

An Information Systems PhD by Artefact and Exegesis?

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Abstract

In this conceptual paper, we speculate on the possibility that a PhD by Artefact and Exegesis (A&E) may be legitimate in the Information Systems (IS) discipline. Research, as creative process and product with the intention of yielding new knowledge, takes many forms across the spectrum of academic disciplines. Other disciplines, particularly in the humanities' fields of arts and design, have artefacts as a discrete part of their PhD product accompanied by an exegesis of one form or another. It may be that some research in the IS discipline lends itself to the A&E approach.

This paper considers A&E PhDs in Humanities and practice-related research more generally. We investigate how A&E might apply to IS research through comparison with the design science approach. We suggest tentative impacts on candidates, supervisors and examiners then conclude with critical issues and open questions raised by our investigations.

Keywords IS doctorate, IS research methods, artefact, exegesis, design science.

1 Introduction

Research, considered as creative process and product with the intention of yielding new knowledge, takes many forms across the spectrum of academic disciplines. In a particular research project, the researcher balances a range of influences to determine the form of the research. These influences include the nature of the particular phenomenon to be investigated and the research approach and methods appropriate to its investigation; the current state of knowledge in the field and how a contribution to it might be made; personal preferences, motivations, skills and experience; and lastly, the culture of the research organisation, its resources and rewards.

The Information Systems (IS) discipline claims to accept a range of research processes and products addressing a plethora of social, technological, informational and systems phenomena and the interaction of these phenomena (see, for example the editorial policy of the *Australasian Journal of Information Systems*). Artefacts of various kinds have a role in much of this research, sometimes as a component of the phenomena under study, or as the outcome of an engineering method being studied, or perhaps as a research instrument or catalyst. However, artefacts themselves are generally considered ancillary to the research enterprise or process.

Other disciplines, particularly in the visual and creative arts, have artefacts as a more integral part of their research product, not just its process. In painting, sculpture, and textiles, in poetry and prose, in music and digital media, and in the performance fields of dance and drama, the artefact (as creative output) is the centrepiece of the research. Biggs (2002, p.5), in early British studies on the artefact in art and design research, reminds us that artefacts alone do not embody knowledge and must be interpreted through placement in a suitable theoretical context. This is addressed in the arts by accompanying the artefact with an exegesis (A&E model) so that “theoretical enquiry and creative practice interact, intertwine and become interdependent” (Corcoran 2010, p.10).

In this conceptual paper, we consider the possibility of A&E as a legitimate form for the IS PhD and consider the implications were it to be welcomed into the IS discipline. The questions we began with are “How has the A&E model been used in the Humanities?” and “How might the A&E genre of research be applied to the IS discipline?” We start with a review of research in the humanities and the A&E approach to creating knowledge. We then consider the state of IS knowledge and how contributions are currently made to it. Bringing these two strands together, we speculate on how A&E might apply to IS research, through comparison with the design science approach. We suggest tentative impacts on candidates, supervisors and examiners then conclude by raising critical issues and open questions.

2 Artefacts and Exegeses in the Humanities

One class of IS research, and of much IS professional practice, involves artefact design, creation, deployment and evaluation. This can be seen as analogous in some ways to the research and practice of the arts and design fields in the humanities. Consequently, the humanities' A&E approach may have much to commend it to the IS discipline. The definition of an IS *artefact* can be very broad and quite diverse. It may include software, use processes, and IS-related methodologies and interventions (Kuechler and Vaishnavi 2012, p.396), and human/computer interactions, management policies and algorithms (Gregor and Hevner 2011, p.2).

The traditional purpose of an *exegesis* was to transmit the word of God to the world. This is consistent with the original Greek meaning of ‘exegesis’ which is ‘to interpret, guide and lead’. Exegetical work was carried out by scholars through the critical explanation or interpretation of religious texts such as the Bible (Oxford English Dictionary n.d.). An exegesis has other names: critical essay, written documentation, dissertation, annotation or even studio report. The exegetical audience has become, not just the doctoral candidate as the author of the exegesis, but also supervisors, examiners and the university community. This demands careful writing both as an artist and as an academic. Kroll (2004, n.p.) insists “the creative PhD is therefore an ideal site for contesting voices where theory and practice clash”. Referring to her own doctorate in Australia, Corcoran (2010, p.10) describes the A&E as “an ascending spiral of concepts, a whirlwind of theoretical and creative ideas colliding and amalgamating to eventually produce an informed, creative and technically developed comprehensive project”.

