Research Through Design Fiction:
Narrative in Real and Imaginary Abstracts

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ABSTRACT

This paper reflects on the uses of prototypes in "Research through Design" and considers "Design Fiction" as a technique for exploring the potential value of new design work. It begins with an analysis of Research through Design abstracts in the ACM digital library and identifies an emerging language and structure of papers in this emerging field. The abstracts: frame a problem space, introduce a study, often involving the deployment of a prototype, and conclude with considerations, reflections and discussion. This format is then pastiched in a series of design fictions written for a project investigating new and emerging forms of reproduction in Art. The fictions take the form of "imaginary abstracts" which summarize findings of papers that have not been written about prototypes that do not exist. It is argued that framing concept designs as fictional studies can provide a space for research focused critique and development.

Author Keywords

Research through Design, Design Fiction, Prototypes

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

WHAT IS THE POINT OF A PROTOTYPE?

As the field of Research through Design takes shape researchers are asking fundamental questions about the foundations of design-based enquiries [e.g. 23, 58]. What is the value of designing digital artifacts in research? What is the point of a prototype? Zimmerman and Forlizzi [58] argue that making research artifacts allows researchers to address complex or "wicked" problems and evaluate how current and future technologies may effect people. They make it clear that the aim of such work is not to produce commercial products but rather to apply design practice to new problems in order to create knowledge (Ibid). However, they also claim that findings will be more acceptable to the HCI community if there are agreed forms of "practice, evaluation and outcome" and suggest more

systematic or scientific approaches to theory development (ibid).

Other practitioners have taken issue with this stance. Gaver [23] points out that taking a more scientific approach is not a straightforward proposition as there are conflicting accounts of what constitutes science. For him research through design is not repeatable, generalisable or indeed falsifiable because its claims are vague − sometimes ambiguity creates useful features, sometimes not. But he also points out that there are many points of agreement within the community: it is generally acknowledged that involving end users is important and exploring alternatives through sketches and scenarios, is crucial (ibid). He ends the discussion with a call to traditions of annotation such as those accompanying the design catalogues of Dieter Rams. This last move is interesting because it calls not on traditions of science or social science but rather the Arts.

The problem with Arts based practices in studies of Human Computer Interaction (HCI) is that they do not sit well with previous forms of conducting research in this field. As HCI takes what is being described as a "cultural turn" it must struggle with the same issues that have troubled the Arts. Responses to art are inherently subjective, one person likes it and another does not. Increasingly evaluations of design prototypes look like this. Some people like this or that prototype but others do not like it at all. Such findings are inconclusive because the researchers do not seek to generalize. Why then ask anyone what they think of a prototype? Why make a prototype at all if no hypothesis is being tested? A standard answer, based on Schon [47], is that design is a material exploration of a problem. But what precisely is to be learned by such explorations? What purpose is served by deploying prototypes in field studies? Is it necessary to make prototypes at all?

Research through Design in the context of academic conferences is clearly not commercial product development. Academics are not trying to develop preliminary versions of devices for later mass production, nor are they typically engaged in market research. There is however a certain amount of confusion about this in the popular press and some academic writing. This confusion is, in part, political, as the institutions in which such research takes place are undergoing change. In the UK and much of Europe it is now argued that universities should primarily serve the interests of industry and contribute to

the economy in some way. Universities have, regrettably, accepted these new terms almost without struggle. There is then a tendency in framing research to emphasize the possible commercial applications research. This framing often finds its way into University press releases about research prototypes [54].

In a recent book Morozov castigates the "solutionism" he detects in many research prototypes [38]. Borrowing the term from Architecture, Morozov characterizes solutionism as quick technological fixes for problems that don't exist. Or badly thought out solutions for problems that will never be solved by technological intervention alone. Morozov seizes on "BinCam" as a particularly insidious example. Here a phone in the lid of a bin takes pictures whenever it is closed. It then sends the images on to Facebook where friends can make judgments about how wasteful or environmentally responsible the user is (ibid). The Daily Mail, a right wing British tabloid newspaper characterized this as an attempt by local government to instigate a totalitarian surveillance state. Morozov claims it as an example of the way that "the geeks" think "the internet" will save us from environmental catastrophes and other complex problems. If BinCam were a prototype of a commercial product such criticism might be justified. But research prototypes are intended to generate knowledge not products. As a research prototype BinCam was all the more interesting because it generated such a furious backlash in the media.

