

The Scientist, the Artefact, and the Exegesis: Challenging the Parameters of the PhD

Tara Brabazon¹, Narelle Hunter², Jamie Quinton³

^{1,2}Flinders University, Bedford Park, Adelaide, South Australia

³Massey University, Aotearoa/New Zealand

E-mail (corresponding author): tara.brabazon@flinders.edu.au

Abstract

A PhD in science demands rigour, repeatability, and accountability. Epistemological, methodological, and ontological expectations flood the policies, procedures, and practice. One mode of doctorate has existed beyond the typical parameters of science: the artefact and exegesis PhD. Most commonly positioned in the creative arts and creative writing, how could this mode of doctorate be deployed in the sciences? This article, written by three academics who shared this innovative supervisory space, reveals the strengths and challenges that emerge from this innovative form and content for research. Our goal is to open out transformative spaces for doctoral education through diverse disciplines.

Keywords: Doctor of Philosophy, artefact, exegesis, creative research

Ilmuwan, Artefak, dan Eksegesis: Menantang Parameter PhD

Abstrak

Gelar PhD dalam sains menuntut ketelitian, pengulangan, dan akuntabilitas. Harapan epistemologis, metodologis, dan ontologis membanjiri kebijakan, prosedur, dan praktik. Satu mode doktor telah ada di luar parameter khas sains: artefak dan eksegesis PhD. Paling sering diposisikan dalam seni kreatif dan penulisan kreatif, bagaimana mode doktor ini dapat digunakan dalam sains? Artikel yang ditulis oleh tiga akademisi yang berbagi ruang pengawasan inovatif ini mengungkapkan kekuatan dan tantangan yang muncul dari bentuk dan konten inovatif untuk penelitian ini. Tujuan kami adalah untuk membuka ruang transformatif untuk pendidikan doktoral melalui beragam disiplin ilmu.

Kata kunci: *doktor filsafat, artefak, eksegesis, penelitian kreatif*

INTRODUCTION

Completing a PhD is a remarkable achievement. Only 1.1% of the world's population between the ages of 25 and 64 hold a doctorate (Rowe, 2021). What is clear from this unusual and powerful qualification is that ordinary behaviours – the normal practices and patterns of our daily lives – cannot summon the extraordinary. All PhD enrolments require a change in our identity, questioning what we take for granted, and configuring a new meaning system around time and value. Through this personal transformation, the idea of the PhD – the purpose of a PhD – is also

twisting and transforming. Sharon Sharminin and Rachel Spronken-Smith asked if the PhD was “out of alignment” or “fit for purpose” (2020, 821). The PhD is situated in a volatile context, and it is “culturally determined” (Kelly, 2017, 1). Through personal, professional, and institutional complexity, scholars, students, and citizens must grasp the diverse threads and trajectories of the PhD, from popular culture, policy, social media, and the lived experience of PhD candidates and supervisors. Divergent national governments have varying requirements of PhD students. Yet the PhD is always promiscuous. It transcends and transforms in response to the needs of students, supervisors, employers, and the economy. The PhD students own their thesis and the journey to its completion. While supervisors/advisors may wish to colonize this knowledge for grants or co-authorship rights to enhance their *Google Scholar* metrics, it is important to remember and focus on the student, their needs, aspirations, and goals. These imperatives may be distinct from economic necessities or the needs of employers. PhDs activate aspirations, hopes, disappointments, despair, and storytelling. These narratives must be unsettled, contextualized and dynamic. The PhD is not efficient. It does not build easy alignments of desire, motivation, behaviour, and outcomes.

Noting this precariousness, this article aligns the aspirations and outcomes of two supervisors/advisors and a student on an unusual path through a science-based PhD. This story of supervision narrativizes the limitations of methodologies and epistemologies, and probes how the expectations of ‘creativity’ and ‘experimentation’ can inhibit learning and teaching. This team of scholars are academics that teach (Brabazon, Quinton, Hunter, 2020), and have ‘survived’ the pandemic while completing a thesis. This is a productive story to share.

Doctoral Education in Difficult Times (Tara Brabazon)

Research into higher degrees before the pandemic confirmed that the doctoral experience was unsettling, ambiguous, disturbing, and liminal (Acker, 2015). Mental health concerns were pervasive, as was the fear of precariat employment during and after the candidature (Sharmini, 2020). The “well-being” of higher degree students has been studied (Velardo and Elliott, 2021), with “research culture” being a “barrier to success” (2021, 1536). Then SARS-CoV-2, aka COVID-19 emerged, and the post-pandemic PhD literature started to feature titles like, “Illuminating the liminality of the doctoral journey: precarity, agency and COVID-19” (Atkinson, 2021). That article, written by 12 Australian PhD students, appeared in October 2021. However, the pandemic only confirmed the already existing disappointments, confusions, worries and complexities of doctoral education in anti-intellectual times. These emotions revolve around one simple question: what is the point of a PhD? The neoliberal tropes and policies of our times, focused on skill development, industry-ready graduates, and graduate

attributes, do not slot cleanly into the doctoral space, nor do they cater for the diversity of students.

This article reveals one of the many futures for doctoral education, summoning research methodologies that do not fit the requirements of national research assessment exercises, disciplinary gatekeepers, or subject categories. Too often ‘creative research’ as a phrase excludes science and scientists. Similarly, the minor mode of PhD – the artefact and exegesis thesis – is isolated to the creative arts. But this article offers a vista of intellectual courage and radical interdisciplinarity if scholars and students wish to walk into, through and beyond the policies and procedures that truncate the experience and parameters of doctoral research.

