

Enquiring with Artefacts in a Sensitive Context.

Janet Kelly*

** The University Of Southern Denmark ,Janetakelly@Gmail.Com*

Abstract: This paper presents a study of the use of material artefacts where they have been used to enquire into a context which requires an additional sensitivity, due to the participants' relationship towards the project objective. Firstly some general principles for what artefacts 'do' in design enquiries are outlined. Then several examples are presented from a constructive design research project where artefacts have been specifically designed and deployed in order to indirectly introduce and enquire into some issues that might in some way be confrontational to the project participants. The motivations and intent behind the design of the different artefacts are explained, as is how they were deployed both as a method for enquiry and as an intervention. The paper concludes by discussing considerations and strategies for using material artefacts to enquiry with sensitivity, for the sake of design.

Key words: *Artefacts, Probes, Enquiry, Sensitive Contexts.*

1. Introduction

In User-Centred and Participatory design processes, which focus on people, the research aspect usually includes involving important stakeholders and potential end-users, and attempting to understand their needs and behaviours. In these cases, as opposed to design processes which are more focused on exploring the limitations and possibilities of technologies, the aim is to try and discover an outcome that will provide value within a particular context of human activity. In order to do this, design practitioners have for many years looked to the social sciences, with their professional skills to document and analyse human behaviours in order to understand these needs and behaviours better. The approach of ethnography, and the particular set of fieldwork methods that it entails, has proven to be particularly popular with designers, but essentially design and ethnography come from very different traditions and have different objectives [2] While ethnography is an approach that can be used when seeking to understand practice, this does not provide all that designers who ultimately seek to alter it, may need. In order to fill in the gaps, designers have also been developing many of their own methods for enquiry.

One of the main things that distinguish the methods designers use for enquiry from those traditional in the social sciences is the central role materials artefacts play. The world of the artificial is the designers' own traditional area of expertise, but it is more than just familiarity that has brought designers to this form of enquiry. Bringing in physical objects and representations of objects creates a different dynamic and different focus in projects. Artefacts can also be deployed in a multitude of different ways and are implicated in the creation of several kinds of knowledge. In this paper I will begin by outlining some of the different ways artefacts have been shown to contribute to enquiry in design processes, before using some examples from my own work to elaborate on some considerations for adapting artefacts to enquire for the purpose of design in a sensitive context.

2. What Artefacts do in Design Enquiries

Enquiry through the deployment of artefacts is a central characteristic of a constructive design research approach [12]. This approach is based on the kind of creative design research practice that is coming out of the tradition of art and design schools, that explores the relationships between people and the physical world through “design experiments” carried out as part of the research. The Field Programme of constructive design research is interested in, “how people and communities understand things around design, make sense of them, talk about them, and live with them,” (ibid pp.69) in other words how design relates to real world context. In this area of research, several authors have elaborated on several different ways artefacts can contribute to design enquiries and design processes, on different levels.

Gaver et al’s [9] cultural probes for example, have been a highly influential design enquiry approach that was originally developed to generate inspiration from current practices. Cultural probes is a method that uses a package of engaging objects, maps, postcards, and other materials, that are sent out into the field to be modified and then returned to the designers. In the original project they were deployed to establish a conversation with elderly people in diverse communities, and were designed to try and provoke inspirational responses. In this project they were not explicitly analysed but use to develop a series of design concepts, tailored for the communities the elderly people were from. “They provided us with a rich and varied set of materials that both inspired our designs and let us ground them in the detailed textures of the local cultures.” (Ibid pp29)

Although the original concept of probes was to intended to generate material to be used as a source of inspiration for designers, the idea of probes, artefacts that could be sent out to document in some way, has become widely influential and has been adapted in many ways [14]. Other forms of probes include informational probes [4] which were used to collect accounts of the ordinary details of the participant’s lives in sensitive settings, empathy probes [10] which experimented with finding new points of view through engaging the participants emotions and domestic probes (ibid) that were deployed in domestic setting, and the materials from which were analysed systematically to produces descriptive models, as well as being used in participatory design workshops to inspire designs.

