Designing for disability: Guidance for designers when working with users with Specific, Critical, Additional Needs (SCAN)

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By

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Appendix A: Full guidelines

1. Introduction

This appendix provides a full breakdown of the guidelines. To aid understanding it is highly recommended that this document should be read in conjunction with chapter 6 (The effectiveness of design and evaluation processes from the SCAN users' perspective: results) which contains detailed information in relation to how they were developed and where appropriate, links to supporting literature. They were created in conjunction with a variety of stakeholders including SCAN users, their carers, family members and associated health, social care and support professionals.

As such they offer practical guidance when working with these groups on such subjects as appropriate method selection, the dangers of making assumptions, the importance of building professional relationships and appropriate communication as well as other advice designers may wish to consider when working with such users. For ease of use they are ranked in terms of frequency, for example nine participants stated that designers should not make assumptions when working with them.

They are intended to increase awareness of the needs of these users in the context of design and evaluation processes. As such, it is hoped they will encourage designers to both adopt inclusive practices and provide a reference point from which they may develop their understanding. They are not the final published guidelines but they will provide the content for whatever means of publication is chosen.

Guideline	Number of participants
Do not make assumptions. Try to start every project with an open mind. Assumptions are often incorrect and sometimes can be dangerous. If you do have to make assumptions try to ensure that they are based on evidence.	9
Communicate in a meaningful way with all stakeholders.	6
Be aware of the sorts of constraints the users you are working with may face[1].An understanding of this will help you design products and services that more effectively meet users' needs.	6
Be friendly, respectful, polite and approachable.	6
Talk to the people you are designing for and not just those you perceive you are.	5
Remain professional but be aware of the need to build a relationship that allows people to work with you[2].	5
Adapt to the needs of users[3]	5
It is important to have some foundation knowledge of how various disabilities will affect the users for which you are designing.	5
Continue professional development by keeping your skills and knowledge up-to-date[4].	5
Listen to what you've been told.	4
If your participants have mobility difficulties and you intend to conduct face-to-face research ensure that the venue you use meets their needs. For example, if a user cannot climb stairs, ensure that the room is on the ground floor or has lift access. This will lead to more inclusive and better quality of research being produced.	4
When working with users remember everyone has some value and something to contribute, no matter how small.	4
Ask your users what format they prefer their written materials to be presented in[5].	4
Be creative when you're designing solutions. The creativity should not just extend to the design but how you approach certain aspects, for example, how you interact with a user.	3
Refer to appropriate standards/guidance.	3
Offer people different ways of giving feedback or requirements[6]	3

[1] 1) Lack of wealth 2) Reliant on state benefits 3) Complex health conditions.

[2] For example, they need to be prepared to talk to you and trust you. This will undoubtedly take time and cannot be rushed.

[3] For example, choose research venues that are physically accessible if you are going to be working with those that have physical impairments.

[4] *"...researchers need to and designers need to definitely... have ...training."* (Linda-a family member/support worker)

[5] For example large print, easy read, audio.

Guideline	Number of participants
If you do make a mistake when working with users, reflect on it and try to learn from it.	3
Try to make the process of interacting with the user as comfortable as possible (put users at ease) - this is important to ensure that you get the best out of the interaction and honest answers.	3
Be humble, open and approachable.	2
Pilot your materials before you use them.	2
When formulating questions ensure they are straightforward and to the point.	2
Always ensure that you conduct research at a time convenient for the participant.	2
Use visual aids as and when necessary.	2
Try to gain firsthand experience on what you are designing.	2
Treat participants as equals.	2
Keep the user at the forefront of everything you do.	2
Try to remember that the user is the expert in their own condition.	2
It is important to understand not just the needs of your primary user group but the needs of any secondary users that may use your products[7].	2
Try to gain as much experience as possible working with a range of different user groups.	2
Consult with users before a design goes to production.	2
Ask users what they require in terms of assistance.	2
Be aware of the context you are working in as specific contexts may demand specific language.	2
You will need to make a judgement in terms of the audience and adapt your language and working styles accordingly.	2
Ask your users what they like to be referred to as, before you start working with them[8].	2
Avoid questionnaires if you require detailed responses[9,10].	2
Avoid leading or negative questions.	2

[6] For example, a hearing impaired participant may not be able to participate in a telephone interview and may instead prefer a face-to-face or written alternative.

[7] For example, family members and support workers.

[8] For example, participant, user, expert user, their name.

[9] Questionnaires have a role in evaluation but may not be suitable for gathering requirements during the design or evaluation process.

[10] For example, if you are looking to compare two systems it may be advisable to use a questionnaire, but if you're looking to gather requirements for a new system this method may not be appropriate. If you need in-depth information it may be better to speak to people. Questionnaires are good when needing to prioritise requirements, for example.

Guideline	Number of participants
You may need to work with several other professionals such as ergonomists or other specialist researchers to understand the information given by users.	2
When working with health or social care professionals, do not be afraid to approach them and ask them for assistance.	2
When you are designing for people try to keep universal design principles in mind[11].	2
It may be beneficial to observe how a user interacts with those closest to them[12].	2
Multiple-choice questions may be particularly useful for gathering statistics. These may help you generalise and search for patterns and trends.	2
When developing questions ensure they are relevant to what you want to find out.	2
When working with users that have disabilities, a mixed method approach may be appropriate so that you can allow as many people as possible to present their views.	2
Ensure that you have a proper understanding of your users' views.	1
If the user has a communication difficulty, try not to predict what they are going to say.	1
Engage with users as early as possible in the design or evaluation process.	1
If you are not sure if the user has understood what you have said, ask them to repeat it back.	1
Do not be afraid to rephrase a question as many times as is required.	1
Some SCAN users may communicate verbally but use additional verbal cues[13].	1
When working with users try to avoid the use of technical language/jargon.	1
Where it is appropriate, act on what users have said.	1
When you are designing try to encompass the views of as many people as possible.	1
Try to understand the differences in personality and other factors that come from working with different disciplines.	1
Give users the opportunity to take part in research.	1
It may be useful to observe the user in their natural environment.	1
Be mindful of cultural issues.	1
If you make a promise try to ensure it's fulfilled.	1

[11] (Bjork 2009:118, adapted from Behar 1991, Center for Universal Design 1997a)

[12] This may include family members, support workers, health and social care professionals.

[13] For example, one of the participants in this study will say 'yessss' to indicate that he likes something.

Guideline	Number of participants
Allow users sufficient time to communicate their views.	1
You may have to do some research into your user groups before you start working with them.	1
It is important you hear the true voice of the user[14].	1
Always introduce yourself when working with users.	1
A user's needs may change with age.	1
If you are asked a question by users and you do not know the answer be honest.	1
Where you can, offer choice to users.	1
Some users may require materials to be broken-down into small chunks and explained slowly and clearly.	1
Have a clear idea on what you require from an interaction with a user.	1
It is important to set and manage users' expectations.	1
Consider the time of day you conduct research activities. Many users may be dependent on public transport which only offers free travel after 09:30am (Network West Midlands, 2015).	1
When you work with SCAN users consider even little factors like where you sit: will that enable the SCAN user to hear you? What you wear, particularly if you are going to be using sign language.	1
When you are doing research try to ensure it is being conducted with the correct user group.	1
When producing written materials, such as questionnaires, give users sufficient space to express their views.	1
When producing written materials, if questions are related group them together for convenience.	1
When designing electronic materials, for example websites, consider people with epilepsy, they may not be able to tolerate flashing images.	1
If you use an online questionnaire to gather information be mindful that some people may not have fast internet connections.	1
Questionnaires may help you access people that are in remote locations. However, you may also wish to consider the use of telephone interviews.	1
Do not limit yourself in terms of the methods you use to either gather requirements or gain feedback.	1
If you need to get in-depth details about someone's life or how they perceive the product you may need to consider using methods such as focus groups or interviews.	1
When you conduct a focus group, be mindful of group dynamics as personalities may clash and may affect the data gathered.	1
Good research is made up of objective and subjective components, the objective will help you gather statistics and the subjective will help you explain trends and users' views.	1

[14] For example, one that is not unduly influenced by advocates.

Guideline	Number of participants
When conducting research try to remain objective.	1
Ensure you use the most suitable method to answer the research question[15].	1
Face-to-face communication will allow for clarification for what is being asked/said.	1
If you are going to use rating scales bear in mind people will rate things differently.	1
You may wish to ask some control questions[16] to establish how the person may use and understand the rating scale[17].	1
It may be helpful to understand the roles and some of the pressures faced by health and social care professionals, family members and support workers.	1
Share your knowledge. Another designer may learn from you, you may learn from them.	1
Always make use of reputable resources[18].	1
If there are standards available to assist you, ensure these are applied.	1
Seek out disability awareness training.	1
Always ensure you have the correct contact details for users and they have your contact details. You may need to clarify or ask further questions after your initial visit.	1
Try not to pity your users.	1
If you are working with a visually impaired user make it clear you are talking to them by referring to them by name.	1
Always provide user support[19].	1
With some disabilities[20] time is an important factor i.e. the duration of an activity.	1
Be mindful of the body language you use.	1
Flexibility is important.	1
Be empathetic towards users.	1

Table A.1 Full guidelines

[15] For example, if you require the results from questions that are designed to collect statistics, you might consider using a questionnaire. However, if you require detailed insight, an interview or focus group may be more appropriate.

[16] *"The main function of control questions...is to afford the [investigator] a valid means of comparing the [participant's] responses to the questions pertaining to the matter...or one which the [investigator] may reasonably assume to be untrue. The process of arriving at the question is in itself important, because the control question should be phrased to suit each individual subject, as well as have a balanced relation in the test with the pertinent or "hot" questions."* (Harman and Reaid, 1956: 578)

[17] The difficulty with rating scales is establishing how realistic are the ratings given.

[18] Peer reviewed journals, books written by well-known authors. Always have some way of validating the information.

[19] For example instructions, documentation.

[20] For example, Autism.

Appendix B: Participants' observations in relation to content and format of the guidelines

Whilst it was not a stated aim of the study to provide guidance in relation to the format the guidelines should take, the study did provide guidance in this area. This guidance is taken from the views of participants in stages 1 and 2.

It was discussed that the guidelines will need to:

- Recognise the realities of working in a commercial organisation, for example, the feasibility of design decisions, and the need to make profit.
- Be flexible in nature.
- Contain information on academic and commercial ethics procedures.
- Contain *"...some figures [and]...nice graphs..."* this view is supported by Lofthouse (2006) who states that "...*designers are motivated by visual communication and like information to be presented with maximum use of graphics (pictures and colour) and minimal text."* (Goncalves, Cardoso, and Badke-Schaub 2014:32, Henderson 1999, chap. 1; Muller, 1989, Riding and Cheema 1991)
- Be logical.
- Make reference to relevant standards, these may include International Standards Organization (ISO), particularly ISO/NP 9241 –230 (2010) and British Standards Institution (BSI) BS 7000-6 (2005).
- Provide a reference framework.
- Not overwhelm designers.
- Be generalisable in nature.
- Promote best practice.
- Be context specific, for example, the guidelines on cerebral palsy will only apply when working with this group.
- Contain guidance on specific conditions such as epilepsy.
- Contain contact information for different disability related organisations.
- Be created and delivered by disabled people.

- Use accessible language.

In terms of how the guidelines are presented, participants suggested that:

- A website or a booklet may be advantageous because it could provide direction to other resources, for example, the guidance in relation to cerebral palsy could provide links to Scope (2015a) and other such organisations.
- Enables quick reference such as bullet points. This view is supported by Goodman *et al*. (2007) who state that designers prefer information that is *"...quick and easy to find and use, visual and stimulating, flexible and open-ended, and relate clearly and concretely to design issues.*"
- Be written in nature to provide a reference point.

Participants also felt that the areas designers suggested guidance on:

- Maintaining professional boundaries.
- Research ethics.
- Method selection.
- A list of things that that may prove helpful or should be avoided when working with certain conditions, for example, perhaps not mentioning certain words or talking in certain ways when working with people that have an Autistic Spectrum disorder.

It was felt that the guidelines are at least a start and that they are different to many other initiatives because they are, at least, in part, created by disabled people *"...cus ...very often it's you know tagged on the back on some...you know Equality Training Act or something where...you're rarely given any significance."* This guidance should be read in conjunction with Appendix G which offers a perspective from designers in relation to the format the guidelines should take.

Appendix C: Some advantages of peer review in design and evaluation processes

Number	Advantage
1	*"Establishes the validity of research based upon the expert knowledge of other researchers in the discipline."* (Glasgow Caledonian University n.d.)
2	Is a valuable source of feedback (adapted from Glasgow Caledonian University *ibid.)*
3	The process is accepted and understood *"...by the majority of researchers."* (adapted from Glasgow Caledonian University *ibid.*)
4	Ensures that the designer has discussed and explained a variety of approaches, also ensures that the results obtained are accurate (adapted from Hargreaves n.d.).
5	Ensures that conclusions drawn are well supported by evidence (adapted from Hargreaves *ibid.*).
6	Ensures that the work produced is of an acceptable quality (adapted from Hargreaves *ibid.*).
7	Can be used to *"...improve the quality of a decision process."* (Committee on the Department of Energy-Office of Science and Technology's Peer Review Program, Commission on Geosciences, Environment and Resources and the National Research Council,1997)
8	Can enhance credibility of decisions made (adapted from Committee on the Department of Energy-Office of Science and Technology's Peer Review Program, Commission on Geosciences, Environment and Resources and the National Research Council *ibid.*).
9	Can provide reassurance that decisions are consistent *"...with the best available scientific and technical information."* (adapted from Committee on the Department of Energy-Office of Science and Technology's Peer Review Program, Commission on Geosciences, Environment and Resources and the National Research Council *ibid.).*

Table C.1 Advantages of peer review in design and evaluation processes

Appendix D: Methodologies, tools and techniques for understanding the user

1. Introduction

There are multiple methods that can be used to gather requirements or evaluative feedback. As Goodman *et al.* (2007:127) states "…*we identified over 330 methods and techniques for use in design."* 57 of these are primarily based on understanding the user, and among the most common are interviews, questionnaires, focus groups and user observations.

