

Book Chapter

Positioning the Arts in the Research Process: Perspectives from Higher Education

Liggett, S.

This book chapter was published in Earnshaw R., Liggett S., Excell P., Thalmann D. (eds) *'Technology, Design and the Arts - Opportunities and Challenges'*, pp 9-21, Springer Series on Cultural Computing. Published with the permission of Susan Liggett. The definitive version of this book chapter is available at: <https://library.oapen.org/handle/20.500.12657/39978>

Recommended citation:

Liggett S. (2020) 'Positioning the Arts in the Research Process: Perspectives from Higher Education'. In: Earnshaw R., Liggett S., Excell P., Thalmann D. (eds) *'Technology, Design and the Arts - Opportunities and Challenges'*, pp 9-21, Springer Series on Cultural Computing. Springer, Cham. Doi: [10.1007/978-3-030-42097-0_2](https://doi.org/10.1007/978-3-030-42097-0_2). Available at: <https://library.oapen.org/handle/20.500.12657/39978>

Chapter 2

Positioning the Arts in the Research Process: Perspectives from Higher Education



Susan Liggett

Abstract Research in the visual arts has contributed to the creation of environments that involve cross-disciplinary, multidisciplinary and interdisciplinary or transdisciplinary projects in departments within and across universities. An overview is provided of the historical context of doctoral awards in the arts with a definition of the terms practice-based, practice-led, and practice as research discussed. It articulates the challenges when acquiring explicit and exact knowledge alongside more subjective approaches that utilize tacit knowledge from artistic practice in research projects. Drawing on examples from art practice and doctoral students work, it analyzes objective, subjective, empirical, and hermeneutic paradigms, as described by Pierre Bourdieu, which can combine empirical approaches and individual understandings to re-enforce our understandings of the world.

Keywords Practice-based research · Practice-led research · Practice as research (PaR) creative arts Ph.D. · Collaboration · New technologies · Cross-disciplinary · Interdisciplinary

2.1 Introduction

Most researchers are aware of the need to position themselves in relation to other fields or disciplines in order to reveal the particular characteristics of their research findings. At the start of the research process, usually in writing the proposal, it can be challenging for artists when “oneself” often plays a significant role in the object of an enquiry. Research in the arts can be largely hermeneutic; that is the understanding and interpreting of it exposes the subjective limits of the artists’ ways of doing and seeing. It is this epistemological method of socially constructing meaning that gives the arts authority within a process of enquiry. However, it is all too easy for knowledge gained tacitly to be “overlooked because it is subsumed into the rational logic of discursive accounts of artistic production” [1]. The articulation of possibilities of artists for shaping consciousness and providing cultural capital can be difficult even

S. Liggett (✉)

Faculty of Art, Science and Technology, Wrexham Glyndŵr University, Wrexham, UK
e-mail: s.liggett@glyndwr.ac.uk

© The Author(s) 2020

R. Earnshaw et al. (eds.), *Technology, Design and the Arts—Opportunities and Challenges*, Springer Series on Cultural Computing, https://doi.org/10.1007/978-3-030-42097-0_2

for the more experienced academic. How can, as Barrett [1] says, “*the interplay of disparate areas of knowledge create new analogies, metaphors and models for understanding objects of enquiry*”?

Cross-disciplinary research involves viewing one discipline from the perspective of another. Interdisciplinary research involves integrating knowledge and methods from different disciplines that use a synthesis of approaches and multidisciplinary research that involves people from different disciplines working together, each drawing on their disciplinary knowledge. Transdisciplinary is close to multidisciplinary but it moves beyond a discipline taking more of a holistic approach creating a union of intellectual knowledge that goes beyond the disciplinary perspectives.

