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# Sustainability Science with Ozzy Osbourne, Julia Roberts and Ai Weiwei

## The Potential of Arts-Based Research for Sustainable Development

Harald Heinrichs

*Transdisciplinary sustainability science is focussing on the integration of different forms of knowledge. Despite significant methodological diversity, the dominant mode of knowledge production, representation and communication in transdisciplinary research is, however, quite traditional: it is based on gathering data followed by a text-based scientific argumentation. In recent times, arts-based and sensory approaches in social and cultural sciences have been employed to avoid scientific reductionism and gain more holistic insights into human experiences. The potential of arts-based research for opening up new ways of knowledge production and communication in sustainability science should be seized.*

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### Sustainability Science and Arts-Based Research – A New “New Mode of Knowledge Production” and Communication?

“Gazing through the window at the world outside. Wondering will Mother Earth survive. Hoping that mankind will stop abusing her, sometime” (Osbourne et al. 1980). This poetic insight into global unsustainability and the radical demand to change course is expressed in only three lines at the beginning of the top 10 song *Dreamer* by rock star Ozzy Osbourne, “Godfather of Metal” and once the notorious front singer of the band Black Sabbath.

In the box office hit movie *Erin Brockovich*, Julia Roberts plays a working-class single parent fighting for justice against a big corporation that is polluting the groundwater of a small town. In an emotionally charged scene she exposes the ignorance, arrogance and irresponsibility of the company and its representatives and angrily demands:

“Oh see, now that pisses me off. First of all, since the demur we have more than 400 plaintiffs and (...) let’s be honest, we all know there are more out there. They may not be the most sophisticated people but they do know how to divide and 20 million Dollars isn’t shit when you split it between them. Second of all, these

people don’t dream about being rich. They dream about being able to watch their kids swim in a pool without worrying that they’ll have to have a hysterectomy at the age of twenty. Like Rosa Diaz, a client of ours. Or have their spine deteriorate, like Stan Blume, another client of ours. So before you come back here with another lame ass offer, I want you to think real hard about what your spine is worth, Mr. Walker. Or what you might expect someone to pay you for your uterus, Ms. Sanchez. Then you take out your calculator and you multiply that number by a hundred. Anything less than that is a waste of our time” (DeVito et al. 2000).

Ai Weiwei, China’s best known artist and political activist, regularly stages provocative multisensorial installations and performances that are openly critical of Chinese policies, often relating to (social) sustainability issues. Examples include the film projects *Beijing: The Second Ring* and *Beijing: The Third Ring* which document the capital city’s recurring massive traffic jams; or his installations of refugee life vests in wealthy Western cities, such as in the baroque pool at Vienna’s Belvedere Palace.

These three randomly selected examples serve to illustrate the potential of art in its different forms – whether music, film or the visual arts – to generate insights into sustainability that go beyond cognitive-based scientific understanding. Multisensorial approaches are able to concretize, contextualize and condense abstract topics and complex phenomena, providing a more comprehensive cognitive and intuitive understanding. In this article I claim that the employment of artistic and sensory methods has the potential to not only improve knowledge communication in the field of sustainability science, but also open up alternative ways for understanding and interpreting the world beyond the purely cognitive analysis and (re-)construction of phenomena. This claim is rooted in insights of neurobiology that human beings are not machines

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for the cognitive processing of abstract information, but complex beings driven by interrelated physiological, emotional and mental dynamics (Dimasio 2017). Artistic and sensory methods respect the integrity of the mind and the body by generating both cognitive and embodied knowledge, and their employment could enrich problem- and solution-oriented knowledge production in sustainability science and help make communication on (un)sustainable development appropriate to human cognitive and emotional predispositions. After over twenty years of debate and experience with the “new production of knowledge”-paradigm (Gibbons et al. 1994), the potential of arts-based sustainability science as a *new* new production of knowledge and communication should be more systematically explored and employed by transdisciplinary transformational sustainability science.

