presentation investigating new sonic and musical practices that converge upon a reframing of sonification as engaged aesthetic activity productive of and carrying new technical and epistemic knowledge.

KEYWORDS: Ethnography; embodied listening; phenomenology; aesthetics; space.

INTRODUCTION

Project RADICAL is a group of artists, composers and creative programmers exploring new ways of making and listening to sonification.[1] Our research places the position of the listener as a central concern which inspires us to design intersections between sound and information by which we can investigate how meaning is constructed through listening experiences.

Working in a variety of media, we approach sonification transdisciplinarily, necessitating an expanded notion of aesthetics in both our sonifications and our artworks. For sonification, this means locating this body of practices outside any particular disciplinary purview, making it available to any whom it might be useful for any purpose. Meanwhile, we allow the meaning of terms like sound art, fine art, or music, to remain open to being defined by the listener. This facilitates the exploration of new sound experiences that aim to provoke questions of how sound and meaning are co-constitutive.

This chapter outlines aesthetic and conceptual frameworks and provides practical examples of the working practices and ongoing research of

1] Project RADICAL is funded by a Leverhulme Trust Research Project Grant (RPG-2020-113). See https://projectradical.github.io/

the group's members. Our work can be heard to resonate in a landscape in which information sharing takes place in a performed, participatory environment that accommodates feedback. We re-examinate aesthetics as grounded in practice, actively investigating phenomenological methodologies for spatial audio and temporal listening. We seek to create sonification work transdisciplinary in both approach and impact: an open family of practices that will be further developed within many disciplines.

We offer the reader an opportunity to apply an ethnographic ear to our work. Below, each of us in turn narrates his individual engagement with sonification through brief discussions of the new sonic and musical practices and how they intersect with technical and epistemic approaches in our creative work. The reader thus has the opportunity to join our discussion as a questioning participant rather than a passive receiver of information.

Our approach mirrors a key concern of our project, which is to reconsider foundational notions of aesthetics, transforming them into productive and performative tools. To this end, we take embodied listeners and information as data systems that encounter one another co-productively within sound environments. In such encounters, speculative objects enter the world through aesthetic processes of perception. By placing the listener at the centre of the experience for sonification, and considering aspects of the sounding environment to include multi-perspectival spaces and temporalities, we resonate with formative notions of 'aesthetics' alongside the formation of knowledge itself.

The turbulence at this intersection reminds us of Gaston Bachelard's writing on the emergence of scientific knowledge as the realm of tangled confusion, of trying out, and the resistance of the inertia of preconceived opinions. Knowledge is repeatedly in need of those "epistemological acts... that bring unexpected impulses into the scientific development" (Bachelard, 2002, p. 136). Another resonance we consider fundamental is one which allows aesthetics to be defined as experience itself, which comes from the Greek words on which the English usage of 'aesthetics' is based: *aisthetikos*, meaning, among other meanings, 'of or for perception by the senses, perceptive', and *aisthanesthai* 'to perceive (by the senses or by the mind)'. It is with these fundamental aesthetic notions that we hope to render information perceptible, and viscerally.

DATA: THE VERY IDEA, AND THE PURPOSES OF SONIFICATION

John Bowers

Let us take a moment to reflect on something so obvious that it is often passed over. Just what is data? As a first critical observation, perhaps we should refer more to capta (things taken) than data (things given). Many philosophers of science, at least since Popper (1935), have emphasised the theory-laden character of data. Data already reflect the purposes and practices of those who 'gather' or 'capture' them. This is most spectacularly clear in quantum physics where, for around a century, it is known that how matter appears, as a wave or as a particle, amongst many other issues, depends on the arrangements of apparatus and the kinds of measurements taken. For a writer like Karen Barad (2007), who critically extends the perspectives of Niels Bohr, this suggests that the apparatus co-constitutes the phenomena observed. Any framing that we assert on the world, between what is inside the experiment and what is regarded as background context, in part creates the phenomena we observe. While Barad is writing about quantum physics, she intends these points more generally. Indeed, it should be obvious to any psychologist, social scientist or, for that matter, opinion pollster that what instructions are given to participants, how a question is articulated, what range of possible answers are given or what coding methods are adopted, are careful matters of design. Measurement technologies and related apparatuses, from webforms to heart monitors, all involve exclusions (of backgrounds from foregrounds), alignments (of the subject-objects of investigation with some scale and some agency, human or otherwise, taking readings), in line with some (tacit or otherwise) purpose. In a sense, data arrives late on the scene, not at the very beginning.

Perhaps we can summarise these points in a slogan: No datum is innocent. Taking this seriously might suggest some reorientations for sonification's research agenda. Rather than taking a given data set for granted, as a 'gift' from the application domain, can we situate sonification in the extended field of capta, where the 'cuts' between what is studied and what is excluded, and the choices of framing, alignment, and purpose that make capture and gathering possible, are also our concern?

Relatedly, let us follow some observations in anthropologically and sociologically inspired studies of scientific practice and observe that data is taken in specific places: in the hospital, in the experimental cubicle, on the street, through the webform. Data is recorded using particular material

technologies, the kinds of things Bruno Latour (1987) calls "immutable mobiles", that enable transportation from one place to another without what is moved being destroyed in the process. Copernicus employed reliable scribes so that astronomical observations from throughout Europe and the Arabic world could be brought to him. In the US 1890 Census, punch cards were more durable and practical than the census taker's hand-written transcriptions of what they were told. Data is taken to and accumulated at centres, particular places, it does not lie around just anywhere. It is in laboratories or the Census Tabulating Offices. In an environment of domestic computing, data is on the hard drive, not behind the sofa. Data accumulates in places which Latour calls "centres of calculation" — centres which connect to, and indeed help to constitute, their peripheries by '(re-)representation paths'. It is at such centres that comparisons and juxtapositions are made.

What should a centre of calculation containing sonification(s) be like? Where would it be? How would its sonic displays relate to the other displays, charts, tabulations, graphs, inscriptions, visualisations that are in play in such places? Whether that place is as big as an observatory or as small as a smart watch, there is a value in thinking ecologically to ask not (just) what is in the sonification but what the sonification is in.

Very commonly sonification research concerns itself, much like classical experimental psychology, with subjects which are making judgments, finding regularities, being sensitive to similarities and differences, making responses that can be evaluated for their truth or accuracy. Clearly, there are many other activities that listeners can engage in and that auditory displays can be designed for. We can design to incite interest, perhaps to draw someone over to examine something with us. We can facilitate curiosity, perhaps for something that might otherwise be neglected. We can enable imagination, perhaps for circumstances where we have become blocked. We may wish to foster intuition somehow, where the path of reason is getting us nowhere. We may wish to create the circumstances for conjecture, for guesswork and wild hypotheses, to get a new perspective on an old concern. Perhaps, we may wish to experience something aesthetically beautiful or challenging because why on earth would we want to not do that? The point is that all these possibilities involve an orientation other than the kind of judgmental truth that goes on in the classical experimental paradigms of sonification and psychologically-informed user research. This is not to say that interest, curiosity, imagination, intuition, conjecture, aesthetic appreciation and the rest are opposed to judgments of rationality

or truth. Indeed, it seems preferable to explore epistemologies where all are equally forms of thought-practice that variably entwine in the different activities that engage us.

Again, some new framings for sonification suggest themselves. Ask not (just) what the sonification represents but what it does. How do we design sonifications that do things (in addition to or) other than represent or 'perceptualise' phenomena? Things like incite curiosity, enhance appreciation, facilitate imagination, give joy, thrill?

