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Editorial

The emerging roles of performance within HCI and interaction design

1. Introduction

As Brenda Laurel noted as far back as 1992, the operation of computers has always been a performative activity (Laurel, 1992). A system's state changes as a computer runs through a program acting out the tasks specified in the script of a program. With interactive systems, human actors take their place on stage alongside computers, performing activities with and through such systems. The recent emergence of ubiquitous and tangible computing moves the stage of the interaction from the virtuality of the screen to the physical environment. This provides opportunities to address performative interactions that include bodily movements to create novel multimodal approaches. For interaction designers, this requires thinking about interaction in a different way, for example considering the role of the body, beyond ergonomics, for its increased relevance as a presentational, representational and experiential medium. Recently there has been a growing interest in developing interaction design methods that more explicitly recognise and exploit the performative elements and potentials of design activity itself.

Across all design disciplines, the importance of effective communication has led to an awareness of the need to consider and improve our ability to represent ideas in ways that open up, rather than shut down, dialogue. Performance, theatre and dramaturgy have begun to figure in the design of interactive systems. There have been long standing debates about the nature, utility, form, timing and quality of communication within the design process. For example, scenarios have found widespread acceptance as a tool for communicating rich user experiences within requirements and design specifications. Whilst they are typically not performed as such, their roots in the forms of traditional narrative point to a performative potential that could be more fully explored. Within object-oriented software design, the CRC Cards technique combines role-playing with scenario walkthroughs and use-cases to provide design teams with a software object's perspective on the

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systems they are developing (Beck and Cunningham, 1989). Within the emerging communities of 'interaction design' practitioners, we have seen interest in the potential of a variety of improvisational theatre techniques such as role-playing (Sato and Salvador, 1999) and bodystorming, a performance flavoured variation of brainstorming developed by the design company IDEO (Burns et al., 1994). All of this suggests that performance in interaction design ought to be a topic worthy of serious consideration.

2. Origins of this special issue

This special issue of Interacting with Computers aims to begin the process of mapping the research landscape of performance and interaction design, to reveal some of the many ways performance manifests itself in design, and to identify methods that will encourage a wider range of designers and design industries to exploit the potential of performance as a design tool. To date, publications dealing with performance as a potential tool within interaction design have been spread as individual contributions in a variety of locations, ranging from participatory design and HCI, conferences such DIS (Designing Interactive Systems) and Critical Computing, through to journals such as Personal and Ubiquitous Computing. To the best of our knowledge, this is the first HCI journal special issue to gather together papers on this particular topic.

The special issue originates in two workshops organised separately by the editors. At the Centre for Contemporary Arts in Glasgow, UK we organised a workshop in 2005 on ''Performative Development''. The workshop was organised as an event in a modern art museum, was driven by the practical demonstration and the application of a specific type of theatre practice, and made use of 'interactive installations', both as design loci and design tools. Participants came from a wide variety of settings, from computing departments in Universities to freelance artists and theatre professionals.

In the same year, at the British HCI conference in Edinburgh UK, we organised a workshop that specifically addressed the issue of how performance might be used as a tool within interaction design. The session explored a variety of approaches to the use of performance and took a critical view on what can and cannot usefully be extracted from the huge body of existing work on performance within drama and social action. For example, the use of theatre as a tool for supporting social change as seen in the work of Augosto Boal, such as Forum Theatre (Boal, 1995) was explored as a guide for the development of performance methods within HCI and interaction design. In many ways the second workshop had a more explicitly instrumental focus, asking what the scope for 'real-design-world' application of these ideas and methods might be. Through hands-on explorations of a range of techniques that workshop explored what form performance and theatrical events might take and at what point within design processes. The second workshop also explicitly addressed the question of how such methodological innovation might be 'sold' to designers and design managers/companies.

The aim of this special issue is to provide a focus for continuing the debate begun at those workshops, and provides an opportunity for the dispersed research groups working on this topic to engage in dialogue towards a more systematic exposition and evaluation of the state of the art, as well as to set the scene for future research directions for performance as a tool for HCI and interaction design.

3. Research programmes motivating interest in performance

The call for papers for this special issue quite deliberately left the door open for a variety of forms of exploration of performance within design to come on to the stage. In selecting them a balance was sought between embracing the entire spectrum of design activity and the research programmes within which performance has figured or through which it has been motivated.

