Re-Embodiment. New Strategies for teaching Embodied Interaction

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Abstract: This paper considers the role of the body and embodiment in design education. It offers a “re-do” of the Embodied Interaction course on the Interaction Design Master’s at Malmö University. This conceptual and pedagogic redo coincides with the increasing relevance of the field which now can be seen to include physical computing, wearables, haptics, and networked devices for transmitting bodily data. Three conceptual shifts are emphasised: embodiment redefined as materiality; critical engagement with contemporary politics and economics; methodological awareness and experimentation. This is not an abandonment of previous approaches, but a revision to coincide with developments in practice and scholarship, both within interaction design and in relevant related disciplines. It also reflects the current cultural and political educational climate by emphasizing a porosity of education, and a flow-through between the university and the world outside its walls.

Keywords: embodiment, interaction, materiality, critical, methodology

1. Introduction

Embodied Interaction has become an established sub field in Interaction Design. In an educational context it has developed into an umbrella for addressing physical computing, wearables, haptics, electronic prototyping (using platforms such as Arduino, LilyPad and Raspberry Pi) and networked devices and systems that access and distribute bodily or personal data. It relies on Paul Dourish’s book Where the Action Is (2001) as a respected anchor in the field, and has fed into a range of related scholarship encompassing performativity (Bentford & Giannachi, 2011; Wilde, 2012; Dalsgaard & Hansen, 2009; Fischer-Lichte, 2008), somatic approaches to design (Schiphorst, 2009; Höök, Ståhl, Jonsson, Mercurio, Karlsson, & Banka Johnson, 2015), postcolonial design approaches (Irani, Vertesi, Dourish, Philip, & Grinter, 2010; Mainsah & Morrison, 2014), phenomenology (Svaenes, 2013; Kozel, 2015), queer bodies (Light, 2011; Blas, 2006) and closely allied media art practices.
Embodied Interaction generates enthusiasm for its ability to open a niche for practical designing, critical reflection and methodological questioning. However, when it is taught a paradox frequently emerges: over-generalization at the same time as over-specification. The generalization is the risk of becoming overly diluted, with embodiment escaping definition entirely or coming to refer to everything; the over-specification is when the teaching becomes overly determined by a particular platform or set of technical skills. Methodological awareness, criticality and a clear sense of what embodiment means can be lost.

The re-do discussed in this paper relates to a specific Embodied Interaction course (it can also be called a module). It is a first year course on the 2 year Interaction Design Master (IDM) at Malmö University and has a student enrolment of between 18-22 students from around the world (it is common for a minimum 10 countries to be represented). It is taught in English and it lasts 10 weeks. It follows the studio-based design teaching model whereby students are expected to be in the studio working full days, five days a week. The prior educational training of the students varies. Increasingly students from the humanities apply out of a desire to integrate their previous cultural and intellectual backgrounds into design. These students don’t always have significant prior design experience but provide interdisciplinary perspectives in combination with intercultural ones.

The re-doing of this course took five years, and it is a continuing process of development and iteration. It is, in other words, a design project in itself that has integrated the voices of approximately 100 students. Significant revisions to the course occurred in the past two years in response to cultural, political and design developments in the wider world, in particular, the expansion of Big Data and the Internet of Things (IoT); the need for increasing attention to whose bodies we are designing for (attending to race, class, age, gender, ability, legal status); and the awareness of waste and excess (taking in environmental questions, asking if we need more “smart” gadgets, questioning advertising hype). It must be stressed that this is not an abandonment of previous approaches, but a revision to coincide with developments in practice and scholarship both within interaction design and in relevant related disciplines. It also reflects current cultural and political dimensions thereby emphasizing a porosity of education, a flow-through between the university and the world outside its walls.

Three conceptual shifts in how the course is taught will be emphasised:

- embodiment redefined as materiality;
- critical engagement with contemporary politics and economics;
- methodological awareness and experimentation.

2. Three conceptual Shifts in the Teaching of Embodied Interaction

2.1 Embodiment Redefined as Materiality

Dourish famously framed embodied interaction as “interaction with computer systems that occupy our world, a world of physical and social reality” (Dourish, 2001, p.3). He shifted the focus to social context and challenged designers to get out of the lab and into the field. This was incredibly valuable for calling attention to real people and real lives, and for revealing how social relations integrating people and designed objects have histories and embedded realities before, during
and after the latest system or object reaches the market. It was an ethnographic move, informed by phenomenology, and continues to be a starting point for the course. But like any good starting point it opens itself up to critique and expansion, not least by Dourish himself. As such, in this course we read his “Epilogue” in conjunction with his earlier writing and attend to some of his self reflection, including his acknowledgement that the body “has very little presence” (he reminds us that this was not the focus of the book), and his pointing to several important related developments that his book fed into: considerations of ubiquitous computing, attending to queer bodies, and a connection with artistic experiments emerging in the media art community (Dourish, 2011).