But concept designs can be usefully discussed without necessarily making them. How much is learned through the actual process of making? Is it always necessary to create prototypes? There is growing interest in Design Fiction which present "fantasy prototypes" in plausible near futures [e.g. 51]. This paper presents what might seem a shocking argument: if design fiction and fantasy prototypes can be a useful means of exploring a design space then perhaps fictional user studies might be a means of reflecting on what might be learned through prototype development. This paper is then, primarily a provocative argument although it is based on real issues in the field.

The following section provides an overview of the language of Research through Design and the kinds of claims made in academic papers. This analysis is drawn on to present plausible "imaginary abstracts" written for a live Research through Design project. Following an overview of the Design Fiction literature the paper presents several of these "imaginary abstracts" describing prototypes that do not exist and studies that never took place. It is argued that placing design fictions in the context of an academic abstract can help identify the value of possible prototypes for generating insight and answering research questions.

THE LANGUAGE OF RESEARCH THROUGH DESIGN

Although Research through Design is a very young field it is possible to detect what Foucault would call an emerging "discursive formation" [21]. This section sketches the language of abstracts in the ACM digital library returned for a search on "research through design". Though far from comprehensive it indicates the current shape of this kind of research and the scope of the claims made.

The first one hundred returns for the search "research through design" were collected on the 11th of July 2013. Most returns were clearly relevant to the topic but two were excluded because they contained the keywords though they were not addressing this topic e.g. a study of RFID tag ranges. The first 100 relevant abstracts were then analyzed using *Sketch Engine*. Sketch Engine is a corpus query system widely used in the field of computational linguistics. It provides corpus derived summaries of a word's grammatical and collocational behavior.

There were 15,889 words in the corpus and Sketch Engine was used to identify the most frequently occurring words excluding: definite and indefinite articles (e.g. the, a, an), prepositions (e.g. in, on, to, through), conjunctions (e.g. if, but, and) and pronouns (e.g. we, our, their). The top thirty most frequently occurring words (with the count in brackets) were as follows: design (451), research (180), interaction (98), use, (76) approach, (70), system (67), paper (67), user (60), process (55), product (50). technology (49), study (45), practice (45), develop (44), experience (43), present (42), HCI (41), social (40), people (39), need (38), development (38), provide (37), knowledge (37), explore (37), describe (35), work (34), and support (34).

Design is both a verb and a noun in English but in this corpus it is only ever used as a noun, as in "the design", or "the design process" or "the design approach". Design as a verb requires an object e.g. designing cars, designing interfaces. Here design is reified as a thing in the world itself. This is interesting because when design is a noun it is also an honorific. One person's "design" is another's gizmo or gadget.

"Collocate" is a linguistic term which indicates words in a given corpus that appear in relation to one another with a greater frequency than chance. The Sketch Engine Thesaurus function shows words that "collocate" in this sense. Here "Design" collocates most strongly with "Approach". The approaches in these abstracts are most likely to be "design approaches" (with 14 instances in the corpus), otherwise they are "holistic", "phenomenological", "ludic" or "different" (with 2 instances each). Less often (with only single occurrences) they are: questionable, quasi participatory, hybrid, observational, scientific, exploratory, speculative, participatory, action, people-centred, designerly, innovative, documentary and iterative.

The word evaluation occurs only three times in the corpus. Exploration is much more likely than evaluation. If papers do not "explore" then they: describe, consider, discuss, investigate, present, reflect, or develop. The abstracts focus on: a community, a group, a space, experience, participants or, less often, people. There is a recurring structural form in

these abstracts. The form is generally: a frame which describes a problem space, an account of a prototype or study, and findings which inform discussion and arguments.

The Frame

Abstracts often begin with a sentence that sets up a problem space. For example: "While quite effective at keeping things together, bags do a poor job of communicating when something is missing." [44]. These may be particular problems relating to kinds of technology, e.g. "While virtual possessions have become ubiquitous, little work exists to inform designers on how these growing collections should be displayed and how they should behave." [42]. But problems can also be framed as relating to particular people and situations, for example - "Uneven access to Information and Communication Technologies (ICTs) in parts of the African continent make it challenging for some Africans who migrate to the U.S. to communicate with family members in their countries of origin" [57]. In this corpus the problem space is sometimes the research field itself [e.g.23, 58] but more often the introductory framing is a remark about the increasing popularity of a new technology and this in itself justifies the study because, by definition, little is known about it.