There are several forms of exegesis. One, for example, where the artist, with a subjective, critical and interpretivist viewpoint, reflects on self to examine her/his artistic practice. Hence practice interacts with research to contribute new knowledge or a novel way of doing things. Alternatively, the artist may reflect, using a suitable theoretical lens, on what the artefact reveals about the world from which it came

and with which it interacts. This is explained in the section on ‘Tentative Pathways for an IS PhD by A&E’.

Artefacts are a normal output in the visual and creative arts disciplines, whether by professional practitioners, or by scholarly academics. The artefacts may be in the domains of fine art, dance, film, theatre, music, creative writing, games, which, in many ways “speak for themselves” as works, open to interpretation and critique. Each of these fields however also has a body of knowledge, both theoretical and reflecting practical know-how, that is at least partially formalised, transmittable and with historical developments and variations which allow informed critique and assessment.

Although these artefacts have not traditionally been recognised within the academy as ‘scholarly’ in the sense of a contribution to knowledge, many universities in recent years have begun to recognise artefact-based research as a legitimate basis for a PhD and have specified criteria for PhD awards in various arts fields not previously recognised in this form. This distinguishes the research as a substantial academic contribution as opposed to a (professional) doctorate named for its subject area, such as a Doctor of Fine Arts. The history of artefact-based doctorates in Arts and Humanities is quite recent in Australia, introduced in 1984 by the University of Wollongong and the University of Technology Sydney (Candy 2004). This form of PhD was only recognised in 2010 as research under ERA (Excellence in Research in Australia) and thus eligible for research funding (Krauth 2011).

Candy (2006, p.1) published a guide for use in the field of creative writing research. She describes two types of practice-related research: *practice-based* when the creative artefact is the basis of the contribution to knowledge. For this type, creative outcomes from the research process may be included in the submission for examination along with the claim for an original contribution to the field. The other is *practice-led* when research leads primarily to new understandings about practice and the inclusion of a creative output for examination is not essential. Paradoxically, other academics in creative writing such as Arnold (2012, p.19) describes *practice-led* as an “umbrella term indicating that the practice leads the research rather than being announced as merely the subject of it”.

Tensions arose from the 1990s between the idea of ‘art as professional practice’ and ‘art as research’ (Fletcher and Mann 2004). According to Butt (2012, n.p.), the blame rests with science, specifically psychology, since -

... within the scientific university, the psychology-influenced educationalists have generally had their hands closest to the rudder of curriculum, leading the development of ‘creative doctorates’ in US colleges of education throughout the 20th century, adapted from the emergent models of the social sciences ... with artists encouraged to stabilise their own work and explain its contribution in a highly unproductive objective style.

Butt (2012, n.p.) vehemently decries the worth of such an objective style claiming that “... a written exegesis usually hinders great work ... existing only to allow a bureaucratic calculation of the student’s acceptability for an awarded degree” and that it is not customary for an artist to critique her/his own creative work. Arnold (2015, p.169) argues that intellect and thought, associated with an exegesis, are not separate from the imagination, senses and memory, associated with an artefact. In her field of creative writing, Boyd (2010, p.3) acknowledges the tensions but considers it to be almost *passé* in view of the high number of creative arts PhDs which have been awarded in recent years. She was well qualified to comment having completed her PhD with a study of 200 creative writing doctorates submitted in Australia from 1993 to 2008.

