Exploring methodological innovation in the social sciences: the body in digital environments and the arts

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ABSTRACT

In this paper we examine methodological innovation in the social sciences through a focus on researching the body in digital environments. There are two strands to our argument as to why this is a useful site to explore methodological innovation in the social sciences. First, researching the body in digital environments places new methodological demands on social science. Second, as an area of interest at the intersection of the social sciences and the arts, it provides a focus for exploring how social science innovation can be informed by engagement with the arts, in this instance how the arts work with the body in digital environments and take up social science ideas in novel ways. We argue that social science engagement with the arts and the relatively unmapped terrain of the body in digital environments has the potential to open up spaces for innovative social science questions and methods: spaces, questions and methods that have potential for more general social science methodological innovation. We draw on the findings of the Methodological Innovation in Digital Arts and Social Sciences (MIDAS) project a multi-site ethnography of the research ecologies of the social sciences and the arts related to the body in digital environments. We propose a continuum of methodological innovation that attends to how methods are moved across research contexts and disciplines, in this instance the social sciences and the digital arts. We illustrate and discuss the innovative potential of *expanding* and *re-situating* methods across the social sciences and the arts, the *transfer* of methods and concepts across disciplinary borders and the interdisciplinary *generation* of new methods. We discuss the catalysts and challenges for social science methodological innovation in relation to the digital and the arts, with attention to how the social sciences might engage with the arts towards innovative research.

Introduction

In this paper we examine methodological innovation in the social sciences through a focus on researching the body in digital environments. Throughout the paper we use the term 'digital body' to refer primarily to 'the body *in* digital environments' with a focus on corporeal fleshy bodies interacting with digital technology but also occasions where such corporeal bodies are momentarily digitally re-presented. There are two strands to our argument as to why the digital body is a useful site to explore methodological innovation in the social sciences. First, researching the digital body places new methodological demands on social science. Second, as an area of interest at the intersection of

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the social sciences and the arts, the digital body provides a focus for exploring how social science innovation can be informed by engagement with the arts, in this instance how the arts work with the digital body and take up social science ideas in novel ways. We argue that social science engagement with the arts and the relatively unmapped terrain of the digital body has the potential to open up new spaces, questions and methods that can inform social science methodological innovation.

Social science methodological innovation is a much debated and contested topic (Wiles, Crow, & Pain, 2011). In this paper we provide an overview of the literature to summarize the main positions and key elements of this debate. We define methodological innovation as novel research practice outside of the mainstream, and we propose a continuum of methodological innovation that both recognizes different levels of innovation and is sensitive to the transfer of knowledge, practices and methods across contexts and disciplines as a source of innovation (Holmquist, 2013; Xenitidou & Gilbert, 2009). We position this model in relation to the larger social science debate on innovation, including the connection between innovation and the transfer of concepts and methods across disciplines. The innovative potential of social science interest in the digital body and the arts is also discussed.

We use illustrative examples from an ethnographic study of methods for researching the body in digital environments in the social sciences and the arts to interrogate types of methodological innovation along the continuum and to discuss the potentials and challenges for social science in engaging with and mobilizing arts-based methods across ontological and epistemological differences. In doing so we set out to contribute to methodological innovation more generally and understanding of the digital body both of which are increasingly important and prevalent for social science data and method.

Social science methodological innovation

While claims for methodological innovation in qualitative social science research methods are widespread, there is a considerable debate, and some scepticism, within social science regarding the validity of such claims (Wiles et al., 2011).

On the one hand, social research funders and publishers increasingly prioritize the development and use of innovative research methods, and explicitly position methodological innovation as central to advancing the impact of social research. Many social science scholars situate themselves and their work as at the vanguard of methodological innovation. For example, methodological innovation is positioned as emerging amid new social questions and insights raised by the turn to visual, multimodal, affective and sensory experiences (Mason & Davies, 2009); as well as advancements in digital technology (Xenitidou & Gilbert, 2009). Disciplinary boundary crossing and interdisciplinary collaborations are also strongly associated with methods innovation (Xenitidou & Gilbert, 2009).

On the other hand, sceptics consider methodological 'innovations' as exaggerated fads (Travers, 2009), more concerned with 'novelty' than 'an effort to inform' (Eisner, 2001, p. 139). From this perspective there is some concern that the 'hype' of methodological innovation can create an 'over emphasis on discontinuities and change' leading to the dismissal or under-development of established social research methods (Delamont & Atkinson, 2001, p. 277). Indeed, the notion of methodological innovation itself has been held up by some as a trope of the progress narrative of qualitative research, 'a cultural expectation', a product of mass consumerism and the marketization of research (Travers, 2009, p. 174).

To a large extent, this debate centers on different conceptions of two key dimensions of methodological innovation. First, the extent to which it is connected to an existing method. For some, methodological innovation includes the use of 'existing theoretical approaches and methods in reformed or mixed and applied ways' (Xenitidou & Gilbert, 2009, p. 4); for others it is confined to the creation of new methods, 'new designs, concepts and ways doing things' (Taylor & Coffey, 2008, p. 8). Wiles et al. (2011, p. 600) found limited evidence of 'wholly new methodologies or designs' in their review of claims of methodological innovation in qualitative social research methods. Rather they suggest that innovation usually draws on the traditions of existing methods, either inside or outside of social science. They proposed three categories of methodological innovation – inception, adaptation and

adoption (Xenitidou & Gilbert, 2009). The second dimension key to the debate is 'diffusion', that is, the extent to which 'true' innovations must be accepted, and taken up, by the wider research community (Wiles et al., 2011). Some argue that a development is not really an innovation until it is widely taken up by others (Taylor & Coffey, 2008). Others define innovation precisely *as* novel research practices that have not yet filtered through to the mainstream, this responds to the tensions between the need for new approach and the social process of diffusion, especially in the context of interdisciplinarity and the challenge of communicating research ideas across disciplines (Xenitidou & Gilbert, 2009).

