

A three-tiered approach to knowledge production in design research

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Abstract. This paper takes Frayling's (1993) seminal article '*Research in Art and Design*' as its starting point, and considers the proposition that opportunities for innovation exist by moving between this trichotomy of models (i.e. research *into* art and design; research *through* art and design; research *for* art and design) to develop new 'interactive' forms of research activity (Newbury, 1996). This call for new categories of design research has also been underpinned by the growing impact of computer-inflected technologies on the design disciplines and the new forms of engagement these have brought (Lunenfeld, 2003). Positioned under Lunenfeld's call and in response to a project situated at the intersection of the arts, sciences and technology, this paper documents a reflective account of the forms and processes of knowledge production *through* design.

Keywords. Communication design; knowledge production; inter-disciplinarity; counter terror.

Introduction

"We live in a world in which the arts, sciences, and technology are becoming inextricably integrated strands in a new emerging cultural fabric ... Technologies not only provide us with new tools for communication and expression, but also provide a new social context for our daily existence." (Malina, Penrose and Ryan, 1999: p.ix)

We open this paper by outlining Frayling's (1993) typology as a platform for reviewing contemporary debates on the conceptualisation and practice of knowledge production through design. The crux of Frayling's (1993) proposition is that three principal models of design research exist:

1. Research *into* art and design - This may include historical work or research into the theoretical perspectives that exist in art and design.
2. Research *through* art and design - This may include materials research, development work and / or action research.
3. Research *for* art and design - This is research where the primary aim is to lead to the artifact itself and not to the dissemination of understanding or knowledge.

Over a decade has since passed, and discussion has continued to flourish with a special issue of *Design Issues* (1999) entitled ‘*Design Research*’, exclusively devoted to research methodology. It was the intention that this collection of essays would begin to identify the types of research being conducted under the umbrella-term of research *through* art and design “...according to the now seemingly consecrated – but still controverted – terms coined by Christopher Frayling” (Findeli, 1999: p.2). Reflecting on the papers selected for inclusion, is a notable shift from Frayling’s trichotomy and an emergent preference for alternative organising frameworks such as Brinberg and McGarth’s (1985) substantive, conceptual and methodological domains (see Strickler, 1999). Accordingly, in his contribution to the special issue Nigel Cross provides a discussion of design knowledge and its processes. Examining both ‘designerly ways of knowing’ and the interface between design as rational problem solving and design as reflective practice, he concludes that, “We are still building the appropriate paradigm for design research” (1999: p.10).

Whilst we are in fundamental agreement with the conclusion of Cross, we caution haste at dismissing Frayling’s trichotomy altogether. Rather, we return to Newbury’s (1996) suggestion of the importance of an interactive practice for defining the research process itself. We suggest that it is erroneous to view Frayling’s tripartite model as a set of mutually exclusive modes of design research and take the stance that an approach in which these modes can interact to be appropriate for the contemporary turn in social science – design collaborations. This is precisely the type of conversations that have started to emerge in recent years (see for example, Lunenfeld (2003)) and his discussion of design *as* research as one that uses its own media to perform investigations; Doloughan’s (2002) use of Kress’ (2000) notion of design as transformation; Jonas (2008) and his re-interpretation of Frayling’s trichotomy; and Findeli, Brouillet, Martin, Moineau and Tarrago’s (2008) examination of transdisciplinarity and research *through* design). Indeed, providing conceptual clarification of the research *through* arts and design approach, Findeli *et al.* (2008) suggest:

“As such – and this is the critical point – it must be understood as having the virtues of *both* research for design and research about design. Contrary to many wrong interpretations, our position is not a “*neither one nor the other*” but a “*one and the other*” situation.” (Findeli *et al.*, 2008: p.71)

Building upon their discussion of the limitations of research *for* design (i.e. rigour) and research *into* design (which they term research *about* design) (i.e. relevance), Findeli *et al.* propose that research *through* design could be defined as “...a kind of research *about* design [more] relevant for design, or as a kind

of research *for* design that produces original knowledge with as rigorous [and demanding] standards as research *about* design” (2008: p.71). In illustrating the merit of this model of thought, they document a short description of the early phases of a research project examining the contribution of design to the improvement of Alzheimer patients’ daily lives. It is interesting to note that the project we document in this paper has evolved in tandem to Findeli *et al.* and thus in a similar vein to the charting of their progress, we document our own work so far illustrating the value of a new form of research activity that moves between Frayling’s trichotomy of models.