### Transdisciplinary Transformational Sustainability Science and Its Methodological Limits

From the 1960s onwards, the sociology of science and the sociology of knowledge have generated essential insights into the social construction of scientific knowledge (Knorr-Cetina 1984, Felt 1995, Latour 1998). Scientific knowledge is now understood to be influenced by a variety of cultural, historic and social conditions – thus making it always observer- and context-dependent. In this perspective, instead of claiming objectivity it is more appropriate to talk about situated, peer-related intersubjective validity. This deconstruction of the way knowledge is constructed in science calls into question the technocratic claims of a hierarchical relationship between scientific and non-scientific knowledge. Conceptual studies on folk wisdom and different types of knowledge – from science, through professional, to everyday knowledge – make the argument that a hierarchy of knowledge crowned by science is questionable if not inappropriate (Feyerabend 1976, Krimsky 1984, Luckmann 1981). Recognizing non-scientific knowledge claims strengthens methodological pluralism beyond positivist, quantitative-statistical notions of science. And indeed qualitative methods and participatory research approaches have gained in importance over the past decades in the social sciences (Lamnek 1996).

These debates and findings are documented in the influential publication *The New Production of Knowledge*, which advanced the paradigm of inter- and transdisciplinary *mode-2 science* as an al-

ternative to traditional, disciplinary-specific *mode-1 sciences* (Gibbons et al. 1994). It provided a forum for discourse on inter- and transdisciplinary approaches in environmental and sustainability science, helping legitimize a new way of doing science with stakeholders. These developments have led to transdisciplinary transformational sustainability science becoming an influential academic program, with significant funding structures, journals, academic positions, and uncountable projects worldwide. Even though understandings and models of transdisciplinary and transformational sustainability science differ slightly (Vilsmaier and Lang 2014), they share a basic logic of a post-positivist pluralism in understanding and shaping the world through different forms of knowledge and ideas. However, they should be about the participation of stakeholders from different academic and non-academic backgrounds in research and development processes; an openness to different kinds of knowledge claims, including indigenous and non-Western forms of knowledge, and normative preferences; and a solution orientation that goes beyond abstract analysis.

Transdisciplinary transformational sustainability science as practiced today has a methodological limit regarding its (re)production of knowledge claims whatsoever. In general, when it comes to established scientific procedures, norms and criteria, transdisciplinary transformational sustainability science appears little different than “normal science”. Wiek and Lang (2016, p. 33) argue that, “for transformational sustainability research (...) it is impor-

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*What if we see waste not just as something to be discarded but as an opportunity for creation? In her recent exhibition called WASTE, Icelandic artist Katrin Fridriks transforms leftovers of her work into works of art. Thus, she wants to contribute to rising awareness about the problem of overconsumption and waste management ...*

KATRIN FRIDRIKS: WASTE EDITION n 25 of 98 EX  
11,9 x 5,3 cm / 4,19 g – 2017  
© Cedric Pierre/Fridriks workshop 2017



tant to develop clear methodological guidelines (as it is important for any other field). Such guidelines provide researchers with instructions and quality criteria on how to conduct transformational sustainability research” and “the key condition is that the respective research activity adheres to quality criteria, including validity, reliability, saliency and so forth” and “transformational sustainability research develops evidence-supported solution options for sustainability problems. It shares with descriptive-analytical research the intention to provide credible knowledge, i. e., sufficient evidence for the effectiveness of the interventions”.

In this perspective transdisciplinary transformational sustainability science is about the scientific construction of evidence-based, solution-oriented knowledge by including stakeholder knowledge, values and normative preferences in a procedure guided by (traditional) scientific criteria. Thus, it is basically about gathering valid and reliable data generated by quantitative and qualitative methods in a participatory process; making a text-based scientific argumentation reflecting abstract, rational and cognitive procedures for transforming a situation or recommending a solution; and then communicating knowledge mainly through traditional academic publishing practices. In this sense, the limit of transdisciplinary transformational sustainability science today can be understood as a hesitation to transgress more radically methodological boundaries into alternative ways of experiencing the world and gaining insights and representations beyond cognitive (re-)construction and abstraction.

### Arts-Based and Sensory Research: Fundamentals and Examples

Arts-based research is a relatively new methodological paradigm in social and cultural sciences. It has its roots in early attempts of individual researchers at the fringes of their disciplines to avoid scientific reductionism by using methods of the creative arts in order to gain more holistic insights into human experiences and practices. Alongside individual outsider scientists who refused to play by the (academic) rules of the game and were brave enough to cross methodological boundaries, a second driver for arts-based research came from developments in arts therapy from the 1970s onwards (McNiff 1998). Findings in psychology and research on social work show that the creative arts – whether the visual arts, theatre, dance or fictional writing – have significant potential for initiating critical (self-)reflection and thus open up new perspectives in psychological and social therapies. In the 1990s arts-based research finally developed into its own branch of qualitative social science research (Baron and Eisner 2011). Since then, there has been an ongoing process of differentiation and professionalization, providing a theoretical foundation and a set of arts-based research methods that allow its use in a wide range of social science disciplines. Thus, arts-based research is now considered a creative research practice providing an alternative way of knowledge production and communication alongside traditional quantitative and qualitative scientific methodologies.