A careful selection of these methods is required to ensure that the right information is gathered at the right point in the design and evaluation process. It is important to note, that this research does not primarily focus on understanding users and their needs but rather the methods used to evaluate products and services specifically the accessibility of these methods to SCAN participants.

It should be noted, however, that:

1) The methods used may reveal as much about the user group as they do about the product being designed and;

2) In order to design effectively for any user group an understanding of product specific requirements can sometimes be insufficient to allow the designer to produce solutions that fully meet users' needs. Additional information such as the users' life circumstance may be of great benefit to the designer when generating solutions to outlined problems.

The following factors should be taken into account when designing usable systems:

- *"Careful planning of human-centred design processes.*
- *Understanding the context of use for the system as a basis for understanding requirements and evaluating the system.*
- *Understanding and specifying user requirements in a clear manner which can be assessed for achievement.*
- *System and user interface development based on a flexible and iterative approach.*
- *Usability evaluation based on both expert and user testing in appropriate points."*

(Maguire 2001:629)

With the above in mind, it is important the methods examined in this appendix are defined and outlined (focus groups, questionnaires, interviews, observations, collaborative design and personas). These are some of the most commonly used methods, for both understanding the user and usability evaluation (the *"…effectiveness, efficiency, and satisfaction with which specific users can achieve specified/particular goals in particular environments."*) (ISO DIS 9241-11) this is the main reason why these methods are examined as part of this appendix.

According to Waller, Langdon and Clarkson (2010:23*)* user involvement can take many different forms and it may involve some or all of the following:

- direct contact such as interviews,
- indirect contact such as questionnaires,
- open ended exploration such as a cultural probe,
- be structured towards specific tasks such as user trials.

These activities may be conducted in many contexts such as participant observations or focus groups. With the objectives to either *"...obtain users' feedback on particular ideas, or to work with users to generate ideas."*
It is for the above reasons that a great deal of this appendix is dedicated to explaining the many and varied methods that may be used to help a designer understand a user (adapted from Waller, Langdon and Clarkson *ibid.* pp 23) and where possible the appendix also provides references and commentary based on published literature where the methods have been used with SCAN participants.

2. Methodologies, tools and techniques for user-centred evaluation

2. 1 Focus groups

Focus groups are a qualitative research method that allow participants to *"…bring in their feelings and opinions about the system or product to be designed…*" (adapted from Kuhn, 2000:310) thus, helping designers and evaluators to understand the users' requirements and where appropriate, the users' life circumstances that drive the requirements. They were developed in the 1940s by Merton and his colleagues (Merton, 1956 adapted from Catterall and Maclaran, 1997).

Maguire (2001:73) states that;

> *"Focus groups are a popular means of eliciting the views of members of the public on a wide range of issues from testing people's political views to assessing the general public's reaction to consumer products."*

In addition, according to Lederman (cited in Thomas *et al.*1995) a focus group is

> *"…a technique involving the use of in-depth group interviews in which participants are selected because they are a purposive, although not necessarily, representative, sampling of a specific population, this group being focused on a given topic."*

Given the above, the participants selected for focus group research are often selected based on the following criteria:

- They are all in a similar age range.
- Have similar socio-characteristics.
- Would be comfortable talking to the moderator and each other (adapted from Richardson and Rabiee, 2001).
- Are selected because of their knowledge in the study area (adapted from Burrows & Kendall,1997)

Focus groups	
Advantages	**Disadvantages**
Allow people to air their views in a natural conversational way (adapted from Maguire, 2003:73). A wide variety of perspectives can be sampled quickly (adapted from Maguire *ibid.*). Require no special equipment and are comparatively easy to conduct (adapted from Maguire *ibid.*). People normally enjoy taking part in them (adapted from Maguire *ibid.*). Can be beneficial for identification of key themes in relation to a subject (adapted from Krueger, 1994).	*" It is not always easy to control the group or the information from it;* *peer pressure may lead to inaccurate reports;* *participants may feel they should give socially acceptable views;* *some individuals may not get the chance to air their views or may be inhibited by other group members, particularly colleagues or more senior staff;* *some people may not always think creatively in a group setting and prefer to be interviewed or to complete a survey in their own time."* (Langford and McDonagh, 2003:74)

Focus groups	
Advantages	**Disadvantages**
Can be an effective means of obtaining information from marginalised groups such as the elderly (adapted from Krueger *ibid.*). Can give insight into people's experiences and opinions. Can be particularly effective when wanting to understand why people think the way they do (adapted from Krueger *ibid*. and Morgan 1997, 1998). Can enable participants to respond freely and spontaneously (adapted from Krueger *op.cit.*). Because the focus group encourages participants to interact, this interaction can produce valuable ideas (adapted from Caplan, 1990). Can generate ideas that will not emerge from individual participants (adapted from Krueger *op.cit.*). Can help identify trends, patterns and perceptions of a particular demographic (adapted from Krueger *ibid.*). Can help with the development of questionnaires (adapted from Morgan *op.cit.*) Can produce data rich in detail that may be difficult to achieve with other research methods (adapted from Asbury, 1995). The discussion is focused on a particular topic (adapted from Frey and Fontana, 1993).	Can be time and resource consuming (adapted from Dong *et al*. 2005:1). May produce complex and unclear results (adapted Dong *et al*. *ibid.* pp 1). It can be difficult to distinguish between focus groups and other types of group interviews (adapted from Frey and Fontana *op.cit.*). Are often formed for a short period of time in a laboratory environment meaning that there is no history among the group and they are not studied in their natural setting (adapted from Frey, 1994). Group dynamics may contaminate views of individual members (adapted from Catterall and Maclaran *op.cit.*). The focus group is not a natural social setting (adapted from Catterall and Maclaran *ibid.*) A discussion in the focus group is not a natural conversation as few conversations focus on one single topic for a sustained period of time (adapted from *ibid.*).

Focus groups	
Advantages	**Disadvantages**
Group dynamics can assist in generation (adapted from Frey and Fontana *ibid.*). The interaction between participants can provide a key source of data for analysis and interpretation (adapted from Catterall and Maclaran *op.cit.*). Ideally suited for exploring lifestyle behaviours within the context of lived experience (adapted from Rabiee, 2004:655). Can encourage participants to positively engage with the research process (adapted from Rabiee *op.cit.*). Type and range of data generated through focus groups can often be deeper and richer than that obtained from one-to-one interviews (adapted from Thomas *op cit.*). Can provide information about a range of ideas and feelings that individuals have (adapted from Rabiee *op.cit.*). Can illuminate the differences in perspectives between groups of individuals (adapted from *ibid*. pp 656). Can produce large amounts of data in a relatively short period of time (adapted from *ibid.* pp 656). Results can be presented in uncomplicated ways using lay terminology (adapted from *ibid.* pp 655).	

Table D.1 Advantages and disadvantages of using the focus group method

Maguire (2003) identifies 3 different types of focus group which relate to:

"1.Current activities and needs
2. New design concepts
3. Review of developing prototypes."

This appendix will explore the use of focus groups to gather information about users' context and needs (1 on Maguire's list) in this section and review of developing prototypes (3 on Maguire's list) in the next section. Nielsen in his (1997) essay entitled 'The use and misuse of focus groups' comments that;

> *"…you shouldn't use them as your only source of usability data… software products, websites, and other interactive systems also need to be liked by customers, but no amount of subjective preference will make a product viable if users can't use it. To assess whether users can operate an interactive system, the only proper methodology is to sit users down, one at a time, and have them use the system."*

This supports the view that a mixture of methods, including focus groups can help designers and evaluators understand users' wants and needs.

Kuhn (2003) states that in a study related to the HAS Project (Home Automation System) a close analysis of the results obtained with the help of focus groups allowed:

• Identification of the essential product requirements.
• Determination of the relevant user needs.
• Detection of users' expectations and the requested functions of the product.
• Definition of the context of use.

As Kuhn (*ibid.* pp 24) states focus groups guarantee a user-informed design process. This statement is true in the majority of circumstances, however, it may not be true if users have SCAN i.e. if you have a group of participants that all use communication aids, it will take them longer to express their views therefore it may be better to interview each participant.

Additionally, Kuhn (*ibid.* pp 324) states that focus groups deliver data about the context of use of a product that cannot be gained with surveys or individual interviews. This aspect would be particularly useful when working with SCAN participants.

However, based on the evidence presented by Kroll, Barbour and Harris (2009) it could reasonably be concluded that an interview would give the researcher more time to explore in-depth issues when working with participants with SCAN (especially those with communication difficulties).

Due to the format of a one-to-one interview, time would not have to be made available for others to contribute therefore this would give the participant more time to respond to questions and the researcher sufficient time to explore the issues raised by their questions or their answers to questions in more detail when compared to that of a focus group.

However, it should be acknowledged that there are logistical implications when choosing to use one-to-one interviews only, for example; each participant requiring more time. Additionally, factors relating to the set up of interviews will need to be considered, this would be time consuming and costly in itself. Other costs may also be incurred such as finding rooms to hold the interview in therefore using one-to-one interviews may not always be economically viable.

It is clear that *"…with the help of focus group sessions a considerable amount of data concerning usability functions and their validation can be elicited*." (Kuhn *op.cit.*).

2.1.2 Using focus groups with SCAN participants

However, as indicated by Kroll, Barbour and Harris (*op.cit.) "…more time is needed to present questions and for the participants to process… in addition, more time is required to allow participants to express his or her thoughts and opinions."* Therefore, with reference to Kroll, Barbour and Harris *(ibid.)* it could be concluded that Kuhn's statement (pp 324) is often incorrect when facilitating focus groups that involve participants with SCAN, especially those with communication difficulties as it may take them longer to answer questions. Thus the amount of data gathered from the focus group may be reduced. Despite this reduction the data gathered could still be useful.

It should also be noted that, focus groups allow a vast amount of information to be generated but do not provide any mechanisms for *"…scientific analysis of the data without adapting the methodologies to incorporate transcription and coding.*" (Kuhn *ibid*. pp 324) Whilst focus groups have many advantages (for example, Maguire *op.cit*.) there is a need for careful consideration of the methodology before it is used with participants that have a disability, in particular physical and sensory impairments.

A point to note, before deciding whether to use the focus group methodology is as stated by Sim (1998:348) *"…certain members of the group may be more assertive or articulate than others, and their views may come to dominate the proceedings."* When working with people with SCAN, this point may be particularly relevant for two reasons. Firstly the participant, like any participant could simply be shy, nervous or apprehensive about expressing their views but secondly it could also be the case that if they use a communication aid, it may take them longer to express their views. This is a view supported by the work of Kroll, Barbour and Harris (*op.cit.).*

Further evidence to support such conclusions were observed by the researcher when one of his colleagues was conducting a focus group with participants that have SCAN. It was observed to be the case that participants who use a communication aid did take more time to express their views.

Participants may also feel that it is not worthwhile expressing their views because they cannot find a way to make themselves heard in the conversation because a verbal participant with strong views can alter voice, tone and pitch. Whereas people with communication difficulties may find this harder to do and so as a result may not bother trying to get their views across, this may lead ultimately to a less inclusive product or service being produced. As stated by Sim (*op.cit.) "…certain members of the group may be more assertive or articulate than others, and their views may come to dominate the proceedings."* This could happen regardless of whether the participants have SCAN or not. However, the evidence examined Kroll, Barbour and Harris (*op.cit.),* Kitzinger (*op.cit*.), Bollard (2003) and Sim (*op.cit*.) does not suggest that this problem is more prevalent in focus groups containing participants with SCAN when compared with focus groups of participants that do not.

Additionally, the use of focus groups in research may or may not be appropriate dependent on the context. If you're holding a focus group regarding the design of a product likely to be seen as embarrassing, for example, an incontinence pad, participants may be more reserved thus it may only be possible to get feedback on limited features of the design (shape for example) therefore it may be more appropriate to conduct interviews in this context.
This is because as stated by Sim (*op.cit*.);

> *"… a focus group is likely to elicit 'public' accounts from participants, in contrast to the more 'private' accounts which might emerge in an ethnographic interview or in everyday interaction taking place outside the context of research."*

However, focus groups do have their benefits as they enable general opinions to be expressed and conclusions to be drawn about a specific group of individuals, as stated by Sim (*ibid*. pp 351);

> *"…it would be reasonable to infer from the fact that a group of brain-injured clients share certain perspectives and find certain aspects of their lives problematic, that other such individuals are likely to have the same or similar perceptions and experiences."*

However if intricate details about an individual's life and experience are required a focus group may not be an appropriate medium and this sort of information would be better gathered through structured interviews but as explained by Kitzinger (1995:301) focus groups are a good way of exploring *"…how knowledge and more importantly, ideas develop and operate within a given cultural context."*

Some general conclusions from the literature reviewed in relation to the focus group method are:

1) Many authors alluded to the fact that the focus group can provide participants with the feeling of safety in numbers (*ibid.* pp 112, Kroll, Barbour and Harris (*op.cit*.) and others).