We propose a continuum of methodological innovation drawing on work by Holmquist (2013) on innovation practices in Human Computer Interaction (HCI). The continuum recognizes different levels of innovation and is sensitive to the transfer of methods across contexts and disciplines as a source of innovation. We interrogate four categories of methodological innovation along this continuum: the *expansion* of methods within its originating discipline; *re-situating* methods across contexts within its discipline; the *transfer* of methods, concepts, knowledge and practices across disciplinary borders to be adapted, reformed or remixed; to the *generation* of new methods through inter-disciplinary mixing. Following Xenitidou and Gilbert (2009) we define methodological innovation as novel research practice outside of the mainstream – mainstream diffusion is not taken as a key marker of methodological innovation. From this perspective the transfer of concepts and practices across contexts and disciplines is central to how methods are adapted and adopted in innovative ways and thus a significant dimension of methodological innovation.

In this paper we argue that researching the digital body can be a catalyst for social science methodological innovation. Digital environments have implications for how the body is made visible, how it is conceptualized, and as a result they change what comes into the research domain (Marshall & Hornecker, 2013). The digital re-imaging and re-imagining of the body places new methodological demands on social science that challenge existing methods. This need for social science to develop concepts and methods to contribute to a deeper and more informed understanding of the digital body speaks directly to the potential of arts-based methods for social science.

The social science turn to the visual and the sensory, together with the methodological challenges of researching the digital, have led to a degree of 'restlessness or dissatisfaction among researchers' at the paucity of social science methods (Mason & Davies, 2009, p. 588). One outcome of this has been intensified interest within social science in mobilizing 'arts-based' research methods to enhance the power of social research to provide new social insights (Wiles et al., 2011). It has been argued that exploiting methodological synergies across this disciplinary frontier is valuable for social science: opening it up to different perspectives, generating imaginative research questions and making available a wider range of methodological tools for creative use (Crow, Edwards, Nind, & Wiles, 2011; Robins, 2013). Further, it has been argued that the broad cultural, social and political context of the arts and arts-based methods are particularly suitable for tackling contemporary challenges that are often 'unfixable' and 'require people to change their own values, attitudes, and behaviour' (Dunne & Raby, 2013, p. 5).

Examining the digital body at the intersection of the social sciences and the arts provides the opportunity to engage with how social science theories, languages and concepts are taken up by the arts in novel ways. Doing so has the potential to open up spaces for social scientists to think about the digital body in new ways, to generate new social science questions, to explore concepts in different ways, and to develop sensitive social methods that can connect with emotion and affect (Glass, 2008), to facilitate communicating knowledge in a more holistic way (Gwyther & Possamai-Inesedy, 2009). Spaces, questions and methods that, we argue, have potential for more general social science methodological innovation.

Method

This paper draws on data and findings from case studies of six research groups, three in the arts and three in the social sciences, working on the body in digital environments undertaken by the MIDAS project.

We investigated the 'research ecology' of each group, that is, their theories, methodological ethos, routine practices, and conceptions in relation to the body in digital environments. Research is constituted differently in the social sciences and the arts, within the arts research is practice led – conducted in and through art objects and creative processes, nonetheless both conceptualize and align with methods as technique or practice.

Participants

Research groups were chosen for the cases using two criteria. First, it was an area/sub-discipline of social science or the arts intensively engaged with the body in digital environments. The cases included embodied learning, social interaction, and cognitive-psychology within the social sciences and design, fashion, performance within the arts. Whilst acknowledging the debate over whether or not Psychology is a social or a natural science, we included a cognitive-psychology research group as a case within social science given the group's focus on social behaviour (navigation) and processes (rather than biological or neural processes) and its social application. The second criteria, was that the groups provided access to a range of theoretical stances on the body, digital technologies that feature across both the social sciences and the arts, and methods. Three to five participants with different levels of experience within the research ecology were chosen from each research group as the focus for the case studies.

Fieldwork

We combined an ethnographic (Hammersley & Atkinson, 1995) and a multimodal approach (Jewitt, 2013). Ethnography was used to explore the social contexts that methods and artefacts were produced through. Multimodality was used to examine the design of artefacts and discourses they materialized. This combined approach enabled us to attend to how each case group engaged with methods and the multimodal character of the body in digital contexts, the diverse modal practices, objects and environments within each site (Dicks, 2014). Fieldwork was conducted over a period of eight to 10 months with each research group. This involved naturalistic observation and video recording of the groups/participants' research seminars, lectures, supervision sessions, studio/lab/field research practice, rehearsals, and exhibitions/performances. Casual and in-depth interviews were conducted with key group participants. The fieldwork materials paid close attention to the meanings participants attached to their actions (Lofland, Snow, Anderson, & Lofland, 2006, p. 84) and captured materials with a focus on: setting (e.g. people/roles); the body (e.g. terminologies, concepts, theories and practices); the digital (e.g. available technologies, metaphors, digital practice, relationship to the body); and methods (e.g. key approaches, concerns and interests). iPads were used to produce in situ fieldnotes that combined written, visual, video and oral notes, the use of a single device supported easy and effective integration of different types of notes. The fieldwork materials were regularly reviewed by the project team and assembled to develop and refine analytical themes and categories relevant to the project focus on body, digital, and methods. These were used as sensitizing themes to guide further fieldwork and the analysis.