Safer Spaces: Communication Design for Counter Terror

The project in question ‘*Safer Spaces: Communication Design for Counter Terror*’ seeks to examine the design of the process of interactive counter terror communication in order to reduce fear and re-engage awareness in communities in public spaces. The research outlined uses transport and urban spaces as a case study. Embodying creative practice and the expertise of specialists drawn from fields as diverse as design, sensors engineering, psychology, social geography and political communication, this new form of research activity pushes the boundaries of knowledge production into an undocumented realm – fusing methods and approaches drawn from across the social sciences and the field of design.

The project as a whole is framed by a two-stage social sciences research design (see Figure 1), which incorporates design methods and creative practice. This research approach has the purpose of assessing public perceptions of existing counter terror communications (stage one) (this knowledge feeds directly into the design of the interactive communication) and the effectiveness of the commissioned interactive counter terror communication tool (stage two).

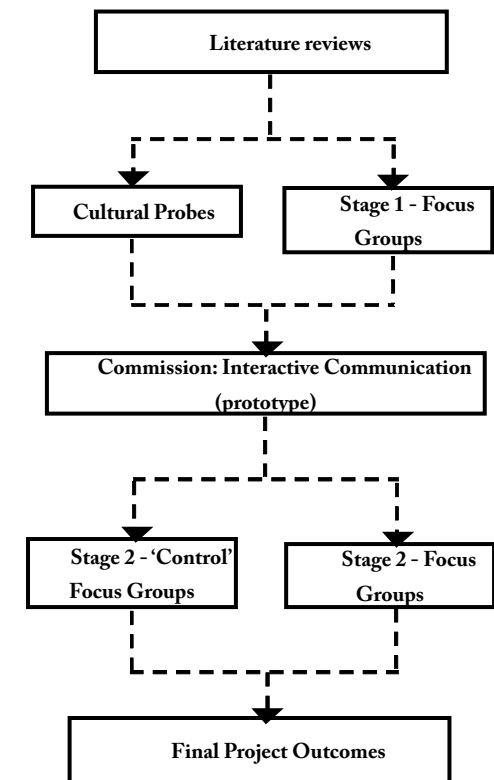


Figure 1
‘Safer Spaces’ research design

Our research design is denoted by three key processes of knowledge production - the synthesis of discipline specific literature reviews, the generation of knowledge from the application of design and social science methodologies and through collaboration with *Jason Bruges Studio*¹ to produce the interactive communication. Accordingly, we offer our three-tiered approach as a descriptive (and *not* prescriptive) account of the process of research *through* design, where each element of knowledge production, successively informs the nature of the interactive counter terror communication:

Tier I - Reconciling inter-disciplinary expertise

The first tier - *reconciling inter-disciplinary expertise* - sought to chart the existing literature on risk and counter terror communication across the fields of design, political communication, psychology and social geography. Drawing upon this historical collective of literature, this approach to knowledge production is characteristic of the research *into* art and design model. Using a content analysis approach drawn from the social sciences, literature reviews were organised thematically noting emergent intersections and disparities across experts' respective fields. This process of identifying relevant literature was integral to the generation of a 'new' knowledge that transgressed each project team member's former understanding of risk communication. Four key themes emerged:

The first, 'affect: a frame of mind?' represented the cluster of literature that considered public perceptions of risk in relation to the topic of terrorism. This was useful not only in understanding the nature of the uncertainty, anxiety and fear the public experience, but also in drawing together a number of frameworks for understanding how counter terror communication, risk perception and affect intersect. The second theme 'processes of reconciliation' was concerned with the way in which public responses to terrorism might be understood both theoretically and practically as a basis for intervention. The literature reviewed highlighted differences in perception between public vs. experts and the need to build trust through the construction of a conversation.