2) Focus groups should ideally have between 6 and 12 participants, this is an estimation as the lowest amount in the literature studies was 4 participants (Macaulay, 1996) and the highest being 12 suggested by Morgan (1997).

3) Focus groups were originally used after the Second World War to evaluate audience responses to radio programs (Maguire *op.cit.*)

4) When focus groups are used as part of the design and evaluation process, they can provide the opportunity for designers to gather participants' feedback in relation to the product being evaluated or designed, in the case of prototypes (adapted from Kitzinger *op.cit.*).

5) Focus groups are a very versatile tool for designers and evaluators (Bruseberg and McDonagh-Philp (*op.cit.*). This indicates that the method can be employed in a variety of situations and as shown by authors such as Kroll *et al.* (2007), if the method is used sensibly, with a few adaptations it can be made accessible to the vast majority of participants regardless of impairment.

2.2. Questionnaires

A questionnaire is defined by Kirakowski (2000) as a method for the elicitation, recording, and collection of information (adapted from Kirakowski *ibid.*)

Questionnaires	
Advantages	**Disadvantages**
A relatively 'low cost' method of contacting 'a large number of people.' (Kirklees Council Research and Consultation Guidelines,2006) An efficient method for reaching participants *"…spread over a wide geographical area.*" (*ibid.)* Respondents are able to complete certain types of questionnaires such as postal and online in their own time. (*ibid.)* *"Telephone questionnaires can make it easier to consult some disabled people but this is only true where the disabled person does not have a verbal communication or a hearing difficulty".* (*ibid.)* An efficient way of data extraction. (Kirklees Council Research and Consultation Guidelines (*ibid.*) *"…can be designed to retrieve a standard set of data that can be used for direct comparison between participants and to summarise results." (ibid.*) Can be more accurate for eliciting sensitive information then a face-to-face interview (Herzog and Rodgers, 1988).	"*It is difficult, if not impossible, to develop perfect questions that elicit the information sought."* (Sandler *op.cit.*) Data about functional limitations may be harder to gain, in part because definitions of a functional limitation are highly subjective (adapted from Sandler *ibid.)* Questionnaires are not suited for exploring complex issues in great depth, exploring issues that are controversial, difficult or new, and should not be thought of as an easy option that requires little time and effort (Kirklees Council Research and Consultation Guidelines *op.cit.*). A small number of participants are unlikely to produce statistically secure data (adapted from Morgan 1999). "*The responses are limited to the questions that have been prepared."* Bruseberg and McDonagh-Philp *op.cit.*) *"Response rates can be low (postal) and refusal rates high (telephone, face-to-face)."* Kirklees Council Research and Consultation Guidelines *op.cit.*) "*There is little control over who completes the questionnaires."* (*ibid.*)

Questionnaires	
Advantages	**Disadvantages**
	"Postal questionnaires are inappropriate for people with reading difficulties or impairments and those who do not read English this is also the case when a person has difficulty in producing written answers to the questions posed meaning that a written questionnaire is inaccessible to them." (ibid.) The length of questionnaires must be "…*kept relatively short"* (*ibid.)* Questionnaires are "…*time consuming"* and *"labour intensive*" (*ibid.*) Questionnaire responses are *"...notorious for discrepancies between what people say that they have done, or will do, and what they actually did, or will do.*" Robson (2002:310)

Table D.2 Advantages and disadvantages of using questionnaires

According to Kirakowski (*op.cit.*) there are three different types of questionnaires:

1) Factual
2) Opinion
3) Attitude based

Factual type questionnaires ask about "…*personal observable information…for example, the number of years that a respondent has been working with computers.*" whereas opinion type questionnaires ask the respondents their opinion about, for example, how well does a new piece of software work, attitude questionnaires; focus on questioning about the respondents internal response to events and situations in their lives.

Furthermore, according to Kirakowski (*ibid.)* a usability specialist would primarily employ questionnaires that investigate a participant's attitude towards, for example, an aspect of a system.

According to Kirklees Council Research and Consultation Guidelines (*op.cit.*) a questionnaire should have a definite purpose that is related to the objectives of the research and it needs to be clear from the outset how the findings will be used and respondents should be made aware of the purpose of the research wherever possible, and should be told how and when they will receive feedback.

Additionally, questionnaires are more suited to situations where factual information is needed to classify people and their circumstances. They can be used to collect introductory information for example; people's preferences and/or to investigate the attitudes, opinions and perceptions of a group of people relating to an issue and to measure people's satisfaction with a product or service.

When working with participants that have a 'significant disability' ISO/TR 16982:2002 does not recommend the use of questionnaires. Instead methods *"…that imply a close relationship between the participant and the analyst are recommended*."

However, a disadvantage of this approach is that it is only specific to the sample of users involved (adapted from Waller, Langdon and Clarkson *op.cit.*).

Therefore questionnaires can be appropriate to use as long as the target user group can access and complete them regardless of disability. Hence adaptations may need to be made to make questionnaires accessible to each target user group.

In conclusion, *"…each approach has strengths and weaknesses so they are best used to complement each other."* (Waller, Langdon and Clarkson *ibid.* pp 22)

Gendall (1998:29) highlights that Labaw (1980) defines, what she believes to be the fundamental principle of questionnaire design that is;

> *"The respondent defines what you can do: the types of questions you can reasonably ask; the types of words you can reasonably use; the concepts you can explore; the methodology you can employ."*

Gendall (*ibid.* pp 29) also comments that factors such as environment *"…the physical aspects of respondent's lives over which they have little control, but which impinge on their ability to act or respond in specific ways; [also] factors such as age, sex, socio-economic status, race, locale and mobility…"* can all impact on participant's ability to complete a questionnaire. Curiously, impairment is not mentioned but surely this would have an effect on how a participant responds to a questionnaire or if they can respond at all.

Gendall (*ibid*, pp 7) outlines what he perceives to be some specific principles of questionnaire design, the first being is that *"…a good question is one that produces answers that are reliable and valid measures of something we want to describe."* (Fowler, 1995) Again here, the aspect of accessibility of the question is not mentioned; and clearly it should be accessible to the respondents targeted. In many instances issues of accessibility of questions are addressed in the design and/or pilot phase of questionnaire design.

The sample of participants used in the pilot phase must be representative of those used in the live study so that the questionnaire can claim to be valid and suitable for its target audience. If it is not practical or possible to do this, alternative methods to the questionnaire may need to be considered.
Additionally, Gendall (*op.cit.*) employs Fowler's definition to define what a bad question might be that is *"…one that obscures, prohibits or distorts the communication from respondent to researcher and vice versa."* Again here, accessibility of the question to respondents is not mentioned.
Surely for a question to be defined as a 'bad question' it must primarily be inaccessible to the respondents it is trying to target and thus may not be valid in terms of surface (face validity).

A questionnaire is said to have face validity when the content of the questionnaire 'looks' appropriate for its intended purpose.
The questionnaire may also lack construct validity i.e. does the questionnaire measure the hypothetical constructs it claims to? An example of this would be does a questionnaire that claims to measure stress levels actually provide evidence of this? (adapted from Gliner and Morgan, 2009:320).

Lastly, it is important to consider both validity and reliability, which refers to whether an instrument can be used under the same conditions with the same participants and still achieve the same results (how consistent is the instrument in its measurement). However, it should be noted that reliability cannot be measured and can only be estimated (adapted from Colosi, 1997).

2.2.3 Using questionnaires with SCAN participants

It is important however, to note that, in the case of SCAN participants these measures are not solely concerned with the content of the questionnaire alone but additionally extend to accessibility. This indicates that the questionnaire will need to 'look' accessible to a participant to have face validity and to have construct validity the questionnaire will need to enable the participant to express their views.

Lastly, in terms of reliability for SCAN participants, this refers to whether the questionnaire be accessed by all participants, in the same conditions, to achieve the same results.

However, due to the nature of some SCAN participants, it may not always be possible to deliver the questionnaire, in, for example, the same conditions because some participants may not be able to interact with the questionnaire in the 'normal' way and may choose to speak their answers instead of writing them. Therefore in such circumstances the measure of reliability may be compromised especially where the ability level of the participants is diverse.

According to Hebert *et al.* (1996:377) the non-respondents to the questionnaire used in the study were primarily *"…more disabled, more cognitively impaired and were at higher risk of dying in the year following recruitment."*
Whilst this study was conducted using elderly participants, it is interesting to note that the participant group that contained individuals with a disability had a reduced response rate.

It could be suggested that whilst age might be a factor in relation to a participant's disability as stated by Petrie *et al.* (2006:1139) "...*this is particularly important as with aging, everyone is likely to acquire multiple disabilities."* In addition, it could be concluded that everybody is disabled in some way as stated by Newell (2003).

A further example of somebody being 'disabled' may be individuals who have difficulty in using their left hand when they're right handed. In all of these cases, the severity of the disability will need to be examined and where it is seen to be severe, adjustments to the methods used will need to be made to enable participants with such impairments to participate. From the results of this study it could be concluded that the disability may have been caused or made worse by age or alternatively participants may not have been able to respond because they found the questionnaire difficult or impossible to access, possibly because

of disability related issues. However, regardless of any conclusions drawn, this work appears to allude to interesting questions in relation to the suitability and accessibility of commonly used methods to evaluate usability.

Bowns, Challis and Tong's (1991:101) study on the 'validation of a postal questionnaire' produces similar findings on the use of questionnaires with elderly persons as Hebert *et al*. (*op.cit.*) state that *"…significantly more non-respondents to the postal questionnaire were dependent and suffering from intellectual impairment than respondents."* The authors also indicate that "…*it would be appropriate to attempt to interview all non-respondents to the postal questionnaire since these tend to be of higher dependency than [other] …respondents."* (Bowns, Challis and Tong *op.cit.)*

The conclusions of this study together with Hebert *et al.* (*op.cit.*) provides evidence that a questionnaire is perhaps not the most accessible research method for participants that are either severely disabled, elderly or both. However it should be noted that not all studies suggest that using questionnaires with elderly people is not advised, for example as Hebert *et al. (ibid.)* pp 377 commented;

> *"This finding contrasts with the study done by Leinbach (1982) who interviewed a random sample of 25 non-respondents and found that they expressed the lowest health needs."*

However, it should be noted that the above study had a small sample size so thus the validity of the study could be questioned.

In conclusion, questionnaires can be a cost effective research instrument that if designed well can capture a vast amount of useful information for researchers; however, they may not be an appropriate instrument to use if the population of interest are severely disabled, elderly or both.

2.3 Interviews

Interviews are a qualitative research method that can be used, both as a tool to ascertain user needs and to evaluate people's attitudes towards given artifacts.

There are three main types of interviews:

1) Structured
2) Semi-structured
3) Unstructured.

An interview can be defined as *"…a two-person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information."* (Cannel and Kahn, 1968:271) According to Warren (2002:83) "…*the purpose of most qualitative interviewing is to derive interpretations, not facts or laws, from respondent talk.*" Warren's thinking is understandable here as when interviews are conducted to understand various aspects of a participant's life, these may contain the participants' opinions or views on certain subjects. However some basic information may have to be obtained from the participants, for instance age, and/or disability. According to Blaxter, Hughes and Tight (2006:173) *"…participants can discover, uncover or generate the rules by which they are playing this particular game.*"

In the researcher's experience, this statement is true because in interviews participants generally retain a lot of control. They can "discover and uncover" the format of the interview due to the questions asked by the interviewer additionally, they also have the ultimate control by choosing how they will answer the questions posed or even if they will answer at all. They may change the questions posed to suit themselves in some circumstances.
Structured interviews are where questions are prescribed by an interview schedule and interviewers should not deviate from the schedule.

A semi-structured interview as described by Robson (*op.cit.*);

> *"Has predetermined questions, but the order can be modified based upon the interviewer's perception of what seems most appropriate… question wording can be changed and explanations given; particularly questions which seem inappropriate with a particular interviewee can be omitted, or additional ones included."*

Unstructured interviews may have a general topic area to be discussed but there are no specific directions as to how the interview will be conducted and the interview can be informal (adapted from *ibid.* pp 270).