Analysis

The six cases were created and written through the research team's analytical process of immersion and iterative engagement with the related fieldwork data. This involved annotation, open and conceptual 'coding' of the fieldwork materials to elaborate 'codes' (Emerson, Fretz, & Shaw, 2011). Attention was given to significant practices, rules, norms, and organizational structures, repeated actions, revelatory moments, inconsistencies and breakdowns. Through this process the fieldwork materials were assembled to explore analytical questions, and to further develop and refine themes and categories relevant to the body, digital, and methods, including methodological innovation. Cross case analysis worked

with these themes to tease out the variation across the six case studies using a constant comparative method. This involved allocating segments of data to thematic categories, building collections of data around these, and comparing these segments to map the range and variation of a given category across the data, in order to specify themes related to how the body, the digital, and methods feature and were organized in the case studies. Through this immersive analytical process the analysis identified the synergies, tensions and points of connection, for researching the body in digital contexts across the project's social science and arts groups. The written cases were reviewed by relevant key participants for comment as part of the 'validation' of the cases.

Findings and discussion

A brief summary of the research ecologies of each research group is given below before turning to our findings on methodological innovation across the cases.

Case studies

The *embodied learning group* researched embodied interaction in digital learning environments (e.g. school, museum) with a focus on empirical, methodological and theoretical development. It set out to inform learning and HCI design by theorizing embodied forms of learning interactions from an interpretative and critical epistemological stance. It was influenced by social theories and methods in communication, embodied interaction and learning and used micro-observational methods to examine situated embodied interaction with attention to gaze, gesture, hand manipulation, body posture, movement, and so on. For example, the group investigated if families' embodied collaborative interaction with digital exhibits in a museum gallery supported or hindered informal learning. They developed taxonomies and frameworks to explain how a technology affects bodily interaction, meaning making and learning.

The *cognitive-psychology gr*oup was focused on visual-spatial cognition in people with Williams Syndrome (WS). Working within a broad positivist stance the group took an informed, critical approach to developmental psychology to clarify concepts related to individuals' understanding of physical space, and understand the environmental perception and orientation of people with WS and how they learn to navigate the physical world. For instance, a virtual maze of an urban environment was used to investigate how young children with WS used visual and spatial cues (e.g. landmarks) to navigate. The group's research was a structured process guided by principles in cognitive psychology, working with specific groups of participants, engaging them in tasks and pre and post-tests. The group used a distinct set of established methods including observation techniques, psychometrics, and interviewing.

The *social interaction group* researched interaction and communication in surgical operating theatres and how to improve this communication through simulation-based training. The group used empirical micro-scale ethnographic observation and video recording methods and concepts and methods from interaction analysis, conversation analysis, multimodality, and social semiotics. The concerns of the participants and the larger context of communication played a significant role in setting the analytical research focus. For instance, the group investigated decision-making and patient safety in the context of continuing professional development using ethnographic research data to design simulation environments (using performance re-enactment) for training.

The *design group* made design objects that represent 'information' in novel ways (e.g. 3D printed touch-objects, visual artefacts and videos) to investigate how people construct, access and interpret information in the physical world, augmented environments and digital systems. The inter-disciplinary group is informed by a critical and design epistemology to challenge and interpret the social order through design *as* research, in which the process of design is approached as 'theory building' and 'theory testing'. We observed how participants investigated ideas of the body, notably the sensory, and spatiality using technologies including GPS and motion sensors, experimental electronics, 3D

Table 1. The instances of types of methodological innovation across the six case studies.

Methodological innovation	Arts case studies		Social science case studies			
	Design	Fashion	Performance	Interaction	Psychology	Education
Expand	3	3	4	1	*1*	2
Resituate	2	3	3	1	1	1
Transfer	2	2	2	*1*	0	1
Generate	1	1	0	0	0	0

printing, prototyping and visualization. For example, one participant used 'sensory probes', 3D printed artefacts she created in response to exhibits in a museum gallery, to investigate and evoke visitor emotional experience, observing and discussing their engagement with these to inform the design of a series of objects. A clear research question or design problem provided a starting point for the group's making. They used an eclectic range of art-based research methods grounded in practice (e.g. speculative design, cultural probes etc.) and were informed by a range of social theories and methods drawn from discourse studies, cognition, neuroscience, graphic design paradigms, history, evolution, perception studies, representation, sociology, media studies, medical-biological theories of the body, aesthetics and semiotics.

The *fashion group* was engaged with experimentation within a design and critical epistemology to investigate the body in and through fashion and the innovative use of digital technologies (notably a range of body scanners, digital rendering tools, and virtual environments). The garments and artefacts participants made served to critique fashion/fashion industry. For example, one participant investigated the ideologies of the body embedded in fashion technologies and their social impact by experimenting with the measurement dimensions of a body scanner and fashion patterning software to create a series of garments that exposed how these produce constrained notions of the body. Participants used a range of digital tools to link physical and digital interaction, in their research, which was conducted as an iterative process that moved between theory, concept development, and fashion design. The multi-disciplinary group drew on a stable established range of methods from fashion and HCI design while the theoretical base for their work was drawn from a wider range of social science disciplines engaged with theories of embodiment notably sociology, queer and feminist studies, and cultural studies.

The *Performance group* interrogated the relationships between the social, the political and the technological through their innovative and experimental performance work using new technologies from a critical epistemological stance. Their research is formulated as 'Practice As Research (PAR)' with a strong focus on theories of performance, the body, culture and social theory, and theories of the digital. They explored the body through artistic performance, theatre, live art, and new media technologies. For example, one participant explored social ideas of pollution, waste, consumerism and human-machine hybridity through a performance in which electrodes connected his body to mobile phone circuits being melted on a hot-plate to echo a method frequently used at e-waste dumps to extract valuable metals, in which the electric currents activated his muscles to construct a 'cyborg-system'. The group used a range of established specialized performance methods and digital technologies (e.g. telematic performance, interactive wearable designs, bio-art and bio-technology) and drew on a wide range of social science theories.