RE-ENGINEERING AESTHETIC ASSUMPTIONS FOR RE-PRESENTING DATA

Paul Vickers

My whole research career has been centred on sonification. I started out wishing to combine interests in music and computing and landed upon the idea of using musical motifs to signal the execution paths through running programs to assist with debugging. Along the way I found that as a technologist I was increasingly grappling with creative pursuits. Coming at sonification from utilitarian and engineering perspectives, the intended goal of my labours is not to create an aesthetic experience. The creative pursuit here was exploring how to get my technology to do what I wanted. Aesthetic considerations were bracketed and treated as side products with the main focus being on how to ensure that the sound allowed the listener to construct precise and reliable information from the data that had been transcoded and transduced into audio.

When I began my endeavours in the mid '90s, sonification was an emerging niche discipline fuelled by the recent availability of affordable computer sound cards. My computer scientist mindset held that every problem and phenomenon could be neatly categorised and placed on a taxonomical chart (I am a programmer, after all). My limited formal musical education lacked an appreciation of the discourses around composition, aesthetics, sonic art, electroacoustic music, modes of listening, and so on. Aesthetic judgements were more concerned with how to make an auditory display that sounded 'nice' and which could be easily rendered diatonically using only a General MIDI sound set and the SoundBlaster SDK. The sublime, for me, was to be found in programming the technology

to turn data into sound; 12,000 lines of well-written source code was my aesthetic experience.

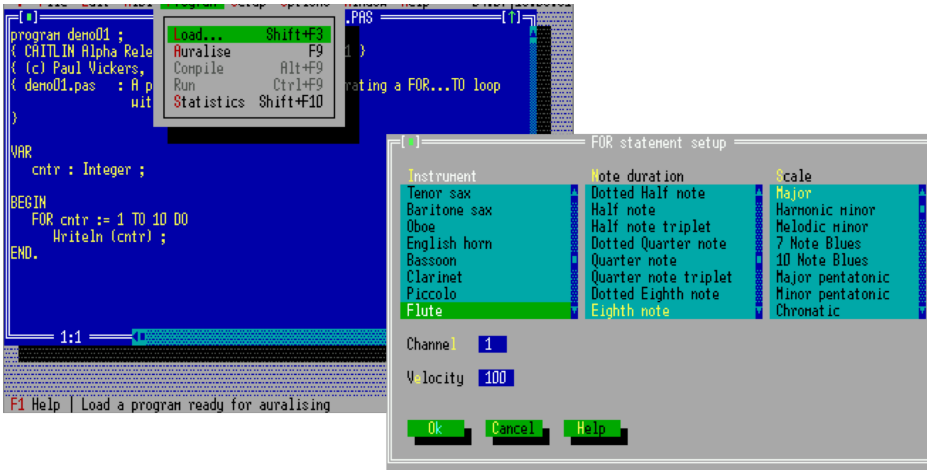

Figure 1: *The result of 12,000 lines of beautiful code! (Author's own work)*

When I began to discuss sonifications with composers and other practitioners of the mysterious 'sonic arts' I was confronted with new worldviews that challenged my narrow black-and-white taxonomical thinking. As I interrogated current sonification practice I saw that the aesthetic plays a vital role and, if not understood well and addressed properly, the result is impoverished auditory displays, both in terms of aesthetic experience and the ability to communicate data.

The simple definition of sonification is the use of non-speech audio to represent data or data relations. However, lurking beneath the surface of the seemingly innocuous word 'represent' is a world of unexplored problems and challenges. Data possess no sound of their own, so any sonic indices we attach to them are (with the possible exception of the edge case of data audification) purely conventional (in the semiotic sense) and come laden with a host of philosophical, experiential, aesthetic, and phenomenological challenges — sonifications sometimes behave so strangely (Vickers, 2020). What, exactly, do we mean when we say that this sound represents that data? Do we mean the sound stands in for the data? Or are we in some ontological way saying that this sound is re-*presenting* the data to us now in this time and place? Or both? Or neither? Would the word 'reveal' (an unveiling or apocalypse) be a better fit here than 'represent'?

In 2006 Bennett Hogg and I began a programme of work to build a more theoretically-grounded framework for talking about and understanding sonification aesthetics (Vickers and Hogg, 2006). I am now firmly of the view that any work that seeks to seriously understand sonification design needs to account for embodied perceptual experience including an account of the aesthetic and phenomenological issues raised by the auditory presentation/representation/re-presentation of data. This necessitates going beyond understanding the psychoacoustics and psychophysics of sound and to embrace the messiness of sound being experienced and perceived by whole living organisms (people as mind, body, and soul) in complex situations and listening environments.

I have needed to learn to approach aesthetics from a new perspective. For much in the world of computer science aesthetics is limited to what sounds 'pleasant' (whatever that means). There is something of a phenomenological turn that needs to be taken in sonification: we must learn to appreciate the role of the senses in listening to sonifications and all that this entails and implies. This goes beyond mere judgments of pleasantness and raises issues of sense, perception, feeling (both physical and emotional), and so forth. To think about sonification design purely in technological and utilitarian terms is to ignore the messiness of the embodied listener who possesses sets of experiential and enculturated understandings that affect the way they will experience, listen to, and comprehend what the technology is attempting to reveal to them. To do this well we need to understand both the technology and the language(s) employed in both the revealing and the perception.

DATA WAYFARING: SOUNDWALKING THROUGH SONIFICATION

Tim Shaw

Both soundwalking and sonification are possible methods for revealing and attending to aspects of shared perceptual environments. Soundwalking is a method for increased awareness of an environment through movement and listening. Developed through the research of the World Soundscape Project, the practice of soundwalking was through an acknowledgment of the changing soundscape of Western Canada in the 1970s (Westerkamp, 1974).

Figure 2. *Listening to an escalator through a contact microphone during an Ambulation soundwalk. (Credit: Vincent Ducard and Sonic Protest, Paris).*

Sonification is the practice of turning data into sound, a way of being able to understand complex data streams through listening. Sometimes used as an alternative to visualisation, it is a method commonly employed by scientists, designers, artists and musicians in an attempt to understand and render data in new ways (Hermann et al, 2011).

Data Wayfaring proposes a combination of these two practices, a listening walk engaging with environmental signals, investigating an unorthodox way of approaching the sonification of data through physical movement. This piece extends two of my previous projects, Ambulation and Netwalk. Ambulation (Shaw, 2020) is a soundwalk which uses field recording techniques and listening technologies to create a walking performance using environmental sound. Netwalk is an augmented soundwalk which broadcasts altered soundscapes and processed video to an online audience using internet streaming technologies. Developed during the lockdowns of 2020 it has become a method for sharing an embodied soundwalking experience to remote audiences. The research around the development and presentation of these sound walks contributes to the idea of field recording and sound walking as a live, procedural practice.

This represents movement away from the notion that recording is only the movement of documentary material from one place to another or the playback of fixed audio files.

I have been conducting augmented sound walks since 2014. In these pieces I walk with an audience through a given environment equipped with various listening technologies. I tune into live signals from the immediate space, sometimes processed through the microcomputer, using them as raw material for improvised performance. I propose, through soundwalking, a flattening of composition and performance, of audience and performer, of process and product. Through my Ambulation sound walk (Shaw, 2020) the act of field recording is not only the process of moving material from one place to another but a live, performative act with the immediate soundscape. I investigate how listening technologies are not only for recording but also a method of perceiving various aspects of space in the moment. Though I do use technologies associated with sound recording practices, no permanent recordings are actually made, the recording device becomes a device for listening through. Mediated sound becomes creative material, or raw data, for compositional purposes.

