Deterritorialising the Research Space: Artistic Research, Embodied Knowledge, and the Academy

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Abstract
Artistic research has in recent years concerned itself with the nature of practice and how this may be framed as research. These debates may have blinded us to a more fundamental concern: territorial claims to the research space made by other forces. Competition for access to material and human resources, funds, space, and infrastructural support, among others, drive debates about the academic status of performance within higher education. The main objective of this article is to demonstrate how the ideological imbalances underpinning the concepts of artistic knowledge and research in Higher Education have contributed to this territorialization. In a milieu of overmanagement, these imbalances often go unquestioned largely because of the university’s ever-decreasing role in interrogating the agenda set by others who stand to benefit from it.

Keywords
artistic research, coauthored research, cognition, embodiment, higher education, knowledge, performance, performance as research, STEM/STEAM, tacit knowledge

Introduction
“‘Practice’ brings into view activities which are situated, corporeal, and shaped by habits without reflection.” (Thévenot, 2001, p. 56)

Although the definition of practice as research1 has been prioritized in university performance arts departments,2 this article suggests that, largely as a result, a more fundamental issue has been obscured, that is, the territorialization of the research space from other contexts and by other forces, who stand to profit from such prejudice. The objective of this article is to demonstrate how the ideological imbalances underpinning concepts such as artistic knowledge and research in Higher Education (henceforth, HE)3 have caused this. These imbalances have often gone unquestioned largely because of the university’s increasing reluctance to interrogate the agenda set by others who stand to benefit from it: for instance, the competition for ever-dwindling sources of research funding within the arts and humanities sectors in HE, as well as outside academia (Hewison, 2014), and in relation to the preferential treatment for science and engineering.

The wholesale adoption of a range of business models by HE institutions seems inexorable with the resultant reification/commodification of knowledge, an inevitable side effect. Some of these institutions use managerialist discourses which categorize students as clients or customers whose approach suggests that they are buying a degree; management expect a return on salary-investment in the form of subsidy-generating research outputs. Since the acquisition of new knowledge is at the foundation of research, artistic knowledge first requires a definition specific to the arts and its contextualization within the larger framework of the academy. As Thévenot’s epigraph suggests, this kind of knowledge reveals itself in and through specific embodied activities and eludes reflection in the moment. The methods and contexts of the social sciences, therefore, do not necessarily apply piecemeal to performance practice(s), which draw from the collective tacit knowledge of the participants and collaborators.

In this regard, Tom Barone highlights some problems that may arise when assessing artistic knowledge and its varied epistemological approaches from the perspective of the social sciences, where the arts may find themselves when valued not autonomously but as social catalysts. His comments reflect on the potential pitfalls of assessing research according to the criteria of a different disciplinary field:

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According to most arts-based researchers, judging their products as if they were indeed works of social science represents a profound category error. They would contend that such assessment malpractice may result in the dismissal of extraordinarily useful research as invalid and even dangerous. Arts-based research projects that serve the purpose of raising profound questions regarding the value of particular social and cultural practices may be unfairly and irrelevantly critiqued as failing to offer trustworthy knowledge. (Barone, 2008, p. 31)

One would not expect to build any kind of research enterprise on untrustworthy data. Although concerns about reliability and validity do not merely evaporate because the inquiry is located in a different field, what is at stake turns around the value and academic status of these kinds of knowledge. For instance, the varieties of know-how demonstrated in performance can be categorized as embodied, collective, indigenous, or tacit, to name a few. They remain intractable and hard to communicate because of their embodied origin. Since they often originate from real-time physical action, these types of nonpropositional knowledge resist easy translation into words:

Encoded in the large, highly evolved sensory and motor portions of the human brain is a billion years of experience about the nature of the world and how to survive in it. The deliberate process we call reasoning is, I believe, the thinnest veneer of human thought, effective only because it is supported by this much older and much more powerful, though usually unconscious, sensorimotor knowledge. We are all prodigious Olympians in perceptual and motor areas, so good that we make the difficult look easy. (Moravec, 1988, pp. 15-16)

The term “embodied knowledge” in this article refers to this knowledge, grounded in sensorimotor experience and action, accessible through the whole body and largely unconscious unless one deliberately directs effort toward observing how it is deployed in action. It escapes notice by operating under consciousness’ radar, so to speak. Resisting analysis, it remains distinct from the Cartesian division of mind and body and includes the metaphoric “heart” and spiritual concerns. Expressed through performers’ actions, the concept of embodied knowledge is related to the work of Mihály Csikszentmihályi (2008), who suggests that only through the involvement of the performer’s whole being does “flow” emerge.