There are also technology probes, which are notable in that they have actually been deployed to enquire through intervention, using semi-functional experimental prototypes that provoke people to reflect on their experiences and aspirations through disruption [17]. Technology probes do more than document current practice in different ways, they also seek to alter it. They resemble Mogensen’s concept of provotypes [15], where provocation is applied through concrete experiences in order to create new practices on the basis on current ones. As Mogensen suggests, artefacts can be used as a bridge between investigation and analysis, to reveal hidden assumptions about current practice, by getting, “participants to experience current practice in new ways by doing it in alternative ways” (ibid pp20), making visible aspects of current experience that may have become invisible, by means of creating a shared vision of an alternative reality.

Critical Artefacts Methodology developed by Bowen [1] is another approach that involves similar aims. Inspired by critical design, it uses critical concepts embodied by designed objects to encourage creativity in co-design processes. Bowen’s methodology involves designers expressing their current understanding of a design situation though conceptual design concerns that are then brought back to stakeholders’ to provoke reflection on

alternative possibilities [ibid]. Methods that employ artefacts can utilize the ability of design to give form to concepts [12] and ‘provoke’ through suggesting alternatives to current practices.

All artefacts used in design enquiry that suggest or create alternative practices, can also create knowledge about those potential practices. Even when artefacts are not the final outcome of the design process, they have the same qualities, becoming as Ehn argues, both devices and “things” capable of ‘modifying the space of interaction for its users, ready for unexpected future use, rich in aesthetic and cultural values, opening up for new ways of thinking and behaving’ [7], (pp.93) According to Latour, physical objects have an agency of their own, [13] which manifests both in their materiality and in their intended, and unintended, functionality. Although they may embody ideas, artefacts always leave room for multiple interpretations [18] and their designers will never be able to fully predict or prescribe how they will be interpreted in the world [16], but it is precisely this unexpected aspect that allows artefacts that are deployed in design processes to become tools to explore new practices. More than just testing an idea, deployment of artefacts allows designer to begin to explore their actual consequences for current practice, if and how they transform and what form that transformation can take.

Finally and a little differently, artefacts can be a means of bringing people into the design processes and giving them a role that allows them to participate. In Scandinavian Participatory design, since the early days and the cardboard computers of the Utopia project [8] designers have been creating mock-ups to that, by acting as props in enacting shared visions of future practices with stakeholders at. Mock-ups are a way of making a future technology tangible and actionable, but with a low-fidelity materiality they are also able to be easily understandable and yet still open to adaptation by any of the participants involved, no matter what their level of technical skills were [6]. Methods based on the games metaphor have also often been used as a basis for mutual learning between designers and users. Brandt[3] suggests what exploratory design games offer are a valuable framework for organising participation, where the various skills and interests of the different participants can be employed in order to explore design opportunities collaboratively. She highlights the necessity of having tangible game pieces, as well as the importance of the use of rules, in order to support the participants in making design moves. ‘The importance of game materials is to create a common ground that everybody can relate to’ [3]. Artefacts create something to orient towards that can be understood on some level by all participants because of their tangibility.

3. The Case: Designing in a Sensitive Context

The case I will present in this part of the paper describes the design of artefacts for enquiry in response to the specific constraints of the project context in which they were deployed. The Pre-users of Medical Devices project is a sponsored by two medical device companies, Novo Nordisk who produce insulin injection devices treating diabetes and Oticon who produce hearing aids. The idea behind this collaboration has been to both create an in depth analytical understanding of why people with certain medical conditions (gradual hearing loss and people with 2 diabetes) delay becoming users of medical devices (hearing aids and insulin injection devices respectively) which could ultimately benefit their health and well-being, and to create design concepts to help overcome this delay.

One of the key characteristics of operating design projects in the medical domain is the importance of sensitivity. While in other cases [4, 5] the need for sensitivity often relates to the extent to which the participants’ physical or cognitive abilities may prevent them participating as equals in a design process, in the case presented

here the need for sensitivity stems from the participants relationship with the particular technologies under development [11]. People with these two medical conditions often may not wish to see themselves as potential users of these devices, because of the implications this has to their sense of identity. In the case of hearing loss this may be because people believe having to wear hearing aids implies that their hearing loss is worse than they feel it is and makes them seem old. While in the case of people with type 2 diabetes, many believe having to inject insulin means that they have failed to treat their condition well by other means, such as diet and exercise, because insulin is often associated with being the last resort as a treatment. The project objective was to see if it would be possible to overcome these beliefs, but in order to do so we had to develop methods that accounted for any lack of sympathy these people may have had with this objective.