The Prototype and Study

Many of the papers in the corpus describe a design artifact. These are very often named with neologisms e.g. Linguabytes [28], Knoby [32], Panavi [52]. Other devices have compound names like the Sonic Cradle [53], The Reverse Alarm Clock [43], The Significant Screwdriver [3]. These devices are often featured in the title of the paper and introduced in the abstract with a very brief description e.g. "Sonic Cradle is a chamber of complete darkness where users shape a peaceful soundscape using only their respiration" [53] or briefer still - "Knoby, a pet-like interactive door knob" [32]. Often these descriptions are so brief that they are suggestive rather than descriptive and therefore somewhat ambiguous. There is often a study with a brief account of results and occasionally short vignettes are included to illustrate the success of the design e.g. "After the study had ended and the systems were removed from the schools, the teachers kept reaching for the devices and mentioned they missed FireFlies" [1]. Studies may refer to field studies of prototypes or interview studies with participants.

Findings and Discussions

The results of studies are occasionally framed as "arguments". These may be around the ways technology should be designed e.g. [34] but occasionally the argument is political [e.g. 9]. Much more often the results of the findings inform discussion, reflection or consideration. Unlike lab based experimental studies Research Through Design seldom if ever states a hypothesis to be tested. Rather the making of the prototype is the process by which a problem space is explored. Field evaluations sometimes

position particular designs as "promising approaches" or even best practice [23] however the results are rarely uniform and are often nuanced.

Research through Design is a vibrant and dynamic field, which is still forming and therefore likely to change, but there are some patterns in the literature. In brief, Research Through Design often describes: an approach, a practice, a process, a framework, a method, or a technique. It is usually developed for: a community, a group, participants or people. It frequently describes: a product, an application, a system, a technology or an interface and these are likely to be - multi media, smart, new, unexamined or emergent. The work is usually an exploration but if it does not explore then it will: consider, discuss, investigate or reflect.

Given that Research through Design does not offer generalisable or repeatable findings but rather discussion, exploration and reflection it may be that design fiction could be considered as a complimentary (though different) practice. The following sections outline the practice of Design Fiction and consider how it might be applied to Research through Design.

DESIGN FICTIONS

There is currently much interest in HCI around "design fiction" [e.g. 50, 4, 36, 31]. The term was coined by the science fiction writer Bruce Sterling who teaches a course on it at the European Graduate School and writes a blog under the same title [50]. In his 2005 book *Shaping Things* [49] Sterling offers an early account which relates it closely to science fiction: "The core distinction is that design fiction makes more sense on the page than science fiction does" (ibid). As part of his design fiction Sterling develops "fantasy prototypes" drawing on the work of consultancies like Superflux and Dunne and Raby's "critical design". He sees the practice as disruptive and subversive and in a recent conference keynote address offered a more formal definition of design fiction as: "the deliberate use of diegetic prototypes to suspend disbelief about change." [51]. The emphasis here is on diegesis, or narrative, but it is not limited to text and can include objects.

A recent special issue of the journal *Digital Creativity* sought to provide an introduction and partial taxonomy of design fiction [27]. This taxonomy includes near future science fiction [e.g. 50, 30] with prescient novels like William Gibson's "Pattern Recognition" as the paradigmatic examples. Design fictions can take the form of narratives, short stories, films but also objects and semi-working prototypes. The taxonomy includes work which positions design fiction as a design technique [4] but also includes its use in corporate propaganda. Microsoft and Phillips have both presented design fictions in promotional films bearing, according to Gonzattoa and van Amstela, the implicit message – "don't worry the future is safe in our hands" [26]. Sterling also notes the corporate use of design fiction pointing to Google's release of YouTube videos showing various fantasy scenarios of Google Glass in use

[51]. Although it has corporate uses design fictions are more often conceived as critiques and provocations as in the "critical design" of Dunne and Raby [e.g. 20.].