The third, 'becoming specific' drew together the literature on public knowledge requirements i.e. the need for specific, context-rich information. It also drew attention to the importance of situating the study of risk perception within the context of the everyday. The final theme, 'space - behaviour relationship' focused upon the tension that exists between surveillance and sensor technologies as security enhancing mechanisms. The desire to reallocate control from the authorities into the hands of the public was noted, as was the impact of design (across environments, products and communications) upon behavior in public spaces and individuals' resilience and responsiveness.

¹ *Jason Bruges Studio* (London, UK) specialises in the development of installations that explore the use of interactivity between the public and the environment, through the use of technology.

Although inherently a research *into* art and design activity, the understanding generated was used as a platform for both research *through* art and design via its use in the development of the focus group questioning, and research *as* art and design through the construction of the cultural probe packs. Both these transitions (outlined below) begin to illustrate the value of moving between Frayling's trichotomy of models.

Tier II - Contemporary perceptions of risk and counter terror

The second tier - *contemporary perceptions of risk and counter terror* - sought to understand public perception of risk and counter terror communications. This was achieved through methods drawn from the social sciences (focus groups) and design (cultural probes²) informed by the theoretical conjectures of tier I. Whilst the use of focus groups conformed to the convention of the research *through* art and design model, the development of the cultural probe packs was defined as research *as* art and design as it used its own media to perform the investigations.

Building upon the analysis of the literature reviews, three areas of interest emerged that tapped into public perceptions as follows: technology and counter terrorism, communication and counter terrorism and the environment and counter terrorism. This broad framework was used to structure the type of questions developed for both the focus group and the cultural probe packs. Our choice in focus groups and cultural probe methodologies resided in the question 'how can mixed-methods help extend our knowledge?' Thus, although we employ focus groups as our principal method of knowledge elicitation, we saw value in the adoption of a second method that could potentially both enrich and enhance the data they provide. Our preference for cultural probes emerged from our belief in the value of multi-modal approaches to knowledge production. The power of engaging with objects within the cultural probe packs in order to create a meaningful discourse and the use of the image as a narrative to extend knowledge were seen to be particular strengths of the method. This was also substantiated through Robertson's (2006) suggestion that although cultural probes are not to be viewed as a means in and of itself, they operate as a useful addition to ethnographic methods such as interviews.

Whilst data collection for stage one focus groups has been completed, our analysis is ongoing (we expect this to be completed during Spring 2009). Note that as the cultural probe packs are currently in the process of being piloted, we cannot attest to the value of adopting mixed-methods approaches. We have however drawn a number of preliminary themes from the focus group discussions. These include: (i) the role of foresight in enhancing a sense of

² Cultural probes are a method for capturing knowledge and understanding individuals' perceptions of specific phenomena through creative participation. Probe packs commonly include a disposable camera, a diary and postcards that are used for design inspiration. See Gaver, Dunne and Pacenti (1999) for a comprehensive overview of the cultural probe method.

security and safety, (ii) the sense of ownership in public space as manifest in everyday peer-to-peer surveillance, (iii) a need for transparency and openness and (iv) the impact of physical spaces upon behaviour i.e. the way the public engages with spaces and interact with each other. What is interesting to note is that the public do not appear to be as fearful of terrorism and counter terror technologies as academic and government literatures suggest. Indeed, this is to the degree that safety concerns take precedence over the terrorist threat. Our analyses so far and the inherent discrepancy between the extant literature and empirical findings, thereby demonstrate the value of complementing multi-modality approaches to knowledge production i.e. research *through* art and design and research *into* art and design.