3.1. Spectrum of design activity embraced

The papers selected embrace the entire spectrum of design activity (see Fig. 1 below), from evaluating a finished system (Mehto et al.), programming a system (Feraeus and Tholander), generating requirements (Newell et al.), gaining insight into user contexts (Rodriguez et al.) and design space inquiry (Jacucci).

3.2. Research programmes motivating performance related work

Another view on the papers is to consider the motivations for the growth of interest around performing activities in interaction design. This emerged in the nineties, coinciding with a deep encounter in a larger context between design disciplines and human–computer interaction (Winograd, 1996). Concurrently, specific motivations

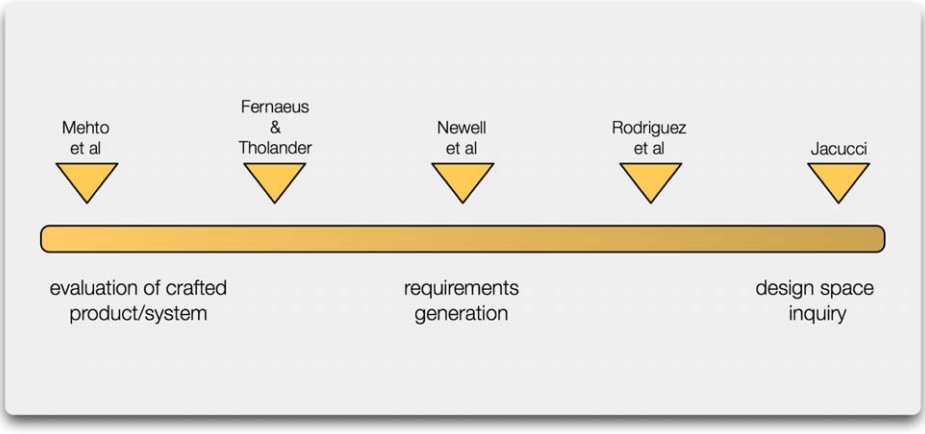

Fig. 1. The design activity continuum.

for this interest grew out of three research programmes: user experience, participatory design and embodied interaction that naturally indicated different approaches and objectives in considering performances in interaction design. As in the previous sections, the papers presented here can be mapped on to this research programme space.

3.2.1. User experience

A first programme can be identified with the user experience movement where researchers and designers aim at a more holistic understanding and evaluation of interaction encompassing, beyond mere cognitive or ergonomic issues, for example enjoyment, pleasure, emotional and cultural aspects (Norman, 1998; Forlizzi and Ford, 2000; Blythe et al., 2003; Jordan, 2000). This also relates to new views in design disciplines as documented by Buchanan (2001) that note how designers are moving beyond symbols and physical things, turning to "action" and "environment" to focus on "leaving experience of human beings, sustaining them in the performance of their own actions and experiences". This thinking points to an opportunity to develop techniques that better afford designing for the user experience, moving beyond the static descriptions of scenarios and the rationalisations of use cases, for example through bodystorming (Oulasvirta et al., 2003).

3.2.2. Participatory design

Participatory design (PD) and its Scandinavian cousin co-operative design were developed to involve users more closely in systems design, and entail a shift in emphasis away from cognition/task-based approaches to design and towards understanding the behaviours of groups of users interacting in complex ways within organisational settings (Kyng, 1995). A number of techniques have been adopted and/or developed to facilitate the PD/co-operative approaches. A key method is scenarios of use – narratives describing what people do/might do in the future when engaged in particular activities (Carroll, 1995). Scenarios are usually developed from in-depth ethnographic studies (Nardi, 1995) – capturing user's stories – and further developed or brainstormed by users and/or designers in design workshops. They clearly contain a dramatic, if not necessarily performative, element – and mark perhaps the first attempt to bridge the gap between ethnography and design using dramaturgical methods. More recently an extension of scenario-based design – the FLEX method – has been made to explicitly link ethnographically informed scenarios to software development through managing the process of abstracting from field study to use case (Benyon and Macaulay, 2004). A review of performative techniques for designers exploring and experiencing scenarios can be found in Iacucci et al. (2002) that in turn indicates the opportunity to bodystorm in the field with prospective users.