Higher education is searching for a vision, purpose and meaning, as thousands of academic and professional staff have been ‘restructured’ out of universities. This article summons the interpretations of two supervisors – from the ‘hard’ sciences and the ‘high’ humanities – and a PhD student who chose to create knowledge differently. The goal of this article is to open transformative spaces for doctoral education that ponders the modes of research through diverse disciplines. This article is a proudly post disciplinary treatise, occupying and activating present experiences and expertise for future plurality, diversity, accountability, and transparency.

Thinking About Creativity in The Science Disciplines (Tara Brabazon)

So often – too often – there is a pull between creating art and building research. This is an inelegant and unhelpful binary opposition. The artefact and exegesis model of doctoral education attempts to transcend and transform this pull between the creative and research. For higher degree students, the goal is to build meaning and knowledge. For supervisors/advisors, the goal is to achieve a timely candidature completion while creating career and research opportunities and managing risk. The reason for this risk mitigation is that the artefact and exegesis mode of doctorate has an unstable pathway through examination because expectations are not clear for students, supervisors, or examiners. Split decisions – divergent results – are frequent in this mode of doctorate. There is a reason. The artefact can be diverse in its formulation: music, soundscapes, architectural design, furniture design, creative writing or an art installation are a few of the more common ‘objects’ developed for this mode of thesis. The exegesis – the ‘explanation’ – is the written component that is composed of between 30,000 to 40,000 words. Between these two textual events, there is space. This is a multimodal space, where ambiguity and confusion can emerge for students, supervisors, and examiners.

A thesis is not passed or failed on the artefact or the exegesis. It is the combination that matters to the determination of the grade. It is not being assessed as an original contribution to art. A film, soundscape, or novel in and of itself is not a PhD. The original contribution to knowledge must be proven through the research, building an alignment between the two modes of research. The problem is that scholars do not confirm the difficult translational work required between the components. This issue is revealed in arts-led research, which is where the majority of artefact and exegeses theses are currently situated. For example, Jenny Wilson stated that,

The focus of artistic research is ... on embodied and enacted forms of knowledge and understanding – forms of knowing and understanding that cannot easily be translated into or transmitted by language (2018, vii).

The concern emerging from such a statement is that there is the assumption that ‘art’ is universal and – simultaneously – blocking a translation into other signifying systems. Such statements – by default – block ‘art’ leading into ‘research.’ Such interpretations ensure that the studio is separated from the lab, clinic, field, or desk research.

The errors I have seen as an examiner in this mode of doctorate include the exegesis merely retelling the narrative of the creation of the novel or film, the exegesis emphasizing the ‘how’ – the method – of the design, rather than the ‘why’ – the theory – that contributes to knowledge. Further, the exegesis does not connect to the wider research context and literature. The artefact is left to float outside of knowledge. That is one suite of problems. Then there is the confusion over the determination of the artefact. In theatre, drama and performance doctorates, the question remains what is the examinable artefact: the live performance or the video of the production? There needs to be clarity on what is the artefact, particularly its parameters and frame. The overarching problem is the assumption that the artefact speaks for itself it, embodying knowledge or creativity. The scale of this difficult is captured in Louise Ravelli, Brian Paltridge and Sue Starfield’s 2014 edited collection, *Doctoral Writing: the creative and performing arts* (2014). Each chapter offers a differing ‘blend’ of creative practices and ‘conventional’ research (Ravelli, Paltridge, Starfield, 2014, 1). The challenge remains that the terminal degree for creative practice in North America in particular has been the MFA, the Master of Fine Arts. Therefore, the doctorate had little role in the credentialling of the creative arts. Yet teaching and research has changed, as has the proliferation of doctorates in areas of the university where it was not required, such as law and medicine. Therefore, the terminating degree for all disciplines has been rendered more uniform. The question is how the diversity of epistemologies, methodologies and ontologies is recognized and managed so that standards are upheld without

crushing the diversity of disciplines. This current article does not value and validate siloes, but instead heightens the importance of intellectual courage and mobility.

To manage this ambiguity, when I occupied the role of Dean of Graduate Research, I changed the language through which we describe our modes of doctorate at Flinders University. That is why the terminology - the artefact and exegesis thesis - was used to describe the doctorate, rather than default to methodological phrases, such as practice-led, practice-based, creative-led, and creative-based. Methodology alone is not research. It is – alongside epistemology and ontology - one part of any research project. This meant that methodology had to be aligned with epistemology and ontology. Fascinating, once this change in terminology was made, the artefact and exegesis mode of doctorate moved through all six colleges at Flinders including science and engineering, medicine, and nursing and allied health. This is not arts-based research. It is a mode of doctorate that is used strongly in the arts-based disciplines but is now used throughout all subjects and disciplines.

The word creative is so ambiguous in its meaning that it is useless when creating policies and procedures for research. It has replaced Raymond Williams description of ‘culture,’ as one of the two or three most complex words in the language (1976). The methodologies to study creativity require understanding the three Ds of technology – digitization, disintermediation and deterritorialization - and uneven globalization (Brabazon, 2014). Then the pandemic must be considered. The coronavirus has offered a profound reminder – if we needed one - that creativity is required to deliver solutions that are yet to exist. ‘Believe the science’ is a cliché or a trope, but through Covid-19 what researchers realized is that the science is not enough to enable societal change or an informed citizenship. Science literacy matters. Creativity is always sociocultural, activating new learning, new knowledge, new ways of teaching, and new ways of creating research. If Australia – and the political systems around the world - are to recover, then definitional rigour in the determination of creativity in research will be crucial. Szabo’s “creative ecologies model” matters (2021). Creativity – through research - builds, supports, and shares systems of change and disseminates disciplinary vocabulary and literacies.