Illustrative examples of methodological innovation

The continuum and four categories of methodological innovation introduced earlier were applied to the fieldwork data for each case study to identify and classify instances of methodological innovation. Overall, we identified more instances and a wider range of methodological innovation among the arts cases than the social science cases (26 as compared to 9, see Table 1), suggesting the arts cases afforded more opportunity to methodologically innovate.

We now illustrate each category of methodological innovation using examples from the case studies: one from the social science cases the other from the arts (where possible). These examples were chosen to as typical instances observed and identified across the project. While this paper is concerned with methodological innovation in the social sciences, examples from the arts case studies are included as they show how social science concepts, knowledge, practices and methods were taken up in novel ways by the art cases and this can provide us with new ways to think about, explore, and communicate these concepts in the social sciences. They point to possible points of connection and collaboration, both in the context of researching the digital body and more generally.

Expanding methods

Expanding the scope of a method (its associated concepts and practices) within its context and discipline of origin, though low on a continuum of methodological innovation, can respond to the changing concerns of a discipline or area, raise new research questions, enhance a method's contribution, and be a step toward further methodological innovation. However, it will not unsettle the ontological or epistemological basis of a method leading to debate as to the extent to which expanding a method counts as innovation. For example, while the methods of sensory ethnography (e.g. sensory walks and interviews) place new emphasis on the sensory and visual aspects of embodied meaning and are considered innovative by some (Pink, 2009), for others they maintain the fundamental theoretical assumptions and methodological practices of anthropology/ethnography (Howes & Classen, 2014). This points to the difficulty of defining innovation, the struggle between tradition and innovation, and how disciplinary communities monitor and regulate methodological boundaries.

Using a continuum and empirical data to explore methodological innovation enables us to contribute research-based insights to this debate. We observed instances of the expansion of methods across most case studies (except the cognitive-psychology group), suggesting that a focus on the response to the body and digital environments requires the expansion of methods.

Within the social science cases, for example, the social interaction group expanded the linguistic focus of conversation methods of analysis, its data collection methods, analytical concepts (e.g. turn taking) and procedures to research bodily resources:

> The body is talked about as a whole entity in relation to mind and body, space and time, but the analytical focus is on bodily sequential interaction. The body is fragmented analytically into observational units: gaze, gesture, hand manipulation, body orientation etc. These communicative modes are mapped to micro body parts (eyes, finger, hands, torso). (Fieldnote)

This micro-focus on the body extended the use of video and the development of multimodal transcription processes to attend to the complexity of communication and the tacit role of digitally mediated bodily interaction in the surgical operating theatre.

From a social science perspective it is useful to understand how the digital body expanded methods and ideas of the body differently in the arts cases, expanding rather than fragmenting the body. The performance group's use of technology, for example, expanded performance as research methods, practices and concepts to live telematic performance connecting performers across locations to explore the character of the body in relation to distance, presence, physicality and materiality. This changed the scale of the body and blurred boundaries of space and time between the virtual and physical and brought the body into new relationships with itself, the performers and audiences – literally creating new ways of seeing the body.

As a category of methodological innovation, expanding methods brought new aspects of the body into the methodological domain of social science, while the arts raises ideas for social science as to how the body could be re-conceptualized via the digital.

Figure 1. Fieldwork photographs of the body scanner screen showing three different avatars: clothed, a grey avatar that has not been fully rendered; unclothed. Source: © Kat Thiel.

Resituating a method

Resituating a method, that is using a method in a new context but within the method's original discipline, can elaborate a method by pushing its limits, bring new perspectives and agendas to bear on a method, and supporting experimentation. *Virtual ethnography* (Hine, 2000), for example, resituates ethnographic methods in online communities within a sociological perspective. In so doing it raised new challenges including how to 'observe' online practice via postings and threads and reshaped ethnographic methods. While potentially innovative, resituating a method does not significantly challenge a method's theoretical underpinnings to generate entirely new methods. We observed instances across the case studies where the use of digital technologies led to the resituating of a method in order to newly frame and view the body pointing to the potential of the digital for methodological innovation.

Within the cognitive-psychology group, for example, well-established psychology methods (observation and experimental intervention) were resituated from a physical context to a digital virtual environment to investigate children's way-finding strategies. This resituating enabled new data and more data to be collected on a participant's way finding activity and strategies, as they could experience sustained periods of navigation without becoming physically tired, safety concerns were erased enabling more complex environments to be used, and records of their activity (routes, turns, timing etc.) were automatically generated by the virtual environment. However, it also raised methodological challenges, notably how to design the digital environment, the research-effect of visual landmarks as navigational cues, and the mode of interaction with the environment (mouse, keyboard, joy-stick). Despite the shifts that occurred when resituating the methods, and the loss of non-visual sensory cues (e.g. sound) in a virtual environment, how the body was talked about remained the same.

The fashion group resituated well-established, specialized methods from a physical to a digital domain in a similar way. However, unlike in the cognitive-psychology group, the technologies they used were better aligned with their existing practice and concepts: e.g. pattern cutting software relates to fast-fashion patterning and body scanners to be-spoke fashion. A study participant resituating the method of body scanning to explore the ideologies of the body embedded in fashion technologies, disrupting the technology to comment on its social impact on producing bodies. *She said,* 'the body scanner is actually doing a lot of work for you but you can't control it'. 'They think of human forms very differently, they are hacking machines really' She fed the body scanner measurements into garment pattern making software to create digital avatars (Figure 1).