Kroll (2004, n.p.) notes “There is no doubting, however, that being made to articulate your practice, to place it in a theoretical context and to periodically explain and defend your strategies to supervisors will alter what you accomplish. The product and exegesis usually develop side by side”. Krauth (2002, n.p.) views the exegetical component of a PhD as a “positive concept - it provides the opportunity for a pre-emptive strike by the writer against the examiners.” With creative writing PhDs still relatively young, Boyd (2010) notes that attention is focussing more on shaping the discipline and developing academic language. While the contestation appears to have abated somewhat with the establishment of the ‘creative work plus exegesis’ model, uncertainty remains due to a lack of clarity regarding the exegesis component of the thesis model (Nash 2004). In writing of creativity within the academy, Arnold (2015) speaks of the ‘subjective academic narrative’ style in the exegesis. In doing so, she uses terms such as ‘self as data’, ‘ego histoire’ and ‘autoethnographical’. This style of writing is associated with reflective journals which are often subjective and personal, and may not be easily transferable to more scientific disciplines that expect scholarly work to be objective and depersonalised. Bourke and Neilsen (2004, n.p.) warn against a style of journal writing which they categorise as ‘first order’, being ‘intuitive,

instinctive, non-reflective' and too easily 'faked'. In contrast, 'second order' journal writing is 'writing about writing', evaluative and self-critical with a 'well-articulated awareness of the research practices in evidence in the creative work'.

Even though Butt (2012) complains of the incursion of science into arts, in this paper, we ponder the inclusion of a creative arts-style A&E into the IS discipline. There are some precedents regarding acceptance in non-humanities academic fields, now established in the academy. Psychology for many years aspired to be a classical science, and its dominant methods and models reflected that in university education, research and journal values, particularly with the dominance of Behaviourism for most of the 20th century. Only comparatively recently did Psychology more fully accept non-experimental approaches more suited to many aspects of its proper subject matter, and concepts, such as mind, consciousness, introspection and subjectivity, together with qualitative methods, re-emerged as legitimate academic activities.

Many artefact-based doctorates, with higher-degree research (HDR) training, privilege written work, demanding skills beyond those strictly required to practice in a field, and shift the criteria back towards the common currency of research norms. These include historical or theoretical contextualisation, critique of the limitations of previous work, application of a (replicable) and recognisable process or method, a discovery or some sort which is reflected upon and itself critiqued before addition to a body of knowledge as a professional resource. Identifying a well-formed research question in advance of choosing a suitable method to answer it is, however, the opposite to what is needed in the Arts which is often a tacit or intuitively guided exploration which only gradually takes form. The necessary subjectivity and emergence of many artistic choices may not always be available to conscious introspection, which in any case may be retrospectively constructed

3 Accommodating Practice at the Doctoral Level

While the artefact-based doctorate in Arts and Humanities is recent in Australia, professional doctorates based in practice have a longer history in a number of academic fields. In Psychology, for example, opinions have differed on the balance between research and practice requirements at the doctoral level. During the heyday of Behaviourism, the American Psychological Association (APA) recognised that clinical practice involves both science (rigour) and art (social sensitivity). This stance has long informed debates in the field, with an implicit subtext that science is academically superior to the practical arts, reflected in the relative esteem in which a PhD in Psychology is held compared to the PsyD (ThoughtCo 2017). Other examples of professional doctorates include the Doctor of Education, Jurist Doctor, Doctor of Business Administration and, arguable, Doctor of Medicine. The professional doctorate is practice-focussed and complements the theory-oriented PhD in those professional disciplines. Largely, these professional programs view practice as the phenomenon of study. While there are some IS professional doctorates (eg QUT), they do not seem common. Distinguishing between the professional doctorate and the PhD still does not address the question of the role of the artefact.

The computing disciplines began to become reified as a field only from around 1950, generally emerging from within the Mathematics or Engineering departments. Whilst theory was initially often referenced to mathematical foundations, the applied nature of much the field has come to dominate research, especially as it mushroomed and diversified. In practice, documentation of various kinds has long been required accompaniments to professional software development, much as an exegesis accompanies an artefact. However, as systems development is a team activity, the roles of writing software and writing documentation are often specialised to different sorts of professions. Indeed, this aspect is often assessed in undergraduate software development projects - it is not enough to write code: the relationship between its form and function must be articulated and focussed to a particular readership.