From experience of supervising doctoral students in the creative arts, I have noticed that an artist’s identity can be lost when research methods are combined from different disciplines, such as those from the social sciences where it is easier to articulate the possible new knowledge that may emerge from interviews or surveys, for example, than those resulting from the art practice. This is particularly evident when the student begins to scrutinize artwork in unfamiliar ways to seek validation from research communities in different disciplines. For example, at Wrexham Glyndŵr University all research students are required to present their work to the whole research community in an event called “Open House for Researchers”. Art students need support when combining different methodological paradigms in their research to bring fresh perspectives and new possibilities to problems. Artists in academia need to convince practitioners from other fields of enquiry within and beyond the university that they can reflect new objective realities that may be of benefit to society.

2.2 Artistic Research and the Academy

It is useful to decode some of the terminology surrounding the arts in academia to facilitate analysis of what artists do in a meaningful way. The word “practice” is used in the arts as it is in other professions to recognize knowledge production through action and doing. We can only fully understand what happens when we make artwork through the process of doing it, as opposed to purely thinking about it and the way artists create work goes beyond the physical activity to include influences, ideas, and critical reflections. The term practice refers to all artists work, but not all art practice can be termed research in an academic context. Despite the fact that most practice involves some form of research as part of the process, for example taking photographs in preparation for a painting, is not considered research in an academic context if the resulting work is not shared and its contributions to knowledge challenged. The theory/practice nexus helps define research in the arts by the linking of theory and practice through a method of intentionally investigating the process and outcomes informed by practice. The term “praxis” is often used to describe the making of artwork in a research context. Practice without the theory remains “practice” which can get very confusing for those involved in the arts, and also for those from the

outside looking in. However, the adoption of the term practice is clear and implies that the production of artworks is part of society and connected to lived experience rather than existing in an ethereal world empty of everyday concerns and therefore unimportant and insignificant. Integrating the arts in society forces us to articulate how the purpose and meaning of art is constructed, challenged and its investments accounted for.

Bringing the arts into academia gives it status and legitimizes it as a profession. In the UK the first training in the arts was available in 1768 when The Royal Academy of Arts opened; art schools were further developed in the nineteenth century and re-designed in post-war Britain under the influence of the Bauhaus [2]. In 1974 in the UK the National Council for Diplomas in Art and Design was merged into the Council for National Academic Awards (CNA) allowing Polytechnics with art departments to issue honors degrees for the first time. Further academization of the arts happened in 1992 with former polytechnics becoming Universities [3]. This put the arts on an equal footing with other subject areas historically considered more academic. With the home of the Art School now residing within Universities, artists have the opportunity to study for research degrees and there has been an exponential growth in uptake of doctorates in the arts over the last decade. Between 1986 and 1995, 181 students received research degrees in the arts subjects in the UK [4] and in 2016/17 alone, 880 students were awarded research degrees in art and design (HESA) [5].

The Ph.D. is now a standard requirement for teaching in an art department in a UK University and with this, it brings pressure on academics to compete for research funding in ways comparable to other academic subjects. With the arts being newcomers to universities system, ontological truth claims between the Realist¹ worldview and the Constructivist² world view are challenged with artists claiming that often regulatory frameworks within Universities consist of a strong Realist components with the use of the terms “question” and “answer” rather than the terms “issue” and “response”.

If the arts do indeed operate within a new paradigm they should be able to say: our ontological position is this, our epistemological position is this, our methodological position is this and all of these are coherent and this is why we warrant special different conditions to the ones that have formally been recognized [6].

Art departments have had to fight hard to ensure that systems were set up to support their students in practice-based research. Between 2000 and 2006 debate surrounding the doctorate in the arts was highlighted at the University of Hertfordshire’s annual conferences on the foundations of practice-based research which published Working Papers on Art and Design [7]. Particular concern regarding academic standards being imposed on art practices and artistic research were further addressed internationally [8] with European League for the Institute of the Arts (ELIA), with the creation of an

¹Realist view here refers to the idea that reality exists independently of observers and their thoughts, feelings, intuitions, and opinions.

²Constructivism here is recognition that reality human construct that interacts with our experience in the real world.

advocacy network to address issues facing the arts in higher education. Its aim is to collaborate to create networks that strengthen, support, promote, and encourage arts institutions across Europe. A specific working group to enhance doctoral research in the arts known as the SHARE³ network holds annual events to raise the platform for research in the arts.