Interviews	
Advantages	**Disadvantages**
Illuminates design criteria from the perspective of the user (adapted from Dewsbury, Rouncefield, Clarke and Sommerville *op.cit.*). Can allow the drawing out of *"…narratives, insights and discussion into interests, beliefs and feelings."* (Axelrod 2009:37) Appropriate when needing to ask a large amount of open-ended questions (adapted from Oppenhiem 1992:81). "*Improved response rates*" Oppenhiem (*ibid.* pp 81) and Brink and Wood,1988:147) A face-to-face interview gives the opportunity for the research study to be explained in a more comprehensive manner then for example, a covering letter that accompanies a questionnaire (adapted from Oppenhiem *op.cit.*)	The cost, both financially and in terms of time is significantly increased when compared to the cost of running a questionnaire (adapted from Oppenhiem *op.cit.*, Robson *op.cit,* Brink and Wood *op.cit.,* and Sandler *op.cit.*) If interviews are not carefully planned the results obtained from them may be biased Akbayrak (2000:5) comments that *"…the main sources of bias are the characteristics of the interviewer and respondents, and the content of the questions…studies have also shown that race, religion, age and social class can be potential sources of bias.*" Interview responses are notorious *"…for discrepancies between what people say that they have done, or will do, and what they actually did, or will do.*" (Robson *op.cit.*)

Interviews	
Advantages	**Disadvantages**
Highly appropriate to use when your participants have a physical impairment that affects their ability to read or communicate in a written form (adapted from *ibid*. pp 82 and Brink and Wood *op.cit.*) Can provide flexibility (adapted from Robson *op.cit.* and Brink and Wood *op.cit*.) Can be adapted as appropriate to enable a researcher to gain access to the required information (adapted from Robson *op.cit.* and Brink and Wood *op.cit.*) *"Non- verbal cues may give messages which help in understanding the verbal response, possibly changing or even, in extreme cases, reversing its meaning."* (Robson *op.cit.)* An interview, if done correctly *"…has the potential of providing rich and highly illuminating material."(ibid.* pp 273) Allows misunderstandings of questions to be clarified (adapted from Brink and Wood *op.cit.).* Allows a researcher to probe with further questions based on the responses given (adapted from Brink and Wood 1988:147). Can be used to inquire about softer more subjective subjects like participants feelings (adapted from Burrows, Mitchell and Nicolle *op.cit.).*	*"It is difficult, if not impossible, to develop perfect questions that elicit the information sought."* (Sandler *op.cit.*) Does not transfer well to a domestic setting (Kjaer *et.al* 2000).

Table D.3 Advantages and disadvantages of the interview method

2.3.1 Using interviews with SCAN participants

Robson (*op.cit.)* provides a list of five circumstances where the qualitative interview is most appropriate (adapted from King, 1994:16-17).

These are:

- If the study focuses on the meaning of particular phenomena to the participants.
- Where perceptions and processes within a social unit are to be studied in prospective.
- Where historical accounts from an individual are required to discover how a particular phenomenon developed, for example, a new shift system.
- Where some exploratory work is required before a quantitative study can be conducted.
- Where quantitative research has been conducted and some qualitative data is required to validate findings or to clarify and illustrate what these findings show (adapted from King *ibid.* pp 16-17).

It is interesting to note that King (*ibid.* pp 16-17) does not mention that qualitative research interviews could be highly appropriate when the participant has difficulty presenting their responses to questions in a written form.

However Brink and Wood (*op.cit.*) state that;

> "*Interviews have many advantages, the most significant of which is questioning people who cannot write their responses (for example, patients with eye patches).*"

Although the quote discusses interviewing patients, as the text has been written for nursing students, it could also be suggested that interviews may be used to great effect with those with SCAN who find writing difficult or impossible.

In a study by Milne, Clare and Bull (1999) it was found that participants with learning disabilities struggle in an interview situation when presented with a high number of questions in a short space of time. Also these participants respond to certain questions better than others (adapted from *ibid.* pp 95). Whilst this work relates to interviewing those with learning difficulties in the context of criminal investigations either as witnesses or complainants, it raises an interesting point that is, care should be taken when interviewing participants with learning disabilities in terms of the question type used and how questions are phrased. These precautions should be taken in order to help society to hear the voice of those with a learning disability because if the wrong type of questions are asked or questions are phrased in the wrong way, this may result in those with learning disabilities not being fully able to express their views.

Additionally, Bull (1995) remarks that;

> *"People with learning disabilities have to rely more heavily than their counterparts in the general population on external cues to aid recall, more care may be needed not to influence their recall by careless interviewing techniques."*

Again, this is written in the context of interviewing a person with a learning difficulty as a witness to, or a complainant of a crime but this same observation could also be made when you ask a person with a learning difficulty to, for example, recall their thoughts and feelings about a piece of software in a follow-up interview after an observation.

As stated by Murphy *et al.* (2004:95);

> *"People with a communication disability are often omitted from qualitative research studies since they cannot respond to the more traditional methods of interviewing."*

Furthermore, Murphy *et al.* (*ibid.* pp 95) notes that *"…their views are important and they may...have additional insights because of their communication situation."* Furthermore, they propose a method (Talking Mats™) for engaging with research participants that have communication difficulties. Talking Mats are communication aids in the form of a 'board' (mat) containing pictorial headings, such as a smiley face to denote 'I like'. A happy and a sad face to denote 'I have no opinion of' and an 'X' to denote 'I do not like'.

A person then places symbols onto the board under the headings depending upon their opinion in relation to the subjects being discussed, for example, if food was being discussed and they did not like fish and chips, a picture of fish and chips would be stuck under the 'I do not like' heading (see figure D.1 below for an example of a Talking Mat).

Figure D.1: Example of a Talking Mat (Image source: Talkingmats.com 2015)

The method can be used when interviewing participants with communication difficulties, it involves participants being asked questions with a set of options being presented 'one at a time in random order' and the participant is given as much time as they wish to respond to open questions wherever possible by placing pictures in different areas of the mat to indicate positive, neutral or negative ('happy, not sure or unhappy') feelings towards an issue. This helped the researchers to build up a picture of each participant's views on an issue. Participants may elaborate on their response if they wish to. Participant's views were not only obtained based on the Talking Mat but also by analysing their *"…speech vocalisations, facial expression, eye contact, pointing, gesture and body language*" (Murphy *et al. op.cit.*). If a participant did not understand what was required or indicated they wished to terminate the exercise the interview was stopped.

The sessions were also video recorded to allow researchers *"…to ascertain the security of responses…*" (Murphy *et al. ibid.* pp 99). The participant's choices were also confirmed at the end of the session *"…to check that he or she was happy with the completed mat…"* (Murphy *et al. ibid.* pp 99). The mat was further validated via a second interview visit. Field notes were also used as a further source of data.

Whilst there was only ten participants in the study and the authors acknowledge that further work on a larger scale needs to be undertaken, they concluded that Talking Mats were;

1) *"...an innovative method of gaining views which the person with (or without) a communication disability may not be able to express otherwise."*

2) "...*is a tool that allowed the views of frail older people to be expressed and included in research studies in a way that is enjoyable and worthwhile for them.*

3) *"...useful at policy level to obtain views of frail older people about services."*

4) Able to improve the quality of life of frail older people *"…with communication difficulties [and enable them] to express their views in a meaningful way."* (adapted from Murphy *et al. ibid.* pp 99)

Methods such as Talking Mats may be used and adapted in the proposed work so that they can be used with a variety of participants that may or may not have communication difficulties. Lastly, Kvale (2001:1) states that *"…some people are not easy to interview.*" However, he encourages researchers to use interviews because they can provide rich information regardless of who the participants are (adapted from Kvale *ibid.* pp 1). This statement is correct, because some people with SCAN can prove very difficult to interview using conventional means. However, he states if the researcher perseveres perhaps by conducting the interview using the Talking Mats method, for example, then the data produced by that interview may well be valid and interesting regardless of who the person is or what disability they may have.

2.4 Observations

Observations are different from other research methods, in that a participant is directly observed in a situation. The advantage of this method is that a participant is seen performing the task in question rather than being asked to give an account of how they performed the task thus dramatically reducing discrepancies or put another way *"…saying is one thing, doing is another."* (Robson *op.cit.*)

Observation can be defined as *"…a research method in which the investigator systematically watches, listens to and records the phenomenon of interest.*" Bowling (2009:186) or *"…watching what people do, to record this in some way and then to describe, analyse and interpret what we have observed.*" (adapted from Robson (*op.cit.*)

Both definitions have been used here as the first defines observation precisely and the second described how researchers understand what they have observed.

Observations	
Advantages	**Disadvantages**
Illuminates design criteria from the perspective of the user (adapted from Dewsbury, Rouncefield,Clarke and Sommerville *op.cit.*). Directness *"…you do not ask people about their views, feelings or attitudes; you watch what they do and listen to what they say."* (Robson *op.cit.)* Can often complement *"…information obtained by virtually any other technique."* (Robson *ibid.* pp 310) Lets you observe natural/real life (adapted from Robson *ibid.* pp 310 and Bowling *op.cit.*). An unbiased technique in relation to the participant for example, does not depend on the participants willingness to be interviewed, knowledge or having a complete set of documents (adapted from *ibid.* pp 386). It can contribute to understanding the experiences of people and the meaning they attach to them *"…especially complex situations."* (adapted from *ibid.* pp 387)	Can be subject to observer bias (Bowling *op.cit.*) and (Robson *op.cit.*) and subjectivity (Cocks *op.cit.*). Can be very time consuming (adapted from Robson *op.cit.*). Can utilise a large quantity of resources, for example, evaluators, premises etc. (adapted from *ibid.* pp 311). The presence of an observer can cause those being observed to act in an unnatural manner (adapted from *ibid.* pp 311). It is impossible to observe in detail a *"…large random sample of people such as organisations."* (Bowling *op.cit.*). *"The types of observations are also limited by the social role undertaken by the observer."* (Bowling *ibid.* pp 387). If the observation is concealed, it may lead to the researcher being placed in dangerous situations (adapted from *ibid.* pp 387).

Observations	
Advantages	**Disadvantages**
May reveal *"…conditions, problems, or patterns many informants may be unaware of or unable to describe adequately.*" (Anon a, USAID 1996) Can be useful, when, for example performance targets are not being achieved or when implementation problems are *"…suspected but not understood.*" (Anon b: pp1) Can be useful *"…when details of an activity's process need to be assessed, such as whether tasks are being implemented according to standards required for effectiveness*." (*ibid.* pp 1) Can be useful *"…when an inventory of physical facilities and inputs is needed and not available from existing sources.*" (*ibid.* pp 1) May prove advantageous when *"…interview methods are unlikely to elicit required information accurately or reliably."* (Anon b *ibid.* pp 2) If used in flexible research designs, observations can be a very flexible method and can be deployed in a number of different situations (adapted from Robson *op.cit.*).	Concealed observation raises ethical issues, for example the lack of informed consent (adapted from *ibid.* pp 387). Concealed observation can cause emotional distress to the researcher (adapted from *ibid.* pp 387). In some settings, for example residential care, participant observation can be *"...intrusive, disruptive and inappropriate on many occasions..."* (Crabtree *et al.* 2002:1, Crabtree *et al.* 2000) Does not transfer well to a domestic setting (Kjaer *et al. op.cit.*).

Table D.4 Advantages and disadvantages of employing direct observation

2.4.1 Using observation with SCAN participants

In relation to using observations with people who have SCAN, Petrie *et al.* (*op.cit.)* outlines a number of advantages and disadvantages. The major advantage of using direct observations with these participants is that *"…careful observation of people using their assistive technologies and discussions with them greatly increases understanding in this area."* Also, observing a situation will add to a researcher's understanding.

Additionally, questions can be asked and clarifications can be given relating to what was seen (adapted from Petrie *et al. ibid.*)

Petrie *et al.* (*ibid.* pp 1139) comments that; some of the most fruitful experiences for us in conducting evaluations with disabled participants were when the implementation team observed how disabled people live (adapted from Petrie *et al. ibid.* pp 1139).

However, whilst observations can prove advantageous they can be difficult to arrange and set up for a number of reasons. Some of these reasons as outlined by Petrie *et al. (ibid.* pp 1135) include:

- If the evaluation involves evaluating some kind of technological artifact either hardware or software; a participant with SCAN may use assistive technology to access and interact with computer systems.
  This assistive technology may not be available to the participant if the evaluation is lab based.

- If the evaluation involves using computer based artifacts and the participant requires assistive technology in order to access it some individuals may configure their assistive technologies in ways that are difficult to recreate in the lab.

- Participants with SCAN may have difficulty in travelling to lab based evaluations because of the nature of their disability or the inaccessibility of public transport.

- If the evaluation is lab based careful planning is required to ensure the building where the evaluation takes place is accessible (adapted from Petrie *et al. ibid.* pp 1135).

Cocks (*op.cit.)* states that when observation is applied correctly "…*it does not exclude participants on account of communication differences."* It was also noted that the use of participant observation was successful because it demonstrated a method that included all the participants present regardless of disability (adapted from Cocks *ibid.* pp 177). Furthermore, the use of participant observation recognised *"…each child's contribution without privileging those who use speech or [communication]."*

Kittellsaa (2009) remarked that observations are useful because they provide an overview of what a participants' life entails. Additionally, *"…there were even lots of opportunities during the observation period to talk with each of the participants."* In addition, she found the observations useful as they enabled her to observe aspects that the participants would have found difficult to describe and to formulate questions based on her observations.

In conclusion, it would appear that the use of observations with those that have SCAN is a highly valued and useful research tool. Participants with such needs may have very complex life situations which can be understood. Finally, if conducted successfully participants with little or no verbal communication can be included. This conclusion is supported by the work of Cocks (*op.cit.*) and Kittellsaa (*op.cit.*).

2.5 Card sorting

Card sorting is a user-centred design technique that can provide an understanding of a user's mental model for an information space, for example, a website (adapted from Nielsen,1995:2 and Spencer and Warfel, 2004:1). It is most effective once the research into user needs and wants from a product has been completed (adapted from Spencer and Warfel *ibid.* pp 4). To ensure that card sorting achieves optimal results the researcher should make every effort to ensure that the participants involved are representative of the eventual users of the product they are designing (adapted from Gaffney, 2000:1).