Arts-based research provides an alternative methodology in which scientific and artistic ways of sense-making converge. It is about aesthetic knowing and aesthetic practice. Aesthetic is used in this context in its basic meaning of sensory perception and intuition. Scientific inquiry can be enriched by artistic ways of knowing because they complement scientific procedures, which are generally abstract, reductive, cognitive, and verbalized (Leavy 2015, p. 20). Arts-based research

- recognizes that art has always been able to convey truth(s),
- recognizes that the use of the arts is critical in achieving self/other knowledge,
- values preverbal ways of knowing,
- includes multiple ways of knowing, such as sensory, kinesthetic and imaginary.

Thus, arts-based methods allow for a more holistic understanding as they reveal multiple meanings of phenomena and strengthen empathetic awareness-raising.

The relevance of exploring the multisensoriality of human experience to better understanding social practices is not only acknowledged by advocates of arts-based methods, but also by the proponents of sensory ethnography (Pink 2015). In sensory ethnography the systematic observation and consideration of the sensory dimensions of everyday life – sight, sound, smell, taste, touch and movement – are complemented by more traditional social scientific research such as quantitative and qualitative interviews. It is seen as a fruitful way to comprehensively understand contextualized individual behavior and social reality, such as walking down a noisy, polluted street, working on a construction site, reading a newspaper in a café, or sitting in a traffic jam. Arts-based, sensory research opens up an alternative way of understanding and interpreting reality.

However, one could argue that following Luhmann (1992, 1997), the process of functional differentiation into the distinct societal subsystems of science and the arts, each with its own specific logic, should not and cannot be reversed: science is science and the arts are arts. Science and the arts have different functions in society, and scientists and artists are embedded in different communicative contexts, each with a distinctive basic orientation towards sense-making. Even though the key argument in Luhmann’s theory – that modernity has led to a powerful differentiation of societal subsystems – is convincing, this does not mean that hybrid practices between science and arts that transgress system boundaries and merge system logics are not possible. In this regard the goal is not that all science should become artistic or that all arts should become scientific. But four decades of experimentation and evolution of arts-based research show that there are topics and questions where sciences can employ arts-based methods to better grasp the multisensorial reality of human beings, to generate new insights as well as to provide new options to inform public debate.

### Eight Fields of Arts-Based Research

Patricia Leavy, currently one of the leading figures in arts-based methods and methodology, differentiates eight fields of arts-based

research: narrative inquiry, fiction-based research, poetry, music, dance, theatre, film, and visual art. In her seminal book *Method Meets Art: Arts-Based Research Practice* (Leavy 2015), she provides arguments and examples for each of the eight fields and discusses their potential, challenges and the conditions for their use. Since this book represents the state of the art of arts-based research, I will briefly summarize key aspects and discuss their relevance for arts-based sustainability science.

Regarding fiction-based research, Leavy (2015, p. 55 f.) argues: “Fiction as a research practice, based on narrative inquiry, is well suited for portraying the complexity of lived experience because it allows for details, nuance, specificity, contexts, and texture; cultivating empathy and self-reflection through relatable characters; and disrupting dominant ideologies or stereotypes by showing and not telling”. The potential of fiction to create “thick descriptions” by means of composite characters and internal monologues to portray the messiness and contradictions of real-world experiences may provide new insights through a more empathetic understanding. At the same time, it fosters outreach beyond specialized scientific communities because novels serve as entertainment as well as (self-)reflection. The key difference to the work of a professional novelist is that the starting point in arts-based research is a scientific topic and question and that scientific literature, concepts, and empirical studies are consulted to create the work of fiction. Through a process of narrative inquiry and observation of interactions, a work of fiction is constructed, its format shaping the production of knowledge with creating distinct insights and communicative power. Given that sustainability challenges in general are characterized by complexity, uncertainty and ambiguity, fiction-based research may capture more comprehensively and in a more nuanced way the ethical and practical difficulties and messiness in individual and collective decision-making. Moreover, fiction-based research allows for temporal and spatial flexibility: sustainability fiction instead of science fiction.