This put two ideologically opposed digital technologies into conversation both literally in terms of programming and ideologically in terms of their configuration of the body and her production of a series of garments. This playful disruption was a typical feature of the arts cases.

The digital body served as a catalyst for resituating methods, while the arts case studies point toward a potential that could inform social science innovation, that is interventions that disrupt technologies, their designed ideologies and affordances, as form of critiquing the digital body and the digital more generally.

Figure 2. Fieldwork photographic composition of the durational performance *Cuddle. Source: © Francis Marion Moseley Wilson.*

Transfering methods

Transfer is the application of an established method, and its associated concepts and practices, from its originating discipline to a new discipline: what Robins (2013) calls 'methodological trespassing'. This can provide a new lens on a phenomena; re-framing it through new questions, and bring a new descriptive language and different analytical concepts to bear on phenomenon. Methodological transfer has supported research in the 'inter-spaces' between social science and the arts, for example, the transfer of social-discourse methods and concepts to explore the sensory potential of digitized smell (Schneider & Wright, 2010). Transfer brings different epistemological concerns and historical groundings to the study of phenomena that can unsettle methods in productive ways. Methodological transfer involves the loss of a method's 'disciplinary history' when it is moved to a new disciplinary context; it is inserted into different research practices and dispositions that can lead to a method being taken up in fundamentally different ways. The transfer of methods enabled the groups to engage with the spaces, challenges and questions that the use (and limitations) of technology created for them.

Within the embodied learning group, an investigation of interaction with a tangible table led to the transfer of a quasi-experimental approach from psychology to an interaction-observation approach. As tangible technologies are not available in naturalistic learning environments and the technology being investigated was relatively unstable, the group used a quasi-experimental approach to bringing students into the university to explore scientific concepts of light using a digital touch-table. An intervention had to be designed around the digital-table, with pairs of students spending approximately 20 min interacting with the tangible table. No guidance or facilitation was given to 'naturalise' the interaction as much as possible. This transfer of a quasi-experimental approach to an interactional setting brought detailed attention to bodily modes of interaction in a focused way to inform the role of bespoke technology for learning.

The transfer of social science theory to the context of performance provided new ways of interrogating ideas of the body and a performative interpretation of these theories. For instance, one participant transferred post-human social theories, methods and concepts to the context of performance to explore the understanding of the human body through its similarity and connection to other living creatures. In a durational performance/installation, *Cuddle* (2014) which took place over 24 hours:

> She created a 'kind of bedroom personal space' in the studio. She slept there over night. Her props included a bed, a stuffed toy teddy and a dead rabbit. She transferred the voice box of the toy into the dead rabbit and the heart of the rabbit into the toy. They were both covered in blood by the end. The traces of her activity are visible via bodily traces (e.g. dry blood on bed sheets, empty food cartons) The audience is allowed to enter the room after 19 hours to imagine the story of what happened there the previous night.(Figure 2). (Fieldwork note)

Figure 3. Fieldwork photographs of three views of a dressed manikin designed to make visible emotional states (here depression) made using a method that combines tailoring techniques of manikin making and quanitified-self methods. Source: © Caroline Yan Zheng.

The transfer of methods and concepts was observed across the arts case studies and in the embodied learning group leading to new methodological practices and interpretation of concepts. This can prompt new notions of existing concepts that in turn lead to a reconfiguring of social research methodologies and their application. While this reflects the more eclectic and less regulated character of methods in the arts groups, it also shows the potential of the arts to work with social science concepts in novel ways. It also signals the potential for opportunities for methodological innovation through the transfer of arts methods to the social sciences.

Generating methods

Interdisciplinary research can lead to the mixing of methods across disciplinary boundaries and this can generate new methods. This mixing affords 'investigations carried out in the spaces between disciplines and without the safety net of codified practices' (Sullivan, 2010, p. 119) and goes beyond the transfer or trans-disciplinary borrowing of methods where methods remain relatively intact. Interdisciplinary research across the social sciences and arts can foster methodological innovation through the creation of 'an experimental space where disciplinary certainties might be unsettled by practices and knowledge-in-the-making' (Grimshaw, Owen, & Ravetz, 2010, p. 160). As discussed earlier in this paper, some consider re-conceptualizing the boundary between disciplines to reform, mix and apply methods 'an intrinsic driver of methodological innovation' (Xenitidou & Gilbert, 2009, p. 4).

This type of methodological innovation is less common than the others on our continuum (Wiles et al., 2011). We identified one instance of generating methods across disciplinary borders in the study. Social science data collection and assessment methods from big data and the quantified-self movement were combined with fashion tailoring methods to create a new method of exploring and visualizing emotional well-being through embodied and affective artefacts. The participant joined the quantified-self community and self-tracked her emotional and physical data using the Gross National Happiness survey and made a Taylor dummy/manikin based on her survey results by mapping her body measurements to the results of the survey questions on internal and external dimensions of happiness (Figure 3).