This article summons the complexity and ambiguity of the word ‘creative’ and widens this discussion beyond the humanities. This is not an issue of the creative arts. The artefact and exegesis mode of doctoral thesis is composed of an object that can be digital or analogue, visual or sonic, and an exegesis – which from the Greek means explanation – which is between 30-40,000 words in length. The artefact can be in written form (novel, novella, poetry, script), design (architecture, some tech, graphic or interior design to name a few), sonic (sonic architecture, sonic art, popular music, podcasts) or visual (fine art, film, screen arts, mixed media

installation). The diversity of possible modes and platforms is staggering and important. The most important part of research and the characteristics of the best doctoral theses is that the researcher focuses on the why - the why of the research - rather than the how of the research. The emphasis is on epistemology rather than methodology.

There is a reason – a powerful reason – why this multimodal research exists. More conventional research methods cannot answer an array of research questions. When I teach creative and practice-led research methods, I used the following analogy. Conventional methodologies can only take research and researchers to a certain point. There is a necessity to make a leap or jump beyond the literature, beyond what a logical or accumulative method for knowledge generation can summon. Therefore, after configuring the research questions and the literature review, the limitations of the research are known. To create an original contribution to knowledge, an artefact can form and frame the original contribution to knowledge. The artefact operates ahead of the research. I always described this as throwing a rock into a pond. Existing knowledge moves researchers to the edge of the water. The artefact throws knowledge ahead through the momentum of that object.

From this – metaphoric – perturbation in the pond, the goal of the exegesis is to connect the shoreline – the limitations of knowledge - with the object thrown in advance of knowledge. This is a surprising, volatile, and exciting mode of research. It does move knowledge forward in interesting and unpredictable ways. That is why – in difficult times – this mode of research is important. However, it is crucial to recognize the key challenges, particularly in the context of this article, and the disciplinary literacies that enable it (Lent, 2016). Verifying the rigours of scholarship - accountability, transparency and repeatability – is challenging. That is why the word ‘creative’ can be constricting and damaging.

The assumption is that the artefact is art, and that art is – intrinsically – knowledge. That slippage in terminology is epistemologically unproductive. Actually, the object is just an object. Scholars must prove, frame, and shape the research around it. Higher degree students have to prove the original contribution to knowledge through the object, the artefact. The artefact means nothing in the context of a higher degree programme. Students move into problematic terrain when they assume that the film, the play, the novella, the exhibition is research. Actually, a film is just a film. It is not research. A novel is a novel. It is not research. A design is just a design. It is not research. Making a film, writing a novel or constructing a design is important, but it is not intrinsically or inevitably research. Higher degree students are creating an original contribution to knowledge. Therefore, the object – the artefact – is that stone in a pond. It moves the debate ahead of contemporary research. In the exegesis, researchers must push knowledge

into a new terrain. Montserrat Castello, Anna Sala-Bubare and Marta Pardo stated, “research writing is a mediator of knowledge creation and epistemic discussion, as well as of research development” (2021, 480). That is where words like ‘art’ and ‘creativity’ become obstructionary in doctoral education. There is no intrinsic quality in the artefact, and even if there was, ‘artistic quality’ has nothing to do with research. Being enrolled as a PhD student requires different expectations and outcomes.

There is a need to justify the methodological selection. Why was this unusual mode of doctorate selected? What does the artefact and exegesis thesis enable for knowledge? These questions are complex, powerful, and important. They also serve to challenge the simplistic strategies for thesis completion. For example, Michael Fennell set his book – *Surviving the PhD: A student’s perspective* – around frequently asked questions. In this ‘guide’ for doctoral education, the process is described as,

A year to read, a year to collect data, a year to write up – [is] oft cited and then chanted. On induction day, we heard about reading and the literature review – how this comes first, the foundation for the year of collecting data (2013, 27).

This paint by numbers approach to doctoral education is inappropriate for most research strategies but has no operational foundation for an artefact and exegesis thesis. This mode of thesis is iterative, delicate, and complex. It is a weaving of knowledge between what is and what could be. To demonstrate these trajectories of scholarship beyond the arts and the humanities, Narelle Hunter shows the capacity of this doctoral mode.

Preparing (for) the Experiment (Narelle Hunter)

My PhD began as with many other students in science education, supervised by excellent educators with a background in the sciences. In fact, I would have argued I was better prepared than most postgraduate students, as my supervisors and myself all had many years of experience in both traditional scientific and educational research, all having already published in both fields. I prepared to investigate how students developed their written communication skills in undergraduate science programs. I was acutely aware that to garner the respect of my scientific peers, I would need to demonstrate a scientific approach to the research as well as presenting my findings in a way that was consistent with other science doctoral theses. I felt that I needed to speak to fellow scientists in a way they recognised and were comfortable with to have them listen to me and embrace the findings of my research into their teaching practices.

As scientists, we learn to read and write in a particular fashion, being comfortable with the genres to which we are exposed. However, the intersection between science and education is difficult to navigate. The language between the

two fields rarely crosses over, and the way research is both conducted and presented differs greatly. I am a scientist at heart. Therefore, as I began my research, I adapted scientific methods to an educational context and planned to present my thesis in a traditional scientific format, as is the norm in the field.

I set about designing and testing innovative curricula that allowed students to develop their understanding of various scientific genre in preparation for associated assessment tasks. Online modules enabled students to work at their own pace through a variety of examples and helped them to structure their own written pieces, with a focus on understanding the needs of the audience. Students developed skills in using the appropriate language for a variety of audiences and worked through aspects of structure and form in a range of writing activities. The intention for the project was to collect data related to any impact of the curricula on student writing, using an analysis of assessment criteria as well as investigating the influence on overall writing structure. This would give me the much-needed scientific data that I planned to use to build my thesis.