The crucial shift in teaching this course is not just recognising that the body is under-determined in much embodied interaction or that bodies are swallowed up by context: it is a shift to understand embodied interaction as material interactions, and embodiment as a sort of materiality. Many designers work with the intuition that materials talk back to their hands and thoughts, and shape their processes. This points to an acceptance that matter is not passive, dull or inert (Bennet, 2010). At the same time, we know that the human body is not bounded or limited by its skin, nor does it exist in isolation. In other words, there is more to matter than passivity, and there is more to a body than its individual, organic and bounded state. Consistent with tenets of New Materialism, it therefore makes sense to approach embodiment as a sort of materiality (Connolly, 2013). This reframing yields relationality, extension and agency to Embodied Interaction, and it opens up a critical perspective that is “materialist and vitalist, embodied and embedded … suited to the complexity and contradictions of our times” (Braidotti, 2013, p.51-52). However, it does not mean losing the human body. This will be explained in the next conceptual shift.

2.2 Critical Engagement with Contemporary Politics and Economics

The implications of framing embodiment as materiality in the teaching of embodied interaction are deepened by asking “whose bodies?” or “what bodies?” and by pointing out that this is not the same as eliminating the presence of the human body. The subtlety and complexity of human bodies are not nullified by a materialist approach that accounts for nonorganic or nonhuman bodies. They can be enhanced.

A political stance on embodiment starts with the simple questions of whether we are designing for a single body or for multiple bodies. Attention is called to whether designs intended for multiple bodies are actually based on the model of the isolated body and mapped outwards (this is often the default case and it is not always ideal.) The next step is to ask what each student thinks embodiment refers to: this usually starts with a basic qualification of a body in terms of its five senses, but this model is rapidly challenged to ask whether there might be additional senses. The sense of time, sense of balance, proprioceptive sense, and other candidates for the category of sense emerge. Then the question of designing for body or mind, or body and mind arises: revealing that much interaction design in the 20th century related to interfaces to facilitate intellectual tasks with the support of eyes and fingers. Are we designing for whole bodies, or parts of bodies? Emotions, memories, affects (which are not the same as emotions), imaginations, fantasies and identity enter in to the mix, reminding us of just how multi-dimensional and multi-material embodied existence really is.

The question of whose bodies are being designed for is deepened by the awareness that bodies are designed through the design of bodily interactions. In
other words, we don't just design interaction but we can be seen to design bodies. Further, when considering existing related designed systems an implicit body may be assumed but not made overt. These questions and implications open considerations of race, age, ability and gender, and assert that expectations of the performance of identity and ability lie hidden in most designed systems (Nakamura, 1995; McFadden, 2014). With particular reference to gender and sexuality, Zach Blas writes that “formations of body and identity bare the mark of technological networks, systems, and machines” (Blas, 2006, p.1). Embodiment is a profoundly political notion with clear design implications: each system affords a balance between choice and constraint, freedom and control, shaping practices, actions and movements (Thacker, 2004). Whether we like it or not, our designs exist within power structures and societies of control (Deleuze, 1992).

The contemporary political climate has called increased attention to various domains of the immaterial or abstract side of materiality, leading us to ask “what bodies?” are being designed, and designed for. Consider data bodies when we design for our data-doubles and address issues of data protection and surveillance (Zuboff, 2015); legal accountability as we are asked to design for refugees with unclear civic status, government agencies, or for the security industry (Schuppli, 2015); and economic agency as both world trade and personal finances become more complex (Lanier, 2014; Piketty, 2014). What seems to be the disintegration of bodies is actually a form of re-materialisation. Bodies are not dissolved into the digital and rendered easier to control, protect and preserve, in fact their materiality only becomes more complex.

In asking into the embodiment of Embodied Interaction it is possible to be overwhelmed by the range of options or complexity. The desire to return to a simple default assumption of a white, heterosexual, able-bodied, young man (who is employed and has money to spend on gadgets) may seem like a better option. It is certainly easier. This course expands the sense of what bodies might be, at the same time as stressing that designers cannot design for all potential variations of embodiment. At times we may design for the young white man mentioned above. Students are asked to define what they mean by embodiment based each specific design project. The pedagogic motivation is twofold. We aim for design students:

- to take note of latent but not-acknowledged assumptions regarding the bodies for whom they design
- to realise that they do not just design for bodies, they shape bodies with their designs.