> If I tell you I feel unwell using statistics – you don't feel that much, but if I show you this – the message is there immediately and strongly and you start to think about your own well-ness. The moment I put my clothes on I felt the happiness of being expressed … While the design of tables and charts of data reveal the objective truth – I want to transform them into meaningful design. (Fieldwork note)
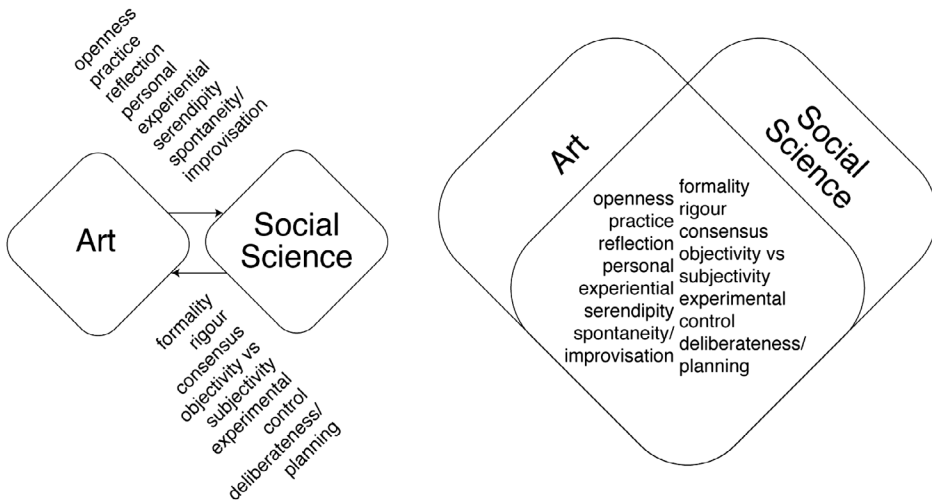
Figure 4. Left: Research principles and qualities of the project art and social science case studies. Right: visualising the potential for their interdisciplinary conjunction.

The next stage of the research was to develop an online app to enable users to transform their survey results into virtual visual expressions of their emotional states as body forms which could be printed using 3D printing methods. The use of digital technology provided a catalyst for methodological innovation and served to bring together social science methods and theory with fashion/arts-based research centered on making and fashion ideas of 'bodies reflecting identity'.

Discussion

The account of methodological innovation presented in this paper shows the central role of context, discipline and the use of digital technologies in expanding, re-situating, transferring and generating research methods, in this instance for understanding the body in digital environments. We draw on these findings to discuss the catalysts and challenges for social science methodological innovation towards. (The findings speak to the case study research groups rather than generalizing to all disciplines housed under the umbrella of social sciences and the arts.).

Driving innovation by working across differing research ecologies

Our analysis of the case studies identified two distinctive sets of research qualities and principles that underpinned the research 'eco-systems' of the social science and arts groups.

With a clear requirement to name and describe methods and justify their choice the research ethos of the social science groups was more formal than those in the arts. A high value was placed on research being systematic and rigorous with a general aim of achieving objectivity and/or theorising the place of subjectivity and researcher affect on research – though this was orientated differently across the three social science case studies. There was emphasis on the need for research to build on previous research in a field, the stability and connectedness of research, and working towards consensus on the understanding of a topic across a research community. Planning was considered paramount in relation to research design, researcher roles, and research questions. Theories and methods were established with clear social science origins.

The research ethos of the arts groups was one of openness in which the research question was generally determined through the process of a study rather than in advance. Research was strongly practice-based with attention to processes of making, recording these processes, and the creation of

artefacts. There was emphasis on intensive reflection with the researcher's body and experiences integral to the arts-research process. A high value was placed on experiential ways of working, trust in the ser-endipitous character of making was high, for example embracing digital 'mistakes', and incorporating spontaneous and improvised 'happenings' into the research process. The use of methods was eclectic, although most had historical roots in arts disciplines, while theoretical inspirations were drawn from beyond the arts notably from the social sciences.

While the research ecologies of the case study groups in the social sciences were embedded in established social science notions of method, the research ethos of those in the arts connected with social science debates regarding the 'post-method condition', that is a widespread dissatisfaction with the conventional concept of method as too prescriptive, over-generalized, and laden with interested knowledge. To some extent labelling the arts as 'post-methods' is an over-simplification that fails to recognize the different set of rules, procedures and principles of enquiry that inform arts-based research methods, and reasserts normative social science understandings of methods. Nonetheless, it is useful to consider the case studies and methodological innovation more generally in the context of this broader debate of methods and post-methods. Following the argument that 'the prefix "post" does not mean a final closure, nor does it announce the "end" of that which it is appended; rather it suggests a thinking through and beyond the problematics of that which it is appended', the arts case studies approach to methods can be understood as providing social science with ways to 'think through and beyond' the 'problematics' of its notion of method and a 'desire to transcend those limitations' (Bell, 2003, p. 322).

Mapping the ethos of the research eco-systems of the cases in the social sciences and the arts (Figure 4) shows the potential of interdisciplinary work at their intersection to drive social science methodological innovation in productive ways. In this sense social science working at or moving across the intersection with the arts can provide a liberating process of thinking through its methodological paradigms and practices. The examples presented in this paper are indicative of how social science engagement with the arts has the potential to open up spaces for innovative questions and methods to help understand the relatively unmapped terrain of the digital body: spaces, that can support social science methodological innovation more generally.

The digital as a catalyst for innovation

The examples from the case studies presented in this paper point to the potential of the digital for methodological innovation and the contribution of such innovation for understanding the digital body. The use of digital technologies provided a means for looking differently at the body and re-thinking notions of the body (e.g. boundaries), which in turn raised research challenges, all of which were cat-alysts for methodological innovation. The digital was drawn into methodological innovation across the case studies in social science and the arts in different ways. Within social science case studies the digital was used as a 'research tool' or as a new context for research (e.g. digital whole-body interac-tion environments in museums). As such technologies did not significantly de-stablize their research ecologies. Nonetheless, the use of the digital had a role in methodological innovation, for example, the cognitive-psychology group's development of virtual environments to explore navigation. Across the arts case studies technologies the digital was used to unsettle or critique ideas of the body, to interrogate the affordances, constraints and ideological design of technologies as well as to disrupt and re-appropriate the expectations and norms associated with their use (e.g. using a pregnancy sonogram device on the male body to create a sonic performance). Within the arts cases, the making of digital artefacts/performances was used to question the social impact of technology, raising new questions concerning the body, with significance for methods.