As part of this research we have conducted studies with people from both condition areas in Denmark and the USA at the request of the two companies involved. These have been exploratory studies due to the challenges of designing in this complex and sensitive context (ibid) and have involved ethnographic field work, including interviews with pre-users and health and hearing care professionals, and recording and observing in the clinical setting. In this paper I will present work that was done in the New York area in the Autumn of 2011. There are three different kinds of artefacts that I present here: the first set of artefacts were design and deployed as part of the study involving people with hearing loss who were not yet using hearing aids and the second two sets of artefacts as part of the study involving with people with diabetes type 2 who were not yet users of injection devices.

3.2 Self-Documentation as a Way of Generating and Exploring New Practices

With regard to hearing loss, an initial insight we had gained from ethnographic fieldwork was that one reason people delayed getting hearing aids was that they had difficulty believing their hearing loss was causing them significant problems. Hearing loss often manifests as a communication problem rather than a physical problem of hearing, which means can be easier to assign environmental factors such as room acoustics or someone mumbling as the cause. It can also be much more problematic for the people close to the person with the hearing loss, as they are the ones that may notice breakdowns in communication more. We wanted to explore if making people reflect more the problems they experienced from hearing loss could change their attitudes to getting hearing aids, but also thought confronting out study participants with this objective would be offensive as it would imply we thought they were ignorant about their own experiences.

In order to explore this design direction we decided we could introduce it indirectly and combine it with a task that was intended to also help document people's everyday life experience of hearing loss, as it emerged over time. We therefore created design probe style auto-ethnography kits with a dual purpose, firstly to get people to document how hearing problems occurred in their everyday lives, but also to encourage them to reflect on how problematic those hearing problems actually were. We asked three of the participants in our study who had identified themselves as having a hearing problem, but had not yet acquired hearing aids to complete a kit with three activities in it. The participants had around one week to complete the tasks in the kit, after which we came back and interviewed them about it. What follows is a presentation and analysis of some of the kit contents as artefacts for enquiry.

One of the tasks in the kit was called the ‘Daily Problems Chart’, it was a small credit card sized chart, which folded out and was clipped together with a small sized pen. It consisted of a grid with a list of possible problems caused by hearing loss down one side and the hour of the day along the other axis, the participants were asked, during the course of one day, to put a mark in the box if any of these things happen for the hour it happened. The idea of the chart was to understand how hearing problems occurred in their daily lives, how extensive were they and how frequently they noticed them, it was also to explore if recording the problems could be a new practice that would make them more aware of the extent of the problem.

Only two of the three participants completed the ‘Daily Problems Chart’, which suggested the task was too inconvenient for the third participant, who said in the follow up interview he hadn’t been able to find the time for it. Of the two that did complete it, their responses indicated that they were surprised by their observations of themselves and that frequency of the situations they recorded was far more than expected. One noted that although she was aware that these situations were occurring, she had not been aware of the extent “I found the exercise, writing down the number of times I’m inconvenienced was also a surprise because even if I am aware that I have to ask people to repeat things – it can be a surprise how many times a day”, she knew what kind of hearing problems she was having but had become accustomed to them so was not really conscious of how much they were impinging on her daily life. This was actually exactly the kind of response we were hoping the chart would generate, as we wanted to see if we could get the participants to reflect in a new way on their problem. In the follow up interviews the chart also served to help the participants explain further the way they experience their hearing loss, as they were able to refer to the specific instances it documented which suggests it also worked quite well for documenting current practice.

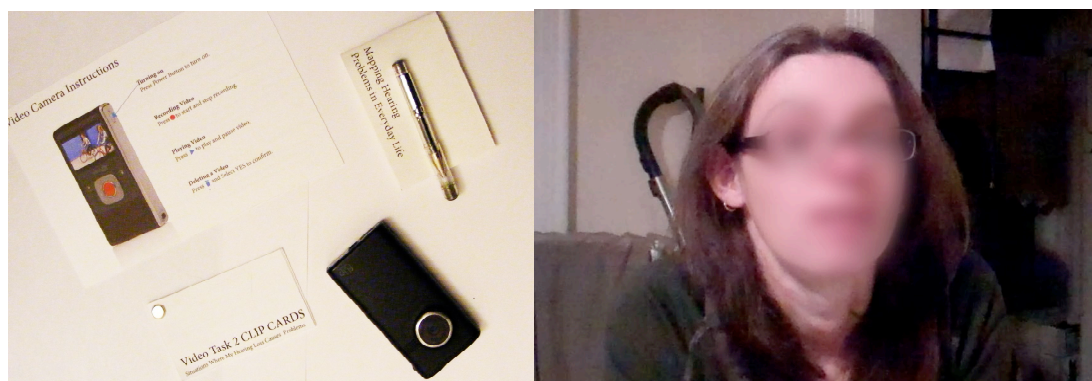


Figure 1&2. The Hearing Loss Self Documentation Kit(Left) Wife being interviewed by her husband about his hearing loss.(Right)