With online modules completed and well into the data collection phase of my research, my candidature entered a pivotal moment. As a part-time student, full-time equivalent to one year completed, both of my supervisors secured new positions outside of the university, no longer able to formally act in a supervisory capacity. For several months, they were able to provide support remotely and the project continued. I was hesitant to settle for a new supervisor who may not understand my project. Therefore, I took several months and sought someone who I felt would be able to provide support and constructive feedback that I needed to fulfil the project. Both of my original supervisors were experienced educational researchers. However, both were scientists, and this strongly influenced their approach towards my project. A scientist myself, I needed a supervisor who would understand my audience and bring a scientific background to our discussions and understand the scientific culture that is the audience for my research. Additionally, I needed support and advice from outside of the sciences, someone who could offer an alternate perspective and creative approach.

In finding a new supervisory team, I also found perspective. Bringing together the experience of traditional science, education and cultural studies allowed a different view of the project that changed its trajectory and ultimately resulted in a project that speaks to both scientists and educators alike. In fact, the new supervisory perspective enabled me to translate the research to be valuable in any context where communication was involved – in other words – everywhere. Professor Jamie Quinton and Professor Tara Brabazon provided their perspectives on what I had already developed.

A PhD is made up of a series of experiences, ideas, mistakes and most importantly, learning from those mistakes. At this point in my candidature, I had

put an immense amount of work into material that my assessors would never see. Certainly, they would see the results of implementing the online materials that I had created, but they could never grasp what they contained or how students used them unless they could see them in action. In a traditional mode of thesis, this would not be possible, meaning that a great deal of the work and learning that I had put in would potentially go unrecognised. In some ways, this is similar to the experiences of many PhD candidates, spending hours in the lab or in the field, which is then distilled into tables and figures in their theses. The experience of the student is never fully articulated to the assessor. One of the most important moments in my candidature was a conversation with my new supervisors about how these online materials could be incorporated into a mode of thesis called an artefact and exegesis, a term I had never come across before. The online materials would be presented as the artefact and the accompanying exegesis would explain the research. This creative mode would allow my assessors to be immersed in the experience that I had designed for students and understand their perspective with authenticity. This was beyond description. This was analysis, punctuated by creative approaches to multimodal information sources. However, would this mode of thesis be accepted by my scientific peers?

The intersection between science and education is challenging for many reasons, not least of which is the differing approach each field takes to research. Kantowitz (2014) typifies the views held by science researchers that educational research can only be made rigorous by replacement with scientific methods. As both a scientist and education researcher, I strive to bring these fields together in ways that value and strengthen both fields rather than pit one against the other. Ultimately, my goal is for scientists to take up the information that I can provide through an educational lens. To do so, I must use experiences and language with which they are familiar. I must speak the language of science so that I can introduce new ideas to my scientific colleagues. Thus, presenting my thesis as an artefact and exegesis was potentially risky as it was challenging the norms of a traditional thesis in the sciences. In order to counter this, I decided that I would approach the exegesis from a scientific perspective, incorporating data analysis and interpretation as would be found in a traditional thesis, while still keeping the structure and purpose of the exegesis true to the genre, explaining and telling the story of the research behind the artefact. My explanation had to be clear to ensure that my audience would be accepting of my unusual choice of mode.

My research combined creative-led inquiry and social science research methods, applied to the field of natural sciences. This unique approach allowed me to address the problem of accessibility of the discipline using a disciplinary literacy framework. E-learning modules became the artefacts of my thesis creation and were supported by a thorough analysis of the impact on student learning and confidence

in developing disciplinary literacy skills within Biology, bringing together design, education and scientific research. Three e-learning modules form the artefacts and, together with the exegesis, formed the objects of examination. The artefacts embody the theoretical ideas presented throughout the doctoral thesis and therefore it was important that both parts were examined together to demonstrate the full scope of my research. As the design of the artefacts was integral to my research, it is fitting that they formed a key part of the thesis. They are not ‘examples.’ They are not an ‘illustration.’ Instead, the exegesis loops from the artefacts, summoning the relevant research literature, and then proceeds to loop once more into the artefacts for new insights. The exegesis serves as companion to the e-learning modules that investigate the development of disciplinary literacy in undergraduate students. The artefacts produced for examination include the three e-learning modules that were produced for and trialled in first year Biology units. For examination, the artefacts were presented exactly as they were delivered to the students, to allow my examiners to view and consider the learning support configured for the students in their most authentic contexts. This was facilitated by embedding links directly into the exegesis that granted access to the e-learning modules held on a file sharing site.

I understood through my research that writing tasks must be meaningful, designed to challenge, and engage the learner rather than simply reiterate rote content. Some writing skills will move between genres. However, students must learn the value of the different genres and develop the skills to be able to think and perform in a variety of genres. The artefact directly addressed this dilemma by focussing on the key aspects of writing within the discipline of science. Each e-learning module focussed on a different genre within the field of Biology. By making the relationship between reading, writing, and thinking visible the artefact provided a point of access for those without the necessary disciplinary literacy to read, interpret, and contribute to scientific literature. The artefact opens the door to scientific literacy by scaffolding writing within the discipline. Therefore, to demonstrate their use they needed to be visible to my examiners. In addition to direct access to the e-learning modules, the exegesis described and explored various aspects of the artefact throughout each chapter. My examiners could navigate the e-learning modules just as my students did as well as diving deeper in the analysis within the text of the exegesis where I could focus on various aspects of the modules and describe how these were used in my research. The exegesis enabled the unpacking of each element of the e-learning modules as shown below, not leaving the examiners to determine the importance of each part but allowing me to guide them through the process of creation and analysis to demonstrate my own learning through research.