Across all of the case studies, methodological innovation contributed to understanding the digital body and facilitated the process of re-imagining the body. The social science research groups fore-grounded the communicative role of body posture, gaze and touch in ways that brought the body newly into focus to *re-interpret* it. The arts research groups *re-made* the body using 3-D scanning to re-work the notion of the body as measurement in fashion, sensory felt experiences in design and the

Table 2. Summary of the contribution of different levels of methodological innovation to understanding the body in digital environments.

Methodological innovation		Contribution to understanding the digital body
Low	Expand	Brought some new aspects of the body (e.g. sensory) into view
		Supported connections between the body and space
		Foregrounded material and physical aspects of the digital body
		Exposed the complexity of bodily communication
		Raised challenges for how the digital body was conceptualized
	Resituate	Broadened what was included in the realm of the body
		Enabled affect and emotion to be newly visible via the body
		Facilitated critique of the digital body
		Addressed new research questions to be asked about the body
		Led to examination of the underlying ideas of the digital body in a context
		Led to some new insights on the digital body
	Transfer	Provide a new lens on the body and new insights on bodily phenomena
		Supported a re-framing of the digital body
		Enhanced the complexity of the digital body
		Provided access to some new descriptive languages and analytical concepts
		Created some new inter-spaces or border zones for the study of the body
		Made the investigation of aspects of the digital body newly possible
High	Generate	Fostered experimental space for engaging with uncertainty and the digital body
		Generated new ways of engaging with the digital body and bodily phenomena
		Supported a re-imagination and re-making of the digital body

boundaries of the body via performance (e.g. telematic-performance and robotics). The categories of methodological innovation we observed contributed to the research groups' understanding of the body in digital environments in different ways, summarized in Table 2.

Expanding and resituating methods led to new aspects of the digital body being brought into view, provided forms of critique, generated new research questions, and led to new insights. As innovation moved beyond the disciplinary boundaries leading to the transfer or generation of methods the view of the digital body made available became on the one hand more complex and holistic and on the other more speculative and uncertain.

Challenges of methodological innovation

Methodological innovation was uneven across the social science and arts research groups in the study. The methodological terrain of the social science research groups drew on distinct sets of methods strongly grounded in its disciplinary histories, methodological innovation was not positioned as central to their ethos, was less common and focused on expansion and resituating methods (summarized in Table 1). In contrast, the eclectic use of methods was central to the methodological terrain of the arts research groups, and methodological innovation was central, common and casual. This unevenness reflects their fundamental differences of approach to the nature of reality (ontology) and how that reality can be known (epistemology).

In turn these ontological and epistemological differences shaped the ethos and character of methodologies in the arts and social science case studies. Within the social science case studies, the epistemological groundings included an interpretative epistemology (social interaction and embodied learning case studies) which 'assume a socially constructed reality that is never fully objective or un-problematically knowable, and a researcher whose identity and values are implicated in the research process' (Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009, p. 734) and a quasi-positivist position (cognitive-psychology case study). The arts case studies drew on an epistemology of Design characterized by a practice-based approach that employs imagination and prototyping to generate and test solutions that envision 'what *might be* but is not yet', rather than 'what is' (Rylander, 2009, p. 10).

A critical epistemology the purpose of which is to 'challenge the social order, and give space to alternative marginal discourses' (Greenhalgh et al., 2009, p. 734) provided an epistemological point of

connection across the social science and arts case studies. For example, the social interaction research group shifted from an ethnographic interpretivist stance to research interaction in the operating theatre and a critical design stance to develop simulation training environments based on their research findings through performative re-enactment.

The level of methodological explicitness was a key difference between the social science and arts case studies. The social science research groups drew on distinct sets of established methods and theories within their field, and methodological explicitness was positioned as essential (e.g. references to rigor, objectivity-subjectivity, systematic processes, etc.). In contrast, tacit knowledge pervaded the methodologies of the arts case studies, processes were less explicit, and structures looser, with some participants rejecting research methods as problematic, irrelevant, and irritating: 'As far as I am concerned, I just do the thing. I don't really think about how I am doing the thing – it's just what I do.' (Fieldnote). These group participants experienced tensions between the 'openness' of making/art as research, the affordances of the digital, and the structure of research methods. Tensions that led to an eclectic range of methods and an ethos of casual methodological blending; as well as in some instances of 'post-method' (i.e. 'no method', 'individual', or 'custom made' methods). While this fluid stance would create tensions if combined with the ethos of the social science groups, it keeps methods in a state of productive flux, and this has the potential to support social science methodological innovation as it affords creative blending and remixing of methods. It supports exploration and un-determined outcomes and in doing so has the potential to open up pockets of innovation in Social Science and to produce new frames of thinking and ways of seeing.

While there is intense social science interest in arts-methods, to date, this has largely taken a 'technical' or 'tool-kit' approach to 'arts-based methods' – expanding and resituating them. In the process, arts-methods tend to be up-rooted and disconnected from the principles and ethos that inform them. This has reduced arts-based methods to 'visual methods'. Alongside this the arts are re-appropriating social science concepts and theories in novel ways through making, that disconnect them in similar ways. For social science to transfer and generate innovative methods through an engagement with the arts, and to benefit from the novel ways that arts engage with social science concepts, this paper suggests it needs to better recognize and understand the potential of art practice as research, and its underlying research ecologies 'where the capacity to create and critique is given form' (Sullivan, 2010, p. 119).