Data Wayfaring creatively investigates the complex relationship between human perception, technology and the many species which share our soundscapes. By listening through multiple sensing technologies I explore the presentation environment as a giant sensor, using various techniques to sense its nuances and unearth its changes. I regard this activity as a reciprocal, dialogical interchange between humans and non-humans, infrastructures and ecosystems.

Through *Data Wayfaring* I am combining soundscape listening with sonified, non-acoustic data. Here I am working with data as a live, ever changing signal which responds and depends upon the direct environmental conditions of its collection. I explore how live data streams can be navigated through walking and movement. In any given environment there are a whole set of possible data streams one can listen into. Through a listening practice we can simultaneously hear, for example, the world moving, animals interacting, fall out electromagnetic signals, pollution levels, telluric currents and cosmic weather. Listening, supported by technology, can encourage us to think and act differently about our shared spaces and create a sense of commonality other than through visual culture.

The purpose of this exploration is not only to reveal nuances and patterns in geo-located data but also to explore the way that data can be

specific, responsive and situated (see Electromagnetic Situationism by Savičić (2019)). Live data streams are converted into sound using different sonification methods developed by myself and the other members of the RADICAL team. I then compose with this data in the same way I would treat acoustic streams through my various microphones.

With this project I demonstrate how having an open, improvisational approach to technologically supported soundwalking enables rich and unexpected results to occur and how this way of working can contribute to contemporary notions of soundwalking and sonification. I hope to investigate the practices surrounding data collection rather than just the data itself. Approaching data as a procedural process, not moving or recording data from one place and presenting it in another but working with it from within the environment it is related to.

RESEARCH METHODOLOGY MANIFESTS PHENOMENA RESEARCHED

Jorge Boehringer

Sonification, the phenomenological encounter of sound and meaning, resonates through all structural levels of my sonic environments and musical works.

As a generator of research questions, sonification allows for the modelling and exploration of phenomena, of data about phenomena, and of processes of gathering data about phenomena. Finished works materially embody sonification when data is created or apprehended within performance methodology or the apparatus of the piece. Most often sonification functions in a mid-field, between my research questions and finished works, in which situations of sound, information, and materiality intersect as three sides of the same coin. Such tripartite intersectionality manifests in circumstances when:

1. what is inaudible is rendered audible; sounding what, from a human perspective, is not considered to be sounding (spatial forms, mathematical propositions),

2. processes of sonification are sonified,

3. sources of indeterminacy are created from deterministic data, often one of two forms: re-mapping or cross-modulation between data signals: the "irrelevant processes" described by George Brecht (Brecht, 1966), or the exceeding of thresholds for predictability or structural apprehension, i.e., real-time atmospheric data used as source for the generation of random phenomena (Haarh, 1998).

The electro-magnetic process of *transduction* is both a technical explicative and a metaphorical analogue for the treatment of information in my work. Transduction involves movement of a signal between material forms. In sound production, transduction refers to the transmission of pressure wave energy to or from magnetic systems (microphones or loudspeakers) creating an electrical signal that can be processed further (i.e., digitalised d). Extension of this process to human listening can be undertaken literally in explaining some processes within the ear, such as the vibration of inner ear membranes in response to sound pressure changes. This process can also be extended beyond anatomical and acoustic notions of transduction, to include what happens within the minds of listeners.

Metaphorically, transduction functions to illustrate the movement of not only electro-magnetic energies, but also conceptual and/or linguistic phenomena produced by listeners. Linkage between embodied listening and environmental sound grounds individual data from ambient sound sources with hermeneutical and skilful applications of listening. Sound perception becomes transpersonal when signal information can be transduced in a social sense through shared embodied or linguistic experience. Such considerations reach far beyond the ontological nature of signals and enter the regions for socio-epistemological inquiry. Examples to follow illustrate how the three methodologies above are enacted through processes of literal and metaphoric transduction in my work.

Transducing inaudible information into audibility has been of material concern in my work beginning in my installation *Standing Waves for Darius Milhaud* (2000) and the subsequent chamber orchestra piece *Standing Waves for Liberty* (2001). Both pieces excite room resonances whose partials are modified by movement in the same space. These approaches are extended through recent work, such as *Meanwhile* (Boehringer, 2020). In *Meanwhile,* pure tones tuned to a peculiarly-shaped attic space (*Figure 1*) are recorded along with ambient environmental conditions and traces of the process of performance. Played back over loudspeakers the material of the recording will excite room resonances in a listening space, and these

will be modified by the position and movements of listeners. Thus, a navigation aid to one's own listening space is provided from a recording of a removed and distant space. The listening experience is private, specific to each listener, as perhaps the listening space itself is. Certainly, the attic in which the original recording took place was private, and yet now this space is re-enacted within a potentially infinite and public collection of new spaces.

Figure 3. *View from the centre of the attic where Meanwhile (2020) was recorded (author's own work).*

Cartesian Birds (2018) is an environmental installation that renders glimpses of a species of bird created through a process of sonification, sonifying itself. A text-to-sound recording of a translation of works by Rene Descartes is subject to analysis. The results are displayed in real-time using a software oscilloscope of my own design. Discovery that the visual analysis produced bird-like forms (*Figs. 2 and 3*) suggested sonification of the data using generative bird-like sounds convolved with excerpts of the text-to-sound reading. The piece thus encounters itself through a transduction from text to image to audio and into the experiences of visitors. Metaphorically, this could be likened to placing the Cartesian Birds before a curved mirror in which they appear as cosmic eggs that produce further Cartesian Birds.

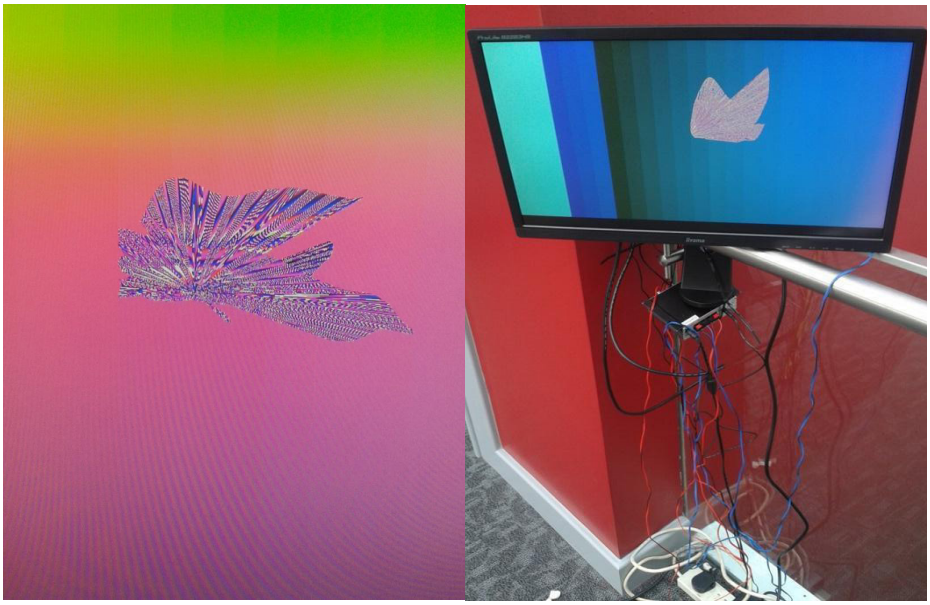

Figure 4. *Screengrab and a node from* Cartesian Birds *(2018) installation (author's own work).*

How visitors encounter themselves and one another in the circumstances of the project is of key phenomenological interest. Transduction of information to sound, literal and metaphorical, is rendered implicitly, rather than explicitly in my works. I withhold information, inviting visitors to participate in the (re)constitution of meaning. As such, listening becomes a performative gesture of intersubjective transduction enacted through absences that cannot be filled, phenomenological lacunae (Merleau-Ponty, 1968).