Embodiment, expressed through various forms of nonpropositional knowledge, constitutes the realm of all performers: actors, dancers, mimes, and musicians, to name a few. Instead of addressing this point of departure, assessment of arts-based research often starts by imposing other perspectives on practice, as Barone argues.

We examine aspects of embodied knowledge as manifested in musical performance, especially as related to current models of mind. Our purpose is to demonstrate that ignoring these aspects does a disservice to knowledge per se and perpetuates the prejudices of scientific research to the detriment of the wide range of cognitive capabilities manifested in performance, associated research, and artistic endeavor generally.

Anna Feldman (2015) has articulated this prejudice from her own educational experience in the United States (where the STEAM movement is attempting to find a place for the arts within the predominantly technoscientific emphasis of Science, Technology, Engineering, and Mathematics [STEM]):

As an A student with a love of drawing and crafting, I spent my K–12 years being told art was a nice hobby. Art skills had nothing to do with science or math success, and engineering was something you went into only if you did well in math and science first.

Feldman’s experience is scientifically unjustifiable and contradicts many of Leonardo da Vinci’s scientific experiments. We critique this evident privileging of “scientific” knowledge as reflected in educational policy as a form of ideological apartheid. The favoring of data-driven factual approaches (as manifested in the STEM vs. arts-based division) is regarded as an artificial bifurcation which downgrades artistic research and practice and closes off potentially fruitful avenues of knowledge and research. It also contradicts the very nature of the word “university,” whose etymology derived and developed from the medieval Latin “universitatem” (nominaive “universitas”), “the whole, aggregate.” A stem with neither root nor flower is unsustainable.

In conclusion, we examine specific cases (orchestras, improvising musicians) in which various forms of embodied knowledge (tacit, distributed, etc.) are made manifest in performance and suggest some possible approaches to artistic research for students and supervisors in the field that take account of new models from the cognitive sciences.

Embodied Knowledge in Performance

Although a renewed interest in embodied cognition has its roots in the phenomenological project (Merleau-Ponty, 2002), current evidence from cognitive science suggests that ignoring aspects of embodiment works against a holistic understanding of the body’s formative role in cognitive processes. As Shaun Gallagher (2015) asserts,

To discount the actual physical body and its various properties and capabilities, or the physical and social environment (which is, at the same time, to discount evolution, development, brain plasticity, and the very real constraints of physical existence), is to offer an oversimplified, sanitised cartoon of cognition. (p. 100)

Gallagher challenges what he considers a reactionary trend in contemporary cognitive science, understood as “the multidisciplinary study of cognition and its role in intelligent agency” (Bechtel, Abrahamsen, & Graham, 1998, p. 90).
his critique of the cognitive scientist Alvin Goldman’s work, Gallagher (2015) states, “Rather than think that anything like anatomy, or sensory-motor contingencies, or environmental couplings should be relevant to cognition, he makes it clear that all important aspects of cognition can be found in the brain” (p. 98). Gallagher takes issue with neglect of the cogniser’s relationship to a given environment, so erasing (to all intents and purposes) the role of the body as an essential part of a unified system of relations between brain, body, and environment: in short, its Umwelt (von Uexküll, 2010).