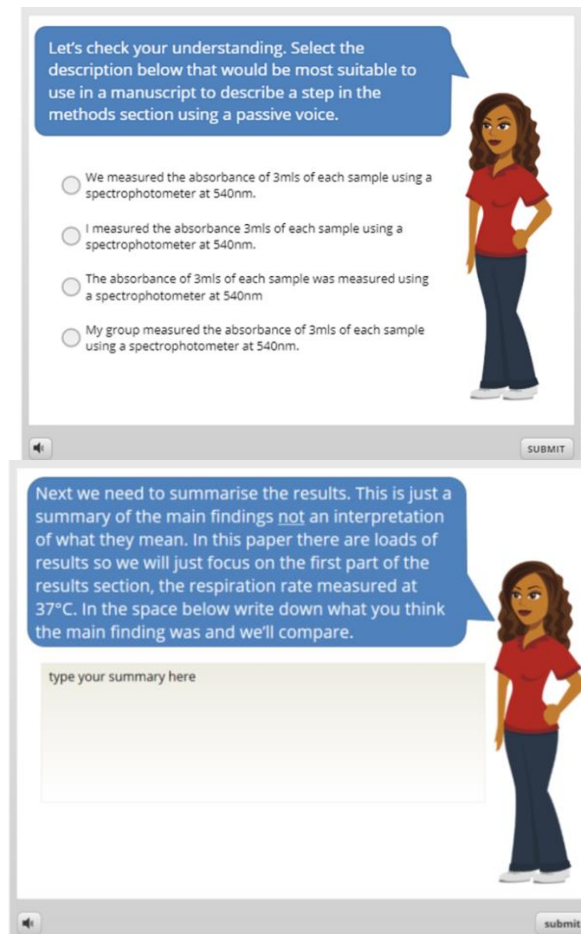


Figure 1. Excerpts from the Scientific Writing Assignment e-learning module depicting activities to use appropriate language for the genre and orient students in reading and interpreting texts within the discipline.

The different perspectives offered by Jamie Quinton and Tara Brabazon were integral in ensuring that the exegesis spoke to a wide audience and was well-tied to the artefact and the creative process of my research, an aspect that is often missing from a more traditional supervisory relationship. Whilst it is natural to seek guidance from experts within the field of research that a candidate is studying, the merits of casting a wider net for supervision or feedback should be explored more often. In the words of Sir Mark Walport, UK Government Chief Scientific Adviser (2013-2017) “Science is not finished until it’s communicated” and the discussion of scientific research with academics in other fields allows ideas to cross creative boundaries and understand how these may be communicated more broadly. In other words, we learn to understand the boundaries of our own disciplinary literacy and that of others and create ways to have research conversations in new and innovative ways that lead to new and exciting discoveries. With such differing perspectives, each of my supervisors was able to offer understanding and critique from their field, which enabled me to delve into creative approaches that would otherwise not be

explored, allowing my artefact and exegesis to be truly transformative in the field of science education.

Science is a creative endeavour, yet the communication of ideas is limited by narrow expectations of genre in undertaking a PhD by traditional thesis. While there is a place for the traditional thesis, it is time to consider the variety of modes that are available to express the range of ideas in the sciences. By encouraging creative approaches that are common in other disciplines we can foster a community of researchers that are open to new methods and further develop their creativity, leading to better science that is also better communicated.

Managing the Challenges of The Artefact and The Exegesis (Tara Brabazon)

Narelle Hunter confirmed the strengths of this mode of thinking and presentation for science theses. Further, she shows that the traditional thesis poses an array of challenges. But when diverse modes and platforms of information are presented, ambiguity and complexity emerge through the multimodality (Brabazon, 2018). The relationship between form and content is intricate, and researchers must write the argument between and through information presentation and knowledge dissemination.

A PhD is a particular genre of writing. When an object, such as performance or exhibition, is a part of the thesis, then a discussion of this mode must be conveyed to examiners. An overt discussion is required to explore the interface and modality of a design. Is the examiner assessing a product or output, or the iterations of the artefact through its design history? For Narelle, the artefact was clearly framed as curricula design. The nature of the artefact – and why it was chosen – must be revealed. For example, with a performance-based thesis, is the examiner assessing a video of the performance, or the performance itself? If the performance is recorded with a single camera, then how are the low production values to be managed? Is this lack of editing assessable by examiners? Therefore, the key determination remains, what are the parameters of the object, and how is it to be framed by the research. The limitations of the artefact – its status as a bounded research object – remain key in demonstrating the knowledge within it. Any ambiguity – in rationale for the object or the boundaries of it – impact on the credibility of the process.

Higher degree theses have policies and procedures. The artefact and exegesis thesis are assessed as research which makes an original contribution to knowledge. Whether or not it is art, let alone quality art, is not being assessed. That is why the word artefact is a constant reminder of its function in knowledge, rather than any assumptions of cultural value as art. This recognition remains important as the examiners read the exegesis before engaging with the artefact. The greatest mistake that students make is the assumption that examiners are thrilled – excited -

to read their novel, watch their film or listen to their sonic installation. Examiners read the exegesis, so they have an explanation for the research project, and why the artefact was required. This is the frame, and a demonstration of the research within the artefact. The artefact and the exegesis are not weighted. When combined with care, they offer a frame for knowledge. If examiners do not see the research in the artefact, and how the artefact moves forward knowledge, then students will fail. Narelle Hunter – cleverly – ensured that the artefact arched into the exegesis through hypertext links.