There are two main variations of this method; open and closed. An open card sort can be defined as allowing users to build their own categories of content under pre-established headings without any constraints (adapted from Nielsen *op.cit.*). This method of card sorting is particularly useful when trying to establish an information structure for new products or websites (adapted from Spencer and Warfel *op.cit.*). Whereas closed card sorting is where participants are asked to place cards into pre-established primary groups (adapted from Spencer and Warfel *ibid.* pp 2). It is particularly useful when adding new content to the structure of an existing website or product. It can also be used for gaining additional feedback after an open card sort (adapted from Spencer and Warfel *ibid.* pp 2).

Card sorting	
Advantages	**Disadvantages**
Simple to administer (adapted from Spencer and Warfel *ibid.* pp 3). Inexpensive to conduct (adapted from Smith and Smith, 2008:22). Quick to execute-you can perform several sorts in a short period of time, which provides a significant amount of data (adapted from Spencer and Warfel *op.cit.*). A well established technique that has been used by many designers (adapted from *ibid.* pp 3). Gives users input into the design of an information structure (adapted from *ibid.* pp 3). Provides a good foundation for structuring websites or products (adapted from Spencer and Warfel *ibid.* pp 3). If participants are encouraged to explain the thinking behind how they have sorted the cards this can provide an insight into their mental models (adapted from Nielsen *op.cit.*). Can be used in conjunction with other usability methods (adapted from Spencer and Warfel *op.cit.*). Can identify items of information that are likely *"…to be difficult to categorise and find."* (Gaffney, 2000:1). Can identify terminology *"…that is likely to be misunderstood."* (Gaffney *ibid.* pp 1). Can be *"…useful for defining website structures."* (*ibid.* pp 1).	Does not understand the whole context of the user or use of an artifact. It is an inherently content-centric technique (adapted from Spencer and Warfel *op.cit.*). The card sort may provide fairly consistent results between participants, or may vary widely (adapted from *ibid.* pp 3). Analysis of the data gained can be difficult and time consuming especially *"…if there is little consistency between participants."* (adapted from *ibid.* pp 3) Participants may not consider what the content of a website is related to and may just sort cords based on subject headings (adapted from Spencer and Warfel *ibid.* pp 3). One person's mental model is not necessarily the same as another; this may lead to a model being produced that is not effective for all users (adapted from Nielsen *op.cit.*). If card sorting is conducted by groups of participants there is a risk that a consensus will be reached that is not *"…an accurate reflection of any one individual's perceptions"* (adapted from Gaffney *op.cit.*). Having large numbers of participants completing card sorting exercises is not always cost effective because of the expense involved in either travelling to a participant at their preferred location or reimbursing the participants travel costs (adapted from Spencer, 2007).

Card sorting	
Advantages	**Disadvantages**
Can be conducted in a variety of circumstances, for example; one on one, group and electronically (adapted from *ibid.* pp 1). Can be conducted before design work commences (Gwizdka n.d.).	If conducted online, the researcher is not present and thus cannot ask the participant why they have chosen to sort the cards in the way they have (adapted from *ibid.* pp 1). Only involve the elements that are either on the card presented to the participants or elements that participants have added using blank cards if provided (Anon b n.d. *op.cit.*).

T**able D.5 Some advantages and disadvantages of using the card sorting method**

2.5.1 Using card sorting with SCAN participants

The method is most effective when the people involved in the exercises are representative of users that the products or services are being designed for. It is therefore surprising that the researcher is unable to find more studies that evaluate the use of card sorting with SCAN users. However, in a study by Savitch and Zaphiris (2006:147) which utilised card sorting with participants that have dementia, the authors found that out of the ten people that were asked to take part in the study three participants did not group the cards at all and they were *"…happy to talk about the individual topics raised, but did not find any associations between the topics"* (Savitch and Zaphiris *ibid.* pp 147). The authors contend that given the above this *"…raises the issue that the card sorting technique used may not be suitable for use with people with dementia.*" (Savitch and Zaphiris *ibid.* pp 150)

However, in a study by Kurniawan and Zaphiris (2003:60) which involved interaction with elderly people concerning the design of web-based health information, card sorting showed differences in the mental models of experts and the users involved in the study, for example *"…the participants in the category labelling experiment suggested new labels for the proposed categories…"* (Kurniawan and Zaphiris *ibid.* pp 60) indicating that card sorting is

a useful method for understanding the mental models of different users (many authors such as Spencer and Warfel (*op.cit.*).

However, it is not clear whether the method can be effectively employed with participants that have SCAN *per se*. There is very limited evidence of this method being deployed in situations where the user group had SCAN, apart from Savitch and Zaphiris' study therefore it is not possible to draw conclusions as to whether the method can be effectively employed with groups of such participants. It was particularly frustrating that no study could be found that evaluated the practical aspects of using the method, for example; whether simpler explanations on the cards for participants with learning difficulties would have made the method more effective and usable for participants in this group.

In conclusion, card sorting allows designers to gain an insight into the mental models that participants form in relation to products or services being designed. Furthermore, having such an insight can prove invaluable to designers. However, as with many methods designers will need to think carefully before they utilise the method to ensure that it is accessible to the participant group being designed for and if it is not, consideration will need to be given to how the method can be modified so that it is accessible to the selected participant group.

2.6 User profiling

User profiling was first used in the 1950s when according to Park and Lee (2009:5) *"…the importance of users in design first emerged."* This method has since been developed further to provide a tool to help designers understand users.

User profiles are created during the user needs analysis process and can be defined as information that describes the characteristics of product users, for example; needs, wants, goals, job responsibility, demographics and any other information such as disability (adapted from UiAccess, 2009).

In addition, profiling can form a key part of the requirements, design and testing phases (adapted from Hyro.com, 2010).

They are often developed from a wide variety of sources; these can include, but are not limited to, general market research, focus groups, interviews and observations (adapted from UiAccess *ibid.*) According to UiAccess (*ibid.)* one of the first tasks when developing a user group profile is to define the user group, for example, users with SCAN. They are not developed for all groups and are generally used for primary groups or groups that designers do not know very well. Designers sometimes use the method as a starting point because they can often describe specific users by highlighting commonly performed actions (adapted from White, Fisch and Pooch (1195:96). In addition Trulock (n.d.a) contends that an expert with knowledge of the systems being designed and the users that they are being designed for are required for effective user profiling.

User profiling	
Advantages	**Disadvantages**
Are a simple but valuable tool for communicating and representing the differences and similarities of a target user group (adapted from Blomberg, Burrell and Guest, 2002:977)**.** Can be useful in some contexts when evaluating designs (adapted from *ibid.* pp 977). Can help prioritise and understand user needs thus informing the design process (adapted from Open Interface, 2010).	Detailed profiling can take time and requires specific expertise and knowledge (adapted from Chi *op.cit.*). Are not static and may change over time (adapted from *ibid.* pp 1). Can be constructed based on stereotypical assumptions thus may not always be correct for all members of a particular user group (adapted from Kuflik and Shoval, 2000:313).

User profiling	
Advantages	**Disadvantages**
Can help build personas for design (adapted from user-centred web effective business solutions, 2008). Can help highlight variations in user requirements (adapted from User Profiling and Testing Toolkit n.d.). Can provide a basis for usability scenario development (adapted from *ibid.*). Can be useful for grouping and prioritising activities of users (adapted from Doodlebunch.com, 2010). Profiles can help design be more specific to a defined user group as they highlight key attributes of that group (adapted from *ibid.*). Can help designers recognise and identify who their customers are, thus allowing the development of products to meet users' needs regardless of ability (adapted from Hyro.com *op.cit.*) Are versatile and can be used in many different contexts (adapted from Chi, 2004:1). Can give an insight into a user's mindset (adapted from Park and Lee *op.cit.).* Can communicate user information in a simple and abstract way (adapted from *ibid.* pp 2).	If profiling is done at the design stage it may be difficult to know in advance exactly who the audience is for a particular product or service (adapted from Trulock *op.cit.a*). Are not well suited to capturing tacit knowledge a user may have (adapted from Park and Lee *op.cit.*). Can generalise user characteristics in favour of quantifiable standards (adapted from *ibid.* pp 1). If done without clear reasoning, profiling far from being beneficial can become *"…an obstacle for reflection on users in design."* (adapted from *ibid.* pp 4) Are not suitable for collecting design research in relation to collective users (adapted from *ibid.* pp 4). Profiles do not express how users represent themselves but rather an expert or standardised opinion is produced (adapted from *ibid.* pp 5) Profiling may result in designers overlooking situational aspects (adapted from i*bid.* pp 5).

Table D.6 Advantages and disadvantages of employing the user profiling method

2.6.1 Using User Profiling with SCAN participants

In relation to profiling users with SCAN, Salomoni *et al.* (2004:84) states that contrary to what is commonly thought, profiling users is still a complex issue, especially in the case of learners with special needs. Whilst this is not specifically related to the design of products and services for this group, it outlines the major difficulty of profiling such users.

This is because not every user will have the same abilities or disabilities as another. Therefore there is never a typical SCAN user meaning that generic classification is not easy. One white, middle class person with cerebral palsy is likely to be very different from another. They may have similar characteristics but be affected very differently by their condition therefore profiling is based on quantifiable standards as opposed to user characteristics.

However, where SCAN users and their context are profiled, in the work of Davis, Moore and Storey (2003) this can improve the functionality of systems and have a positive impact on the life of such users. In this work, the use of context aware user profiling was found to proactively enable participants to take part in conversations and help such users to respond with more than binary responses (adapted from *ibid.* pp 1). For more information on profiling users with SCAN, see the section on personas.

2.7 Think Aloud Protocol (TAP)

Think Aloud Protocol (TAP) is a process used by a researcher normally during the evaluation stages to help them understand (at least in part) the thought processes that occur when a participant uses the product (adapted from Carpen n.d.).

Think Aloud Protocol (TAP)	
Advantages	**Disadvantages**
Few participants are needed to gain results (adapted from Thomas and Urquhart, 2006:13). Can provide information that could be hard to obtain from other methods (adapted from *ibid.* pp 13) Can give an understanding of the users' mental model (adapted from Evaluation Toolbox, 2004). Can help participants concentrate as they are forced to work and verbalise what they are doing throughout the evaluation (adapted from *ibid.*). Can provide a mechanism for obtaining real feedback from users (adapted from CS1Q-HCI Evaluation Methods, n.d.). Verbal data can be easy to collect (adapted from *ibid.*).	Tasks analysed using think aloud protocol need to be carefully selected and relevant to participants (adapted from Thomas and Urquhart *ibid.* pp13) Requires a skilled observer who is proficient in using think aloud protocol in order to obtain best results (adapted from *ibid.* pp 13 and Evaluation Toolbox, *op.cit.*). The technique will need to be piloted to ensure that it is appropriate for use in a given context (adapted from Thomas and Urquhart *op.cit.*). It can be difficult to recruit participants willing to participate (adapted from *ibid.* pp 13). As thinking aloud slows the thought process, this can increase mindfulness thus preventing errors that may occur in a real world setting (adapted from Evaluation Toolbox, *op.cit.*). . Can be unnatural and distracting to some participants (adapted from *ibid.*). It can be exhaustive to verbalise some processes such as lengthy procedures (adapted from *ibid.*). It can be difficult for some user groups to articulate their thoughts, for example, those with communication difficulties (adapted from CS1Q-HCI Evaluation methods *op.cit.*). Can place users in an unnatural and pressurised situation (adapted from *ibid.*).

Table D.7 Advantages and disadvantages of using the Think Aloud Protocol method

2.7.1 Using Think Aloud Protocol with SCAN participants

In relation to using think aloud protocol with those that have SCAN it would appear that this method is used but with some adaptation. For example, in a study by Strain, Shaikh and Boardman (2007) they remark that its use is limited when working with the visually impaired population (adapted from *ibid.* pp 1855) and propose three ways in which the method can be adapted;

- **Synchronized Concurrent Think-Aloud (SCTA)-**where the participant is given the option of pausing the screen reader in the middle of the interaction and discussing what was happening on the page and what they were experiencing.

- **Traditional Retrospective Think-Aloud (TRTA)-**In this method participants complete the task first and then think aloud.

- **Modified Stimulated Retrospective Think-Aloud-(MSRTA)**-In this approach the participant completes the task without interruption. After attempting to or completing the task the moderator will then slowly walk the participant through what they thought was happening (adapted from *ibid.)*.

However, each of these methods have their own limitations, for example, in relation to SCTA the natural flow of the task was interrupted as participants stop performing the task in order to talk. Further evidence of modification of the method can be found in a study conducted by Chandrashekar *et al*. (*op.cit.)* who remarks;

> *"We found that conventional Think Aloud Protocol cannot be used as is, and will require modification to be useful, when evaluating websites with blind users."*

The author suggests some ways in which the method could be adapted for use by this group because since these users use a screen reader, requiring them to read a short passage out loud before thinking aloud was not feasible and that simply explaining the method to them was insufficient.

Blind users did not often respond even when prompted and often showed a reluctance to pause and restart the screen reader.

Therefore, to overcome these obstacles, the authors suggest getting the users to retrospectively think aloud. In addition, to the two studies (outlined above) Roberts and Fels (*op.cit.)* also comment that TAP cannot be used in its traditional form and devised a method called GTAP 'Gestural Think Aloud Protocol' to accommodate the needs of deaf participants.