The kit also included a small video camera, and one of the tasks, the ‘Interview Task,’ asked the participants’ to interview someone close to them about their hearing problems; giving them a set of suggested questions for them to use. The idea of this was to probe the social aspect of hearing loss, and to explore if the practice of interviewing others who may be affected by their hearing loss, encouraged them to reflect on the way their hearing loss affected the people around them, effecting in any way their decision to seek help.

The follow up interviews suggested that the ‘Interview Task’ seemed to have had a big impact on all the participants as they had not necessarily been aware of the extent to which their hearing loss was problematic to

others before completing it. One of the participants interviewed the care workers, who were with her several hours a day helping her look after her sick mother, and was surprised to learn from one of them how she was reacting to her hearing problems, “I also interviewed a second care giver, who told me something very startling – she told me, because of my hearing loss, she hesitates to talk to me – because she thinks it bothers me when I have to ask her to repeat things, so it prevents – it is an impediment for her even talking to me. I did not realize it had that kind of effect – that it would prevent somebody from talking to me.” She had previously only thought about her hearing loss in terms of how it affected her and had not really been aware that it was affecting the people around her to the extent that it changed their behaviour.

The wife of one of the participants even re-appropriated the task, asking to interview him after he had interviewed her, in order to bring up a potentially sensitive topic with him about how hearing loss was affecting their relationship.

WIFE: so did what I describe seem to be what you experience?

HUSB: I think it is an accurate description, although I think you are probably being kind, I think there is probably a greater frequency of times in which you’ve said something to me if I am in the other side of the apartment and I haven’t done-I am not even aware that you actually spoke.

WIFE: so I just assume that it’s your natural inclination to ignore me

HUSB: (laughing) he-he well that’s- that would be causing a p-problem in our marriage cause it’s not. I’d-I never ignore you

The participant with hearing loss had not previously been aware of how his wife was interpreting his behaviour, even though he had been aware that his hearing loss may have been causing her problems, and that this could even be affecting their relationship.

This re-appropriation of the task clearly documented an instance where a hearing problems become relationship problems. It also created new kind of practice for this couple, that of using the video camera as a mediator in their negotiations around hearing loss. In a later interview the same participant explained how his about his hearing loss had changed, “my thinking about this has been developed, my first thoughts about it would focus on my physical disability, but it is true that in the development of this (the study), I am thinking more about the function in a relationship.” Before being asked to complete the tasks he had only considered his hearing loss as a personal problem, but had been forced to reflect on the implications it had for his relationship with his wife because of the study. For the design agenda, this instance helped to reveal that giving spouses tools to communicate about hearing loss could also be a way of changing attitudes about getting hearing aids.

The kits had multiple role in the study, firstly to explore new practices by created an intervention that forced the participants to reflect on their hearing loss in a range of ways. This intervention both tested this hypothesis that having to reflect would make people with hearing loss more aware of the problem, but also generated new practices, some of which were even unexpected even by its’ designers, such as the re-appropriation of the interview task by the participant’s wife. As the kit was also about to investigating new practices, this intervention was able to be accepted by the participant in the context of the project as a self-documentation task. The kit additionally created a format for organising participation which actually empowered the participant, turning them into the researcher. In particular the inclusion of the video camera in the kit, with its flexible functionality allowed the participants to appropriate and adapt the task in their own way.

3.3 Making Visible Hidden Aspects of Current Practice in the Guise of Exploring New Ones

The next two set of artefacts were created for the study that involved people with type 2 diabetes and were deployed in a workshop we held in the US. One of the insights from the ethnographic study we had done with people with diabetes was that the blood sugar measuring practices associated with the condition had an impact on how people understood the condition and its' treatments. We wanted to further explore how different ways of measuring might change these understandings, but once again we did not want to confront them with the suggestion that their current understandings were wrong. In a previous part of our study [11] we had experimented with co-design activities based on Critical Artefact Methodology [1]. Although this approach was initially intended to provoke creativity during co-design sessions, we had found it useful for broaching sensitive topics regarding the need for treatment technologies, through the abstraction and re-representation of specific aspects of treating and living with the medical conditions. We decided to adapt the method, to create artefacts that were intended to embody different meanings that blood sugar measurement could have, and how it related to living with the condition daily and in the long term.