Uexküll compared each Umwelt to an invisible bubble within which each species lives. The bubble is invisible precisely because it consists of relations, since all relations as such, in contrast to things which are related, are invisible. The objective meaning of each world and each part within each world depends less on physical being than it does on how the relations constituting the Umwelt intersect. (Deely, 2001, p. 130)

The Umwelt as “a network of relations” (Deely, 2001, p. 129) constitutes a central theoretical orientation for our argument, which plays out against the background of recent shifts in the theoretical foundations of cognitive science, as summarized by Bem and de Jong (2006, p. 206), in which they describe the key differences between three models of mind, namely, computationalism, connectionism, and dynamicism. Our concern is not the tripartite division, which facilitates our understanding of the processes, but their interdependence, their relationship with each other, and their own Umwelt.

Gallagher calls Goldman’s approach “body snatching” after the 1956 Hollywood B-movie Invasion of the Body Snatchers. The premise of the film is that emotionless alien invaders who have invaded the earth in the form of giant seed pods gradually replace their human counterparts, cloning them while they sleep. Gallagher’s critique of Goldman’s body snatching aims to reconnect the body to the environment in which it is embedded.

By concentrating on written language and invalidating other knowledge, HE apparently still values the kind of approaches Bem and de Jong (2006) broadly classify as computational. The most striking implication of this approach is its separation of a self-contained mind from an environmentally situated body (the classic Cartesian mind–body problem). It seems to us that contemporary models of mind (and, by extension, knowledge) such as dynamic systems theory7 are better suited to capturing the changes over time exemplified by various performances (musical, theatrical, etc) and further that these approaches acknowledge the interrelatedness of agents with the environments in which they operate. We will return to this point in the “Distributed Cognition in Performance” section.

**Scientific and Artistic Knowledge**

Iain McGilchrist (2009) has systematically documented the ascendancy of left over right hemisphere thought in the bipartite structure of our brain: “If one had to characterize the left hemisphere by reference to one governing principle it would be that of division” (p. 137). He offers a large body of evidence to demonstrate that we have prejudiced the workings of one side of our brain to the detriment of the other, and in so doing, we have prejudiced one sort of knowledge to the detriment of another. For instance, oral knowledge is no longer valued as much as written knowledge: “I think it is fair to say that in our schools the written word has triumphed over the spoken word. Literacy has had a far greater impact than oracy” (Rodenburg, 1993, p. 22).

The combination of both imbalance and division has over time led to a bifurcated educational system, with the arts and humanities opposed to the sciences. The theory of the Umwelt might be applied metaphorically to this current situation, where we may note that its “network of relations,” with all its potential for synergistic development, has been systemically destroyed through an emphasis on division and by the elevation of certain subject areas alongside a deliberate denigration of others.

In James Thurber’s (1940) fable, The Owl Who Was God, all the animals of the forest mistake the Owl’s apparent ability to see in the dark and his monosyllabic responses to their questions as uncommon wisdom and they declare him their God: he promptly leads them to their inadvertent communal suicide. The theme of simple minds being mistaken for deep wisdom also lies at the heart of Jerzy Kosinski’s (1970) book, Being There, filmed with Peter Sellers in 1979. There are many similar examples of the theme in theater, from King Lear’s Fool to Richard Foreman’s (2009) Idiot Savant. However, Thurber’s miniature morality tale succinctly describes, with the blackest humor, the tragedy which is the inevitable outcome for the foolishness of the animals’ premise of choice.

These themes are reflected by Ken Robinson’s account of how the educational system in the United Kingdom was derailed by politicians. He says8 that in 1987, Kenneth Baker9 hatched the idea of core and foundation subjects in an attempt to resolve a public debate with Margaret Thatcher. He came up with English, maths, and science as so-called core subjects. This division inevitably led to the current system of educational apartheid, adopted in many countries, which favors STEM over their arts and humanities counterparts. The acceptance of Baker’s division put a stop to an inclusive concept of university education developed over many centuries. The absurdity of this proposal is expressed clearly by Richard Schechner (Schechner, n.d.):

> Is the knowledge danced at a Candomblé terreiro to be given equal weight to the announcement recently by scientists working at CERN’s (Conseil Européen pour la Recherche Nucléaire) Large Hadron Collider near Geneva of the existence of the Higgs Boson, “a long sought particle that is a key to understanding why elementary particles have mass and indeed to the existence of diversity and life in the universe”? . . . Is the Large Hadron Collider’s work and discovery less mysterious than the trance dancing of Shango or the other orixa? In terms of people’s daily
lives, which has more effect? Do any of us here understand either process sufficiently to pass judgement?