Tacit knowledge is rightfully valued in design practice, but tacit assumptions can become blind spots and hinder the design process.

2.3 Methodological Awareness and Experimentation

The previous shift accounts for overcoming the void that can ensue when the application of skills occurs in a contextual vacuum. Here the focus shifts to the pedagogic handling of methodology and design processes, with the aim of promoting a reflective awareness regarding selection of methods most appropriate for the design project that students are asked to complete for this course.

From a pedagogic standpoint there is some controversy over whether it is wise to introduce methodology so early in Master’s education, preferring to default to a one of the models for clear iterative process that provides scope for revision and experimentation. The critical skills developed by this course include the evaluation of a range of potentially relevant methodological approaches. This prompts
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awareness into how designers choose to do their practical work, and validates the reflexive loop of questioning how and why one might select a particular approach for a particular project rather than using one general method for all design scenarios.

Simultaneous to the acquisition of hardware and software skills with a focus on Arduino, the methodological reflection begins with “Lab, Field, Gallery and Beyond” (Koskinen, Binder, & Redström, 2008). It is important to stress that no judgement is offered. The point is not to convert the students to a particular method, but to develop in them the awareness that it is possible to select a different method for each project. The article by Koskinen et al is useful for calling attention to the differences between a technologically-driven inquiry which, quite legitimately, might need to be located primarily in a lab environment and a field-driven enquiry which develops by designers being in the world interacting with people “in the wild”. Mild ethnographic-style data gathering is introduced, and the groundwork is prepared for participatory design. (It must be stated however that this course does not develop design ethnography or PD, we open scope for future courses to build upon these areas.)

From the Koskinen et al paper, we move to Critical Design (Dunne & Raby, 2001) in conjunction with a specific methodological example in the form of Cultural Probes (Gaver, Dunne, & Pacenti, 1999; Gaver, Boucher, Pennington, & Walker, 2004). The Critical Design perspective is important given the emphasis placed on the porosity of the studio: the fact that big questions occurring in the world can and should filter into the student project process. This is not to say that these problems will be solved, or that the process becomes so complex that the project sinks, but that education is not separate from the students’ lives as thinking, observing, acting, political beings in the world. Departing from the model of Critical Design, well established by Dunne and Raby, and opening a sense of critical design as interpreted through contemporary practices with repositioned technological, aesthetic and political qualities is stressed.

Cultural Probes prove to be useful for allowing a creative way to implement fieldwork in a condensed time frame and some students have used this effectively. This method of sending data gathering “kits” home with a limited number of people for a specified number of days in order to gain a glimpse of people’s lives, thoughts and imaginations provides practical and poetic grounds for design decisions (Gaver et al, 1999; Gaver et al, 2004; Hansen & Kozel, 2007). The combined qualities of playfulness and rigour are useful for opening out the students’ ideas of how to engage people in their design process, while at the same time providing a clear structure for data gathering and evaluation. It also permits a play across materials. Digital and analogue materials of all sorts can be included in the probes (such as notebooks, evocative objects like postcards or photographs, little containers with scented or tactile materials, and digital or analogue recording devices). The responses of the participants can be embodied in various forms.

Finally, body based methods – potentially a large field – are introduced with the assistance of two articles on bodystorming (Oulasvirta, Kurvinen, & Kankainen, 2003; Schleicher, Jones, & Kachur, 2010) These two papers work well together for identifying why designers might need to open out design processes to include bodily experimentation. This points to the possibility for using embodied processes for designing for embodied interaction. The second article critiques the first, but both are quite limited in focus and design objectives, making the point that there is scope for further development in this area. Bodystorming opens out to performativity in relation to materiality should any students wish to develop
this further in their projects or in their subsequent thesis projects (Jacucci & Wagner, 2007).

The fairly rapid overview of methods (technology-driven, ethnographic-style, critical and bodily) may have a weakness of being confusing, but this is outweighed by the pedagogic value of instilling an awareness that designers can choose to apply and/or modify methods for particular design contexts. The essential ingredient is a quality of meta-level awareness of why and how a particular method is selected and implemented, in combination with careful attention to how others may have used similar methods. Ethics and accountability are stressed. This contributes to the often repeated goal of developing a reflective practitioner. It also echoes the priority placed on experimental methods and processes espoused by the inter-disciplinary field of New Materialism, where practitioners and theorists are called to “advance speculations about processes that exceed our current capacity to grasp them and [to] act experimentally on those very processes when a problem, danger or disturbance arises.” (Connolly, 2013)

3. Structure and Evaluation of the Course

The focus of this paper is primarily the three conceptual shifts in the redo a course in Embodied Interaction outlined in Section 2. This section provides some details on the practicalities of the course, such as its shape, instruction and basis of evaluation, to make clear that the course is not entirely abstract or theoretical. It integrates some approaches from the humanities, but is still a design course (Bardzell & Bardzell, 2016). A brief gallery of work is included.