Other arts-based methods go beyond textual approaches involving narratives, fiction or poetry to address other sensorial modes. Music, for example, makes use of sound, melody and rhythm, often combined with language, to bridge cognitive and emotional dimensions. This method has proven to be especially fruitful in projects with marginalized groups to gain insight into and increase self-awareness of situated circumstances as well as to express experiences, intuitions, emotions, and perceptions in a multisensorial way. Music history is full of examples of cultural criticism that

impacts people on both an intellectual and an emotional level. Experimenting with sounds and music in sustainability science may open up new ways to gain access to cognitive as well as intuitive perceptions and to express these insights in the language of music, which appeals to a deep part of human nature.

Theatre and film address even more senses because language, movement, visual impression, sound and tactile experience – imagined or real, such as in participatory theatre – are merged, thus bringing it closest to everyday multisensorial experience. And through dramaturgy and plot – in analogy to narrative inquiry and fiction-based research – insights can be created and communicated in an aesthetic manner. It is important to note that theatre and film, as the other arts-based methods, are understood in this context not only as tools for representation and the communication of social scientific insights but as a research approach in their own right. The process of creating a play based on a scientific topic or question using the investigation and interpretation of data and information from various sources is itself a form of research. It has the aim of discovering new insights and presenting them to the public in a different way than the usual academic research-and-publish format. Similar to literature or music, the history of theatre and film is full of examples of critical reflections on social, economic, or ecological real world challenges. In other words, arts-based sustainability science does not mean producing the next Hollywood blockbuster, but instead engaging with theatre and film to open up new ways to understand and communicate indi-

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... By inviting experts from different subsystems of society to reflect on her work, the artist Katrin Fridriks desires to break the art bubble and open a dialogue with society at large – and possibly inspire researchers to find solutions for the environmental issues featured in her work.

KATRIN FRIDRIKS: WASTE EDITION n2 of 98 EX  
13 x 9,8 cm / 26,34 g – 2017  
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vidual and collective struggles for sustainability. It is about making use of theatre and film as specific forms of artistic and sensory ways of knowing and expressing for sustainability scientific purposes.

The broad field of the visual arts – ranging from painting through installations, artistic film and digital media, to performances – provides a rich array of resources for arts-based research as well. The line between theatre and film and another arts-based method, visual art, is sometimes blurred, yet depending on the type of social scientific research being carried out and the specific question at hand the radical freedom of visual arts allows for the greatest creativity in the production and communication of insights in diverse sensorial ways. Even more than in the other arts-based research methods, it is not about instrumentalizing visual arts for the purpose of communicating sustainability issues to a broader public, which would be impossible or misleading in most cases anyway. It is more about learning from visual arts how (un)sustainable developments can be critically reflected on and interpreted in multisensorial ways, such as in Ai Weiwei's movie on Beijing's traffic.

In contrast to these arts-based methods, dance and movement are explicitly non-verbal. This does not hinder dance, especially modern dance, from providing opportunities to critically investigate and represent embodied knowledge, embodied habitus and cultural norms. Given that routines as embodied habitus and social practices are a key challenge to unsustainability, they could be explored and represented through bodily performances and transformations of bodily behavior in space and time. As with other arts-based methods, however, dance and movement are certainly not capable of contributing insights and delivering an aesthetic form of representation to every kind of research question in sustainability science.

### How to Select an Arts-Based Method

As in every good research practice, an arts-based method should be carefully selected with regard to the object of investigation. Along with quantitative and qualitative methods in the social sciences, arts-based methods provide new possibilities for producing and communicating knowledge. If a decision is made in favor of arts-based methods in a specific research project, then – in a second step – the most appropriate arts-based method must be carefully selected. However, the selection of a method is not usually determined by the objective and the research question. In research practice, it is the resources – time, skills and funding – that influence the selection of a method. This is especially true for the use of arts-based methods. Without doubt a professional novelist, filmmaker, theatre dramaturg, choreographer or visual artist with their training and talent will be better equipped to produce novels, films, plays, dance performance or paintings with higher aesthetic quality than a scientist. On the other hand, researchers with their training and expertise are better prepared to formulate research questions in their respective fields. There are basically two ways of dealing with the issue of competence and skills in arts-based research. Either the researcher collaborates with an inter-