2.3 Knowledge Production and Practice-Based/Practice-Led Research

Practice-based, practice-led, practice as research (PaR), artistic research, and arts-based research are all widespread terms in creative arts research which are not interchangeable and exhibit qualities that need to be understood regarding the nature of the art practice and the resulting production of knowledge. Different perspectives on these can be explored through the writings of Candy and Desmond [9, 10], Barratt and Bolt [11], Grey and Malins [12], Macleod and Holdridge [13], Briggs and Karlsson [14], Nelson [15].

In summary, *“Practice-based Research is an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice”*. By contrast *“Practice-led Research is concerned with the nature of practice and leads to new knowledge that has operational significance for that practice”* [16]. Practice as research (PaR) distinguishes artist-scholars in a university context from professional practice. Nelson [15] describes PaR as a research project in which practice is a key method of enquiry where the practice is submitted as evidence of a research enquiry. An important difference between the personal or professional artist and artwork in the doctoral research is the form the knowledge produced takes. For example, *“understandings about audience experience, taxonomies, models of collaboration and the artwork themselves”* [17]. This is not to be confused with arts-based research which is another term used principally in the fields of education where it is used to understand education through arts-based concepts, techniques, and practice [18]. A practice-based Ph.D. includes creative works that arise from the research process as part of the submission.

Despite the literature available on different perspectives on practice-based research, there is still not an “an integrated discourse on the place of practice-based research in Ph.D. programmes” [17]. The definition of research within the university is clear and Wrexham Glyndwr University had articulated it as a *“process of investigation leading to new insights collectively shared”* [19]. Two expectations of new knowledge resulting from by research are firstly, that it has to be open to being

³SHARE stands for Step-change for Higher Arts Research and Education and was an international networking project, comprising 39 partners working together on enhancing the “3rd cycle” of arts research and education. It created a Europe-wide exchange framework for the widely different experiences, practices and ideas that make up the lively domain of artistic and cultural research. [<https://www.elia-artschools.org/activities/artistic-research/share>].

challenged and, secondly, that it has to be verified. Creative arts research outcomes and methodologies are sometimes difficult to understand and quantify in terms of traditional scholarship, which can lead to a devaluing of studio-based enquiry [20].

It is only when artist researchers, with their practice, firmly root themselves in their discipline, and position themselves in relation to other disciplines, that they can then truly reveal the characteristics particular to their research. Students enrolled on Ph.D. programmes are frequently expected to present their research to the wider community of students from other disciplines. This can have a “de-centering” effect on the newly enrolled student. On writing the research proposal it can, initially, be confusing if “oneself” plays a significant role in the object of an enquiry. This has also presented challenges to supervisors at Wrexham Glyndwr University guiding students in cross-disciplinary teams.

2.4 Cross-Disciplinary, Interdisciplinary, and Multidisciplinary Collaborative Research in Doctoral Studies

Bourdieu notes that on-going privileges of positivistic and instrumentalist approaches to research persist [20, p. 4]. The researchers in the case studies described have experienced a de-stabilizing effect on their confidence when writing proposals. A lack of experience sometimes leads to an over reliance on scientific or social science paradigms to justify “fuzzy” concepts.

The following examples demonstrate a research project conducted by Liggett and two that she has supervised to illustrate how these challenges have been overcome by researchers having a clear understanding of themselves and their motivations for the research. They all adopt a mixed-method approach and involve interdisciplinary or cross-disciplinary collaborations through the research design of the supervisory teams comprising academics from different subject areas. Supervisors recognized the importance of openness and a willingness to seek the advice of other academics to ensure the support was provided for cross-disciplinary dialogues in the following projects.