Just as the way of thinking of the software developer is quite different from that of the documenter, the way of thinking of the artist is different from the author of a thesis. Still, a substantial written research contribution is expected for higher-degree research study with artefacts (such as software code) considered as supporting work, and not in itself assessed as the primary contribution. It is in this context that we argue for a consideration of the A&E approach for certain cases of research in the computing disciplines where a significant artefact has been created.

4 The Artefact in the IS PhD

Our underlying argument is that, Information Systems is a multi-faceted academic field, so can, and should, support a range of research approaches - from the scientific through to the artefact-based. An IT artefact may be produced to be relevant in a practitioner context and also innovatively designed,

cognizant of historical precedents, established methods, theoretical context and stance, and other intellectual criteria that provide rigour, replicability, scope of applicability and a clear contribution to a knowledge base that qualifies the work as research. In recent years, a previously vexed tension between rigour and relevance has been conceptually addressed in the still emerging field of design science research (DSR). In this section, we explore the qualities of DSR against the academic conceptualisation of research output in creative fields for which the A&E model is appropriate.

Although the previous discussion has been framed in terms of doctoral awards, such criteria extend to research generally, and to the acceptability of papers for quality publications. In 2015, a distinguished ICIS panel (Baiyere et al. 2015) recognised and discussed the contrasting contributions of design science researchers towards either the artefact (Hevner et al. 2004) or design theory (Gregor and Jones 2007). This was an issue also considered by Goes (2014) in a MISQ editorial. Although design is fundamentally a creative activity, this does not imply that it is not rigorous, nor that theory cannot emerge from a reflective analysis of process. In a 20 year review of ECIS papers, Stein et al. (2016) noted the emergence of design science and the potential value of ‘theory-light’ papers. They found Iivari’s (2014, p.109) design science research ‘Strategy 2’ (which is initiated by the real problems of practitioners), promising in this regard, echoing Gray’s (1996) definition of practice-led research as identified by practical needs and involving methods familiar to practitioners.

4.1 An Alternative to Design Science

Design science research has emerged in recent years as an important approach in Information Systems. Contrasted with “behavioural science”, the “sciences of the artificial” were characterised by Simon (1996, p.5) such that -

1. *Artificial things are synthesized (though not always or usually with full forethought) by human beings.*
2. *Artificial things may imitate appearances in natural things while lacking, in one or many respects, the reality of the latter.*
3. *Artificial things can be characterized in terms of functions, goals, adaptation.*
4. *Artificial things are often discussed, particularly when they are being designed, in terms of imperatives as well as descriptives.*

At this level of abstraction, a painting and an IT artefact may be considered equivalent. All the same, distinctions are becoming apparent. There are differences between critical writing based on clinical practice as in Psychology and an exegesis about a creative product such as a painting or an IT artefact which may be considered practice-related. The line of work by Shirley Gregor and her associates (Gregor and Iivari 2007; Gregor and Jones 2007; Gregor and Hevner 2013) have provided model criteria for design science in IS, which broadly encompasses all practice-based IS research.

Key papers on what was to become design science emerged in the 1990s. The seminal paper by Hevner et al. (2004) established a guiding framework for IS research with the artefact at its centre. Developments since that time have addressed perceived biases and deficiencies in that formulation, proposing, in particular, for greater attention to theory (Venable, 2006) and against over-valuing the rigorous building of a technological artefact at the expense of understanding its active context (Sein et al. 2011). More recently, Iivari (2015, p.107) has contrasted the currently dominant ‘Strategy 1’ approach of designing a general problem solution, independent of specific practice with ‘Strategy 2’, where the researcher builds an artefact to solve a real problem in a specific client context and distils prescriptive knowledge of general value from that. He is agnostic as to whether one or other strategy is better for theory building, and generalisation is problematic from an instance whether in a lab or field context. These research strategies have affinities with the models of A&E outlined in the next section.