**TABLE 1:** Comparison of arts-based methods with quantitative and qualitative methods (Leavy 2015, p. 294).

QUANTITATIVE	QUALITATIVE	ARTS-BASED
■ numbers	■ words	■ stories, images, sounds, scenes, other sensory inputs
■ data discovery	■ data collection	■ data or content generation
■ measurement	■ meaning	■ evocation
■ tabulating	■ writing	■ (re)presentation
■ value neutrality	■ value non-neutrality	■ political/emancipatory consciousness
■ reliability	■ process	■ authenticity
■ validity	■ interpretation	■ truthfulness
■ proof	■ proof	■ compelling/moving/aesthetic power
■ generalizability	■ transferability	■ resonance
■ disciplinarity	■ interdisciplinarity	■ transdisciplinarity

ested artist and their areas of expertise complement each other or the researcher develops skills and competences in a specific arts-based method, for example by learning creative writing techniques, and produces a scientific work of fiction. Both options certainly have advantages and disadvantages. Ultimately, what is most important is the recognition that arts-based research is a hybrid of the arts and science. Scientific research should be oriented towards artistic aesthetics because the goal is to produce and communicate knowledge in a multisensorial way.

By creatively employing artistic methods in social scientific inquiry, an alternative form of production of knowledge and communication has been developed over the past two decades. Arts-based research now provides a distinct methodological approach alongside traditional quantitative and qualitative methodologies (see table 1). With its potential to overcome blind spots in mainstream science, arts-based, sensory research should be considered as a “serious” complementary research approach in sustainability science.

## Towards Sensory Sustainability Science

Transdisciplinary transformational sustainability science has developed over the past twenty years into an innovative and vibrant academic field. It has repeatedly created new methodological approaches and continues to experiment with new ways in research and development. There is now a striking diversity of methods being employed in this field. Arts-based and sensory methodology and methods, however, are not routinely employed so far. Certainly, there are some interesting examples of and proposals for employing the arts in sustainability science. Some approaches discuss the potential of visual arts for sustainable development (though they fall short of seizing the potential of this methodology for sustainability science, see Kagan and Kirchberg 2008, Line-

berry and Wiek 2016); others include arts in transdisciplinarity projects (Collegium Helveticum<sup>1</sup>); and still others use sensory research for exploring and intervening in sustainability challenges (Pink 2008). Given the development of arts-based and sensory research over the past years and its promising application in a broad range of topics, the time is right to import these creative approaches proactively into transdisciplinary transformational sustainability science. Moreover, there is another window of opportunity for this perspective, because in addition to the development of arts-based research in the social sciences there is an intensifying debate in the arts community on artistic research as well (Carruthers 2008, Weintraub 2012, Institute for Artistic Research<sup>2</sup>, Zurich University of the Arts, Research Focus Transdisciplinarity<sup>3</sup>). Braiding these strands together, there seems to be significant potential especially for:

- establishing multisensorial research of (un-)sustainable practices,
- complementing quantitative and qualitative approaches to generate a more comprehensive understanding of social reality,
- enriching transdisciplinary research by improved communication with non-scientific stakeholders,
- improving public scholarship,
- innovating teaching by employing arts-based, sensory research methods.

In order to seize this potential a number of challenges need to be addressed:

- collaborating with artists from different artistic genres,
- developing competences by training for researchers in artistic and sensory methods,
- creating funding and institutional structures for arts-based, sensory sustainability research,
- critically reflecting and developing on transdisciplinary research combining arts-based, sensory research methods with conventional quantitative, qualitative and participatory methods.

Without any doubt these challenges are formidable. But the potential benefits are so significant that sustainability science should embrace arts-based methodology and methods. Employing arts-based methods, however, is not an end in itself. It is just a way to develop a more *sensory sustainability science* as a new way of producing and communicating knowledge on sustainable development. Engaging in this endeavor would fit into the history of continuous methodological innovation that has driven sustainability science over the past two decades and brought it to where it is today. And, hopefully, sensory sustainability science will help to dispel Ozzy Osbourne's concern about the future of Mother Earth.

1 <https://collegium.ethz.ch/forschung/transdisziplinaritaet>  
 2 [www.artistic-research.de](http://www.artistic-research.de)  
 3 <https://www.zhdk.ch/fspt>

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