The use of data in my work is tied to a fundamental indeterminacy present in all experience, from which frame of reference it is impossible not to withhold information. Historically, the meaning of data in both scientific and quotidian contexts is taken to be materially determinate and observer independent. This is changing as artistic work is directed towards methodical experiment with the being and the circumstance of the perceiver within the structure of experience (Irwin, 1977). Likewise, contemporary scientific practices address phenomena as dynamic entanglements of participating researchers, apparatus, and matter (Barad, 2007).

Signals are bodies transducing bodies, listening extends an intersubjective field beyond the human. That which is listening is also becoming, and becoming itself vibrates, be it flesh, mineral, or plasma.

INTERSUBJECTIVITY AS THE SPECTRUM OF PERCEPTIONS IN MEDIA-SPECIFIC SPACE

Gerriet Sharma

In electroacoustic sound composition we are dealing with spatial phenomena that not only come from a direction and head toward a vanishing point in the concert or studio space but also with sound phenomena that have sculptural spatial dimensions like proliferation, width, height, and so on. These form diverse sound masses that can penetrate, layer, move around one another and, through their properties, define space itself. However, given the contemporary proliferation of formats for spatial audio, projection techniques and devices, software tools, and spatial concepts, it remains an unresolved problem to determine what and where different listening groups hear in the created space, how plastic sound objects are experienced, and how these experiences would be described by listeners.

The aim of the research I propose is the conception of a common *space* of the perception of three-dimensional sound phenomena – a domain I have elsewhere called the Shared Perceptual Space (SPS) (Sharma, 2015).

For the composer and sound scenographer, the question arises today to what extent a communicable or self-explanatory composition of these phenomena is conceptually, theoretically and at all practically possible when faced with changing architectural space situations, different spatial descriptions, projection technologies, and perceptions.

> How composers conceive musical content and form – their aims, models, systems, techniques, and structural plans – is not the same as what listeners perceive in that same music. In electroacoustic music, the separation between the act of sound making and perception, combined with the specialised nature, proliferation and transience of methods and devices, indicate that technological knowledge cannot be part of any method founded on perceptual consensus. (Smalley, 1997, p. 107)

Is there within the field of space-sound composition, a space located within the music, where a composer's perception within the compositional process overlaps both the engineers' and audience's perception? How and from which sides (linguistic, technical, artistic, etc.) can this field be approached? Anyone who has spent a while working in a studio

has experienced the specialisation of their own perception that has very little in common with third parties' listening experiences and habits. This subjective experience can sometimes also take the form of acoustic illusions.

> My experience of teaching composers has often revealed to me that such distortions are frequent. (Smalley, 1997, p. 111)

To communicate this impression, approaches for a more stable perception by third parties must be found. Here I am not focused on "the description" or "the precise form" which appears to everyone or must appear to everyone the same way. That would be an unacceptable, regressive approach in the field of art/music. With the degree of freedom we reach for artistic creation and spatial sound designs, we are in a position to produce sculptural sound phenomena that are 'ghost like', ephemeral mirages whose perception is dependent on many prerequisites, not least the vantage point of the audience. So it is not about coordinating perception or the fixation of modes of perception. In this respect artistic research is often in a fruitful conflict with engineers demanding fixation of "auditory objects" in Cartesian space for their models (Zacharov & Koivuniemi, 2001; Rumsey, 2002; Berg & Rumsey, 2003). It is therefore about the layering of different perspectives and their descriptions of plastic sound objects and taking them into account during the compositional process.

Demarcating outlines of an SPS in the project Orchestrating Space by Icosahedral Loudspeaker (OSIL)[2] we repeatedly implemented a three-phase process: within the context of a series of progressively evolving electroacoustic compositions, the plastic qualities of these sound phenomena were explored. Parallel to the compositional process, an attempt had been made to find a catalogue of terms to establish generalisable descriptions of the objects produced. Research into existing terminologies and their application was employed to this end. Furthlaer to this, these terms were reviewed in an attempt to classify the researcher's own compositional process. Additionally, engineering sciences were used to simulate and explain the artistically produced spatial sound phenomenon in psychoacoustic terms with listening experiments, measurements and virtual modeling. The resultant interlocking descriptions and also collisions of perceptions gradually informed the ensuing compositional process and led to an expanded understanding and a different sonic practice of spatial designs with

2] Funded by Austrian PEEK/FWF programme at IEM Graz (2015-2018), www.iem.at/osil.

these phenomena.[3] However, we need many more and radically different approaches to understand our ability to perceive these phenomena. The current boom in sales, marketing and production of loudspeaker tools for the projection of "3D Audio" entirely focused on the reproduction of existing music and sound-environments, underlines the need for an alternative combined listener- and practice-based research strategy in the service of media-specific creations. Therefore, in searching for methods of investigation and throughout the research process we shall try to understand what we induce, i.e., which perception spectrum we provoke and which categories the audience, engineers and we have both for and in the listening experience. The aim is to better understand the variability and through research (constructing models, verbalisation, new compositions and sonifications) to get reacquainted differently with these plastic sound objects and their conception through an assumed SPS.

AN INTEGRATIVE OBJECT: EPISTEMIC TRANSFERS BETWEEN COMPUTER MUSIC COMPOSITION AND SONIFICATION

Marcin Pietruszewski

This section discusses a convergence of practices between computer music composition and sonification. Rather than focusing on respective polarities, I attempt to address epistemic contexts occurring in a transfer between practices of science and computer music composition. The composition with scientific data problematises both fields and gives rise to what can be called an "integrative object" (Schmid & Hatchuel, 2014), a speculative vantage point functioning in the non-disciplinary middle between respective domains. A reflection on these issues was foundational for my recent composition 'Synthetic Pulsar' (2021).[4]

3] The results can be reviewed in several places and publications. See https://www.researchcatalogue.net/view/385081/958807

4] See https://www.ctm-festival.de/festival-2021/programme/exhibition/ventrilogues/synthetic-pulsar-by-marcin-pietruszewski-alex-freiheit. A binaural rendering of the work can be streamed via Deutschlandradio Kultur: https://www.hoerspielundfeature.de/hoerstuecke-mit-kuenstlichen-stimmen-ventrilogues-1-100.html

Computer music composition based on scientific data depends on a fundamental understanding of data and phenomena that underlies it. Yet, what constitutes data and its objects is not unproblematic. Instead of taking a given data set for granted, domain-specific and instrumental contexts should be considered as a pre-condition of data's formatting, resolution and content. There is no such a thing as "raw data" — any data is deeply intertwined with a theoretical model of the world on which the measuring procedure is based. The praxis of composition with scientific data needs to first unpack the data and locate itself in the extended field of capta — the methodology of discovery — within the 'cuts' between what is studied and what is excluded, and the choices of framing, alignment, and purpose that make data capture and gathering possible (Lanigan, 1992, p. 215).