A second programme motivating performance research then can be identified with the continuation of projects aimed at involving users in the design process with strategies (techniques) that offer common languages to users and designers (Ehn and Sjögren, 1991; Ehn, 1992). The search for proper ways to organise the participation of users in design also originated from the limitations of "representations of work". In particular, Suchman (1995) considers that representations of work should not be

taken as "proxies for some independently existent organizational processes but as part of the fabric of meanings within and out of which all working practices – our own and others' – are made" (Suchman, 1995, p58). The danger here is that the further representations are removed from work the more likely it is that the view of work becomes increasingly stereotyped. These problems have stimulated researchers to bring into view the lived experience of users left out of standard representational forms. Exemplarily in cooperative design, open-ended representations allow users to simulate future work by creating hands on explorations of emerging designs (Kyng, 1995) As examples of representations of work, Kyng mentions work situations descriptions and use scenarios. The former are reminders of situations and the latter are not detailed descriptions of artefacts and their use but attempts to "recreate a context for experienced worker to exercise the mock-up/prototype". After the Scandinavian design experiences the trend in this area has been to involve professional performers to create a deeper cooperation between HCI/interaction design and performing art disciplines (e.g. Howard et al., 2002, and Newell et al., this journal).

3.2.3. Embodied interaction

The third research programme motivating performance research is tangible computing and embodied interaction (Dourish, 2001). While the previous two generally explore techniques for design sessions and concentrate on methods and design process, this programme raises the issue of what the interaction design agenda should be like if it is informed by design thinking. Embodied interaction as an HCI framework incorporates embodiment as a new form of the manifestation of computing resources and as a new way of interacting with computers in the physical environment. This results in moving the stage of the interaction from the virtuality of the screen to the physical environment, providing opportunities to address performative interactions that include bodily movements to create novel multimodal approaches. For interaction designers this requires thinking about interaction in a different way, for example considering the role of the body, beyond ergonomics, for its increased relevance as a presentational, representational and experiential medium. An example is the application of a performance perspective to interaction design thinking based on a variety of performance theorists, performance and theatre anthropology (Jacucci, 2004).

4. Summary of the papers

Rodriguez et al. (956–976) followed the user experience research programme in attempting to devise a process and toolbox (including role-play techniques and bodystorming) for interaction designers, to engage them with unfamiliar contexts. The unfamiliar context represents a growing challenge within HCI and interaction design as the use of interactive systems extends beyond the relative familiarity of the developed world workplace into the home, the entertainment sphere, the environment, the developing world and even the body itself. Rodriguez et al. explored the problem of attempting to gain insight into a vastly different culture by creating a toolbox that

provides both descriptive and experiential information about a given context. The toolbox comprises a number of levels of information and forms of representation, from structured basic information about the design challenge context in the form of a booklet of text and images, through experience tools such as video-personas and scenarios. The personas and scenarios were designed with a specific view to their use as stimulants for role-play by the toolbox users (i.e. designers). The use of the toolbox was then evaluated with a group of graduate design students – one of four target groups for the toolbox, the others being design managers, industrial designers, and researchers. During a two-day workshop the graduate students, none of whom had any prior experience of the particular design challenge (Indian rural healthcare), used the toolbox and presented a final role-play performance to a panel of industry based designers. The final role-play is shown to have been both the most important part of the toolbox use process for the graduate design students, and a facilitator of rich communication with the panel of industry designers. It is as a tool for stimulating discussion amongst designers that the toolbox is shown to be most useful.

Mehto et al. (977–995) continue this concern with affording designers a richer view on user's experiences and context, what we might characterise as affording shared information experiencing, but embed their work more explicitly within the realm of participatory design. In this they extend the locus of sharing from designers to the wider set of design stakeholders, most particularly users. They explore through a programme of drama and dramaturgical methods the possibilities of performance within user-centered design. In their long-term study, they took a large group of users and designers through a series of exercises; play-back theatre, drama workshops, a Forum Theatre style staged performance, and dramaturgical readings. The study made extensive use of professional actors and dramatists to support and facilitate these various exercises, and in so doing opened up many questions about how and where theatre and drama professionals should best be introduced into the design process. The authors conclude their paper by presenting a model for applying drama and dramaturgical techniques across the user-centered design lifecycle. Echoing Rodriguez et al., they found that performance work with both designers and end-users promoted empathy and improved communication amongst and between designers and users.