5 Tentative Pathways for an IS PhD by A&E

In this section, we inspect some published university exegesis regulations to draw an equivalence between the goals and products of DSR and the A&E model. It is noted that getting to a position, where forms of research consisting of both practice and theory are accepted by the arts and design colleges of universities as worthy of their highest award, has been somewhat controversial. Gray (1996) describes the “squashing” of artistic practice into traditional (respectable) scientific forms, whilst Milech and Schilo (2004, p.9) address how the “prevailing regulations for HDR study do not ‘naturally’ translate to the experience of research students in the creative and media arts”.

In this section, we provide models of A&E from the web sites of three Australian universities (Curtin, Deakin and the University of New South Wales) and a little of their potted history. Milech and Schilo (2004, n.p.), with examples drawn from Mann and Fletcher (2003) who were keen to clarify the nature and role of the exegesis in Australian higher degrees, relate how a thesis proposal involving creative work plus exegesis was rejected by Curtin University's regulations in 1990. That event subsequently led to the accommodation of such theses at Curtin University (2017), as the web site illustrates -

... the exegesis does not provide a direct commentary on the production, nor does the production simply illustrate the exegesis—rather both elements maintain the integrity of the specific discourse (or language) in which they are created, and “speak to” each other through their common purpose of elucidating a response to the research question. (The exegesis, however, may refer to the production and/or contain commentary on the production as an appendix or a subsidiary portfolio).

Milech and Schilo (2004, n.p.) recognise and discuss three A&E models for such theses. These models reflect varying priorities regarding theory and the artefact itself, and examination regulations likewise embody different values:

- 1) the *context* model, which has major focus on the historical/disciplinary context(s) of the work;
- 2) the *commentary* model, with an emphasis on the creative work itself plus an explication, and
- 3) the *research question* model, where neither the creative product nor written document is privileged, but independently provides answers to a research question, which can evolve and refine over time.

In the *commentary* model, the exegesis is secondary to the artefact, whether it is a cursory ‘annotation’ or a fuller ‘report’ locating it in research *context*. Designs following ‘Strategy 1’ (Iivari 2015) are often a conceptual proposal, illustrated by a prototype, and perhaps summarily evaluated. In the *research question* model, both components (artefact and exegesis) are equally honoured as different expressions of the ‘answer’ to the same question using appropriate norms: for example, so that a painting can ‘speak for itself’ as an artefact but can be academically critiqued according to art theory and history. In ‘Strategy 2’ (Iivari 2015), the artefact is *a priori* bound to be relevant, and originates as a functional product for its users, but theory and design principles subsequently distilled from it follow a research logic separate from the building activity itself.

The web site of Deakin University (2017, n.p.) stipulates another example of relatively traditional A&E models -

Theses in the creative arts (visual arts, media arts, performing arts and creative and professional writing) may be presented in one of two forms: a conventional written thesis, or a thesis comprising creative work and a supporting written exegesis. In the creative work plus exegesis model, both components are examined. Together they need to demonstrate a substantial original contribution to knowledge.

The purpose of the exegesis is to elucidate the creative work's themes and/or place it in a disciplinary context and/or explore the creative processes involved. In the latter case, it may provide guidance to the examiner regarding the sequence of development in the creative work.

In the examples of university regulations cited by Milech and Schilo (2004, p.8), expectations range from a “brief explanatory annotation” (at sub-PhD level) to presenting “the research framework: the key questions, the theories, the disciplinary and wider contexts, of the project”; that “tells the story of the research: its aims, its methods, its achievements” and relevant critical debates that inform and position the work.

In discussing the evolution of the exegesis, Krauth (2011, n.p.) writes ‘in the early 2000s, there was plenty of room for experimentation’ as creative writing PhD candidates tested the university regulations regarding A&E requirements. Most notable was Boyd (2010, n.p.) from Griffith University who argued that there was no logic in the “need for a link between an exegesis and its accompanying creative product”. She claimed that her creative component, a feminist sci-fi private detective novel for young adults, was a valid research contribution in its own right, while the exegesis, “a massive study of 200 creative writing doctorates submitted in Australia from 1993 to 2008, included much statistical work, and many graphs and tables” was also a valid contribution to the discipline (Krauth 2011, n.p.). Boyd's PhD submission was successful despite the exegesis not being artefact-based.