For an understanding of the ensuing global acceptance and consequent ubiquity of the current apartheid of knowledge, we might turn to Bertolt Brecht: “When something seems ‘the most obvious thing in the world’ it means that any attempt to understand the world has been given up” (Brecht, 1964, p. 217).

The adoption of this educational hierarchy has led to myriad consequences for the last two generations, and any attempt to discuss artistic research and methodologies such as practice as research which does not acknowledge this false premise about knowledge, demonstrates at best a form of epistemological myopia. For the objectives of this article, any attempt to detract or reduce the research space must acknowledge the High Table of STEM at which the arts must expect at best to emulate Oliver Twist. And to “ask for more,” the arts must also follow the example of Eliza in Pygmalion (or My Fair Lady) and learn to speak the vocabulary of their superiors correctly. Education has absorbed or ameliorated a business-style language to reflect our market-driven obsession, which is still being fought against:

Today’s corporate vocabulary, freely and unthinkingly deployed by university leaders, was a product of the military. It was then adopted by the first modern big businesses, the railways, in the 19th century. In the 20th century, especially after 1945, it was embraced by business more generally before its unthinking assimilation by the public sector. . . . “Delivery” implies the end stage of a one-way transaction where something is made, marketed, sold and consumed by students. It fails to describe the potential richness of the interaction between tutor and tutee, which at its best can lead to unpredictable and unexpected outcomes.10

The vocabulary of research has largely been predicated on scientific research or more precisely an oversimplified concept thereof which depends upon the supremacy of propositional knowledge. Michael Polanyi was criticizing this long ago:

What most forcefully struck Michael Polanyi was that, however ill-fitted the modern scientific methodological model was to substantive inquiry in the fields of the arts, society, and the humanities, it did not in fact correspond even to the way in which modern physical scientists themselves actually went about their work. (Mead, 2007, p. 302)

This division of arts and sciences is also challenged by Mary Midgley’s (2001) understanding of the synergetic relationship between scientists and artists where both are unable to act without feeling. Indeed, a not inconsiderable number of scientists refuse to accept the capitalist Iron Curtain which apparently separates them from the arts: Charles Darwin11 and Albert Einstein12 (whose wife and mother, respectively, were accomplished pianists) are popularly quoted in their overt admiration for and dependence upon the arts. Contemporary representatives of this trend include the artist and scientist, professor Florian Dombois13 and Brian Cox.14

In the early 20th century, John Dewey (1958) stated, “The odd notion that an artist does not think and a scientific enquirer does nothing else is the result of converting a difference of tempo and emphasis into a difference in kind” (p. 15).

The segregation and marginalization of the arts and humanities through the ascendancy of STEM contradicts these facts and is of itself devoid of any scientific evidence but rather based on political rhetoric. One consequence is that students in the United Kingdom, like Feldman above, aiming for university education are encouraged to choose between allegedly “soft” and “hard” subjects at school and mixing between the two categories often “weakens” scientific applications.

Schools currently are not funded to provide subjects outside of the curriculum which is based on STEM, further depleting choice for young people. If the subjects are segregated by value, so is their language. Perhaps we should not be surprised that when an arts student wishes to enter a research-based degree, the language and methodology of science-based research, which that arts subject emulates or copies, appears foreign to the language of the student’s academic experience. If the language of research plays no part in its practice, how can we ensure any connection between practice and research? In medicine, this situation would simply be unimaginable, yet in the arts, it is commonplace.