Newell et al. (996–1011), taking up the themes of theatre within user-centred design, participatory design, and the use of drama professionals, also apply a Forum Theatre inspired approach, this time to requirements gathering for technologies for older people. The challenge here was twofold – first to find appropriate ways of applying Forum Theatre ideas within a design context, and secondly to work with a user group the authors characterise as 'extreme', i.e. older people. A professional scriptwriter was used to develop scenarios, which were then performed and recorded on video. The videos were then shown to older people and their carers. The videos were designed such that at various points they could 'naturally' be paused to provide an opportunity for discussion. The authors believe that the success of the video discussion sessions lies in the narrative structure and performed nature of the scenarios. The fictional nature of the stories and characters promoted wider ranging discussion

than would otherwise have been the case, and the insights they gained are shown to have informed requirements for the design of a fall detection system. The authors are now developing this work in a number of projects. They are exploring questions arising from this experience such as how to decide the most appropriate focus for a narrative depending on the type design challenge and stage in the design lifecycle, and how to link the outcomes of this work to other forms of design research outcome such as formal usability studies, demographic data, etc.

Fernaeus and Tholander (1012–1031), extend the scope of the papers in this special issue to the field of embodied interaction. Rather than looking at how performance can improve the process of interaction design they look at how it can orient the design agenda in a specific setting. In particular, they investigated the practice of programming among groups of children and demonstrated the opportunity to design for embodied programming in which embodied acts support more sociable, accountable learning. They explored children's making of computer games and simulations, analysing episodes from ethnographic observations and explorative role-play sessions. The analysis of these episodes points to how tools and activities are used by children as resources for building interactive systems, while at the same time allowing for bodily action in the negotiation of design ideas. They argue that research on computer programming has mostly approached the problem of improving practices from a cognitive perspective, focussing on concepts such as memory, perception and conceptual understanding. Drawing inspiration from the embodied interaction framework (Dourish, 2001) they instead emphasise aspects such as social and physical performances with and around technology. A further episode is taken from a technology intervention with tangible interfaces in children's programming activities. The tangible programming system, which came out as a result of this project, allows for groups of children to build their own dynamic play worlds. They conclude by noting how performance not only served as a means for the childrens' design activity, but also in the end made physical performance part of the actual programming environment.

Jacucci (1032–1054) provides the final point on our design space activity continuum (design space inquiry), as well as embracing all three research programmes (user experience, participatory design, and embodied interaction). Importantly, his paper also presents a shift in focus from conceptions of theatre and performance that are rooted in an urge to re-create realistic scenarios and narratives to the domain of the fantastic and the highly abstracted. Informed by both theatre practice and design experience he introduces a new creative practice that uses objects and masks to explore design problems. A rich tradition of performance using masks is drawn on and the paper proposes that within the context of design this tradition can be turned towards design inquiry. The mask performance as a process and an experience provides designers with a new tool for inquiry. This practice also provides a principled and well-developed way of approaching the use of props within design practice. Whilst using props as tools with design workshops is not new (Howard et al., 2002), Jacucci shows us how theatre practice can provide a way to embrace the potential within the theatre arts for using props in order to afford opportunities for less realistic/naturalistic

encounters and experiences. As he points out, reality does not actually help us explore the full extent of the hugely complex and rich world of lived human experience. For this we must turn to the arts and creative expression. Unlike the first four papers, Jacucci argues that the theatre of realism and naturalism is not the only model we can import into design practice. However, Jacucci warns us of the dangers inherent in applying creative art philosophies and methods to the essentially (inevitably?) pragmatic world of artefact and system design. He discusses the problems involved in learning from theatre and the performing arts, which include translating experiences beyond a toolkit approach, and dealing with the multilayered complexity of principles, techniques, theories, methods procedures. The conclusion is that applying theatre techniques as recipes results in losing the context and soul of some practices. The challenge is how to avoid this happening.

Taken as a whole, the papers in this special issue provide a broad sweep across the key uses and challenges for those of us interested in further exploring the potential of performance within HCI and interaction design. The rest of this paper will explore some outstanding major research challenges for the field.