Firstly, Heald and Liggett undertook a multidisciplinary research project in collaboration with a Consultant psychiatrist and Professor of social psychiatry both from Bangor University titled *In-between-ness: using art to capture a sense of self during anti-depressant treatment* [21]. The rationale for the research was to try and understand how reality is constructed and whether this process can be manipulated with medication and also, to determine the implications for the authenticity of “self” for someone undergoing treatment for depression. The artists worked one-to-one with four participants over 6 weeks. Service users were issued with a video camera and asked to film on a weekly basis with visual prompts introduced as a stimulus. The process allowed participants to explore how views of themselves changed as they recovered from depression. Interviews and psychometric tests were carried

out before, during and after their treatment, in collaboration with the trial psychiatrist. The findings revealed that the interview transcripts recorded positive benefits to participants in terms of increased responsiveness to sensations, their surrounding environment, the quality of their feelings and their sense of “self” when engaged in this creative process. The psychometric tests, by contrast, evidenced no change in data.

The artists’ practice acted as a personal rationale in the approach to the research and initial research questions stemmed from the issues arising from their work.

These questions were recognized by the medical professionals and validated by the psychiatrists in the collaboration. This external rationale then drove the art practice as the artists made new artworks in response to the situations and experiences they encountered on their research journey. Figure 2.1 shows Liggett and Heald’s film work made in response to feeling “in-between” working as artists at a psychiatric unit. The artwork cannot be detached from the research project, and the artwork produced by participants was seen as integral to the project and exhibited alongside the artists’ work in the final exhibition concluding the project.

Secondly, Braisby’s Ph.D. project, which was practice-led and interdisciplinary [22], identified how galvanic processes can enhance the work of the artist printmakers and act to reverse the current decline in the teaching of intaglio etching. His work involved making artworks to gain a deeper understanding of the chemical and electrochemical processes involved. Scientific advice was sought from academics in the chemistry department and workshops were designed for artists to learn about



Fig. 2.1 Paper Interior, film duration 9' 20'', Heald and Liggett (2013). Photo credit Karen Heald. Copyright © K. Heald, 2019

the processes. The learning generated from the workshops was analyzed using Soft Systems Methodology (SSM) developed by Checkland [23]. It involved drawing a rich picture; a process that uses images and words drawn out on a large sheet of paper to describe the problem situation. Exposing the richness of the data helped in the framing and re-framing of the situation and generated new ideas and insights into the problem situation.

This rich picture process identified two aspects to the research question. The first relates to the research into the galvanic techniques and the second to their application as an artistic medium. The first is a well-defined problem that can be addressed through a scientific problem-solving experimental approach under the rubric of the “hard systems” [23]. The second part of the question needed to engage with messy, real-world issues. This world was engaged through: workshops (electro-etching), presentations (using the rich picture), collaborative work (other artists), and interviews.

The research strategy developed was based on a hybrid model of both the practice-based and practice-led methods [16]. The quantitative (practice-led) research collected data by experimentation and developed a new process to produce the artwork. The qualitative data (practice based) developed new understandings of the process. Figure 2.2 shows experiments in enameling or plating etching plates with a different metal in its impact on the practice of etching was evident in the creation of the



Fig. 2.2 Don Braisby, Experimenting with Enamelling (2019) 23 × 29 cm Copyright © D. Braisby 2019, reproduced by permission

artwork produced. The research required the researcher to move out of his artistic environment and engage with chemists, scientists, and physicists.

Finally, Wyatt's Ph.D. cross-disciplinary project [24] investigated how people living with dementia engage with, and experience, painting whilst working alongside an artist-researcher. Arts-based inquiry⁴ was adopted as a method creating a body of paintings to provide insights into different experiences and forms of engagement when painting. Figure 2.3 is an example of a painting Wyatt made in response to the memory of a beach in Wales. These were used to inform a qualitative study that used social science methods of interviews observations and video recordings. The use of both arts and social science research methods presented a challenge initially but the research demonstrated how an artists' perspectives can contribute to the field of health by promoting new approaches to research.

In all three projects, the subjective strength of their work has grown out of the positioning of the researchers in their studies by a self-scrutinizing process that is, perhaps, unfamiliar in other disciplines. This process is necessary to prevent the artist becoming a "pseudo-scientist", having a "split personality" or being over narcissistic.