Tier III - Collaboration with Jason Bruges Studio

The third tier - *collaboration with Jason Bruges Studio* - used the information derived from the focus groups (and the cultural probes in due course) as a knowledge production tool to inform the nature of the interactive counter terror communication. (Note that focus groups will also be completed post-interaction, to assess the degree creative communication design makes possible new ways of engaging communities in counter terror dialogue). As the work of the studio is principally concerned with the design of an artifact i.e. interactive communication tool, this third tier comes under the umbrella-term of research *for* art and design. Research of this type includes materials research, research into sensors technology (in collaboration with our sensors expert), in-situ observations and site-specific photographic documentation.

It is at this point that the opportunities for innovation obtained by moving between Frayling's trichotomy of models becomes evident. For instance, although principally concerned with research *for* art and design, the work of *Jason Bruges Studio* is also informed by the findings drawn from tiers I and II (thereby harnessing research *through* art and design and research *into* art and design processes). Although in its early stages, this aspect of the research has used the literature review and preliminary analysis of the focus groups to shape the design of a number of potential interactive communication tools. In particular, idea generation has been fostered by what the studio have viewed as two key themes: (i) ownership in public space as manifest in everyday peer-to-peer surveillance and (ii) the inside / outside juxtaposition i.e. the sense of claustrophobia and dis-orientation felt in relation to the outside world. This has been translated into a number of potential prototypes embodying sensor technologies, of which two are outlined for illustrative purposes.

The first, presents a panoramic view of the platform portraying it as a digital landscape that offers the opportunity for peer-to-peer surveillance. This builds upon our finding that the public feel reassured by the presence of others. The second example uses a series of digital skylights that linked to the outside world provide projections of over-ground structures providing the public with

a sense of orientation during their journey within the underground system. The final example we outline, builds upon the playful character of a 'hall of mirrors' through the real-time projection of a series of digital portraits. A video camera mounted to each screen projects a filtered image of the public back onto the screen itself. Two variations of this are currently under discussion. Sensitive to proximity, the first reacts by contracting and dilating the size of the projection (in much the same way as the iris of an eye behaves) in line with the physical proximity of members of the public to the screen. The second variation, projects the image within a standard frame size, filtered this time by a sobel or laplacian filter - standard image processing techniques that use edge detection algorithms. The resultant image is a simplified projection of the public, analogous to a line drawing. Note that both variations of the digital portraits capture the movements and actions of individuals in real-time. As such, it aims to provide an interactive means of self-reflection, drawing attention to the implicit presence of peer-to-peer monitoring as opposed to 'control tower' surveillance in the everyday.

Whilst we anticipate that the link between knowledge production in tiers I and II and the construction of an interactive communication tool will become clearer as the prototypes come into fruition, we hope that they have demonstrated the utility of an interactive form of design research. To draw from Forlizzi and Lebbon (2002):

“Designers can no longer only be concerned about the interaction of word and image; they also must be concerned about the interaction between the audience, the content of the communication, and the outcomes of the design. In order to create dialogues that effectively persuade the viewer to adopt a new belief or change behavior, the communication designer can no longer rely solely on intuition.” (Forlizzi and Lebbon, 2002: p.5)

Conclusion

This paper has presented a three-tiered reflective account of the forms and processes of knowledge production occurring through the practice of design research. In doing so, we aim to have demonstrated how design can be both “...a unified and coherent inquiry...” (Buchanan, 2008: p.65) that like research can be “...characterised by iterative cycles of generating ideas and confronting them with the world” (Stappers, 2008: p.82). The implications of this 'interactive' form of research activity for Frayling's trichotomy have been considered and a more processual approach that unites these new 'interactive' modes of design research and practice proposed. We anticipate that in line with the emerging work of Findeli *et al.*, (2008) this paper prompts further re-consideration of Frayling's trichotomy and one from which research and design can flourish across these boundaries.

Acknowledgements

We wish to express our gratitude to the EPSRC, AHRC, ESRC and CPNI for funding the project '*Safer Spaces: Communication Design for Counter Terror*' upon which this research is based (EPSRC Ref: EP/F008503/1). We would also like to thank members of the project team and our government partners for their valued contributions and extend our gratitude to Jason Bruges Studio and Research Quorum for their collaboration.

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