A key challenge for a composer working with scientific models is a representation of data as sound. A sound can be experienced as a change over time where its properties are perceived in its dynamic unfolding. Thus, representation of data as sound requires an invention of a temporal form: mapping between properties of data and sound. The formal problem cuts across both fields of practice, sonification and computer music composition, and points to a fundamental problem regarding the relationship between complex representations — series of numbers or sound streams — and an understanding of objects and their relationships.

Synthetic Pulsar (2021) was commissioned by CTM Festival in Berlin and was presented on specially built 64-channels Meyer Sound loudspeakers installation at Vollgutlager (Figure 1). The material point of departure for the work was the New Pulsar Generator (nuPG) program (Pietruszewski, 2020) in conjunction with physical modelling synthesis, both developed in SuperCollider 3.10 programming environment.[5] The work attempted to attain an epistemological exchange between practices of sound design, computer composition, contemporary thought and science through a series of speculative sonification models attributing physical properties to a well-established data set: rotational profiles of astrophysical pulsars (Bell, 1968).[6]

5] Also see: https://www.marcinpietruszewski.com/the-new-pulsar-generator and https://www.curtisroads.net/software/

6] The data sets were sourced from the European Pulsar Network (EPN): http://rian.kharkov.ua/decameter/EPN/browser.html

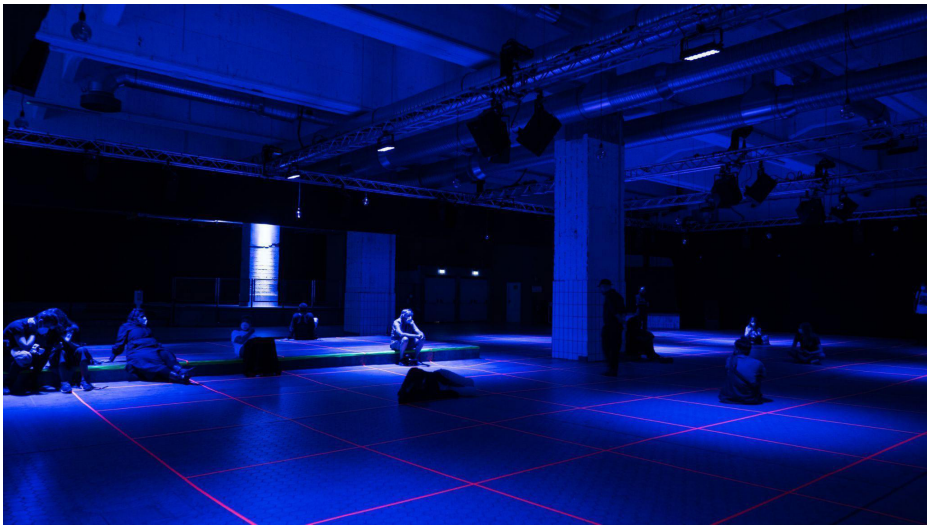

Figure 5. Synthetic Pulsar *(2021) at Vollgutlager, Berlin. Photo Copyrights: Eunice Maurice and CTM Festival*

While the practice of augmenting one data set or data feature by a secondary data source is an established method within sonification practice (Boverman *et al*., 2010), *Synthetic Pulsar* speculated physically impossible objects, attributing pulsars with forces of attraction and repulsion, and material qualities such as rigidity and elasticity. The process of attribution followed a systematic model of experimentation where existing sets of pulsar data properties (time vs intensity) were supplemented by a dynamic physical model emulating interaction of objects in a virtual environment. A classic sound of a pulsar consists of a radio-wave auditioned through a set of loudspeakers.[7] The speculative model of *Synthetic Pulsar*, intervening at the level of data, forces pulsars into physically impossible interactions: pulsars rotate around each other, attract and repel, collide and bounce around, slow down to almost stasis and spin around at extreme speed. These processes were dynamically mapped into various parameters within the pulsar synthesis model such as rate of emission, multiple sets of formant frequency, spatial position and amplitude. The audience was free to move around the venue and explore a variety of sound constellations in space.

In a broad perspective, the work attempted to capture an object of a pulsar as a synthetic entity no longer belonging to a singular discipline,

7] See https://www.youtube.com/watch?v=x5BQV3WX80E

but localised in the in-between zone of non-disciplinarity. Anne-Françoise Schmid has developed the concept of "integrative object" in order to capture exactly these types of objects. A reflection of these objects contributes to a more nuanced view on how sciences create something new and how innovation happens. According to Schmid, these objects "are not given, they are unknown, their dimensions are fragments of disciplines, but articulated in a heterogeneity such that milieu, a mid-site, is necessary to conceive and to receive them" (Schmid & Hatchuel, 2014 p. 136). Schmid proposes that we think of such an object as a multi-dimensional entity, each of whose dimensions is a different discipline or discourse. Since these dimensions can never be added to each other so as to synthesise a whole object, it is constituted ('made ready' for presentation) each time through the partial perspective and intentions of a given researcher. The richness of the model, and its application to contemporary objects, resides in this incomplete, problematic status that prevents integrative objects from ever being presented as a 'readymade'.

EXPECTATION IN SONIFICATION LISTENING: MOVEMENT SONIFICATION EXPECTATION MODEL (MOSEM) CASE STUDY

Joe Newbold

We can also see how musical elements of a sonification may impact not only one's experience of listening, but also an individual's behaviours. To examine how the use of musical structure within sonification impacts its use, the Movement Sonification Expectation Model (MoSEM) focused on musical expectation (Newbold, Gold, & Bianchi-Berthouze, 2020). MoSEM is used to examine how sonifications are experienced through the understanding of how real-time feedback can impact one's experience of one's own movement alongside people's implicit and embodied musical expectations. By basing these designs within the theory of embodied sonification cognition (Roddy & Furlong, 2015), sensory integration (Wolpert & Ghahramani, 2000) and musical expectation (Huron, 2008), an understanding of how one may interact with such sonifications can be gained. Exploring sonification in this way then extends our understanding of how musical structure within sonification can be used to impact people's interactions with it.

This programme of work used a simple implementation of expectation, altering the harmonic conclusion of a chord progression, to be complete or incomplete. This chord progression was then used as real-time feedback for a movement. When the individual reached the end of the movement they heard a final cadence. Either the music created by the sonification resolves (harmonically stable) at the end of the movement and they feel a sense of completeness and reward, or else the music created is incomplete (harmonically unstable) and hence they feel encouraged to continue their movement.