In conclusion, think aloud protocol is a useful method that can be used effectively by SCAN participants so long as the method is adapted to meet the specific needs of the defined user group.

2.8 Data logging

Data logging can be defined as recording events and the time at which they occur (adapted from Dumas and Redish, 1999:227).There are several options for data logging, some of which include:

Data sheets and databases-these are designed with performance outcomes in mind, the data can be recorded on paper or on an online database. A typical data sheet or database may include sections for the following elements:

1) Test time elapsed
2) Data type
3) Actions to be completed by the test participant

- **Self-reporting-**this method can be used when personal resources for data collection are limited and involve test participants completing a questionnaire after completing each task. The method can be completed on paper or online (adapted from Master of Technical and Scientific Communication Program, 2004).

- **Automated data logging –** these can be used for computer based usability tests (adapted from Rubin, 1994).

Data logging	
Advantages	**Disadvantages**
Accurate measurements. The data is recorded at the exact time it needs to be (adapted from Meakin, 1999). Mistakes are not made when the data is being analysed (adapted from *ibid.*). Allows the automatic production of tables and graphs to aid the analysis of data (adapted from *ibid.*). Can record data about a person discreetly over long periods of time such as physiological responses to certain situations (adapted from *ibid.*). In relation to automated data logging this can be advantageous as it traces exactly where bugs occur (adapted from Master of Technical and Scientific Communication Program *op.cit.*).	It can be costly to purchase data logging equipment (adapted from Meakin *op.cit.*). Paper based questionnaires (self reporting data logging) can be disruptive when used with computer based usability tests as they are not integrated with the participants testing tasks (adapted from Rubin *op.cit.*). In relation to automated data logging there can be a large amount of data that needs to be analysed (adapted from Master of Technical and Scientific Communication Program *op.cit.*).

Table D.8 Advantages and disadvantages of the data logging method

2.9 Participatory Action Research (PAR)

Participatory Action Research (PAR) can be defined as a participatory, democratic process concerned with the development of knowledge seeking "*…to bring together action and reflection, theory and practice, in participation with others*" in the pursuit of practical solutions to outline problems (adapted from Brydon-Miller and Maguire, 2003:10-11). PAR aims to empower research participants to become co-researchers by involving them in every stage of the research from design to its writing up (adapted from Kitchen, 2002) and is an attempt to address the issues of representation and unequal power arrangements between researchers and their participants (adapted from *ibid.*) Its philosophy is to facilitate a programme of social action through studies with and by research subjects.

The role of the academic is to enable and facilitate by supporting participants by imparting knowledge and skills to the research participants who co-direct the project (adapted from *ibid.*).

The concept was first explained in Kurt Lewin's 1946 paper entitled 'Action research and minority problems'. By the mid 1970s, four main streams of action research had emerged, these are:

- **Traditional:**
  - Stems from Lewin's work within organisations and is generally a conservative approach.

- **Contextual (action learning):**
  - Derived from Trist's work on relations between organisations and tries to involve all affected parties and stakeholders (a liberal philosophy as transformation occurs by consensus).

- **Radical:**
  - Is related to Marxian 'dialectical materialism' and a strong focus on emancipation and the overcoming of power balances.

- **Educational Action Research:**
  - Has its foundations in the work of John Dewey an American educational philosopher in the 1920s-30s and is often used in educational settings. This is usually employed when university based researchers work in schools on community projects.

(adapted from O'Brien, 1998)

Participatory Action Research (PAR)	
Advantages	**Disadvantages**
Empowers all participants, for example, the researcher does not control the direction in which the research proceeds; rather it is directed by the participants (adapted from Lancaster PhD online n.d.). Promotes reflection through its stages; this can help the researcher to understand the problem being investigated more clearly and thus provide more appropriate conclusions (adapted from *ibid.*). Because of its cyclical nature and the understanding gained from each cycle it can improve the actions of the researcher taken in the next; thus leading to better results being produced (adapted from *ibid.*). Flexible and responsive, the research design can be easily changed to meet the needs of the participants at any stage (adapted from *ibid.*).	Can be time consuming because of its cyclical nature (adapted from Lancaster PhD online *ibid.*). Can be complex to conduct (adapted from Lancaster PhD online *ibid.*). Can lead to personal over involvement of the researcher which can bias research results (adapted from *ibid.*). Can lead to lack of enthusiasm especially in situations where the research has lots of participants and there is a delay in decision making (adapted from *ibid.*). Can be resource consuming (adapted from Warger and Burnette *op.cit.*). Difficult to maintain validity and reliability (adapted from Balcazar Keys, Kaplan and Suarez-Balcazar *op.cit.*).

Participatory Action Research (PAR)	
Advantages	**Disadvantages**
Low control of the research environment thus preventing manipulation of data, also generating highly focused data (adapted from *ibid.*) Can bridge the gap between theory, research and practice as the theory of the research design is informed by practice (adapted from *ibid.*). Can increase the relevance of the research to all participants (adapted from Warger and Burnette *op.cit.*). Can increase research rigor (adapted from *ibid.*)**.** Can minimise logistical issues (adapted from *ibid.*). Acknowledges that participants have expertise to share with trained researchers (adapted from Balcazar Keys, Kaplan and Suarez-Balcazar, 2006:1). The process can be controlled by trained researchers and participants (adapted from *ibid.* pp 1). Recognises the need to involve participants under study directly in the research (adapted from *ibid.* pp 1). Can improve professional practice (adapted from Warger and Burnette *op.cit.*). Can promote the inclusion of those with SCAN (adapted from *ibid.*).	Can be complex to integrate in quantitative research designs (adapted from *ibid.* pp 6). It is difficult to devise control groups in the context of PAR (adapted from *ibid.* pp 6). *"Consumers often reject the use of validated instruments and want to design new instruments that are more consumer friendly."* (*ibid.* pp 6).

Participatory Action Research (PAR)	
Advantages	**Disadvantages**
Because of its collaborative nature and involvement of stakeholders at every stage including in the selection of research questions; these can be more meaningful to research participants. This helps address related issues thus ultimately results in actions that are more doable and sustainable (adapted from Warger and Burnette *ibid.*). Can encourage participants to share and take ownership of the research process (adapted from Radarmacher, 2006:29). Can help researchers solve problems using local resources and participants (adapted by White (*op.cit.*).	

Table D.9 Advantages and disadvantages of the participatory action research method

2.9.1 Using PAR with SCAN participants

Park *et al.* (1998) found that the participatory action research process empowered participants to take ownership of their action changes and thus resulted in the increase inclusion of those with SCAN (adapted from Warger and Burnette *op.cit.*).The authors indicate that this was probably because *"…practitioners saw that researchers were really trying to listen to them and understand their perspectives…"* although it was a slow process *"…eventually practitioners saw themselves as part of the dialogue.*"(*ibid.*) The nature of PAR suggests that no one stake holder decides the direction of the research but rather everybody is treated equally. Because of this, the inclusion of those with additional needs is encouraged.

Furthermore in a paper by Balcazar, Keys, Kaplan and Suarez-Balcazar (*op.cit.*) they remarked that:

> PAR *"…provides a framework in which people with disabilities can take an active role in designing and conducting research.*"

It can help individuals develop a critical view of the world and provide better understanding of the needs and rights of individuals with disabilities thus meaning that it would be appropriate to use a PAR methodology in this research as it seeks to examine the needs of people with SCAN in relation to participation in design or evaluation processes; particularly the methods used to facilitate this.

It allows SCAN participants to shape research to meet their needs at every step of the process.

Furthermore, because of its participatory nature it may increase the value of the research in such a way that is benefits people with disabilities (adapted from *ibid.* pp 7).

"*Despite the challenges that participatory researchers confront, we believe that its potential benefits for people with disabilities outweigh its limitations."* (*ibid.* pp 7) – The authors conclude that this is due in part to *"…the growing assertiveness of leaders and advocates from the disability community."*

It provides for *"…possible involvement and influence in research for persons with disabilities."*

> Additionally, *"…it provides researchers more direct access to and thus greater understanding of the social realities experienced by people with disabilities."*

> Furthermore*, "…it can help participants with disabilities become more aware of their competencies and efficacy, empowering them.*" (*ibid.* pp 8)

The major conclusion of this research was that *"PAR is one way to assure socially relevant and responsible research directed at making a difference in the lives of people with disabilities.*" (*ibid.* pp 8)

Kitchen (*op.cit.*) found that whilst disabled people learnt new skills, contributed to debates in relation to the involvement of disabled people in research and the projects had partially successful outcomes, there were a number of practical issues that arose as a result of choosing to use this methodology, these were;

- Gaining access to participants
- The research was time consuming.
- Difficulties in procuring funding for the project.
- The project was not a full PAR project due to not all stakeholders having the required skills. As a consequence of this, the conclusions of the project may not fully reflect the views of those involved.

In conclusion, it would appear that based on the literature examined there are advantages and disadvantages to using PAR in research with SCAN participants. The idea that it allows participants to become co-researchers may seem attractive. Additionally, as noted by Balcazar, Keys, Kaplan and Suarez-Balcazar (*op.cit.*) the fact that using PAR can make for a research process that is highly responsive to the needs of a participant may also be highly advantageous.

However, one note of caution may be that in order to ensure the research is fully participatory academics will need to provide the necessary training, support and guidance.

2.10 TLX (Task Load Index)

Task load index was developed by NASA (National Aeronautics and Space Administration) in 1988 (Hart and Staveland,1988) it involves rating six aspects (known as subscales) once this has been done the participant rates fifteen paired comparisons to provide an overall workload rating (adapted from Wiebe *et al.* 2010:475).

The subscales are:

- **Mental demands**- the mental and perceptual activity required by a task.
- **Physical demands**- the physical demand of the task such as pushing and pulling.
- **Temporal demands**- relates to time needed to complete the task.
- **Own performance-** how the participant feels their own performance contributes to the completion of the task.
- **Effort**- how much mental and physical work was required to perform at a certain level.
- **Frustration** - the effect of stress on task completion (adapted from *ibid.* pp 431 Duarte, Carrico and Guimaraes 2007, and Young, Zavelina and Hopper, 2008:103).

The goal of TLX as stated by Hart and Staveland (*op.cit.*) is to provide a sensitive and reliable estimate of workload.

Task Load Index (TLX)	
Advantages	**Disadvantages**
Widely acceptable in the research community (Federal Aviation Administration n.d.). Easy to use and administer (adapted from Bruneau, 2006:1). Cost effective (adapted from *ibid.* pp 1). Is an un-intrusive method and does not interfere with the task under study (adapted from *ibid.* pp 1). Can give a measure of internal processes (adapted from Bruneau *ibid.* pp 1). Provides a quick and simple technique for estimating workload (adapted from Stanton *et al.* 2005:321). Because of its generic nature it can be used in many domains (adapted from *ibid.* pp 321). Available in both pen and paper and software formats (adapted from *ibid.* pp 321). A widely used technique (adapted from Stanton *et al*. *ibid.* pp 321). Multi-dimensional approach (adapted from *ibid.* pp 321). Proven superiority with other techniques (adapted from Stanton *et al*. *ibid.* pp 321).	The scores given by participants may not reflect the true mental workload of a task as it is a subjective measure. Therefore results will not be based on a consistent structure (adapted from Bruneau *op.cit.*). Can be intrusive to primary task performance when administered online (adapted from Stanton *et al*. *op.cit.*). The subscales can be laborious and time consuming (adapted from Stanton *et al. ibid.* pp 321). Participants who perform poorly in tasks may rate the workload as 'high' or 'low' in order to hide weaknesses thus not giving a true measure (adapted from *ibid.* pp 321). If used during task performance rating of the six subscales may interfere with participants' performance of the task especially during high workload situations (adapted from Anon b *op.cit.*). Data produced can be complex to analyse (adapted from Marcotte and Grant 2010:46). Can have limited use when combining assessments of physical and mental demands (adapted from DiDominico and Nussbaum, 2007: 982).

Task Load Index (TLX)	
Advantages	**Disadvantages**
Has good face validity (adapted from Anon n.d. b) and is a highly validated method (adapted from Euro Control n.d.).	Because TLX scores are influenced by physical and/or mental demands they are not always a true reflection of mental workload levels (adapted from *ibid.* pp 982). The criterion related validity of the method is unclear (adapted from Wiebe *op.cit.*). The score with the lowest rating is assigned to a value of zero automatically forcing one of the six scales out of the calculation of overall workload thus not providing an accurate reflection (adapted from Chang and Chen, 2006).