The gravity of prejudice against the arts in the United Kingdom has led to the Warwick commission report of April, 2015. The Guardian newspaper began a related article (February 17, 2015) with “Creativity, culture and the arts are being systematically removed from the education system, with dramatic falls in the number of pupils taking GCSEs in design, drama and other craft-related subjects . . .” The commission itself is published with this headline:

The key message from this report is that the government and the cultural and creative industries need to take a united and coherent approach that guarantees equal access for everyone to a rich cultural education and the opportunity to live a creative life. There are barriers and inequalities in Britain today that prevent this from being a universal human right. This is bad for business and bad for society.15

Further statistical evidence for the decline of arts provision in U.K. education is provided by The Incorporated Society of Musicians: “Over the last 5 years there has been a decline of 14% in the number of arts GCSE entries from 720,438 in 2010, to 618,440 in 2015.”16 The currently proposed introduction of a compulsory Baccalaureate for secondary school children with five subject areas also threatens school support and provision for art, dance, design, drama,
music, or other creative subjects in the UK school timetable.

In the United Kingdom’s Research Excellence Framework 2014, the four panels’ reports represent very contrasted attitudes to coauthored and multiauthored submissions, as may be seen in the appendix. It is clear that as many as 10 coauthors are both common and welcomed in science and engineering submissions. In other subjects, there is little reference beyond occasional dual authorship. It would appear that there is disparity in ways of working, demonstrated here between STEM and non-STEM subjects. And yet we share with all our professional colleagues an understanding based on experience that all valued artistic work derives from collaboration and thrives when communities embrace it. Theatre, music, and dance are essentially collaborative art forms which depend upon conjoining not just those who share a single discipline but very often embrace multidisciplinarity, so including technological and scientific alongside artistic knowledge. The paradox of the norm of joint authorship as standard within the sciences while the arts reflect an “auteur” style of academic superiority, even within a collaborative practice, would seem to require addressing urgently. The coauthorship of this article represents our commitment to this perspective.

**Distributed Cognition in Performance**

Edwin Hutchins’ (1995) term, “socially distributed cognition” (p. 129), applies to ensemble settings. It reflects on aspects of embodied cognition within hypothetical Umwelts of musical and theatrical performance. Hutchins derives this approach from in-depth research into a U.S. Navy crew’s navigation of a large ship, in which the crew members successfully participate in a set of tasks depending on their rank and expertise in a hierarchy (the chain of command), each of whom engages with a small aspect of the very complex task of managing the big picture task of commanding the ship.

The unit of analysis for distributed cognition is a distributed cognitive system composed of a group of people interacting with external cognitive artifacts. Such a distributed system (e.g., the cockpit of a commercial airplane) can have cognitive properties that differ radically from the cognitive properties of the components, and these properties cannot be inferred from the properties of the components alone, no matter how much we know about the details of the properties of those components. (Zhang & Patel, 2006, p. 334)

The symphony orchestra is perhaps the most immediate musical exemplar of Hutchins’ concept, the division of labor of necessity in that particular Umwelt for the trivial reason that no single human being can play more than one instrument at once. The central Gestalt principle emerging from both these cases follows the precepts of one of its early pioneers, Max Wertheimer, who maintained that “the whole is greater than the sum of its parts and that the properties of the parts are governed by the laws of structure of the whole” (Kirsch, 2009, p. 378). This is mirrored in the theory of trans-disciplinarity (Niculescu, 2008), a simple example of which is a song: an autonomous form which is constituted by but greater than the sum of music with poetry. This paradox is apparent when assessing ensemble performances in music or theater, when individual marks are awarded which may not truly be weighed up in isolation from the standard of performance of the whole ensemble.

The abiding premise is that musical performance originates from embodied knowledge: the skill of the conductor exemplifies both the concept and communication of this knowledge. Musical performance is here understood as the sum of purposive actions of agents who work together with the common goal of realizing a musical task in the moment, all those who sing and play musical instruments. As Christopher Small (1998) maintains, these actions take place within specific environments, encompassing the entire setting and its agents—from front of house staff to the audience, sound engineers, promoters, entertainers, and their entourages—suggesting that these performances both enact and constitute specific social relationships: in short, by way of networks of relations or in Gallagher’s phrase as “environmental couplings.”