5. Mapping the future research agenda

The papers in this special issue sketch out the broad potential and outline of performance within recent and growing fields of methodological innovation: the use of ethnography within design contexts and the use of more visual research and communication techniques. HCI and interaction design. However, whilst we feel that more than sufficient arguments exist to serve as motivations for introducing performance techniques into HCI and interaction design contexts, more systematic explorations and integration with real design practice are needed. The papers presented here open up many questions for future research. We consider below a number of the more important challenges facing the community if performance is to move from the periphery of the HCI and interaction design fields.

5.1. More 'real-world' examples

Longer term evaluation and integration in real design practice, in industry settings, is now needed. So far most studies have been within the context of work that is limited in both time and complexity of the challenge being addressed. Will such techniques scale to very large and complex design projects, or to mission critical applications? How will industry designers, managers and other stakeholders respond to performance tools and methods as a feature of design life? Are 'live' performances, whether facilitated by professionals or not, realistic in industry settings or will video prove the more useful tool as Newell et al. hint? IDEO with its use of bodystorming provides a good, if so far rather isolated example, of how performance techniques can permeate a company (Kelley, 2001). More examples of applying these techniques in industry are needed.

5.2. 'Selling' performance

Following on from 5.1 (above) a particular aspect of extending the use of performance into the world of commercial design will be the question of how to 'sell it'. Work that develops guidance on how to promote performance related interaction design methods into a variety of settings, from commercial and industrial through to academic will be needed. It has taken ethnography many years to be taken seriously as a research method within commercial design, for example 2005 saw the first major 'industry ethnography' conference (EPIC 2005, held at Microsoft in Redmond, November 14–15), performance methods may take even longer. What lessons do other methods, successful and failed, offer those keen to promote performance methods?

5.3. The contribution of disciplines from the performing arts

As Jacucci's work shows there are rich veins of practice and theory within the performing arts that can be (with caution) mined. We would like to see this work extended in both breadth and depth. We are minded here to heed Dourish's (2006) warning against taking too pragmatic an approach to the exploitation of techniques like ethnography, or in our case performance, within design. If all we seek is to establish that using performance methods and tools somehow leads to 'better' requirements or 'better design' we may in the process miss other benefits that performance may bring. Inevitably perhaps, initial attention has focussed on the more obvious and accessible techniques within theatre and the performing arts, particularly those rooted in forms of traditional (realistic) narrative. However as Jacucci shows in this issue, there is a huge array of traditions which might be drawn upon. To fully exploit them we must learn how to communicate and work with those in the performing arts and industries. HCI in particular is replete with examples of the difficulties of working in truly cross-disciplinary ways.

5.4. Performance and problematic issues in interaction design

Driven by the widening range of uses and users of interactive systems, HCI 'and interaction design currently face a growing range of 'slippery problems', for example: the tacit and emotional aspects of experience (Pantic et al., 2005), ethical issues (Walker and Dearden, 2004), and 'extreme users' such as non-literate peoples (Maxwell and Macaulay, 2006), etc. A great deal of attention in HCI and interaction design communities has recently been focussed on these less tangible challenges. The performing arts are an area of human creative practice that has traditionally explored or worked within these areas, and hence may shine a light on them for designers who currently have little to guide them from the existing HCI and human factors literature. This certainly seems to have been the case in the work of Newell et al. reported in this issue, where they exploited traditional narrative drama and more contemporary Forum Theatre techniques within their work with older people. Application of the performance techniques and methods presented in this issue may provide new purchase on these slippery problems.

5.5. Ethnography and performance: A marriage made in heaven or hell?

In recent years, we have seen a considerable growth in the adoption of ethnographic techniques within design (Macaulay et al., 2002). Interest in ethnographic techniques in design can be traced to a growing concern about the gap between users and designers, and the perceived relationship between this gap and systems failures (Berg, 1998). Ethnographers are now widely used in the interactive systems design industries as part of requirements generation and design processes. However, the translation of the usually rich (and often 'wordy') outcomes of ethnographic and other qualitative research into a representation that is meaningful in a user centered design context can be problematic. Design stakeholders can find it difficult to engage with ethnographic data and the (often) complex discussions about the ethnographer's insights they contain (Crabtree and Rodden, 2002). Designers find the heavily textual material difficult to access and use in the fast paced image and performance oriented world of commercial design. The challenge is how to represent and communicate ethnographic data within the design process in effective and efficient ways. The opportunity this affords is to revisit one of the core challenges of design management – improving the quality and utility of dialogue within design. Adding ethnographers to the mix of voices in the design process can provide projects with a great deal of rich and valuable information, but in so doing they bring into sharper relief existing problems with ensuring that design projects afford the richest possible opportunities for open dialogue. As Mehto et al. and Newell et al. suggest, performance techniques offer the potential for meaningful engagement with ethnographic insights for a number of reasons:

- Dramatists and actors are skilled at turning complex sets of ideas and information into accessible narratives.
- Designers and users are familiar with the conventions of drama and story telling. No matter what your background, the conventions of storytelling are deeply embedded within the human psyche and offer as near to a universal 'language' as we are ever likely to find (with the caveat of course that cultural traditions and conventions in performance vary from culture to culture).
- Participatory theatre methods such as Forum Theatre and the Theatre of the Invisible (Boal, 2002) have been widely used in a number of settings and contexts to provide audiences with an opportunity to interact with and co-create a narrative, question the actors and explore and alter the story. In other words theatre need not always be a one way, static, communication medium.

The challenge now is to explore how drama professionals, ethnographers and designers can best work together to represent ethnographic insight, and how different performance methods can be used to improve the quality of dialogue between users, designers and other stakeholders. For example, we already know that the range of disciplinary backgrounds with design teams creates communication problems, will the addition of yet another disciplinary group compound this?

5.6. Using visual media for design

Whilst visual forms of representation are, and always have been, a crucial part of systems design, what we are referring to here is that visual media are increasingly exploited both as tools for inquiry and as a means of communicating design information. Commercial design ethnography for example makes great use of visual ethnography, which uses video and photography, and increasingly web technologies, to both generate and communicate design research findings (Pink, 2001). In this issue Rodriguez et al. used video personas both as outcomes and stimuli for performance work, and reported that both graduate students and the industry designers involved were keen to see more of this type of material. Newell et al., responding to the pragmatic problem of staging performances for large groups of users, videotaped their work for final presentation in discussion sessions.

Clearly the dynamics of a live versus a video performance are different, we need to explore the benefits and losses of each approach better. In addition, a video recording of a performance intended for a live staging is different in many aspects from a performance intended for final experience on video or film. The methods of writing, production and post-production of each have many significant differences. We need to be careful to ensure that this is built into our practices. Undeniably as video production equipment prices come down, and as computational power improvements create far wider access to what were previously professional standard non-linear editing facilities, we are at the beginning of the era in which high quality video production is much more achievable within design contexts. Whilst within the performing arts it is generally the moment of live experience and the emotional, intellectual and somatic aftermath that is the key intended end point, within design contexts such a transitory, unrepeatable and elusive outcome may not always be acceptable. If visual media are used to overcome these problems, what techniques for staging, recording and re-viewing performances should we adopt?

6. Conclusions

As has already been noted, the emergence of performance within HCI and interaction design can be seen as rooted in a number of recent research programmes within HCI and interaction design which have attempted to respond to the challenges of truly embracing the complex and difficult to abstract world of human lived experience. In other words they are part of the expansion of our field of concern from task to user to contextualised experience. As such they can also be viewed as one amongst a number of recent attempts to evolve method and methodology within these fields in order to respond to this ‘post-task’ world. The papers in this special issue embrace the full range of design lifecycle activities, and a rich cross-section of currently important research programmes within HCI and interaction design. Whilst the field of performance and theatre within HCI and interaction design is young and has yet to find critical mass in terms of research groups, or dissemination, the papers in this issue offer a tantalising glimpse of the possibilities and dangers inherent in the enter-

prise. Perhaps most tantalisingly of all, Jacucci lays down an important challenge; how should we import ideas and tools from the performing arts without stripping them of their creative power? How can we avoid the trap Dourish (2006) has argued the importing of ethnography into design has fallen into – that of denuding the original method of its power and greatest potential. By too crudely turning performance techniques and ideas to existing design agendas we may miss out on the opportunity to revisit and revise those very agendas. The temptation is to see performance and drama techniques as just another way to 'represent reality' for the purposes of design, rather than as a way to open up design to the less tangible, more fantastical, aspects of human lived experience and to embrace the creative aspects of design work more fully.

The papers in this special issue also offer a useful starting point for mapping out the key future challenges for the field, and we look forward with great anticipation to seeing it develop in coming years.

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