3.1 Seminars, Technical Instruction and Deliverables

The course balances seminar style discussions with an intensive workshop in technical skills, in particular hardware and software basics relevant to electronic prototyping using Arduino. This enables the students to achieve a basic level of functionality in the prototypes they develop for their practical project work. Variations in student technical skills are evaluated each year, resulting in modifications to the workshop process that may allow for two levels of instruction: basic and advanced. The work is practical and studio based, lasting between 7-10 days. Support by more advanced students of students with less knowledge has proven to be quite effective.

The seminar component of the course is based around the discussion of assigned readings. Seminars last approximately 3 hours, and particular students are assigned to open out the readings by leading the discussion with the support of the teacher. This can imply a steep learning curve for students who have not had to grapple with academic argumentation or writing style before entering the Master’s, but it is necessary to support the educational development in criticality, reflectivity and academic writing. (Note: Most of the readings assigned in class have been used as references in this paper). The course relies on another body of writing we call journalism that refers to shorter articles from newspapers, blogs and other discussion forums. These include everything from articles promoting or censoring smart gadgets and pointless apps, to claims that embodied devices will save national health care systems, to celebrating wearables in fashion or deploring the fashion for hack-a-thons. In this category of required reading there is passion, irony and a proximity to the reality of what is happening now that balances the more sober tone of academic articles and recognizes that intelligent journalistic
commentary emerges more quickly than the (necessarily) slow academic publishing processes for books or peer reviewed journal articles.

The deliverables for the course upon which students are evaluated include a project prototype and a paper. The project prototype is produced by a team of between 3-5 students. Emphasis is on prototyping and conceptual experimentation, rather than taking a safe route for producing a fully functional, sleek design – which is unrealistic anyway, given the multiple learning objectives and short time frame of a 10 week course. The project brief is quite open, with the instructor assigning a provocative and sometimes abstract theme and supervising the development fairly closely. Previous themes include: “Archiving the Intangible,” “Time Travel” and “Accidents.” These themes are selected with reference to active research projects in the Faculty, providing a link between the students’ work and existing funded research projects. Students are never told what to do by faculty, but see the wider relevance of the pedagogic processes.

The group project receives one evaluation applied to all of the students equally, but the papers are written by each student individually so that their separate voices can be heard and evaluated. They are asked to follow a strict short paper ACM format as an exercise in writing within formal constraints. They are, however, encouraged to experiment with their ideas while grounding their arguments by referring to their group projects, to the academic writing discussed in the course and to relevant design examples. They are given one group tutorial on writing.

In summary, three educational processes integrated into one course:

- Electronics skills acquisition in the form of a workshop component (a “crash course” in Arduino, sensors, and actuators);
- A theoretical and critical component based on readings and seminar discussions;
- A collaborative project producing a design prototype.

3.2 Gallery of Student Projects

*Figure 1 and Figure 2. Who Are Tina? (2014). Project intention: to awaken a fleeting memory of an absent person by using inflatables and a performative scenario. Designed by Kent Cam, Sarah Homewood, Petr Kozlik, Dennis Overhage, and Anna Navndrup Pedersen. (Photo: Sarah Homewood)*
4. Conclusion

In reflecting upon the on-going design project that is this course on Embodied Interaction, a question emerged over who is doing the “redo” of bodies: the teachers or the students? In other words, are we, design professionals who teach for university departments, re-doing the body so students can learn Embodied Interaction with more contemporary and critical relevance? Or are we teaching them to redesign the body in Embodied Interaction, which is to say, redesign contemporary bodies?

Clearly the second version of this question is the more significant, with more profound implications for cultural transformation, but it builds on the first. We are not merely revising and iterating prior scholarship in embodiment, offering new marketable skills and techniques. In developing greater awareness of the material and political implications of embodiment we reveal the extent to which our bodies are already modified by existing designs, and will continue to be modified by future designs. We are not abandoning the body in a turn toward materiality, but acknowledging that there is no unwinding the material transformations that have occurred and will continue to occur. Above all, we demonstrate that interaction designers have the conceptual and practical tools to tackle difficult questions and problems.
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