The most effective way to establish this framing is to focus on ‘the why’ of the research, rather than ‘the how.’ The problematic exegesis explains how the novel was written, or how the film was made. ‘How’ is needed. That is the method if not the methodology. But the emphasis of research must be on ‘the why.’ Poor exeges focus on the how. The challenge is to show the examiner why the artefact was necessary to answer research questions and enhance knowledge. A multimodal thesis must reflect on why a particular mode most effectively develops research and an original contribution to knowledge. Therefore, it is important to not move the same content through diverse forms, without a clear specification about how the material is transformed and knowledge created through the movement.

Research methods are active, enabling the daily decisions of researchers (Kevin, Vialle, Howard, Herrington, Okely, 2016). These decisions include ethics, choice of research area, representativeness, and generalizability. But these decisions also require – for all researchers – an understanding of multimodality. As Jamie Quinton specifies in this article, the gift of the artefact and exegesis thesis to all doctoral education is that it necessitates students configuring an overt and clear connection between the artefact and the exegesis. The two modes of information presentation and knowledge dissemination must not be marinated in ambiguity or assumptions. The student provides instructions to the examiner – even implicitly – about how the artefact, exegesis and their relationship is to be assessed.

While students often lament that only a few people will read their thesis – which is untrue if a strong dissemination strategy is actioned for the research – it is important to remember that the thesis is being written for examiners. If the examiners are forgotten in the construction of a thesis, then the research will not pass effectively through examination. Students must not make assumptions that examiners will follow the argument between the two modes of the thesis. Difficult, intricate, and reflexive work is required to connect each mode of research presentation. Therefore, let us explore the nature of supervising these modes of doctorate in the sciences.

The Scientist Supervising a Creative PhD in Science (Jamie Quinton)

When one embarks on the supervision of a Creative PhD for the first time, supervisors will enter it with some trepidation and concern as it is a different mode of PhD than that met in any traditional form of doctorate. This is particularly true for a scientist who is eminently aware that their credibility, integrity, and reputation are paramount to their and their research group's potential future success. It requires some bravery and confidence to even entertain the idea, as many colleagues would instantly discount the notion of any mode of PhD other than the way it has always been done as an affront to the homological ideals that they have been trained to unquestioningly follow.

When Narelle approached me to supervise her Science Education PhD, I was honoured that a respected and valued academic colleague from my college was willing to entrust me with the role of principal supervisor of her PhD program. Prior to this, we had a few discussions around teaching strategies and experiences, when I was involved in teaching and learning leadership roles in our former Faculty of Science and Engineering. Although our discipline backgrounds were from different areas of science, I was confident that I could advise Narelle with the expertise, respect, and compassion that she would need to help her complete her degree while working full time and raising a young family.

With a value for knowledge creation and desire for learning, along with an open mind that knows that no PhD journey begins with a guaranteed picture of what it will appear to be at the end, I agreed to undertake the supervision of Narelle Hunter's PhD. Given the nature of the research area spanning education, I asked Tara Brabazon, former Head of the School of Teacher Education at Charles Sturt University and at the time Dean of Graduate Research, to co-supervise Narelle's PhD. Tara has experience with the supervision of artefact and exegesis PhDs and has published widely on the subject. Given Narelle's work in producing e-learning tools, Tara introduced Narelle and I to the notion of the Creative PhD as a possible mode of presentation and dissemination.

What passes through a supervisor's mind at the start of such an undertaking? The first requirement is the need to have a strong understanding of what a Creative PhD entails. The Creative PhD is an artefact and an exegesis, comprising an 'object' that is created as a product of the research and a 'narrative' around how the research informed that creation, but also the significant original contribution to knowledge (SOCK) that has occurred as a result. The Creative PhD is rather different to a 'technical' scientific PhD project, which relies on discovery as the mechanism for generating that SOCK.

However, to appreciate how the Creative PhD approach could work within any context – in this case that of scientific educational research – one must have a clear understanding of what a PhD is in its most general sense. Science scholars

tend to not think about this beyond focusing heavily on the soundness of the methodology adopted. Science PhDs activate an investigation, collecting data sets, and revealing a depth of understanding. These are demonstrated within the frame of discovery to illustrate the SOCK. The credibility in many ways comes down to methodology. Indeed, many PhD theses have been passed or failed simply on the alignment of the methodological soundness and expertise exhibited in the work with those expected by the examiner. The creative and technical PhDs are methodologically different to each other, and to be different is to be distrusted.

In asking the question, will the different mode have afforded by the Creative PhD lead to the same or an even better outcome, an astute awareness of the PhD itself is critical. As a scholar who is dedicated to a life of learning, I believe in the continual development of my own skills to ensure that the quality of my work is the best it can be. I therefore take professional development and training quite seriously and embraced the opportunities that are created in this different approach. I should also add that, as a scientist, I expect to be incorrect and continually test my hypotheses and assertions to see if I am in fact, mistaken. This is a direct consequence of the intrinsic falsifiability requirement of any scientific hypothesis, theory, or law, as described by Karl Popper (1959) and Thomas Kuhn (1996) who modernised empiricism to form the current paradigm that underpins the methods of scientific research in the 21st century.

All PhD journeys share commonalities. The scholar needs to understand and demonstrate epistemology, methodology and ontology to an international expert in a field. In practice, this means that they need to become familiar with the research field in question and develop sufficient expertise to be able to identify a sensible research question and the best methodology to attempt to answer it in a way that leads to a new and significant contribution to knowledge. The thesis then must demonstrate the knowledge generated by enacting the methodology, and then scaffold that new knowledge to that extant in the research field.