In the workshop which we conducted with four people with type 2 diabetes, we presented three mock-ups of technologies that were meant to represent different ways that measuring technologies could mediate between the actions taken to treat the disease and the consequences of it. The mocks ups were low-fidelity, made in white card with a printed graphical interface stuck on, and the intention was that these would serve as props when the participants discussed their potential uses. These were presented to the participants along with a short use scenario in PowerPoint. We used the persona of a person with type 2 diabetes who was struggling to motivate herself to treat the condition, and asked the participants to rate the concepts as to which would be most useful to her, pick one in pairs (they were banned from choosing the same object) and then create a short dialogue where they should try and persuade her of the benefits of the device. The workshop was video recorded and the discussions transcribed and analysed.

The first concept, the 'Food Scanner' represented a device/application that could scan food barcodes and estimate how much, how quickly and for how long blood sugar levels will rise from fasting level for people with diabetes and was intended to provoke reflection on the constant decision making regarding food that is part of treating diabetes in daily life, and explore new practices that might be instigated from knowing what the effect food would have on their blood sugar in advance. The second concept, the 'Blood Sugar Watch', represented a watch like device that could read blood sugar levels continuously, indicating if this is in the target range, too high or too low with a coloured scale. The Blood Sugar Watch was intended to represent a different way of thinking about blood sugar, with more intuitive communication than abstract numbers, and to explore the idea of having a constant presence for the condition, which is normally symptomless. Finally the 'Risk Predictor' concept represented a home kit for blood sugar measuring that would allow people to see what their risk was of developing complications from diabetes such as blindness, heart disease, amputation and death, over time. . The idea behind this concept was to get the participants to reflect on how they related to the risks associated with the condition.

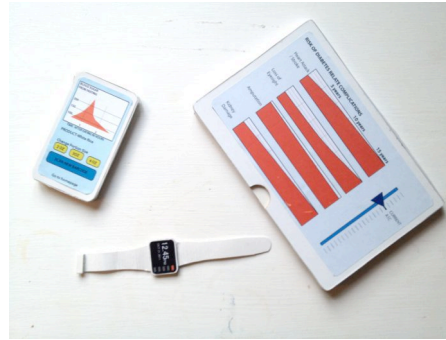


Figure 3. (From left to right) The ‘Food Scanner’, the ‘Blood Sugar Watch’ and the ‘Risk Predictor’

In the actual workshop the artefacts were not taken up as props to enact scenarios as we had hoped. Instead the participants began to evaluate the artefacts as potential future products. In doing so they began to compare their current practices to the new ones the artefacts implied and divulged a lot about their attitudes to measuring blood sugar and the different meanings it had to them. For example some of them saw themselves as an expert in their own treatment, they wanted to make it clear that they understood their own body and therefore did not need an external reference in the form of a blood sugar measurement. With regard to the ‘Blood Sugar Watch’ concept, one participant suggested that it could not tell him anything he did not already know, “I would wear it if I felt I needed it but me personally I’m under control I know what I do and what I can’t do and I do it- I might not need something like that”, he showed that he felt like he understood his the condition so well and did not actually feel the need to rely on blood sugar measuring technologies to understand what was happening in his body. Similarly the reactions to the ‘Food Scanner’, suggested the participants thought it would only be useful to people who were newly diagnosed with the condition and not for people like them who had had it for a while. These reactions suggested the participants felt that blood sugar measuring was something you did to learn about the condition, but not to assess its progress.

It also became apparent that any kind of external measurement was always open for interpretation and even up for negotiation. They reflected on whether they believed it would be possible to relate the responses from the devices to behaviours, for example one participant suggested that rather than being informative seeing your blood sugar rise after eating on the ‘Blood Sugar Watch’ would be a flaw because you would have to interpret yourself why it was happening, “you’d have to judge to, it goes up and you know you just ate so that’s why it’s up”, which implied that he thought that high blood sugar was not a problem as long as it could be accounted for. Another related the ‘Risk Predictor’ to his own eye doctors advice, implying that as you cannot predict a diabetes related complication will happen for certain, the information would not be valuable, “my eye doctor that I go to once a year regularly and he’s shocked that there is no diabetic retinopathy, when it was going up and down up and down for those 9 years, and he’s shocked....so you can tell somebody they’ll go blind in 2 years but it probably won’t be accurate”, this suggest that he felt that as the complications of diabetes were a risk but not a guarantee, knowing the risk was high did not make a difference.