Conclusion

This paper has contributed to the current debate on methodological innovation in social science in the context of digital technologies and the body, and the arts in four ways. Firstly, we have developed and applied a continuum along four categories to explore social science innovation. The empirical focus of the paper adds to existing work on social science methodological innovation that, with a few exceptions (e.g. Bengry-Howell, Wiles, Nind, & Crow, 2011), is based on literature reviews and personal reflection. Secondly, we have focused on the role of interdisciplinary boundary crossing as a catalyst for social science innovation, through the analysis of instances of methodological innovation across three social science and three arts research groups. Thirdly, we have illustrated how the arts research groups in our study took up social science theories and concepts in novel ways that have potential for social science, pointing towards the possibilities for social science to engage with such groups, the challenges of doing so, as well as the potential to open up social science to new questions and methods. In doing so we briefly discussed methodological innovation in the context of the 'post-method' condition. Fourth, we have discussed how the use of digital technologies is placing new demands on social science methods that drive innovation, and how such innovation can support social science understanding of the still relatively unknown terrain of digital. We suggest that the types of innovation across the disciplinary boundaries of social science and the arts discussed in this paper are likely to become more important and more prevalent as we move more into needing to think of the digital body in social science data and method more generally.

Acknowledgements

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References

Bell, D. M. (2003). Method and Postmethod: Are They Really So Incompatible?. *TESOL Quarterly, 37*, 325–336. doi: 10.2307/3588507

Bengry-Howell, A., Wiles, R., Nind, M., & Crow, G. (2011). *A Review of the Academic Impact of Three Methodological Innovations: Netnography, Child-Led Research and Creative Research Methods*. Southampton (UK), National Centre for Research Methods (NCRM).

Crow, G., Edwards, R., Nind, M., & Wiles, R. (2011). *Opportunities for methodological synergies at the boundaries of the social sciences and the arts and humanities*. Report for ESRC, Southampton: National Centre for Research Methods (NCRM).

Delamont, S., & Atkinson, P. (2001). Editorial. *Qualitative Research, 1*, 275–277.

Dicks, B. (2014). Action, experience, communication. *Qualitative Research, 14*, 656–674.

Dunne, A., & Raby, F. (2013). *Speculative everything*. Cambridge, MA: MIT Press.

Eisner, E. (2001). Concerns and aspirations for qualitative research in the new millennium. *Qualitative Research, 1*, 135–145.

Emerson, R., Fretz, R., & Shaw, L. (2011). *Writing ethnographic fieldnotes* (2nd ed.). Chicago, IL: University Of Chicago Press.

Glass, N. (2008). Interrogating the conventional boundaries of research methods in social sciences: The role of visual representation in ethnography. *Qualitative Social Research, 9*, 50–68.

Greenhalgh, T., Potts, H., Wong, G., Bark, P., & Swinglehurst, D. (2009). Tensions and paradoxes in electronic patient record research: A systematic literature review using the meta-narrative method. *Milbank Quarterly, 87*, 729–788.

Grimshaw, A., Owen, E., & Ravetz, A. (2010). Making do: The materials of art and collaboration. In A. Schneider & C. Wright (Eds.), *Between art and anthropology: Contemporary ethnographic practice* (pp. 147–162). Oxford: Berg.

Gwyther, G., & Possamai-Inesedy, A. (2009). Methodologies a la carte: An examination of emerging qualitative methodologies in social research. *International Journal of Social Research Methodology, 12*, 99–115.

Hammersley, M., & Atkinson, P. (1995). *Ethnography: Principles in practice*. London: Routledge.

Hine, C. (2000). *Virtual ethnography*. London: Sage.

Holmquist, L. E. (2013). The interplay between research and industry: HCI and grounded innovation. In S. Price, C. Jewitt, & B. Brown (Eds.), *The Sage handbook of digital technology research* (pp. 459–472). London: Sage.

Howes, D., & Classen, C. (2014). *Ways of sensing: Understanding the senses in society*. London: Routledge.

Jewitt, C. (2013). Multimodal methods for researching digital technologies. In S. Price, C. Jewitt, & B. Brown (Eds.), *Sage handbook digital technology research* (pp. 250–265). London: Sage.

Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). *Analyzing social settings: A guide to qualitative observation and analysis* (4th ed.). Belmont, CA: Wadsworth Thomson Learning.

Marshall, P., & Hornecker, E. (2013). Theories of embodiment in HCI. In S. Price, C. Jewitt, & B. Brown (Eds.), *Sage handbook digital technology research* (pp. 144–158). London: Sage.

Mason, J., & Davies, K. (2009). Coming to our senses? A critical approach to sensory methodology. *Qualitative Research, 9*, 587–603.

Pink, S. (2009). *Sensory ethnography*. London: Routledge.

Robins, C. (2013). Art, academe and the language of knowledge. In N. Addison & L. Burgess (Eds.), *Debates in art & design teaching* (pp. 157–172). London: RoutledgeFalmer.

Rylander, A. (2009). Design thinking as knowledge work: Epistemological foundations and practical implications. *Design Management Journal, 4*, 7–19.

Schneider, A., & Wright, C. (Eds.). (2010). *Between art and anthropology: Contemporary ethnographic practice*. Oxford: Berg.

Sullivan, G. (2010). *Art practice as research*. London: Sage.

Taylor, C., & Coffey, A. (2008). *Innovation in qualitative research methods: Possibilities and challenges* (Working paper. 121). Cardiff University. Retrieved from http://www.cardiff.ac.uk/socsi/research/publications/workingpapers/papers-121-130.html

Travers, M. (2009). New methods, old problems: A sceptical view of innovation in qualitative research. *Qualitative Research, 9*, 161–179.

Wiles, R., Crow, G., & Pain, H. (2011). Innovation in qualitative research methods: A narrative review. *Qualitative Research, 11*, 597–604.

Xenitidou, M., & Gilbert, N. (2009). *Innovations in social science research methods*. National centre for research methods report. Retrieved from http://eprints.ncrm.ac.uk/804/