In a Creative PhD, the ‘thesis’ comprises an artefact and an exegesis. The artefact is a deployable object of some kind, whether concrete, such as a tool or device or abstract, a model or theory of interwoven complex concepts, which is constructed by the scholar with the expertise gained from the research. The exegesis is an expansive dissertation that describes the motivation and background research that have led to the construction of the artefact. With the Creative PhD, the need for academic rigour remains. There still needs to be a deep dive into literature, recognition of a research problem and an original contribution to knowledge that is not about the artefact itself, but rather how it is a tool that can be deployed to gain traction under the frame and lens of this new knowledge, and the ontological scaffolding of the SOCK that is created through its construction and deployment to existing knowledge in the field of research.

My role as the Dean of Science was to uphold standards and champion the cause when all others have buckled under the impetus for rationalisation for workload reduction, or simply compromised in the spirit of innovation. I take this responsibility very seriously, and especially so in the case of the doctorate. These were firmly in mind as I considered this radically different approach to that which lies in my comfort zone.

However, it is important to invert the frame and ask the question: How would one alter a Creative PhD thesis in the Sciences to form a standard thesis? This question triggers the realisation that in a standard science PhD thesis, the data set created by the investigation and the complex rationale of the interpretation of that data, along with the limitations to that interpretation imposed by the subtle nuances at the edges of the methodology, is in fact what forms the artefact. Most engineering theses are designed around a physical object or a method for creating one, in mathematics a new theory or proof, in computer science a new language or algorithm that offers a new functionality proposed by the scholar would form the artefact. Indeed, one could argue that most PhDs are in fact Creative PhDs in disguise. It is merely the notion that the artefact is embedded within the standard thesis and is separated in the Creative PhD, the two modes are rendered equivalent. The scientific method is not compromised if the journey of artefact development as knowledge is gathered is captured in the exegesis. Provided that the examiner of a Creative PhD can appreciate this perspective, they can still deploy their expertise to critically assess the scholar who is adopting it.

The two modes of thesis therefore have the same requirements – the epistemological foundations and ontological scaffolding of new knowledge created remain as they always have. They are merely different in their methodologies and the international standards required theses at PhD level is sound. Additionally, the Creative PhD offers one distinct advantage. The explicit need to produce the artefact provides a point of focus and a mechanism for ensuring progress. In a standard science PhD, the artefact typically appears through the act of discovery, of seeing new data and new interpretations appear as the investigation occurs. That is not to say that discovery is not a part of the Creative PhD. On the contrary, discovery is inherent in the recognition of all new knowledge, irrespective of the mode adopted. However, one could argue that the Creative PhD is easier to supervise as a result. The planning, processes, and machinations inherent in completing via the Creative PhD mode are slightly different due to the ordering of concepts, but it remains iterative in that the artefact and exegesis require development and adjustment in unison because they must form a cohesive pairing in order to make the compelling case that is required.

When it comes to supervision, my attitude has always been that for the engaged supervisor, each HDR supervision is a learning journey too. This was

especially so in Narelle Hunter's PhD. We summoned the supervision with great enthusiasm and found it to be a natural, organic process that was different to every other PhD that I have supervised in the past. Admittedly, that may have occurred because Narelle chose non-obtrusive research methods that meant she had no need to go into any laboratory to conduct her investigations, although we did discuss data interpretation and the formation of models in the same way that I would in a standard lab-based PhD. However, being an academic, Narelle's skillset set her up for success. She read widely and rapidly developed her expertise with forefront ideas and a deep understanding – she knew how to develop the foundations of her research which she did quite quickly. The role of advisor was rendered to that of a questioner that kept asking about perspectives both in the middle and at the edges of the frame of the research question as needed.

In the formation of the artefact, supervision was again quite straightforward in that Narelle created a suite of digital objects to deploy in classrooms that made students aware of the extent of their disciplinary literacy and more importantly, included them in the background thinking of their own educational development. With an awareness that each scholar needs to develop disciplinary multiliteracies, the responsibility is handed to the student to realise that the journey is more complex, but also more effective, if they see their own development as an important part of their learning journey rather than leave that responsibility with the teacher. That alone transforms students from passive learners who Google everything into active learners who are crusaders for knowledge.

For the exegesis, the key concepts required to ensure that a compelling case for world-class expertise is demonstrated are to ensure that the epistemological foundations are established, and relevant literature critically reviewed, thus leading to a research aim and a need for the generation of the artefact. The artefact is then introduced but its role in answering the research aim and knowledge creation and development are asserted, then linked with the research field. As a supervisor, all of my actions were focused on helping Narelle achieve these objectives.

Overall, I cannot speak highly enough of the privilege and experience I obtained in supervising Narelle's PhD candidature. The extent of commitment and support of her family, in combination with effective use of all time she dedicated to the tasks required to conduct and finalise the thesis were running at full speed. I think these elements, combined with Narelle's clear understanding of each element required and perhaps the efficiencies afforded by the artefact and non-obtrusive research methods led to the expediency of her candidature. Narelle completed her PhD in 24 months and submitted within 12 months of her Confirmation of Candidature review. That is not only incredibly impressive, but phenomenal and inspirational.

Would I supervise another Creative PhD or recommend it to others? Absolutely and without hesitation. Comfort and confidence in being able to assist a student complete their PhD via this underutilised, alternate mode is quite possible through understanding how it sits in the international PhD space and can demonstrate the requirements of the PhD award. Narelle's PhD was a potent and powerful journey into Science Education. I look forward to the challenge of this mode of doctorate with a lab-based project at some point in the future.