Fiction has also been used critically to re-consider existing or emerging ubiquitous computing technology. Dourish and Bell [19] used science fiction as a lens through which to view ubiquitous computing, pointing out that what design scenarios typically leave unsaid is the implicit social and political context of a design. But it is not only science fiction that has been incorporated into the design literature. Wright and McCarthy argue for the value of the novel and novelistic techniques in terms of gaining a greater understanding of felt life [56]. DiSalvo recently suggested that fictional design and critical design can be more broadly conceived as "speculative design" arguing that the use of "tropes" (figurative language like metaphor, irony and hyperbole) can be tools to craft meaning [18]. But Design Fiction is not entirely new in HCI.

Scenarios, Personas and Storyboards
It has long been standard practice in HCI to develop scenarios, storyboards, and personas to illustrate potential technologies and services [e.g. 12, 15]. Scenarios have been used to summarize the results of requirements analysis [e.g. 14, 39], illustrate findings from field studies and as the input to creating a design rationale [16]. Often these scenarios lacked detail and the imagined "users" were little more than a name. Cooper [17] advocated the use of more developed personae where at least age, occupation and gender are known. Lene Nielsen [41] later critiqued such persona as little more than stereotypes, arguing that more character based scenarios would lead to deeper understanding. Literary techniques such as pastiche have been used to place concept designs in different fictional worlds, some from science fiction e.g. 1984 or A Clockwork Orange, but also other cultural contexts like Agatha Christie's Miss Marple stories or the Simpsons [8, 7]. Newell et al [40] recruited actors to play the parts of older people and improvise responses to concept designs during workshops. Briggs et al [12] made short films where characters discuss imaginary technologies such as the "biometric daemon" a device discussed but never seen.

It could be argued that HCI scenarios cannot be considered as fiction because they have some factual basis. They are usually concerned with designs which are soon to be carried out. But Mark Weiser's seminal article exploring ubiquitous computing in the early nineteen nineties is illustrated with scenarios or fictions as rich as any near future imagined by William Gibson. In a 1991 special issue of *Scientific American*, Weiser describes the Computer of the 21st century through the eyes of "Sal" [55]. She is described waking up, having breakfast and going to work and at each point she is aided by a range of technologies that did not exist at the time. She looks out of her windows and sees "*electronic trails that have been kept for her of neighbours coming and going*" [55]. These smart windows tell her that

her kids are up. At breakfast she circles a newspaper article she is reading and the pen sends it to her office. Driving to work she looks through a "foreview" window that lets her know that the traffic on her planned route is slow. Once at work she collaborates on a shared document with a colleague on screen. The notes on previous meetings feature biographical details about all attendees in a searchable form.

Many of the literary devices employed in Weiser's scenario are borrowed from science fiction. One of the staple tropes of science fiction is the invention of new words and argots. The prose of Philip K Dick, for example is littered with neologisms like "conpat", "pape", "precog" that are at first almost impenetrable. These neologisms are not defined, they are addressed as if to contemporaries of the characters who would understand them perfectly because they inhabit that world. Weiser employs the same device with neologisms like "foreview", "telltale" and "tabs".

But this does not mean that there is an easy equivalence between HCI scenarios and fiction, they are not quite the same forms. There are important functional and structural differences. For instance, most design scenarios are written in the present tense, the Sal scenarios being a good example. Television and film scripts are also usually written in the present tense. Other forms of fiction, like novels and short stories, seldom are, so why this difference? Perhaps because, scenarios, like scripts, are in a process of becoming: they are there to be made into something else. A scenario is part of a process, a fiction exists in its own right. Perhaps for this reason also scenarios do not end, rather they stop, they are not resolved. For resolution to occur a conflict must be worked out and this is another structural difference between scenarios and fiction. Ubicomp scenarios resemble science fiction except for the omission of conflict, the basic foundation of all narrative [10]. The use of fiction can open scenarios up for the inclusion of social and political conflict in design thinking [5].

It may be for these reasons that there is so much interest in design fiction, but perhaps also why there is hesitation and doubt. In what sense could fiction contribute to knowledge or design? The following sections report the use of design fictions in a research through design project investigating new forms of Art reproduction [5]. DiSalvo argues that speculative fiction must present a trope which relates ideas and objects in ways that can be interrogated and challenged if they are to be anything other than simplistic provocations [18]. In an attempt to relate concept designs to research questions fictional academic abstracts were written for a real project "Digital Originals".