What followed was a more flexible notion of the relationship between the exegesis and the creative component. This is particularly the case at the University of New South Wales (UNSW) which is entirely committed to flexibility. The web site of the UNSW School of the Arts and Media (2017, n.p.) states:

*Unlike many other writing programmes, we do **not** encourage an exegetical relationship between these two components, where the critical work makes manifest the aesthetic and theoretical rationale for producing the creative work, or provides an interpretative template for assessing it. Instead, we encourage a far more flexible connection between the creative and the critical: a complementary and dialogic relationship, rather than a supplementary and explanatory one.*

As Krauth (2011, n.p.) notes “the creative writing exegesis has picked up momentum on its liberating trajectory. A similar trajectory is now predicted for the creative component”.

5.1 Exegesis Doctoral Supervisors, Candidates and Examiners

The process of developing and presenting a PhD for examination could be viewed as an IS process. In writing about how to conduct, present and examine DSR, Gregor and Hevner (2013) and others have rightly started specifying the process in a more formal manner by considering stakeholder interests and power in the organisational context, specifying outcomes and benefits, designing tasks and products, setting criteria for evaluation of outputs, considering the skills and knowledge required to perform tasks and how these might be acquired, and looking into supporting technologies, with more to be usefully done.

All disciplines attempt to give advice to those involved in their research enterprise. Arnold (2012, p.15), in her studies of practice-related research, considers key areas which are central to good supervision in creative practice. By means of a 1 to 10 trajectory, she identifies:

- 1-7. 'hands-on' supportive supervision/interaction*
- 8. acting as a critical friend*
- 9. quasi examiner*
- 10. submission, waiting, result, exultation, glory!*

The steps below correspond to those which could be taken by an astute doctoral candidate.

- 1. prepare proposal and selection of supervisors*
- 2. work on journal commences and proceeds, avoiding the 'first order' style reflective journal in favour of a more critical and evaluative one.*
- 3. reads in chosen genre. The artefact must sit well within its own genre, field or domain.*
- 4. begins to write rough first draft of artefact such as painting or novel. This is comparable to designing and building an IT artefact.*
- 5. reads other writers on writing in this genre.*
- 6. continues to build the artefact. The major new and significant contribution to knowledge or theory is that it can be situated within current academic insights and debates into issues that have arisen from the writing/building of the artefact, and from the reading of genre, other writers' insights and academic materials.*
- 7. plan exegesis to rough first draft. The writing journal can be mined for headings as issues arise regularly throughout.*
- 8. revise, revise, unpeel, relate, reference, check rewrite edit, edit, edit.*
- 9. meet supervisors' quasi-examiner advice/demands/expectations towards the second half of the second year. There has already been a long interpersonal relationship between supervisor and candidate.*
- 10. submission, waiting, result, exultation, glory!*

Each university has their own A&E regulations. This template from the creative arts could be usefully adapted for IS.

6 Critical Issues and Open Questions

In this section, we present some underlying issues and questions which surfaced in the consideration of alternative approaches to the IS PhD.

The first question to be asked is, is the academy purely self-defining or are there theories and principles external to it that can serve as a foundation for discussion? One view might be that the academy generally, its disciplines and its specific institutions decide through purely political and social mechanisms what forms its activity will take. Institutional economic considerations and academic employment would then be the bedrock with an overlay of social status with attendant titles, awards, committees, incentives, punishments, panels, transient rules and other control mechanisms determine contingently what forms of PhD are acceptable and the conditions under which they are so. The AQF provides some external guidelines for a level 10 qualification which clearly admit a range of acceptable forms, criteria and responsibilities:

Responsibility for accreditation: “accrediting authorities must ensure that ... graduates will have undertaken a program ... that produces significant and original research outcomes culminating in a thesis, dissertation, exegesis or equivalent” (AQF 2013, p.65)