Why Would a Student Consider Completing an Artefact and Exegesis Thesis? (Tara Brabazon)

Narelle Hunter and Jamie Quinton confirm the benefits in moving this mode of doctorate into the science-based disciplines. Yet there is no doubt there are still concerns to address within the humanities-housed artefact and exegesis theses. Considering the challenges, the problems, the worries, and effort required for an artefact and exegesis, why would any student – in any discipline – make this selection? Firstly, and what is most intriguing and is the foundation for this current article, the traditional theses are starting to incorporate more elements from creative theses. As confirmed by Narelle, she originally modelled her research in the traditional or standard form of 70,000-100,000 words. Indeed, these traditional theses are now featuring multimodal attachments, and porous boundaries to the conventional written text. References and dissemination strategies are arching to podcasts and videos, asynchronous conference presentations, and posters. Kevin Tavin, Gila Kolband Jusso Tervo confirmed the scale of this transformation, with their 2021 book, *post-digital, post-internet art and education: the future of all-over*. They confirmed the importance of convergence and positionality of the research and the researcher.

This convergence is (at least) two decades in the making. Hypertext was incredibly important for research – structurally and metaphorically - for two decades, enabling research accountability. Hypertext shows how simple and powerful it is for ideas to arch beyond our universities. Our references – just like our ideas - are not positioned on a shelf in a university library. They move and with open access imperatives in place can contribute to citizenship. Positionality – of the researcher and the research – is crucial to this mode of thesis. That positioning allows researchers to express doubt, alongside the historical and theoretical legacies, barriers and inconsistencies that frame our work. Positionality also allows us as researchers to be honest, confirming what our research can achieve, and what it cannot achieve. The best of doctorates state – clearly – what is integral to the thesis, and what sections, topics and tropes are not part of the thesis. These statements must also be tempered by what Nick Srnicek described as “platform

capitalism” (2016). The proliferation of platforms for conveying sound and vision has meant that meaning is not the issue. Interpretation and analysis are key.

The PhD has an andragogical imperative. Researchers can summon the legacy of past researchers and reorganize and revision it for the next generation. These skills and abilities must not be under-estimated. The key skills for the post pandemic PhD involve how to manage fear, how to manage uncertainty, and how to manage disruption. Standpoint theory confirms that we are what we see. We are also what we do not see. We know what we know. We rarely know what we do not know. Disciplinary gatekeepers only increase our ignorance, our capacity to not know what we do not know.

Moving Beyond The ‘Business as Usual’ PhD (Tara Brabazon)

All research is culturally situated, summoning originality into being. As I write these words and this article is published, I have just resigned from my term as Dean of Graduate Research at Flinders University. My priority through my term was to ensure that the student was not ‘blamed’ for their ‘failure.’ Attrition must not be individualized. That individualization of student blame needs to change. Today.

This ‘individual problem’ of attrition has seen up to 50% of those who start a doctoral programme withdrawing from their degree (Lovitts, 2001). Lovitts describes attrition as “the invisible problem” (2001, 1). The students that leave universities are wiped from our institutional stories, but these attrition rates are higher for women, citizens with disabilities and students of colour. The completers and non-completers have been shown to be equally able intellectually (Lovitts, 2001, 6). Therefore, the reason for attrition is not the selection of candidates, but the shape and structure of graduate programmes. In moving beyond personal responsibilities and blame, a different future form the doctorate can be summoned.

The creative researcher aligns the knowing and the knower, values and the valuer. Work such as presented in this article ensures that Doctoral Studies and the Scholarship of Supervision (SoS) are part of the suite of Higher Education Studies and the Scholarship of Teaching and Learning (SoTL). Daniel Saunders, Ethan Kolek, Elizabeth Williams, and Ryan Wells argued that too much of higher education studies is dominated by “functionalist approaches” (2016, 1), using quantitative methods and survey data. Quantitative methods enable particular neoliberal decision making. Knowledge creation is political, and doctoral studies, as terminal degree education, is saturated in the quantitative mantras of job-ready graduates and graduate skills. Neave described this, “entrepreneurial utilitarianism” (2013). While the focus remains on employment and employability, the risks of un/employment are unevenly distributed. As Adsit, Doe, Allison, Maggio and Maisto stated, “precariousness is unevenly distributed in today’s corporate university”

(2015, 21). Therefore, the injustices of the past – where the supervisor and student relationships festered with inequalities, disempowerment, and exploitation – has been extended. Now, supervisors cannot protect their students, as even the tenured academic must suffer and/or manage waves of restructuring. The profound issues with the senior leadership of higher education – particularly with regard to the disconnection from teaching and research (Brabazon 2021a) – ensure that the higher degree programme is marginalized or invisible when institutional restructures emerge. Doctoral programmes are rarely profitable. In the current Australian model – enabled through the Research Training Program legislation – governments fund universities for student completions, not student load. Therefore, the capacity to complete a PhD student, for a supervisor, is the valued key performance indicator. Yet this imperative to completion is undermined by the waves of restructures that have rendered supervisors redundant. Therefore, one of the characteristics of the neoliberal university is irrationality (Brabazon, 2016): removing the senior academics that can supervise students to completion. The characteristic of students that finish their theses is a continuity of supervision. A stable labour force enables student completion. Yet a stable labour force also maintains a wage bill. Therefore, in the determination of a university budget, higher degree students become a minor inconvenience, a liability, that is lost through waves of restructure, and rendered invisible by attrition.

This article is situated and saturated in a tough time for international higher education, university work, learning and life. Yet the solutions offered are not popular. They are not carolled by gatekeepers or journal editors. In claustropolitan times (Brabazon 2021b), the capacity to explore, to experiment and to stretch in our universities are being lost. Yet the artefact and exegesis PhD expands the options for teaching, learning and doctoral supervision beyond disciplines, and beyond the accustomed parameters of knowledge.

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