The in-between-ness project involved a collaborative multi-method pluralistic approach to the research questions and monthly dialogues within the research team. Initially, the challenge for the artists was to emphasize their individual practice in the research design. Ostensibly their role could be seen to be purely one of facilitator



Fig. 2.3 Megan Wyatt, Whistling Sands (my Favourite Beach), 2017 Copyright © M. Wyatt 2019, reproduced by permission

⁴Arts-based inquiry uses artistic expression as data for inquiry.

for the participants. In reality, it was much more than this. The collaborative process offered the artists a new method of challenging ideas that grew out of their practice. It wasn't until each researcher's motivations and position within the research process was established that a meaningful collaboration existed where all academics equally owned the research.

In the "In-between-ness" project with mental health participants and Wyatt's project involving people living with dementia the relationship between the researcher and the participants is an intrinsic aspect of the research. When viewing and making artwork, it is not merely the deciphering of reality which occurs, because new understandings emerge, and connections and explanations are exposed to both viewer and artist. Viewing and creating artwork can transform understanding to inform and generate new and valid knowledge [25]. Practice-based research is used in these projects as it allows for new outcomes which do not oppose a verbal explanation [26].

In Braisby's research involving galvanic etching, the known data from multiple points of view is gathered together and made visible. This data enabled the researcher to identify hidden links and make new connections and insights with their personal practice to facilitate the refinement of the research. This process exposed the richness of the data that emerged from the research and helped in re-framing the situation. This firmly positioned the researcher in this research field, and this practice generated new ideas and insights into the problem of why electro-etching has never become mainstream in institutes of art.

2.5 Art, Collaboration, and Technology

The use of art as tool for social change is gaining traction with advocates such as Alistair Hudson, the director of the Whitworth and Manchester Art Gallery since 2017, which promotes projects that have a real impact on people's lives. People need to value art so that they no longer say that they need a hospital rather than a gallery. The mission is to get people to understand that the two are not mutually exclusive and that people need both hospitals and art galleries [27].

According to the World Economic Forum, creativity is a key skill needed for future employment [28]. The Fourth Industrial Revolution [29] brings advances in technology that are challenging traditional jobs in the shift from the human to the digital. Robots and artificial intelligence (AI) are more efficient in certain areas than humans in the workplace. In the future, 47% of work may be lost to automation processes [30]. Mobile Internet and cloud technologies are impacting society. However, robots do not yet possess innate creativity (though software may soon be able to emulate some of its characteristics) so business leaders, educators, and governments still recognize the importance of human creativity.

Artists are increasingly collaborating with scientists and technologists in a multitude of ways that extend the boundaries of knowledge. For example, The Foundation for Art and Creative Technology (FACT) a leading UK visual arts organization has developed a number of projects promoting creative media and creative technology.

In 2019, it worked with the NHS, BBC, charities, and businesses in a project called “The Future World of Work” to provide an arts-led critique of innovation and technology, reimagining work in relation to gender, the gig economy and careers advice for uncertain times [30]. It worked with a number of artists who undertook workplace artist residencies who make artwork in response to their experiences culminating in an exhibition at FACT’s gallery [31].

Artists can provide useful critiques of society and can raise awareness of societal issues in various ways. The German artist and filmmaker Hito Steyerl has an interest in how the media, technology, and the global circulation of images impact society.

We live in a world that is already deeply edited and PhotoShopped. It is cut and pasted, and the people who know these practices because they work with them everyday – let’s call them artists – they understand the importance of these practices, not only understanding the world but also making it as it is [32].

Steyerl’s video installation *Factory of the Sun* examines the desires and threats of image circulation and the possibilities of shared resistance when surveillance is everywhere in our increasingly virtual world. *Factory of the Sun* tells the surreal story of workers whose forced moves in a motion capture studio are turned into artificial sunshine [33, 34].