One musical example of such environmental couplings is found in the practicing block at conservatories, in which aspirant musicians hone their performance skills individually or in a team. “Practicing an instrument means assembling, storing, and constantly improving complex sensory-motor programs through prolonged and repeated execution of motor patterns under control monitored of [sic] the auditory system” (Altenmüller & Gruhn, 2002, p. 76). In addition to these sensory-motor and auditory skills, musical thought (Thompson & Ammirante, 2012) testifies to the high cognitive demands of musical performance, drawing on capacities such as decision making, pattern recognition, categorization, creativity, and, in some cases, creating real-time stylistically appropriate improvised material.

The tendency to view sensory-motor control as non-cognitive may be linked to the assumption that it is computationally and neurobiologically trivial. And yet the lesson of artificial intelligence and robotics is the reverse. Whilst programmes designed to calculate chess moves are capable of beating grand masters, when it comes to picking up, manipulating and accurately moving the pieces, the current state of the art cannot match the dexterity of a small child. Similarly, although we may tend to think of vision and visuo-motor control as something rather prosaic and straightforward, neuroscientists’ attempts to unravel the visual system of primates have revealed startling complexity, with correspondingly extensive neural tissue devoted to it. (Barton, 2007, p. 139)

Acquiring such know-how demands dedicated practice over a lengthy period of time, lastingly transforming brain interconnections and building a repertoire of sensory-motor
responses and actions (Sacks, 2011; Schlaug, 2015). This evidence from neuroscience speaks directly to Gallagher’s point regarding brain plasticity and the gradual transformation of the brain’s wiring in practicing, so that as musical expertise develops over time, this procedural memory takes over more and more as a parsimonious strategy, which draws from the wide range of tacit, embodied, and implicit types of knowledge under discussion. In the case of professional musicians, this change in responsibilities allows for the attainment of cognitive off-load so that the focus can turn to issues of expression, emotional content, and interpretative aspects in general (Cumming, 2000).

In real-time live performance, there is no opportunity to correct mistakes and cognitive resources must be deployed with speed and economy. Although structurally the brains of musicians and engineers are the same so that they share common cognitive strategies, their differences in wiring point to different domains of knowledge unfolding over different timescales. Although scientific research certainly involves teamwork (as evident in the tendency to accept and legitimate papers with many authors) and draws on socially distributed cognition through engagement with different Umwelts from molecular biology to astrophysics, the purposive actions of performers in many respects exemplify and bring to life Linda B. Smith’s (2005) embodiment hypothesis, “the idea that intelligence emerges in the interaction of an organism with an environment and as a result of sensory-motor activity” (p. 279).

L. B. Smith’s model of dynamical systems theory (DST) satisfies a number of the criteria of a general dynamicist model of cognition for considering musical ensembles through the lens of “the real time and inherently variable processes of perceiving and acting, the province of dynamic systems” (L. B. Smith, 2005, p. 279). DST is an appropriate model for understanding the grain of musical performance because it accounts for both the transient and larger scale aspects of experienced time, form in the moment and form evolving over time. Tom Davis (2011) describes music in terms that aptly captures its relation to time, its dynamic processual nature, and its creation of networks of relations between performers and listeners: “Music is inherently ephemeral and durational: a dynamic process that takes into account the performer/listener relationship and recognizes the act of participation in the creation of the aesthetic” (p. 123).

So it comes to be that the performer’s Umwelt, grounded in tacit knowledge and whose principal currency is sound, is bound to exist in a sometimes uneasy relationship (Coessens, Crispin, & Douglas, 2009) with the academic realm of mnemonic symbols such as writing, notation, and other discipline-specific languages and conventions. Following Polanyi (Allen & Reber, 1998), you might say that the ground of this tension rests on the difference between riding a bicycle and reading a manual on bicycle riding. Although Arthur Reber cautions us to be mindful of the interconnectedness of implicit and explicit knowledge and to avoid strict segregation of these concepts, he nonetheless acknowledges what he calls “the primacy of the implicit,” maintaining that “other things being equal, implicit learning is the default mode for the acquisition of complex information about the environment” (Reber, 1996, p. 25).