PROJECT BACKGROUND: DIGITIAL ORIGINALS
It is a commonplace to note that digital technology has severely disrupted cultural industries such as music, film and television. The "digital originals" project took the much smaller world of fine art as a case from which to learn. Here technologies such as the iPad and the iPhone are also

challenging previous business models for artists [5]. For example, print makers such as David Hockney who use the iPad find it difficult to offer "limited editions" of digital paintings because the files can be easily reproduced with no diminution of quality at little to no cost (ibid). The project then investigated the notion of what a "digital original" might look like (ibid).

The project began with a series of ethnographic studies of practicing artists [6]. This was followed up by a series of iPad workshops with a collective of artists sharing studio space in a derelict building [11]. Three artists were chosen for further collaboration and many ideas were generated by the team during visits to their studios and workshops. So many ideas were generated that it would not have been possible, given time and budget constraints, to follow all of them to completion.

"Imaginary abstracts" were written, in part, to capture the ideas and to consider more closely whether any of them should be further developed. The following section draws on the analysis of real ACM abstracts to present plausible fictions.

In the words of the cultural critic and philosopher Slavoj Zizek, this "may sound a little bit crazy". The abstracts in the next sections report fictional studies and findings that require something like a "willing suspension of disbelief" from the reader. In other words, if you intend to proceed any further then please bear with me. This paper does not report empirical findings in the tradition of a group authored project paper. It is rather a reflective argument drawing on traditions of the essay in the Humanities.

IMAGINARY ABSTRACTS

Imaginary Magnitude is a work of science fiction by Stanislav Lem [33] that takes the form of introductions and prefaces to books written in the future. It is made up of summaries, quotations and critiques of texts that do not exist. It is an economical and evocative literary device picturing whole new disciplines and fields of study in brief paragraphs. The technique allows the author to play with ideas, plots and character without having to write an entire novel or short story. Although Lem has been described as the genre's Bach and Philip K. Dick as its Shakespeare, few would recommend science fiction for the music and poetry of its language. Science fiction is a literature of ideas and thought experiment. The anthology of prefaces and introductions to works that have not yet been written is a very pure expression of the form.

"Imaginary Abstracts" describe prototypes that do exist and report findings from studies that did not take place. They are in this sense design fictions. But the levels of fiction are multiple. They describe fictional designs but also fictional problem spaces and fictional findings. The following "imaginary abstract" describes a fictional prototype and a fictional field study with fictional results.

Coin Operated Public Projection: Paying to Avoid Public Art

The ease with which digital files can be copied has disrupted business models across the cultural industries. This paper considers reproduction in fine art and describes a coin operated art installation in a busy city centre. The NewBarn Art Collective is housed in a derelict building with several shop fronts facing the street. A system was deployed to display images on an empty shop window. The system drew on a database of images created by the artists and a coin operated slot on the street changed the image currently displayed to another random selection. The display received very little attention in the first days of the study until one of the artists added photographs of his own genitals to the database. The subsequent displays caused many pedestrians and bus passengers distress. The artist had added so many of these images that users often had to insert several pounds before another kind of image would appear. The installation was eventually closed down but not before the collective had made a tidy sum from the event. Public art, from the Angel of the North to Hirst's pregnant woman is often disliked as much as it is loved. Coin operated projections of this kind allow users not only to select but avoid public art.

This imaginary abstract takes some license with style but it frames a problem space as a Research through Design abstract might, it describes a feasible design concept and provides a fictional set of findings.

Like many fictions it has some basis in reality. The researchers did work with a group of artists working in a collective as described [11]. The notion of digital public art was one that the research team explored in a number of concept designs. The setting – the derelict buildings and the bus stop - exist as described. The coin-operated system was never made and of course the "findings" are entirely fictional. However, the risk of artists producing images that the public would find shocking or distressing was real. It is also true that many people dislike public art very much. Charging to change public art would perhaps be a viable if unethical proposition. The fiction is an exaggeration but it describes real possibilities.

Shifting the focus from the material questions of design to questions of how to frame the problem space and how findings might be presented emphasizes the role of prototypes in generating knowledge. What kind of knowledge could making such a system develop? What sort of questions might a field deployment answer? Although it may have been interesting to make such a coin operated public art system it was clear, after writing the abstract, that doing so would not answer the main research questions. Or not answer them in a very satisfactory or compelling way.