2.6 Conclusions

The artists’ subjective and hermeneutic approaches offer new perspectives to research but there are challenges in articulating the unique qualities their work offers. Cross-disciplinary supervisory teams at Wrexham Glyndwr University have enabled critical dialogues for the students and supervisors to set out clearly and test the concise methodological approaches to their work. The unpredictability of artistic research has brought challenges, particularly when adopting a less prescriptive approach to outputs in the research proposal. The researchers here often found it easier to talk about the results of their interviews, or scientific experiments, than articulating the impact of their practice within their projects when applying a multi-method approach to research questions. In the In-between-ness project, for example, the therapeutic effect of the project was not the primary measuring stick for assessing the success of their work.

According to Polanyi (1962), aesthetic insights “*motivates the early stages of much scientific research*” [35]. Mixed disciplinary supervisory teams at Wrexham Glyndwr University have forced us to challenge perceptions of ourselves as artists and consequently enriched our projects. We often cannot predict what others will learn from our work, but it is the process of learning and identifying one’s individual position in the research process that will allow for new avenues of knowledge to emerge. The arts can be a powerful tool for social change, for wellbeing and for connecting people. As Candy states in the summary of her new book, there is a

considerable amount we can learn from paying close attention to the world and it takes a creative mind to do this with insight [36].

References

1. Barrett, E., Bolt, B.: Practice as Research, Approaches to Creative Arts Enquiry, pp. 4–6. Bloomsbury Publishing Plc, London (2007)
2. Elkins, J.: Why Art Cannot Be Taught, pp. 37–39. University of Illinois Press, USA (2001)
3. Davis, M.C.: The Council for National Academic Awards 1964–74: A Study of A Validating Agency. Loughborough University, UK (1979). Available online: https://en.m.wikipedia.org/wiki/Council_for_National_Academic_Awards. Accessed April 2019
4. Elkins, J., Motram, J.: cited in Artists with PhD's, p. 13. New Academia Publishing, Washington, DC, USA (2009)
5. HESA. Available online: <https://www.hesa.ac.uk/news/11-01-2018/sfr247-higher-education-student-statistics/qualifications>
6. Biggs, M., Buchler, D., Nelson, S.: Social Dynamics of Knowledge Communication Within Higher Education: The Case of An Art-Science Collaboration (2011). Available online: <https://uhra.herts.ac.uk/bitstream/handle/2299/7582/905511.pdf?sequence=1>. Accessed March 2019
7. Biggs, M., et al.: Editorial: the foundations of practice-based research, vol. 1. Working Papers in Art & Design (2000). Available online: <https://uhra.herts.ac.uk/bitstream/handle/2299/7325/101063.pdf?sequence=1>. Accessed April 2019
8. Wilson, M., Van Ruiten, S.: ELIA SHARE (2013). Available at: <https://www.elia-artschools.org/activities/artistic-research/share>. Accessed May 2019
9. Candy, L.: Research and creative practice. In: Candy, L., Edmonds, E.A. (eds.) Interacting: Art Research and the Creative Practitioner, Chap. 2, pp. 24–59. Libri Publishing Ltd, Farringdon, UK (2011)
10. Candy, L., Edmonds, E.: Practice Based Research in the Creative Arts: Foundations and Futures from the Front Line. Leonardo **51**(1), 63–69 (2016)
11. Barrett, E., Bolt, B.: Practice as Research, Approaches to Creative Arts Enquiry. Bloomsbury Publishing Plc, London, UK (2007)
12. Grey, C., Malins, J.: Visualising Research: A Guide to the Research Process in Art and Design. Ashgate Publishing Ltd, Farnham, UK (2004)
13. Macleod, K., Holdridge, L.: Thinking Through Art: Reflections on Art as Research. Routledge, Abingdon, UK (2006)
14. Biggs, M., Karlsson, H. (eds.): The Routledge Companion to Research in the Arts. Routledge, Abingdon, UK (2011)
15. Nelson, R.: Practice as Research in the Arts. Palgrave MacMillan, London, UK (2013)
16. Candy, L.: Practice Based Research: A guide (2006). Available: <http://www.creativityandcognition.com/resources/PBR%20Guide-1.1-2006.pdf>. Accessed April 2019
17. Candy, L., Edmonds, E.: Practice Based Research in the Creative Arts: Foundations and Futures from the Front Line. Leonardo, vol. 51, Issue 1, February, pp 63–69 (2016)
18. Smithbell, P.: Arts-Based Research in Education: A Review. The Qualitative Report, **15**(6), 1597–1601 (2010). Available online: <http://nsuworks.nova.edu/tqr/vol15/iss6/14>. Accessed May 2019
19. Wrexham Glyndŵr University Vision & Strategy to 2025: Inspiring, Transforming, Enabling and Sustaining. Definition of Research taken from Vision and Strategy to 2025 (2018). Available online: <https://www.glyndwr.ac.uk/en/media/156309%20Strategy%20English.pdf>. Accessed April 2019
20. Barrett, E., Bolt, B.: Practice as Research, Approaches to Creative Arts Enquiry, pp. 1–13. Bloomsbury Publishing Plc, London, UK (2007)