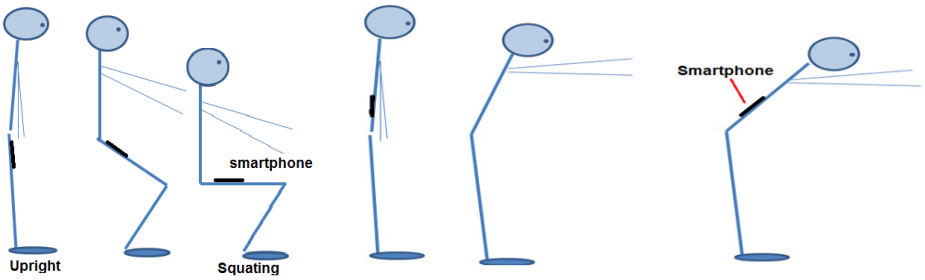

Figure 6: *The two movements first explored in the Movement Expectation Sonification Model (Adapted from Newbold (2019))*

This idea of expectation was first explored in two movements, the stretch forward and the squat down. In the first study, users moved more and for longer in musically unstable conditions, moreover users felt a greater sense of reward from the stable conditions. Length of sonification (i.e., how far into the movement the harmonic ending was heard), which was intended as a control parameter in the study to avoid learning effects, was shown to affect movement behaviour and perception of sound. The second study used the same design to investigate the squat down movement, a movement with more additional cues that the ending is coming and one that beginners commonly struggle with. It was expected that the same impacts would be seen, in terms of movement behaviour and perceptions. However, while participants did report feeling more motivated to continue their movement in unstable endings and felt they had achieved more in the stable ending, there were no significant effects on the movement behaviours, differing from the results of the first study. This again implies there are factors outside that of the musical expectation that impact the movement behaviours and perceptions.

This led to a study, presented in Newbold *et al*. (2020), examining the impact of different movement types was explored in depth. Based on the

previous studies , two movement types were defined as 1) open movements, where limited additional cues are indicating the end of the movement and 2) closed movement where strong additional cues are indicating the end of the movement. It was hypothesised that the presence of these cues would limit the impact of musical expectation on movement behaviour, as people are more reliant on the additional cues. These studies show the way the expectation of one's movements impact how musical expectation can be used to alter one's movement, either when it does not match the expected movement, or it disagrees with external cues to the end of the movement. From these observations, an extension of MoSEM was used to consider the impact of movement expectation.

From this understanding of the use of musical expectation within sonification and how it impacts one's perception of self, we can begin to unpack some of the potential benefits for using musical elements within sonification and how they are embodied by the individual. In Roddy's work for embodied sonification, this impact is further considered through the lens of embodied cognition (Roddy & Bridges, 2018). The Embodied Sonification Listening Model, (Roddy & Bridges, 2018), is used as a way to understand how people's embodied cognition of sound impacts how sonifications are perceived and the conceptual metaphors that are used when extracting meaning from them. By considering then some of the higher-level musical ideas that people may have embodied understandings of, we can start to explore how the experience of a sonification can be used to impact one's perception and behaviour.

BOWING THE RIVER/KNOWING THE RIVER

Bennett Hogg

The realisation that violins were once trees has been a conceptual stimulus for several projects for me over the past 30 years. As part of "Landscape Quartet"[8] I began by staging a number of encounters between violins and the natural environment. Dragging violins along paths, and listening — via microphones implanted in the instruments — to the resultant sounds, reveal paths less as fluid transitory spaces than as obstacle courses to be

8] An AHRC-funded environmental sound and music project 2012-14.

negotiated. The violin gets snagged on things, and comes into contact with a variety of materials, and monitoring the sounds produced on headphones sets up a complex relay of haptic and auditory experience remarkably akin to bowing. A direct connection between what I *feel*, in terms of tension in the strings and the textures of materials coming into contact with the violin and the sounds I *hear* coming from the violin through my headphones is quickly established in a manner akin to Michael Polanyi's example of the blind person's stick (Polanyi, 1966).

Soon after these experiments I brought violins into a river and developed an improvised musical practice where the water flows over the strings, effectively bowing them. The sound is closer to an ensemble of flutes than the expected sounds of a violin, and affords the player movement to or against the flow. This movement with different currents is an experience that is different to the dragging mentioned earlier, but which is also experienced as akin to bowing: the haptic "feel" and its resultant "sounding" seem to connect to the deeply incorporated knowledge of bowing for a violinist. In this situation the feedback between action and sound is augmented by a sense of "getting to know" the river itself: the different currents produce different sonic results depending on the actions of the "player". The net result is that the player, violin, and river act upon one another, the player acquiring knowledge about the river that would otherwise be inaccessible, a sonification of aspects of the river's behaviour in real time.

What this experience reveals for me is the inescapably tacit and embodied nature of sonic experience. According to Michael Polanyi tacit knowing is that which cannot be directly articulated in words and is often not even consciously "known". There are two interconnected states of tacit knowing, the proximal and the distal. Distal tacit knowledge is in play when I pick up a glass, proximal is in the series of unconscious muscular and haptic actions I enact to do so. Playing an instrument or singing depends, as do all actions, on a great deal of acquired and practised tacit knowing, and so it seems likely this might be transferable to novel situations. In one sense it's unsurprising that bowing should be associated with the sounding of a violin, yet the actions of dragging and submerging violins excludes the essential dimension of actual bowing, the movement and control of the right arm. As I see it, putting the familiar object (the violin) into an unfamiliar context brings this hidden tacit knowledge that underlies bowing into the open. It emerges as a tool through which to understand the river.

What is the nature of this "understanding", then? Polanyi exemplifies tacit knowing with the example of using a stick to explore a dark cave where "our awareness of [the stick's] impact on our hand is transformed into a sense of its point touching the objects we are exploring" so that meaning becomes "located at tip of the probe or stick to which we are attending" (Polanyi, 1966, p. 13). But Polanyi does not mention sound, despite his discussion of how people with visual disabilities use a similar tacit knowing to navigate the physical world. It is not only the haptic but also the auditory that is in play in the scanning and tapping of the stick, and something similar is in play with the violin on the forest path, or in the river. Quite specifically qualitative aspects of the environment are revealed through haptic and auditory experience, drawing on tacit knowing adapted and deployed without being consciously invoked: I became aware of the role played by my tacit knowledge of bowing in understanding the novel situation *when* I dragged it along a path, or immersed it into the river. Skills and knowledge otherwise concealed behind competencies emerge into conscious experience in the forest and river. Although this particular tacit knowledge results from my training as a violinist, all auditory and sonic experience is mediated like this.[9] This raises problems for sonification, but also opens a range of affordances and modes of engagement with sonification where we are actively exploring data, rather than representing it.

CONCLUSIONS

The creation and apprehension of meaningful sound is of key interest for those engaged with new musical practices, experimental interdisciplinary artwork, and sonification research. Above we have demonstrated points of entanglement and resistance within a trans-disciplinary research team who explore new sound experiences aiming to provoke co-constitution of sound and meaning. Rather than presenting a unified singular perspective, our work embodies theoretical considerations through diverse sonic practices. For sonification, this allows us to mobilise a more nuanced perspective that locates it as an activity outside the domain or purview of any specific disci-

9] Karin Bijsterveld distinguishes between these terms on the basis that not all sonic experiences are exclusively auditory. (Bijsterveld,2019).

plinary category: in the non-disciplinary middle. Meanwhile, terms such as sound art and computer music become necessary frameworks for capture and experience with the complex worldliness of data.

A central theme in our research is that sonification is a domain that needs to be redefined, a domain whose objects and methods are in the process of negotiation. Approaching these problems, creative practices offer an opportunity to ask not just what a sonification represents but what it does. How do we design sonifications that do things, in addition to, or other than, merely represent or directly 'perceptualise' data relations? The process of our work, of artwork, addresses quotidian needs: things like inciting curiosity, enhancing appreciation, facilitating imagination, giving joy, thrill, and creating the circumstances for conjecture, for guesswork and wild hypotheses. Sonification can become not merely a demonstration in sound, but an experience of or with sound, open to exploration, and critical reflection.