Of course such a concept, had it been developed, would very likely have changed through the process of making. It would have been work-shopped with the artists and may

have been transformed into something much more interesting than the original rather shallow coin operated art idea. This then would have been Research through Design. But the narrative presented in the abstract is also a design in the sense that it is a design fiction. It raises questions and explores a design space without committing too much resource. It allows for a number of possible outcomes to be generated and forces the imagined prototype into a research context.

About a dozen such abstracts were generated around different concept designs during the project. The following sections provide brief examples of the framings, prototypes, studies and arguments.

Imaginary Frames

Although the ACM Research through Design abstracts rarely state specific problems to be solved they do situate the work within particular discursive frames. An imaginary abstract called "Art Dispensing Machines; Labour Based and Symbolic Theories of Value" framed one imaginary paper with regard to different theories of value. Other framings followed the custom of noting a particular technological trend, e.g. crowd sourced investment. One abstract began with a particular theory of materials in the field*: "Pierce and Paulos [45] argue that an illuminated screen is "active" in that it demands attention in ways that inactive materials such as paper do not. It may be for this reason that digital frames have not become popular formats for the display of art. The "slow paper print" prototype explores activity through inactive materials"*. More often the setup would state the case that digital technologies had disrupted all aspects of the creative industries including the visual arts, as in the first example.

Imaginary Prototypes

Following the pattern in the research through design literature the names of the prototypes often featured in the titles of the abstracts e.g.: *"Juke Box Paintings: Ambient Environments in Public Spaces"; "UtopiArt: Micro-sponsorship through Unlimited Edition Prints"* and *"Art Lamp: Framing Digital Art in the Home"*. As with the ACM abstracts the prototype would be explained as briefly as possible. For example *"UtopiArt is a website which seeks to provide unlimited digital copies of work by new artists through micro-sponsorship"*. The form of the abstract dictates brevity and as previously noted there is an inherent ambiguity in the form. For example one "slowprint" drawing on the slow technology movement *"takes the form of a deep glass cage into which new prints of each day's work are produced to cover the previous day's image. A mechanical key activates the transition and the device uses no electricity. The frame fills up for the 111 days it took to complete the painting. The user may then leave the final image or repeat the process."* The description is vague enough to give an impression of a design rather than a precise account. It was hoped that such vagueness might

result in creative misunderstandings and further ideas. This proved to be the case with the idea of a slow "glass-print" which was imagined as some form of slowly changing projection on treated glass. When discussed with a collaborator this very vague description was transformed into a working prototype based on the Peppers Ghost illusion. This was not what the abstract was intended to evoke but was more useful for that reason.

Imaginary Studies

In order to consider what might be learned from actually making such prototypes, imaginary field studies were also included in the abstracts. These imagined the prototypes being well and also badly received. For example, the "art lamp" was not a success: *"Reactions in the home studies were mixed. Some family members enjoyed the novelty of the constantly changing images and ambient light. Others found it distracting and wanted something more static and tranquil. Subsequent iterations of the design added slow and stop facilities to the lamps and these were more acceptable. A dial was added so that content could be filtered by keywords such as: portrait, landscape and abstract. The final iteration of the lamp was given to the Art critic Brian Sewell who described it as "simply foul" and "one of the most ghastly things I've ever seen"* It is not unusual for research through design papers to describe "useful failures" but clearly not all failures are useful. The imaginary study suggested how failure might or might not be a useful finding. Other scenarios envisioned successful deployments. For example with the "visual juke box" abstract: *"Although the prototype was developed for a short term deployment each of the sites has requested that the system remain in place. It is argued that although payments to the artists are relatively small the project indicates future models for micro payments to artists"*. By imagining the results of a field study, rather than focusing on material questions of design, the fiction forces the question – would this be worth doing?