Table D.10 Advantages and disadvantages of the Task Load Index method

2.11 Mental models

A mental model can be defined as;

> *"...internal cognitive structures that the individual constructs, explicitly or implicitly, to represent a particular target domain, be it an event, an activity, an object, or a subject area. In this sense, mental models are the conceptual frameworks that individuals form, based on experience and formal knowledge acquisition, which allow them not only to predict the results of explicit behaviours but also to interpret and understand their environment."* (Jacob and Shaw, 1998)

The concept of mental models was first given credibility in 1943 when Kenneth Craik described them as *"…small scale models' of reality."* (Craik, 1943)

Mental models	
Advantages	**Disadvantages**
"*Provide simplified explanations of complex phenomena."* (Schumacher & Czerwinski, 1992) Are flexible (adapted from Sterman, 1992). A wide variety of information in many formats can be processed (adapted from *ibid.* pp 3). Easily adapted and modifiable (adapted from *ibid.* pp 3). *"Denote the knowledge structure that users apply in planning actions.*" (Jacko and Sears,2003:58) Can be used for "…*planning, execution, evaluation and interpretation."* (*ibid.* pp 60). Can provide a deep understanding of peoples' motivations and thought processes along with emotional and philosophical background from which they come (adapted from Stone, Patton and Heen,n.d.:2). Models can have a long lifespan and so can be used to direct progress or user-centred design (adapted from *ibid.* pp 7). Are applicable in many situations (adapted from Kurtz,n.d.).	"*Are incomplete and constantly evolving"* (Schumacher & Czerwinski *op.cit.).* Are usually not accurate representations of a phenomenon and typically contain errors and contradictions which can go unresolved (adapted from *ibid.* and Sterman *ibid.* pp 4). Often contain measures of uncertainty about their validity that allow them to be used even if incorrect (adapted from Schumacher & Czerwinski *op.cit.*). Cannot assess "…*the impact of externally imposed changes or allocate responsibility for delay and disruption."* (Sterman *op.cit.*) Because of their nature, they cannot easily be examined by others (adapted from *ibid.* pp 4). Can be hard to justify the assumptions users make as a result interpretations can differ (adapted from Sterman *ibid.* pp 4). Can be unstable and unscientific (Jacko and Sears *op.cit.*). Are typically *"sloppy"* or "*messy"* " which can mean they are incomplete, unclear and cannot be described quantitatively (adapted from Doyle, Ford, Radzicki and Trees, 2003:6).

Mental models	
Advantages	**Disadvantages**
Highly advantageous when used in training as long as the models are correct (adapted from *ibid.*). Can capture intuitions about how users come to understand and misunderstand the devices they use (adapted from Carroll, 2003:35).	Can be prone to errors and bias (adapted from *ibid.* pp 6). The boundaries are unclear (adapted from *ibid.* pp 6). Can be *"…highly unstable over time, at least in their details."* (adapted from *ibid.* pp 6) Typically fail to account for important time delays that can create instabilities (adapted from *ibid.* pp 6). Are not good for representing information in non-linear formats (adapted from *ibid.* pp 6). Fail to incorporate feedback mechanisms (adapted from *ibid.* pp 6). The causes of problems are often represented in a simplified way (adapted from *ibid.* pp 6). Often fail to represent operational thinking (adapted from *ibid.* pp 6). The process of updating is not instantaneous (adapted from *ibid.* pp 6). *"The diversity of definitions and the lack of a coherent methodology may cause confusion."* (Kurtz *op.cit.*)

Table D.11 Advantages and disadvantages of mental models

2.12 Usability testing

> *"Usability testing is a methodology to determine the extent to which a product can be used by a specific population to achieve certain goals with efficiency and satisfaction."* (Byerley and Chambers, 2001:303)

It also measures:

- Ease of use
- Efficiency
- Memorability
- Error frequency and severity
- Subjective satisfaction (adapted from Usability.gov n.d.).

There are several different types of usability tests, these are:

- **Exploratory Tests**- are used early in the product development life cycle in order to help establish the validity of conceptual or high level design ideas prior to the development of fine details.

- **Assessment tests-** can be used as information-gathering tools during early development to evaluate the *"…usability of lower-level operations and aspects of a product."* (Rubin, 1994)

- **Validation or verification tests** - are conducted towards the end of the development cycle and are used to confirm a product's usability.

- **Comparative tests** - can be used in conjunction with any of the above tests to compare two or more aspects of a product (adapted from Master of Technical and Scientific Communication Program, 2004:25-27).

Usability testing	
Advantages	**Disadvantages**
Can help discover the real needs and tasks of the user (adapted from Viewmark, 2010). Can provide tangible evidence for design recommendations (adapted from *ibid.*). Cost effective, as it can identify and eliminate potential problems before they happen (adapted from *ibid.*). Decreases user errors in relation to the final product (adapted from *ibid.*) Increased user productivity and satisfaction (adapted from *ibid.* and Uehling 1994). Decreased training, maintenance and service costs (adapted from Uehling *op.cit.*). Can increase sales revenue and brand loyalty (adapted from Uehling *ibid.* and Master of Technical and Scientific Communication Program *op.cit.*). Helps minimise risk. Releasing a product after testing carries less risk than releasing a product that has not been tested (adapted from Master of Technical and Scientific Communication Program.*op.cit.*). Can help companies achieve a competitive advantage thus increase market share (adapted from of *ibid.*). Can help create a historical record of usability issues that can be used to inform future releases of products (adapted from *ibid.*).	Are subjective in nature (adapted from Uehling *op.cit.*) Due to the qualitative nature of the test it can difficult to measure benefit (adapted from *ibid.).* Is only a simulation of a products use (adapted from Master of Technical and Scientific Communication Program *op.cit.*) Cannot prove an absolute guarantee that the product will work (adapted from *ibid.*). May include participants that do not represent the target audience (adapted from *ibid.*). Often be resisted due to the cost. It can be time consuming (adapted from *ibid.*). May provide inconclusive data (adapted from *ibid.*). The validity of test findings heavily depends on identifying the right target audience (adapted from Kern Learning Solution *op.cit.*). Only focuses on a product and tasks that can be completed; it does not explore a user's mental model (adapted from Dicks n.d.:28) As they focus on single smaller tasks, it may be difficult to identify if every aspect of the system is truly usable (adapted from *ibid.* pp 29).

Usability testing	
Advantages	**Disadvantages**
Can help make developing documentation easier (adapted from *ibid.*). Keep product development teams focused on users' needs (adapted from *ibid.*) Can extend the product development life cycle (adapted from *ibid.*). Can be an effective indicator of potential problems with products (adapted from *ibid.*). Can help determine the effectiveness, efficiency and usefulness for many different types of products (adapted from *ibid.*). The results obtained can form the basis of recommendations for improvements (adapted from *ibid.*). Results can be reliable and detailed (adapted from Theofano, Stanton and Wolfson, 2008:8-18). Can help understand different users' behavioural patterns (adapted from Kern Learning Solution, 2008). Seeing is believing- when you physically see a user struggling to do a task in a session you immediately become aware of problems encountered (adapted from *ibid.*). They give an accurate reflection of what is accomplished, not what is said to have been accomplished (adapted from Evalued *op.cit.*).	Does not assess whether a participant likes a product, just simply whether they can use it (adapted from *ibid.* pp 29). May only test parts of the system that have been identified by the test administrator thus even positive results in these tests do not guarantee the usability of the whole system (adapted from *ibid.* pp 29). The results can be complex and time consuming to analyse (adapted from Evalued *op.cit.*). Can be difficult to recruit participants because of the need for a significant commitment (adapted from *ibid.*).

Table D.12 Advantages and disadvantages of usability testing

2.12.1 Usability testing with SCAN participants

Some of the barriers to the inclusion of SCAN participants in usability tests are:

- Recruitment of participants can be "*problematic".* However, it is important to test with such participants. (Petrie *et al. op.cit.* and Van Der Geest, 2006).

- *"…designers do not routinely consider people with disabilities to be part of the ultimate user base."* (Burgstahler *et al*., 2004)

- Additionally, they may have limited funding, lack experience when working with SCAN users and be constrained by ethical considerations (adapted from Sandler *op.cit.).*

- According to Burgstahler *et al*. (*op.cit.*) many educational institutions do not teach *"…students about how to include people with disabilities in such tests.*" This is worrying as clearly there is a need for usability testing with SCAN participants especially given the reliance such participants have on computers and the Internet.

Rubin and Chisnell (2008) propose some practical guidelines for running usability tests with SCAN participants, these include:

- It can take additional time to recruit participants with SCAN; allowances should be made for this.

- Make personal contacts with organisations who work with your target audience.

- It may not always be possible to recreate how SCAN participants interact with products under test conditions. This may mean recruiting for particular types of assistive technology.

- When communicating with your prospective participants it may be easier to contact them via e-mail. However, it is advisable to ask the participants for their preferred method of communication when contact is first made.

- Where the participants require support workers, ensure these are included in the session and that the costs in relation to them are covered.

- Schedule extra time before and after sessions, many SCAN participants may require this to complete tasks such as filling in pre and post session paperwork. It may also them longer to complete test tasks.

- Be conscious of energy level limitations.

- Find out what extra logistical considerations your participants may have such as adapted transport, use of support workers etc.

- Support workers may be just as much participants as your main target user, because they regularly work so closely with the participant.

- Ensure that the test venue is accessible.

- Test materials and procedures may need to be adapted depending on the needs of the participant

(adapted from *ibid.* pp 293-294)

In conclusion, from the literature reviewed, it would appear that usability testing with SCAN participants has many benefits and the extra effort required to involve SCAN users in such tests can be highly beneficial (Rubin and Chisnell *ibid.* pp 294). There is a need and in some countries there are requirements to conduct such tests with these participants.

2.13 Cognitive walkthroughs

This method is used to evaluate user interface usability (Stanton *op.cit.)* and is a "*…detailed review of sequences of actions to evaluate the effectiveness of an interface without formal training.*" Mowat (2002) and therefore it is focused on ease of learning (adapted from Polson *et al*. n.d. pp 4). The method is based on cognitive theory and is a tool for interface development not validation thus it can be highly useful in iterative evaluation processes (adapted from Rieman, Franzke and Redmiles,1995:388). It focuses on the cognitive processes needed for task completion (adapted from Polson *et al*. *op.cit.*). Performing a walkthrough involves carrying out a simulation of the cognitive processes that are required to successfully complete the specified action sequence (adapted from Polson *et al*. *ibid.* pp 4).

Cognitive walkthroughs	
Advantages	**Disadvantages**
Structured approach to user interface analysis (adapted from Stanton *et al. op.cit*.). Can be used early in the design life cycle thus allowing design flaws to be highlighted and corrected (adapted by *ibid.* pp 96). Designed to be used by non-cognitive psychology professionals (adapted by *ibid.* pp 96). Based on sound theory, including Norman's model of action execution (adapted by *ibid.* pp 96).	Can only cater for certain aspects of usability (ease of learning) (adapted by Stanton *et al. ibid.* pp 96). Can be time consuming for complex tasks (adapted by *ibid.* pp 96 and Polson *et al*. *op.cit.*). Is based upon an analyst's subjective judgement, as a result of this the reliability of the method is questionable (adapted by Stanton *et al.* pp 96). Requires access to the personnel involved in the tasks under analysis (adapted by *ibid.* pp 96).

Cognitive walkthroughs	
Advantages	**Disadvantages**
"*Easy to learn and apply."* (*ibid.* pp 96) Output from analysis can be very useful (adapted by*. ibid.* pp 96). Can be used to gather requirements for evaluation (adapted from Wilson, 2010:356). Offers design teams an opportunity to evaluate early mock-ups of designs quickly (adapted from Rieman, Franzke and Redmiles *op.cit.*). Does not require a fully functioning prototype or the involvement of users (adapted from *ibid.* pp 388). Can help designers to assume a user's perspective and thus identify potential problems with the system (adapted from *ibid.* pp 388). Can be used by software developers as it can assist them to define user goals and assumptions (adapted from Polson *et al*. *op.cit.*). Can work well with a user-centred design approach (adapted from ADHS 2005). Effective in highlighting issues in relation to the learn-ability of a system (adapted from *ibid.* pp 2). A flexible method (adapted from Wharton *et al*. *op.cit.*).	Evaluators may not represent the real user of a system (adapted by Stephanidis 2007:357). Can only be performed by expert evaluators (adapted by Ghaoui, 2006:641-642). Involves the completion of a large quantity of paperwork (adapted by *ibid.* pp 641-642). Only examines specific user tasks rather than the whole interface (adapted from Helander, Landaeur and Prabhu, 1997:717). Analysis of correct sequence of events but does not attempt to predict what users will do if these are not followed (adapted from Helander, Landaeur and Prabhu *ibid.* pp 717). Assumes evaluator possesses cognitive theory skills (adapted from Wharton *et al*. *op.cit.*).

Table D.13 Advantages and disadvantages of the cognitive walkthrough method

2.14 User diaries

User diaries are a method for providing *"…a record of user behaviour over a period of time…"* (a week, a month or longer). They comprise of the user's ideas, experiences, anecdotes and knowledge (adapted from Alexander and Maiden 2004:214). They also require the participant to keep a record of the activities they are doing, either by completing questionnaires or recording their own observations, thoughts and feelings. The information gathered may lead to the identification of user requirements for a new system or product (adapted for Maguire and Bevin *op.cit.* and Fairbrother, 2008).

Diaries can be most effective when trying to understand user requirements (especially at the evaluation stage) and should feed into concept development.

Four types of diary study exist, these are:

- **Unstructured-**participants report on their activities. This approach is useful if you wish to elicit general themes.

- **Structured-**participants report on everyday activities in order to answer specific questions.

- **Usability Test-**participants complete set tasks and report on results. This is a structured comparison of task performance.

- **Problem report-**participants report on their activities identifying problems/issues.