Translating into words the multimodal and ephemeral character of performance remains a daunting task, perhaps accounting for why relatively few performers are willing to devote time and energy to “writing up” such experience. This challenge is made more difficult by the privileging of explicit knowledge as written text within academia, so that current educational requirements demand that performers must demonstrate expertise not only in performance per se but also that they submit evidence of research skills in the form of a mini dissertation. Katherine Coessens and her colleagues (2009) underline the territorial nature of the operations of this politics of knowledge.

They write, “Research should be committed to making this enormous treasure of implicit knowledge and skills of artists as explicit as possible, bringing it out in the open so that it may be better understood and, hopefully, used by others.” (Coessens et al., 2009, p. 175) This is the first crucial step in reclaiming this contested space—one in which the arts and humanities compete with the sciences for funding, in which the ascendency of the sciences allows little room for the dimensions of expertise (Collins, 2013) demonstrated in and through performance.

**Conclusion: Epistemologies of Research**

This article brings to fruition a collaborative project across our individual disciplines, coauthored with deliberate intent to compare the states of play in our respective fields.

Although geographical distance and different institutional landscapes further separate us, we seem to be dealing with a similar set of problems, most acutely the devaluation of forms of knowledge associated with artistic practice in the broadest terms. Accordingly, we propose a recalibration of research practice and methodologies in relation to the sciences, the humanities, and the arts which more accurately reflect both their practice and synergistic relationship. Artificial or politically driven models which seek to separate knowledge from itself or prioritize one sort of knowledge over another should be seen as such. Related decisions made through competition for funding should be transparent. Understanding and cooperation between arts and sciences should be a declared goal. Early researchers in the arts should be clearly made aware of the ideological underpinnings of the system they have inherited, so as not to assume its orthodoxies at face value and to begin to forge research avenues as practitioners. Bridges need to be rebuilt between those for whom the current prejudices offer short-term benefits (and penalties) to address the current bifurcation and begin to move toward research
which reflects more truthfully (and inclusively) on current thought and practice.

Performance as research is able to draw from a wide variety of theoretical frameworks such as reflective and/or autoethnographic approaches (Chang, 2008; Schön, 1983), interpretative phenomenological analysis (J. A. Smith, Flowers, & Larkin, 2009), and sensory ethnography (Pink, 2009) and to deploy current directions from Gibsonian ecological psychology such as affordance theory (Clarke, 2005; Gibson, 1968, 1979; Greeno, 1994; Windsor, 2011; Windsor & de Bezenac, 2012). Although this is by no means an exhaustive list of possibilities, they share a grounding in various aspects of the links between embodiment and cognition and may provide the performer as researcher with some theoretical perspectives that serve to do justice to her experience as an embodied agent and the cognitive complexities of musical thought in action. These are the vantage points from which to begin reclaiming and deterritorialising the research space.

Appendix

Research Excellence Framework 2014

Summary of responses concerning multiple authorship

Report by Panel A (science and medicine)
- An increase in multi-authored works was noted, co-authorship claims were common issues, multi-authored outputs were common with up to six authors, and statements of author contributions welcomed.
- It was noted that big science “cannot result in anything but a plethora of multi-authored outputs, requiring more assessment time.”
- “Almost all of the outputs were multi-authored, reflecting multi-disciplinary teams often from a number of collaborating institutions.”

Report by Panel B (science and engineering)
- “Sub-panel 9 collected information about author contribution for outputs with more than 10 co-authors. With larger numbers of co-authors becoming more prevalent across many Main Panel B disciplines . . .” “Multi-author large-scale international collaborative papers in support of, for example, the Intergovernmental Panel on Climate Change process, were often highly cited.”
- “The number of international authors and co-authors on the outputs seen by the sub-panel was significant.”
- “Evidence for these changes is apparent in the number of multi-author papers from large teams, which in many cases resulted in high impact papers using a large number of complementary techniques.”
- “A growing fraction of experimental physics can only be carried out by large international teams, leading inevitably to publications with a large number of authors”
- “The sub-panel realized the need to put in place a system to ensure that all authors submitting an output with more than 10 authors specified their contribution in a rubric of up to 100 words.”