The ‘Food Scanner’, the ‘Blood Sugar Watch’ and the ‘Risk Predictor’ did not explore new practice in the way that was originally intended, possibly both due to their lack of functionality and the construction of the task associated with them. They also created a different kind of participation than was originally intended, that of critical consumers, rather than players in an enactment of new practices. Still, they did succeed in helping making

bridges between investigation and analysis, as through their evaluations and critiques of the artefacts as products, the participants' revealed aspects of their attitudes towards measurements as part of treating their diabetes that may otherwise have remained hidden. The artefacts indirectly introduced different aspect of measuring and assessing blood sugar in order to uncover the workshop participants' attitudes.

3.4 Combining Exploring New Practices with Formats for Participation

Another insight that had come out of the fieldwork was that for people with type 2 diabetes, insulin as a treatment was something they had heard about it, but knew very few facts relating to and had many misconceptions about. Our observations suggested many doctors were not aware that the patients had limited or misinformation about the drug; and often did not address the patients real concerns when insulin was introduced as a treatment option. We wanted to investigate formats for communication tools based on the subject of insulin, but did not want to suggest to pre-users that their assumptions about insulin were wrong. Instead we took inspiration from Brandt's [3] work on using design games and created a board game like artefact that would work as a format for creating participation in workshops but was also another kind of design probe, a way of exploring a format for quickly identifying concerns that could then be adapted into a communication tool for health care professionals

In the same workshop with people with type 2 diabetes in the US, we deployed the 'insulin concerns game' which, like the auto-ethnography kits, both acted as an intervention that explored new practices and enquired into themes. The 'Insulin Concerns Game' consisted of a board and playing pieces on which were written different concerns that had heard during our interview and observations, such as "RISK OF PUTTING ON WEIGHT", "THAT IT WOULD BE FOR THE REST OF MY LIFE", "I DON'T KNOW WHAT IT WOULD DO TO MY BODY" and "IT'S NOT GOOD TO BE ON MEDICINE- IT HAS SIDE EFFECTS". There were also two blank pieces per player on which they were asked to write their own concerns. The players were then asked to take turns place the concern on the board indicating to what extent it was a big or small concern for them and account for their placement. The board was fold out and had bright blocks of colour reminiscent of traditional board games, with hexagonal pieces.

The game worked well as a way of organising participation; the four participants quickly understood the format, and began identifying and committing to their main concerns about insulin. Many of these concerns, as we had anticipated, were misapprehensions that a health care professional could easily address if they were aware of. One participant, for example, assumed it could be painful, aside from the injection, which is not generally a problem associated with insulin, "Of course I could be the body type, I don't know if I am, that once you're on insulin you're in pain and of course the shot is somewhat painful", this suggested that he was afraid of it because he misunderstood what it would do to his body. As they had been given some pre-written suggestions, the participants also identified some issues which are associated with insulin that they had not been aware of before, "I wouldn't know what the side-effects are, I didn't know it could make you put on weight, I didn't know any of that because I never took it"; weight gain is a real side-effect of insulin, again showing that the participants had very limited information about the drug. The games success in getting the participants to elaborate on their concerns also suggested that it might work well if adapted into a tool for communication between health care professional and patients.

Although we had not anticipated finding out anything significantly new about the participants views of insulin as researchers, we were surprised to gain some new perspectives when the participants elaborated on their reasons for the choice of a particular concern. In particular a concern which was well known to us, that people perceive insulin as a final resort ‘the last step on the treatment ladder,’ was thrown into a new light when it emerged that some of the participants were afraid insulin actually might not work for them. One participant put that as her main concern, “my diabetes will eventually kill me because if I take insulin and its still not controlled, that’s my main concern” , while another expressed a concern about becoming resistant to it. These responses suggested that people were reluctant to try insulin because they were scared it might not be an effective treatment and then there would be nothing else that could be done. This was not a way that we had framed this concern before during our previous analysis of our material, and it highlighted that we had not considered people might doubt that insulin would work as a treatment.