Imaginary Arguments

Most of the abstracts included an argument or interpretive conclusion. For example, when the art critic Brian Sewell gives a negative review of the art lamp the abstract ends as follows: *"Drawing on Bourdieu's "Distinction" the paper argues that aesthetic responses are neither universal nor timeless but rather expressions of social class."* This kind of argument suggests that a negative evaluation might nevertheless make an interesting paper. On the other hand, it might not, again forcing questions as to the worth of this kind of proposal. These arguments were sometimes framed as implications for future iterations of design. Other arguments drew on wider political and social contexts. For example *"The paper argues that the design exploited the potential versatility and mutability of digital formats more effectively than standard paper prints."* Again these "fictional" arguments were based on real research issues. Some of the arguments had been used in previous papers

and may be drawn on in future ones. Situating them in abstracts about imaginary prototypes again forced basic questions about what such design activity might contribute to the fundamental research questions being addressed.

RESEARCH THROUGH DESIGN FICTION

Writing up the concept designs in these pastiches of academic abstracts served multiple purposes. The first was practical in that it helped archive concept designs and also to identify ideas that were probably not worth taking any further. Platforms such as Arduino, Gadgeteer and new production facilities such as 3D printers mean that prototypes can now be designed and made relatively quickly. As prototypes become easier and cheaper to make a "because we can" mind set can be hard to resist. Situating a concept design in an imaginary abstract forces a consideration of whether any research questions are being addressed or not.

But the abstracts also served a more theoretical purpose. One of the project collaborators was working in the field of Business Studies and he was able to consider different models of monetizing designs even though they did not exist. The business models were largely theoretical and working prototypes were not necessary to consider the management and monetization issues [34]. There were then practical and theoretical benefits to this "slightly crazy" practice.

Although the examples in the previous section relate to imaginary abstracts for a particular project the format can be applied to other research domains. For example, the following imaginary abstract addresses the familiar HCI topic of care for aging populations,

PERMA-Care: Applying models of well being to Designs for Residential Care.

"*There have been considerable advances in psychological understandings of "well being" recently but few applications of these insights to technologies designed to support older people. This paper describes the application of Martin Seligman's PERMA model of well being to a design for care home residents. The model includes Positive affect, Engagement, Relationships, Meaning and Achievement [48]. In order to support these aspects of well being a system was designed to create an online "Delphi Counsel" where retired academics in residential care could take part in question and answer sessions for geographically remote young academics. It was hoped that younger researchers would benefit from the previous generation's knowledge and that the dialogue would be engaging and meaningful for the retirees. A system was developed to allow residents in a communal room to make and upload recordings of group discussions about online academic queries. Although the residents were initially enthusiastic about contributing to the system, squabbling and bickering broke out with increasing rapidity as the study progressed. Retired ethnomethodologists, hostile to*

other forms of social inquiry insisted on dismissing any approach but their own. Although there were problems with conflict management many residents found the engagement meaningful and engaging, suggesting that there may be potential in further applications of the PERMA model to designs for older people."

Again this imaginary abstract is based on real research questions and suggests a plausible design though the study is a fiction. Like all of the imaginary abstracts it seeks not simply to sketch a possible prototype but to question what, if any, new knowledge it might generate.

DISCUSSION

Clearly the process of actually making a working device, testing it in the field and iterating on the design would offer quite different insights from those gained from writing a design fiction. Repentir, for example, is a real app developed for the Digital Originals project which allows users to take a photograph of an oil painting and slide or rub through previous versions of the work, right back to the initial line drawing and blank canvas [29]. Following extensive field studies it was clear that artists, critics, gallery owners and gallery visitors valued the app. But how interesting such work is to a research community must depend upon the framing of the problems space, the relation of the findings to the research questions and how the discussion contributes to the field. It depends, in short, on narrative.

The term narrative should not be understood narrowly, it is as central to human thought as metaphor and structures most professional discourses including those of lawyers, doctors and scientists [10]. The literature on narrative theory is very large but Richard Schechner offers a compellingly brief definition with the Japanese aesthetic of jo-ha-kyu where "jo" is a long festering breech, "ha" a crisis and "kyu" the climax [46]. This equates to beginning middle and end but includes conflict, struggle and resolution. This structure is discernible in the Research through Design abstracts. The breech occurs in the frame which identifies a problem space, the crisis occurs during the study where a prototype or approach is tested and the climax comes when conclusions are reached through discussion. The imaginary abstracts pastiche this form and in doing so force a degree of reflection that would not necessarily arise through a more traditional concept design. In a sense then an imaginary abstract might be thought of as a prototype paper.