Report by Panel C (architecture, sport, politics, business, etc.)
- “Sub-panel 18 was also unusual in Main Panel C in that a number of institutions submitted coauthored papers more than once”

Report by Panel D (arts, history, religion, languages, etc.)
- “This range of quality was also visible in all the forms that outputs came in: monographs and other single- or dual-authored books”
- “Almost all requests for double-weighting were approved. Most accepted requests (but not all) were for single-authored monographs.”

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Notes
1. In the United Kingdom, there is a contested effort to unify or centralize its definition (Kershaw & Nicholson, 2011; Nelson, 2013). Evidence elsewhere suggests the discussion itself may be more fruitful than any enforced consensus (Schatzki, Knorr-Cetina, & Savigny, 2001; Caduff, Siegenthaler, & Wälchli, 2009; Coessens, Crispin, & Douglas, 2009).
2. This article primarily concerns musical performance but related considerations apply to research in higher education across the performing arts. The authors between them are experienced across genres within and between music and the related fields of theater and dance, not as separate entities but as synergistically conjoined disciplines. Mutatis mutandis, we suggest that examples from one specific discipline may apply to others.
3. Higher Education (HE), for the purposes of this article, is taken to represent all University education. Our collective experience is within HE in United Kingdom and South Africa as practitioner researchers.
4. As opposed to “knowing that” (the world of facts and figures), in Gilbert Ryle’s (1963) famous distinction.
5. In this regard, Bechtel, Abrahamsen, and Graham (1998) provide a historical overview of 20th century cognitive science and its gradual transition from an early “mind as computer” model to a more embodied perspective (pp. 1-104).

6. Although these models (or metaphors) of mind provide broad summaries of the major interpretive frameworks in cognitive science since the 1950s, their relevance to concepts of knowledge in HE may be minimized as long as it continues to valorize data presented in conventional written formats.

7. The most recent model of mind, dynamic systems theory (DST), has generated a vast literature, in which the work of Niklas Luhmann in art and the social sciences looms large.

8. Sir Ken Robinson’s Keynote Speech to the Music Manifesto State of Play Conference on the Second Day of the Event—January 17, 2007. Retrieved from http://www.brainhe.com/resources/documents/sir_ken_robinson_musicmanifestoconfkeynote07.pdf (accessed 25/10/2015).

9. British politician, b. 1934; served as Secretary for Education from 1986 to 1989 under Thatcher.

10. Geoffrey Channon, Deputy Chief Executive (academic), The Higher Education Academy, Letter to Times Higher Educational Supplement, December 8, 2011.

11. “My mind seems to have become a kind of machine for grinding general laws out of large collections of facts, but why this should have caused the atrophy of that part of the brain that alone on which the higher tastes depend, I cannot conceive. A man with a mind more highly organized or better constituted than mine would not, I suppose, have thus suffered, and if I had to live my life over again, I would have made a rule to read some poetry and listen to some music at least once every week; for perhaps the parts of my brain now atrophied would thus have been kept alive through use.” Darwin and Darwin (1908, p. 51)

12. Calaprice (2000, p. 245).

13. Founder of the “Y Institute for Transdisciplinarity” in Bern in 2006; in 2011, appointed as professor in the Department of Cultural Analysis at Zurich University of the Arts.

14. English physicist and professor of particle physics in the School of Physics and Astronomy at the University of Manchester. Cox was a keyboard player for the bands D:Ream and Dare.

15. Vikki Heywood CBE, Chairman of the Warwick Commission on the Future of Cultural Value http://www2.warwick.ac.uk/research/warwickcommission/futureculture/finalreport (accessed 6/5/2017)

16. http://www.culturallearningalliance.org.uk/news/arts-gcse-entries-2010-to-2015/ (accessed 23/10/2015).

17. We trust that the human aspects and the orchestral setting dispel any potential impressions of robot orchestras or performing monkeys, not to mention song and dance men or electronically enhanced one-man bands.

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