Figure 6. Participants playing the Insulin Concerns Game in a workshop in the USA.

The ‘insulin concerns game’, following on from the work of Brandt and others, used the recognisable format of the board game to organise participation by assigning the participants the roles of game players, which they easily understood. The activity served to create a form of co-analysis, where the game pieces represented some of our observations from the field and through the participants’ responses to these, new framings and ways understanding these emerged. Like the kits, the games were able to be introduced and accepted in the context of the project as a research tool, but additionally served to bridge between the investigation and analysis. Finally the game also explored what new practices for getting people with type 2 diabetes to elaborate on what their concerns were; a format which could be adapted to a different setting such as interactions between patients and health care professionals.

4. Discussion

When designing artefacts to enquire, the project they will be deployed in becomes its own specific and unique context for design, distinct but not separate from the ‘real world’ context in which the outcome of the design process is eventually intended to be deployed. When designing artefacts for enquiry, the particularities of that context must be accommodated. The artefacts I have presented here were attempts to enquire into a design space in a project context that required sensitivity to participants’ feelings towards the project objectives, as these could

be confrontational to their sense of identity. The artefacts were designed in order to be able to indirectly introduce the aspects of the project agenda that may have been offensive to the participants. Artefacts and even the methods by which they are deployed cannot be transferred in their entirety from one project to the next. Just as in a 'real world' context, the project context will have its own unique opportunities, challenges and constraints, which the designer should consider. In this case this meant designing the artefacts and their associated tasks in a way that was sensitive to the participants' relationship to the prospect of use with regard to these medical devices.

Creating formats for participation and roles for project participants which they feel comfortable with can be important in any collaborative design project, but is particularly important a situation like this where the project objectives may conflict with the participants' interests and leave them feeling disempowered. Both the artefacts and the tasks together can help create different roles for the participants because they are something understandable and tangible to orient towards. Sometimes the nature of the task and the role that it implies can be made explicit in the artefact, for example with the 'Insulin Concerns Game', the object itself suggested a familiar activity and seemed to have a clear purpose so the task was easily explained and understood. Another option is to give the participants a greater ownership of the project by using artefacts create to give them a means to control the material that is being generated. The tasks in the self-documentation kit did this by making the study participants into researchers of their own lives, while other methods such as low fidelity mock-ups like the cardboard computers, or some of Brandt's design games [3], equip the participants with tools that allow them to take on the role of designers and developers.

Closely related to the roles they create, it is also relevant to consider how the artefacts will be introduced within the project context and in turn what this might make possible. Participants will understand an artefact they encounter as part of the study, in relationship to how they understand the purpose of the study. In the case presented here, this was utilised in order to circumnavigate or disguise a purpose that was potentially confrontational. Both the self-documentation kit and the 'Insulin Concerns Game' disguised a potential confrontational design interest with another kind of exploration that would probably seem more acceptable to the participants; these artefacts and their associated tasks, combined interests that might have been more controversial with ones that the participants would be more open too. Here introducing an artefact as part of a research task, specific to the project context, was also a way of exploring new practices that could be transferred to other contexts.

Designing artefacts with multiple purposes is one strategy for deploying artefacts for enquiry in a context where it may not be advisable to be completely transparent about what all the objectives of the enquiry are. Another strategy which was followed with the deployment of the critical artefacts was to abstract issues and re-represent as artefacts. This is a way to introduce issues without confronting participants with the interests behind doing so. As product concepts, the participants were able to take on the familiar role of critical consumers, but in the process of doing so still revealing hidden attitudes and assumptions that put current practices into a new light. The advantage of using material artefacts here is that they can embody an issue or an idea in a non-explicit way that allows it to be introducing indirectly as a discussion topic.

Artefacts can be a powerful tool for enquiring in design, both for generating different kinds of material and knowledge, and for structuring participation within projects. Introducing artefacts into contexts of interest is a way to help understand how practices can be transformed through alterations to the material world. Additionally artefacts can be used to both to indirectly broach delicate issues both by re-representing them in the form of design

concepts, and also to pursue potentially confrontational objectives by combining different roles and purposes. In a context where the design agenda is potentially controversial, adapting design methods that centre around material artefacts such as probes and design games, can both be a way to approach the controversial issues with sensitivity while generating the knowledge for design.

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