21. Liggett, S., Heald, K.: In-between-ness: Using art to capture changes to the self during antidepressant treatment (2013). Available online: <http://in-between-ness.co.uk/about/synopsis-of-research-project/>. Accessed May 2019
22. Braisby, D.: How Can the Development and Use of Galvanic Etching Techniques Enhance the Work of the Artist Printmaker? Ph.D. Thesis, University of Wales (2017)
23. Checkland, P.: Systems Thinking, Systems Practice. Wiley, London (1981)
24. Wyatt, M.: A cross-disciplinary study into how people living with dementia engage with and experience painting alongside an artist researcher. Ph.D. Thesis, University of Wales (2019)
25. Sullivan, G.: Arts Practice as Research: Inquiry in the Visual Arts. Sage Publications, Newbury Park, CA, USA (2005)
26. Niedderer, K., Roworth-Stokes, S.: The Role and Use of Creative Practice in Research and its Contributions to Knowledge (2007). Available online: <http://niedderer.org/IASDR07SRS.pdf>. Accessed May 2019
27. The Guardian 21 Oct (2019). Available online: <https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2014/oct/21/alistair-hudson-mima-modern-art>). Accessed May 2019
28. World Economic forum. Available online: [<https://www.weforum.org/agenda/2018/12/why-the-fourth-industrial-revolution-needs-more-arts-graduates/>]. Accessed May 2019
29. Schwab, K.: The Fourth Industrial Revolution (2015). Available online: <https://www.foreignaffairs.com/articles/2015-12-12/fourth-industrial-revolution>. Accessed May 2019
30. Benedikt Frey, C., Osborne, M.: The Future of Employment, Published by the Oxford Martin Programme on Technology and Employment (2013). Available at <https://www.oxfordmartin.ox.ac.uk/downloads/academic/future-of-employment.pdf>. (Benedikt Frey, C & Osborne). Accessed May 2019
31. FACT Future World of Work Project (2019). Available online: <https://www.fact.co.uk/future-world-of-work>. Accessed May 2019
32. Steyerl, H.: 12th ELIA Biennial Conference ART, SCIENCE AND SOCIETY: Art Questions, Art Knows, Art Matters Hosted by the University of Applied Arts Vienna at the Museums Quartier Wien, 8–10 November 20 (2012)
33. Steyerl, H.: Factory of the Sun, February 21–September 12, 2016 courtesy of The Museum of Contemporary Art, Los Angeles. Available online: <https://www.moca.org/exhibition/hito-steyerl-factory-of-the-sun>
34. Tattersall, L.: Curator MOCA LA. Available online: <https://www.moca.org/exhibition/hito-steyerl-factory-of-the-sun>. Accessed May 2019
35. Polanyi, M.: Personal knowledge: towards a post critical philosophy. Routledge, London (1962) cited in Rust, C. Unstated contributions: how artistic inquiry can inform inter-disciplinary research. *Int. J. Des.* 1(3), (2007). Online at: <http://www.ijdesign.org/index.php/IJDesign/article/view/201/80>
36. Candy, L.: The Creative Reflective Practitioner: Research Through Making and Practice. Taylor Francis, Abingdon, UK (2019)

Open Access This chapter is licensed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