It is anecdotally reported that some scientists when setting up an experiment will write the abstract, background and introduction of their papers leaving a blank space for experimental results to be inserted later whether they support the hypothesis being tested or not. This story is probably apocryphal given the reluctance of scientists to publish negative results, especially in medical studies [25]. However, it illustrates a practice where the purpose of an experiment is already clear and its outcome – positive or

negative – is of enough value to proceed. The imaginary abstracts here are oriented to Research through Design and so do not present results that are unambiguously positive or negative. Rather there is an imagined formation of the problem space (e.g. the disruption of previous business models caused by digital technology) a proposed design intervention (e.g a coin operated art installation) and a set of findings (e.g. public indignation). The story contains within itself a shadow of other possibilities – public rapture, indifference and so on.

To be clear, this paper is not arguing that it is unnecessary to make prototypes in order to do Research through Design. Nor does it advocate faking studies or making up results. However, it is worth noting that many of the prototypes described in the real ACM literature are no longer in working order. The paper is archived but the design is not. In this sense the accounts are of value even though the designs described no longer exist. And further the descriptions of prototypes in academic papers are likely to be accounts of devices working perfectly on, as it were, their best day. There are few accounts of days when the prototypes are buggy and not working very well. But again, this is not to say that there is any equivalence between fictional and real results. Presenting fabricated or falsified data as real is clearly fraud, as in the notorious Stapel case [13]. There is a clear difference between presenting a fiction and simply lying. These "imaginary abstracts" emphasize their status as fiction through the title and also through exaggeration and caricature (e.g. artists intent on making exhibitions of themselves and belligerent retired ethnomethodologists).

As previously noted, the use of fiction in design is not entirely new in HCI. Many papers in the Research through Design literature present concept designs, critical designs or speculative designs. But its value is disputed and some see it as art rather than research. Dunne and Raby insist that critical design is not art but Bardzell and Bardzell [2] have argued that this is not obvious from the artifacts themselves. They point out that if there is a difference between critical design and art it is not ontological but rather situated in the discourse around it (ibid). For this reason it may be useful to draw a parallel between concept design and conceptual art. Conceptual art or installation art is an art of ideas. It is sometimes argued that actually seeing, say, a sailing boat perched on top of a stack of bottled water, adds little to the idea – it is the idea which is the real work in the piece. It is not of the utmost importance that critical designs actually function, neither, perhaps, is it necessary for them to exist.

If the difference between critical design and art is not ontological but in the discourse which surrounds it perhaps the same could be said for the designation "design" itself. That design is used as noun and not as a verb in the current Research through Design abstracts perhaps indicates a degree of reification. But it also indicates the importance of narrative in establishing the prototypes as design objects.

As previously noted, design is an honorific, for example, it is possible to claim that these are designer glasses but those are not, even though there is no register of chartered spectacle designers: the difference between the eyewear depends on the discourse around them. Narrative then is central in both design and design fiction.

DiSalvo recently argued that common to the objects, scenarios and fictions of speculative design is narrative form. As previously noted narrative is also a feature of academic abstracts, they have a beginning, middle and end as clearly structured as any short story. If speculative design is to be more than spectacle and provocation, DiSalvo claims, it must present a trope which relates ideas and objects in ways that can be interrogated and challenged [18]. Framing concept designs in the context of a fake scholarly abstract focuses attention not just on the suitability and utility of a particular idea but on the potential insights such a prototype might generate. The form of the imaginary abstract forces the construction of such tropes, whether they are convincing or not may be the basis of whether to take the ideas further in Research through Design rather than research through Design Fiction.

CONCLUSION

This paper has argued that design fictions can be a useful development tool for Research through Design. The analysis of Research through Design abstracts indicates an emerging language and structure in the literature. This form was pastiched in a series of "imaginary abstracts" written during a project investigating new forms of art reproduction. These fake abstracts were useful in three ways: first in establishing the discursive spaces in which work might be situated; second in specifying concept designs while retaining a degree of ambiguity; third in considering possible outcomes by creating fictional findings from field studies. The use of design fiction helped identify weak ideas without discarding them and also helped identify whether particular prototypes would be likely to answer research questions. The paper has argued that the discourse of design is enriched when it includes fiction as well as findings.

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