Criteria: “Graduates at this level will have systematic and critical understanding of a complex field of learning and specialised research skills for the advancement of learning and/or for professional practice” (AQF 2013, p.63)

Knowledge: “Graduates of a Doctoral Degree will have ... a substantial body of knowledge at the frontier of a field of work or learning, including knowledge that constitutes an original contribution” (AQF 2013, p.64)

However, these outer limits provide little constraint on 'self-accrediting' institutions and disciplines. It could be argued that 'anything goes' (Feyerabend 1975, Porter 1934). Alternatively, it may be that the bedrock lies in the utility of knowledge in humankind's curation of the planet and all its populations. Utility here has an ethical quality, not just an instrumental one. If so, then the form becomes less important than the possible impact of work.

A second question concerns the nature and dynamics of knowledge itself. In previous sections of this paper, two contradictory positions have been put concerning whether or not an artefact can embody knowledge. One says yes, 'let the artefact speak for itself' the other says no, explicit knowledge is abstract and may only be embodied in a sentient or artificially sentient being. The first view is that there are 'knowledges' all of which should be admitted; that the artefact is the contribution. The other says that the PhD is for abstract knowledge only; the artefact is mere instrumentation in the service of knowledge creation. There is a continuum of positions between these extremes. Paltridge et al (2011) found a similar continuum in their study of 'doctoral offerings in the visual and performing arts' and presented two case studies, one from each end of the continuum they detected.

Further, what constitutes the 'knowledge' to which many institutional PhD specifications require a 'contribution'? Is it just ever-expanding libraries and journals; or is it a 'stock' (in the systems dynamic sense) which is increased by publication and decreased by depreciation (low citation) and cemented by re-publication to a practical audience through text books, etc. (Bauer 1994)?

Thirdly, considering the A&E form of the PhD raises questions about the nature of 'design' (verb and noun) within IS. The concept of design and design thinking is very multi-disciplinary and diverse. For example, Lidwell et al. (2003) argue that their *Universal Principles of Design* 'enhance usability, influence perception, increase appeal, make better design decisions and teach through design' which has little to do with theorising 'design'. The PhD program is a designed artefact, a particular PhD submission is a designed artefact, DSR is a designed artefact ... do we get into an infinite regress asking 'where is the design theory behind this artefact?'.

Lastly, there is a duty of care to candidates which limits the types of research that they can undertake. As Baiyere (2015, p.3) notes “It is also of concern to some DSR researchers that what is required of a DSR paper appears to be almost Herculean compared to other possible research approaches”. Perhaps the A&E approach may address this concern somewhat. There are, of course, other ways. For example, team project-based research is common in scientific disciplines but very rare in IS, yet most IS practice is exactly in that mode.

7 Conclusion and Possible Future Work

The concept of artefact and exegesis is becoming well established in artistic fields which create artefacts as part of their practice. In this paper, we have argued that A&E may provide a model for a particular kind of PhD research in IS, namely, research in which an artefact is created although it may not be the centrepiece of the study. This contrasts with research which sees an artefact as the phenomenon under study or research which relies on professional practice.

As IS strives for theoretical respect as well as practical relevance, traditionalists who have dismissed the possibility of a theoretical IS by defining theory in narrow, classical scientific terms have largely retreated and IS is showing a growing maturity. The approach of DSR is particularly relevant in IS scholarship, and not just because it properly locates its subject matter with respect to rigour and relevance. Perhaps there is an additional way to achieve this under certain circumstances.

In preparing this paper, the authors have reviewed literature from a range of disciplines, studied the requirements for A&E research in many Australian Universities, reviewed PhD theses that involved artefacts and considered what some of these works might have looked like had they been presented in the A&E form. Interestingly, the authors are not of the same mind about this subject, which is a valid reason for raising it!

In future work, we will continue to examine documentary evidence on the subject and will broaden the research into interviews with candidates, supervisors, examiners and program administrators. This work may generate a well-grounded design of an IS PhD by A&E which, perhaps, may be evaluated to assess both its effectiveness and applicability.

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