The set of practises and theoretical investigations proposed within this text forces us to question the role of data within the sonification process: *No datum is innocent*. In our practice, sonification examines data from a perspective *as experienced*, rather than assuming a non-existent ideal perspective and uncritically expecting that data broadcast at it will be received and understood. Listener-centred thinking thus informs the agential cuts we perform between what is studied and what is left unexamined. Further, such agential cuts guide our development of apparatuses, experimental systems for gathering and communication of information.

Sonification does not happen in a vacuum. Artistic practices with data sharpen our sensitivity to a broader ecology of display. Rather than asking *what is in the sonification*, we may ask w*hat the sonification is in*. Sound thus becomes entangled in not only the creation of meaning but also the creation of place. In our works, as discussed in this chapter, relations between place, periphery, and connections between them become compositional and material concerns that drive our research. New questions emerge: how can we design for juxtaposition, comparison, and manipulation? What materials and modalities will we develop to do so?

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BIOGRAPHIES

PAULO DE ASSIS

Paulo de Assis is an artist-researcher who combines musical practice (as a pianist of the classical repertoire and experimental performer), musicological expertise on 20th century Western art music, publishing experience (as author, editor, and translator), and wide-ranging transdisciplinary interests in contemporary philosophy and epistemology. His work over the last 12 years has been devoted to artistic research: he was the PI of an ERC grant (2013-2018), is the founder and Chair of the international conference series Deleuze and Artistic Research (DARE), and the editor of the book series Artistic Research at Rowman & Littlefield International (London/New York). He is regularly invited for keynote speeches, evaluation committees, review panels, PhD external examinations, masterclasses, and performances. He is affiliated to the Orpheus Research Centre in Music at the Orpheus Institute Ghent.

Between 2013 and 2018, he was the Principal Investigator of the European Research Council's project "Experimentation versus Interpretation: Exploring New Paths in Music Performance in the Twenty-First Century" (MusicExperiment21), hosted at the Orpheus Institute.

Previously, he studied piano with Vitaly Margulis and Michel Béroff at the Hochschule für Musik Freiburg i. Br. (Germany), and with Alexis Weissenberg in Verbier and Engelberg (Switzerland). He has a PhD on music analysis on the works of Luigi Nono (Aveiro/Venice/Salzburg, 1999–2004; supervised by Jürg Stenzl and advised by André Richard, João Pedro Oliveira and Wolfgang Motz). Between 2003 and 2005, following a commission by the Foundation Giorgio Cini (Venice) he completed Camillo Togni's unfinished piano concerto, which he also premiered at the theatre La Fenice in Venice (2006). Between 2009 and 2012 he was Research Fellow at the Centre for the Aesthetics and Sociology of Music (CESEM) at the Universidade Nova, in Lisbon.

In addition to fifteen edited volumes, he authored three monographs: "Logic of Experimentation: Rethinking Music Performance Through Artistic Research" (LUP, 2018), "Domani l'Aurora" (Olschki: Florence, 2004), and "Luigi Nonos Wende" (Wolke Verlag, 2006).

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Lucia D'Errico is an artist-researcher in the field of music, with a specific focus on performance, experimental practices, and transdisciplinarity. She performs on guitar and other plucked-stringed instruments, with a particular interest in Western notated art music of the twentieth and twenty-first centuries. From 2014 to 2018 she has been part of the research project MusicExperiment21, with which she has explored notions of experimentation in the performance of notated music in the Western tradition as an expansion of/in opposition to traditional practices of musical interpretation. She holds a PhD from the KU Leuven (docARTES programme) and a master's degree in English literature, and is also active as a graphic artist and video performer.

She has been a Doctoral Researcher in the ERC funded project MusicExperiment21 (2013–18), a Postdoc Fellow at the Orpheus Institute, and part of the coordinating team of the doctoral programme docARTES. Together with Paulo de Assis (Orpheus Institute) she is currently the co-editor of the book series Artistic Research at Rowman & Littlefield. Her monograph Powers of Divergence: An Experimental Approach to Music Performance (2018) is published by Leuven University Press.

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HANS-JÖRG RHEINBERGER

Born on 12th January, 1946, in Grabs (Switzerland). Study of philosophy and biology in Tübingen and Berlin, M.A. Philosophy (1973), degree in biology (1979) and doctorate as Dr. rer. nat. Free Univ. Berlin (1982), habilitation in molecular biology Free Univ. Berlin (1987), university lecturer Lübeck Univ. (1990), Associate Professor Salzburg Univ. (1994), Scientific Member (since

1996) and Director (since 1997) at the Max Planck Institute for the History of Science. «Honorarprofessor» (part-time prof.) TU Berlin for the history of science and technology (since 1998). Since 1998, member of the Berlin-Brandenburg Academy of Sciences and Humanities, since 2002 member of the German National Academy of Sciences Leopoldina, honorary doctorate of the ETH Swiss Federal Institute of Technology Zurich in 2002, recipient of the Cogito Prize (2006).

Hans-Jörg Rheinberger (born 12 January 1946) is an historian of science who comes from Liechtenstein. He was director of the Max Planck Institute for the History of Science in Berlin from 1997 to 2014. His focus areas within the history of science are the history and epistemology of the experiment, and further the history of molecular biology and protein biosynthesis. Additionally he writes and publicizes essays and poems.

Hans-Jörg Rheinberger was born in Grabs, Switzerland on 12 January 1946. He is the great-grandnephew of the composer Josef Rheinberger and grandchild of the artist and architect Egon Rheinberger. He studied philosophy, linguistics and biology at the University of Tübingen, the Free University of Berlin and the Technical University of Berlin. After completing his magister degree in philosophy (1973) he earned his doctorate (Dr. rer. nat.) in 1982 with a dissertation concerned with protein biosynthesis and habilitated 1987 in molecular biology at the FU Berlin.

From 1982 until 1990 Rheinberger worked as research assistant and research group superintendent at the Max Planck Institute for Molecular Genetics in Berlin-Dahlem. The following two years he spend as visiting professor at the universities of Salzburg and Innsbruck. After a sabbatical at Stanford University (1989/90 within the program «History of Science»), he was senior lecturer at the Institute for the History of Medicine and Science of the University of Lübeck from 1990 until 1994. Subsequently, Rheinberger was associate professor at the University of Salzburg until 1996.

Since 1996 Rheinberger is scientific member of the Max Planck Society and has been director at the Max Planck Institute for the History of Science from 1997 until 2014. Since then he is Emeritus scientific member of the institute. From 1993 until 1994 he has been fellow at the Berlin Institute for Advanced Study. In 2000 Rheinberger taught in the capacity of visiting scholar at the Collegium Helveticum of the Swiss Federal Institute of Technology in Zurich, 2006 at the Johns Hopkins University in Baltimore and 2016 at the Northwestern University in Evaston. He is honorary professor at the TU

Berlin, member of the Berlin-Brandenburg Academy of Sciences and Humanities, the Academy of Sciences Leopoldina, as well as the P.E.N.-Club Liechtenstein.

Rheinberger's primary field of activity within the history of science is the epistemological exploration of the experiment and of the research practices of the natural sciences with focus on the biology of the 19th and 20th century. In his studies he describes «experimental systems» to be the driving forces within the development of the modern natural sciences.[3] He developed his corpus of theoretical categories in dependence to the philosophy of Jacques Derrida and draws many inspirations form the works of Gaston Bachelard.

His main focus is aimed at the «structures of the experiment», which he deciphers by applying reconstructive analysis to the work in laboratories concerned with biological research. In contrast to the common self-image the researching science themselves hold Rheinberger shows that planning and control is less defining the every-day-business of research than improvisation and chance. According to Rheinberger promising «experimental systems» are distinguished by the amount of space the grant an «epistemic thing» to unfold itself. This is, as he puts it, imperative to «deal prodictively the unknown».

Awards and distinctions

- 1998: Honorary Professor at the Technischen Universität Berlin
- 2006: Honorary doctorate at the ETH Zürich
- 2006: cogito-award

PAMELA BURNARD

Pamela is Professor of Arts, Creativities and Education at the University of Cambridge, Faculty of Education, where she is manager of the Professional Doctorate programme with a mandate to develop best practice for training and education in innovative contemporary and traditional approaches to practice-based, participatory, and arts-based research.

She is a conservatoire-trained musician, an academic, researcher, Fellow of the Royal Society of Arts, Homerton College and The Arts in Society

Research Network. She is founder-convenor of CIAN, an intercultural arts network and the biennial international BIBACC conference). She is a re-elected board member of the National Association of Music in Higher Education (NAMHE), sits on the Creative Industries Federation HE/FE working party and was twice elected to the Board of Directors for ISME (2002-2006).

Known internationally for her research on diverse creativities in music of all kinds, with 17 books authored/co-authored/edited and 100 published articles and book chapters, her work addresses crucial issues concerning music (and the arts) in contemporary society. Professor Burnard is dedicated to advancing instrumental and vocal music teaching and learning, teaching music creatively and teaching for diverse musical creativities and their assessment. She is an ardent advocate of practice-based research, arts-informed and a/r/t/ographic inquiry. In this field her ambition is to re-envisage how musical creativities can be developed through innovative practices and key evaluation criteria.

ELENA UNGEHEUER

Elena Ungeheuer understands the humanities as a mediator between academic disciplines, arts, technologies and cultural practices. Her media-critical theory of action is anthropologically grounded and specialised in research questions around aesthetics, epistemology and the Now. After completing her doctorate at the University of Bonn (dissertation "Dissertation Wie die elektronische Musik, erfunden' wurde ... Quellenstudie zu Werner Meyer-Epplers Entwurf zwischen 1949 und 1953", Mainz: Schott 1992), she taught at the Robert Schumann Conservatory Düsseldorf, the Hochschule für Musik und Tanz Cologne and the Technical University of Berlin, among others. She is now Professor of Contemporary Music at the University of Würzburg/Germany).

JULIA BROOK

Julia Brook is an Assistant Professor of Music Education at Queen's University's Dan School of Drama and Music. Julia holds PhD in Education

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ANA LUCÍA FREGA

Ana Lucía Frega is a visiting professor at universities in Latin America, Europe and the USA. She travels continuously in her country and abroad giving courses and conferences; her articles – many of them refereed – appear in journals in Argentina, Australia, USA, Spain, England, Mexico, Switzerland, Brazil and Chile. His books, already 60, a permanent reference in his speciality, are published in his country and in Spain, and some of them have been translated into English. The Oxford Handbook in Philosophy of music education, edited in collaboration with Dr. W. Bowman (NY 2010) has a Spanish edition under the title: "El manual Oxford de Filosofía en educación musical, un compendio", co-authored with Pablo Martín Vicari, (Buenos Aires, November 2016). In 2019, the chapter dedicated to South America will be published in The Oxford Handbook of Assessment and Policy in music education, with the collaboration of Ramiro Limongi.

Former President of the ISME (International Society for Music Education) and current Honorary life member, she is an Individual Member of the International Music Council/UNESCO (excom member (1997/2003), and has been a Consultant of CARI (Argentinean Council of International Relations) for more than thirty years.

MARCEL COBUSSEN

Marcel Cobussen is Full Professor of Auditory Culture and Music Philosophy at Leiden University (the Netherlands) and the Orpheus Institute in Ghent (Belgium). He studied jazz piano at the Conservatory of Rotterdam

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Cobussen is author of several books, among them *The Field of Musical Improvisation* (LUP 2017), *Music and Ethics* (Ashgate 2012/Routledge 2017, co-author Nanette Nielsen), and *Thresholds. Rethinking Spirituality Through Music* (Ashgate 2008). He is editor of *The Bloomsbury Handbook of Sonic Methodologies* (Bloomsbury 2020, co-editor Michael Bull), *The Routledge Companion to Sounding Art* (Routledge 2016, co-editors Barry Truax and Vincent Meelberg) and *Resonanties. Verkenningen tussen kunsten en wetenschappen* (LUP 2011). He is editor-in-chief of the open access online *Journal of Sonic Studies* (www.sonicstudies.org). His PhD dissertation *Deconstruction in Music* (Erasmus University Rotterdam 2002) is presented as an online website located at www.deconstruction-in-music.com.

GERRIET K. SHARMA

Dipl. Media Arts, KHM Cologne. MA Composition / Computer Music Institute of Electronic Music and Acoustics Graz (IEM, AT). 2016 Dr.art.*Composing with Sculptural Sound Phenomena in Computer Music* at University of Music and Performing Arts Graz (KUG, AT).

2017-2018 Edgard Varèse guest professor (DAAD) at the electronic studio of theTechnical University Berlin (TU, DE). 2010-2015 Organisation, establishment and curatorship of *signale-graz*, an international concert series for electroacoustic music, algorithmic composition, radio art and performance. 2008 awarded with the German Sound Award, 2009 renowned Chargesheimer media-arts grant Cologne (DE).

Performances, exhibitions and concerts in Europe and abroad e.g. New York City Electroacoustic Festival (USA), Music Biennale Zagreb (HRV), ELIA-Art Schools NEU/NOW Festival (LTU), signale-graz (AT), ZKM Klangdome Karlsruhe (DE), Darmstaedter Summer Courses (DE).

2015-2017 cooperation *gleAM* with physicists of the department of Accelerator Physics at the Helmholtz-Centre Berlin (Research-Centre on complex material-systems and energy) re-interpreting the process of producing the brightest synthetic light on the planet as a sculptural process in 3D sound. 2015-2018 head of artistic research oft the project *Orchestrating Space by Icosahedral Loudspeaker* within the Austrian Programme for Arts-Based Research.

Since 2019 he is guest professor at IKG DART programme Madrid (SP) and is currently working on a book on *spatial practices in sound and music*, new compositions, VR-exhibitions and a lecture series.

PAUL VICKERS

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He works in the Department of Computer & Information Sciences in the Faculty of Engineering and Environment at Northumbria University. I also have an official university web page.

He is the author of How To Think Like A Programmer.

Prior to October 2001 he worked for 12 years in the School of Computing & Mathematical Sciences at Liverpool John Moores University.

Paul Vickers is a computer scientist. He is a chartered engineer. He teaches and researches in the computing domain where it intersects with creative digital media. For instance, he teaches introductory digital audio; he conducts research into how to use sound to communicate data and information (sonification) and he also looks at how the aesthetic properties of scientific artefacts affect how they may be used, that is, how people interact with them.

He collaborates with computer and network security specialists, with 3D modellers and digital special effects experts, with musicians, with artists, and, of course, with other computer scientists and engineers.

Paul Vickers also served as a board member of the International Community for Auditory Display 2004-2012, 2015-2018.

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