(adapted from UC Berkeley School of Information, 2008)

User diaries	
Advantages	**Disadvantages**
Provides an opportunity for users to record activities throughout the day (adapted for Maguire and Bevin *op.cit.).* Provides an efficient method of understanding a user's behaviour (adapted from Smyslova, and Voiskounsky, 2009:317). Provides an insight to how products are used over time (adapted from *ibid.* pp 317). Allow users to self report (adapted from Fairbrother *op.cit.*). Provide deep insight into peoples' lives (adapted from *ibid.*) Can be used to help personas or bring scenarios to life (adapted from *ibid.*). Because of the nature of material,for example, users own insights this may provide a convincing argument for some design decisions (adapted from *ibid.*) Especially useful for gathering information about a user's behavioural patterns (adapted from Design Council, 2010) Can often capture the intentions of users leading to a more goal centred design (adapted from Cooper, 1999). Carried out *in situ* in the users' real environments (adapted from UC Berkeley School of information *op.cit.*) *"Facilitate broad geographic distribution."* (*ibid.*)	Users may forget to complete diaries or summarise activities (adapted for Maguire and Bevin *op.cit.).* Information from users is self reported thus it is only as good as the user reporting it (adapted from Usability Body of Knowledge n.d.) Can become tedious for the participant (adapted from Czerwinski, Horvitz and Wilhite, 2004:2). Using a diary may disrupt the flow of daily events (adapted from *ibid.* pp 2). Entries may not be comprehensive or accurate (adapted from *ibid.* pp 2). Participants may require reminders to complete (adapted from UC Berkeley School of information *op.cit.*). May be expensive for long durations (adapted from *ibid.*). The amount of data produced can be overwhelming (adapted from *ibid.*). Risk of delay between event occurrence and recording (adapted from Designerly Notations, 2010). Relies heavily on participants' co-operation (adapted from *ibid.*).

Table D.14 Advantages and disadvantages of user diaries

2.15 Lead user evaluation

Lead user evaluations involve working with users that currently experience needs that are unknown to the public therefore they are generally associated with emerging trends in the market (adapted from Tumati, 2010). An example of a lead user could be an open source software developer as they profit from using the software they develop (adapted from von Hippel, 2002). The method was first introduced in 1986 by Von Hippel and is based on the theory that there is always somebody that has the need first and the rest of the market place will develop that need later. According to Von Hippel, lead users have two characteristics:

1) They deal with needs that are general in a market place but are involved months or years before these are encountered.

2) Lead users will benefit significantly from obtaining a solution to those needs (adapted from Hannukainen Hölttä-Ott, 2006).

3) They often are interested in and make heavy use of a particular vendor's product (adapted from Pitta and Franzak, 1997:237).

Lead user evaluations	
Advantages	**Disadvantages**
Lead users *"…are better able to identify and communicate their needs"* (Hannukainen Hölttä-Ott *op.cit.*). Are not based on existing products but on user needs (adapted from *ibid.).* Working with lead users can allow firms to anticipate trends and to gain a competitive edge (adapted from *ibid.*). Can provide a valuable resource in customer need identification (adapted from *ibid.*).	Identification of lead users is difficult (adapted from Hannukainen Hölttä-Ott *op.cit.*). There is a lack of knowledge that differentiates lead users from ordinary users (adapted from Schreier and Prügl *op.cit.*). Are not suitable in some contexts such as where users may feel uncomfortable disclosing information (adapted from Ezinemark.com, 2009).

Lead user evaluations	
Advantages	**Disadvantages**
Can produce new product concept and design data. Can examine unrealised potentials in relation to products and their uses (adapted from Lauweart, 2009:63). Lead users are often able to explain why present products do not meet their needs (adapted from Pitta and Franzak *op.cit.*). May save company time and money in relation to development (adapted from *ibid.* pp 239). Ideas generated by lead users may enhance marketplace acceptance (Herstatt and von Hippel,1992) Can often be a valuable addition to a product team because of a focused set of characteristics (adapted from Pitta and Franzak *op.cit.*). Can serve as a problem solving forecasting aid (adapted from *ibid.* pp 237). Lead user concepts are valued by more typical users in target markets (Herstatt and von Hippel *op.cit.*). Lead users can often recognise problems with products immediately (adapted from Pitta and Franzak *op.cit.*). Lead users *"…adopt new products faster and more intensively than other users."* (Schreier and Prügl, 2008)	Can be time consuming (adapted from *ibid.*). Better for the industrial goods market than other markets as lead users of these goods can be identified more reliably than those of consumer goods, (adapted from *ibid.*) It can be difficult to find large numbers of lead users (adapted from Lin and Seepersad, 2007:1). Often possess a vested interest in obtaining solutions to their needs and thus may not consider the needs of others (adapted from *ibid.* pp 1). Are not easy to utilise (adapted from *ibid.* pp 1). Lead users are not created equal, their abilities and as such their usefulness may vary (adapted from von Hippel and Riggs *op.cit.*). A small sample of advanced users may not be representative of the entire population (adapted from Lai and Honda n.d.:7). Evaluations don't always guarantee success (adapted from Von Hippel, Thomke, and Sonnack, 2001). Lead users can threaten even the most promising projects (adapted from *ibid.).*

Lead user evaluations	
Advantages	**Disadvantages**
Lead users demonstrate knowledge that is more domain specific and thus often provide innovations as a result (adapted from Schreier, Sberhauser and Reinhard Prügl, 2007). Lead users can often perceive new technology as less complex thus more willing to adopt them (adapted from *ibid.*). Working with lead users may result in attractive user lead innovation (Urban and von Hippel 1988, von Hippel 1986). Lead users may produce ideas that other users do not (adapted from Ozer 2009:134). Are often motivated by a stimulus of non-economic origin such as pleasure (adapted from Morrison, Jeppersen and Frediceresen, 2004:3 and Korotkova, 2007:3). Lead users are capable of generating mass market solution (adapted from Korotkova *op.cit.*). Can appreciate the benefits of sharing their knowledge (adapted from *ibid.* pp 3). Because of their leading requirements and rich experiences, lead users are often a valuable resource in product development (He and Chen, 2010:1). Lead users have higher competence levels when compared to normal consumers (*ibid.* pp 1).	

Lead user evaluations	
Advantages	**Disadvantages**
Can assist a business in assessing the viability of an idea/concept (adapted from Tumati *op.cit.*). Usually a good source for multiple innovative ideas (adapted from von Hippel *op.cit.*). Concept development involving lead users can be faster and cheaper (adapted from Herstatt and von Hippel, 1992). Often solutions proposed by lead users have been developed under real world conditions (adapted from von Hippel and Riggs 1996:15). Can often help companies understand the nature of the breakthrough they are seeking (adapted from Preston n.d.). Can bring product design teams into a close working relationship with lead edge customers (adapted from *ibid.*). Can be seen as a systematic approach to generating breakthroughs (adapted from *ibid.*). Collects information about both needs and solutions (adapted from Lilien *et al*. 2002:1042).	

Table D.15 Advantages and disadvantages of lead user evaluations

2.15.1 Lead user evaluations with SCAN users

Hannukainen (2005:60-61) concluded that there is a strong indication that disabled persons could be seen as effective lead users. This is because even able bodied users are at some stage of their lives, situationally disabled, for example, using a mobile phone in the dark would impair a non-disabled user's sight.

Given this, SCAN users could be classified as lead users because according to von Hippel (*op.cit.)* they face needs before the bulk of the market place (adapted from Hannukainen *op.cit.* pp 55). However, there were two limitations of this study, these were:

1. The study only examined visually and hearing impaired participants.

2. The study had relatively few participants, this may indicate that further research needs to be conducted with users that have a wider range of disabilities such as physical and learning in order to fully justify the claims made (adapted from Hannukainen *ibid.*).

Further evidence, of the value of using SCAN participants as lead users, is provided by the remarks of Green, Seepersad and Hölttä-Ott (*op.cit.*) who state that *"…they often identify novel and important needs which many customers value, but few articulate.*" However, they recognise that whilst lead users are beneficial, they can be difficult to identify and so suggest an approach described as "*empathic lead user technique."* This method simulates a disability such as wearing dark glasses to impair sight (Green, Seepersad and Hölttä-Otto (*ibid.* pp 4) the approach has a number of advantages, which include:

- Increasing the availability of lead users.
- Enabling people on the design team to experience the product as a lead user.

- Vastly improving customer needs elicitation (adapted from Green, Seepersad and Hölttä-Otto *op.cit.*).

However, whilst these are advantages it should be recognised that this method proposes simulation of a disability and so should never be used as a substitute for talking to lead users.

In conclusion, it would appear that this method presents many benefits for those who design for SCAN users. However, it does have one substantial limitation i.e. it can be difficult to identify appropriate persons to act as lead users.

2.16 Prototyping/Mock-ups

Prototyping involves creating a representative model or simulation of the final product (adapted from Warfel, 2009:6). There are two different types of prototypes:

1) **Low fidelity**-can be defined as paper mock ups, storyboards or paper prototypes which lack the details of a high fidelity design. The goal of low fidelity prototyping is to convey conceptual design and show the user scenarios that are important.

2) **High fidelity**-can be defined as prototypes that mimic the look and feel of a real system and are often developed using a software tool.

(adapted by Proctor and Vu, 2005: 327)

Mayhew and Dearnley (1986) propose three different types of prototyping; these are; exploratory, experimental and evolutionary (this classification is based on Floyd, 1984).

1) **Exploratory**-clarify information requirements, desirable features and alternative design possibilities (adapted from Searey, 2007). This technique can prove especially useful in the early stages of product development as it can help ease communication problems between product users and developers.

2) **Experimental**-involves building a prototype of a proposed solution to a particular problem. This can then be evaluated to assess its adequacy before implementation work. It may contain all elements of the proposed system or test functions of a particular interest to the development team (adapted from *ibid.* pp 481).

3) **Evolutionary**-the emphasis of this is on the gradual adaptation of the system to cope with changing requirements. The products created as a result, can be thought of as versions, with each version being tested and used (adapted from *ibid.* pp 481).

Law (1985) identifies two further classifications of prototyping; these are performance and organisational:

1) **Performance**-this can be used when the system is placed in its intended work environment to check whether it can handle its intended workload. This can be a difficult process but is useful when trying to detect problems with hardware and software (adapted from *ibid.*).

2) **Organisational**-this is where a prototype is put in its operational environment, for example, the user's normal workplace. This can be useful when you wish to clarify;

1) If the users' requirements have been met.

2) To clarify the needs of the organisation.

This type can be particularly useful when;

1) The system is to be installed in many different places,
2) Where a large scale system is implemented (adapted from Mayhew and Dearnley *ibid.* pp 481).

Organisational prototyping can be further sub-divided, these are:

- **Ergonomic**-concentrating on hardware set-up considerations.
- **Functional**-focused on the suitability of the surrounding support requirements (adapted from Mayhew and Dearnley *ibid.* pp 484).

Prototyping/Mock-ups	
Advantages	**Disadvantages**
Prototypes can be *"…easily changed or discarded."* (Bernstein, 2013) "*May improve communication between developers and customers."* (*ibid.*) *"Users may have increased satisfaction with systems developed."* (*ibid.*) *"...may provide [the necessary] proof …to acquire funding."* (*ibid.*) *"...may serve as a marketing tool."* (*ibid.*) *"...may serve as a base for operational specifications."* (*ibid.*) *"...may help management assess progress."* (*ibid.*) *"...exploratory prototyping can allow productive work to proceed despite initial uncertainties."* (*ibid.*)	*"...may encourage an excess of change requests."* (Bernstein *op.cit.*) May lead customers and managers to believe the prototype is ready for delivery (adapted from *ibid.*). The *"...performance characteristics of prototypes may mislead the customer*." (*ibid.*) *"Customers may not be prepared to provide the level of feedback required."* Additionally, they *"…may not be willing to participate in the iteration cycle for long periods of time."* (*ibid.*) Early prototypes may not be viewed as serious design solutions (adapted from *ibid.)* "*Hi-fidelity prototypes may be mistaken for a real product".* (*ibid.*)

Prototyping/Mock-ups	
Advantages	**Disadvantages**
"...may demonstrate progress at an early stage of development." (*ibid.*) *"...may provide early training for future users of the system."* (*ibid.*) *"...may highlight incomplete functionality or inconsistent requirements."* (*ibid.*) *"...may produce useful deliverables if the project runs out of time or money."* (*ibid.*) *"...may reduce misunderstandings between developers and customers."* (*ibid.*) *"...may reduce re-design costs as problems [can] be detected earlier."* (*ibid.*) *"...may reduce the time required for testing."* (*ibid.*) *"...may result in an equal partnership between develops and users."* (*ibid.*) *"...may result in a better product that fits the customers' requirements."* (*ibid.*) *"...may strengthen requirements specifications."*(*ibid.*) Systems used through prototyping may be easier to judge and easier to use (adapted from *ibid.*). Open to change and innovation (adapted from *ibid.*).	Important product characteristics, for example, performance and security may have been ignored in prototype development (adapted from *ibid.*). *"It may not be possible to prototype all aspects of a product."* (*ibid.*) "*Prototypes may become over - evolved."* (*ibid.*) Prototypes may have inaccuracies (adapted from *ibid.*). *"Prototyping is an adaptive process that may not exhibit well-defined phases.*" (*ibid.*) *"…may continue too long because there [is no] well-defined completion [criteria]"* (*ibid.*) *"The context of use for a prototype may be very different from the context of use for the final system.*" (Maner *op.cit.*) Can lengthen the development process (adapted from Lo *op.cit.).* If it is limited in functionality, it may not scale well if used as the basis for a final deliverable (adapted from One Stop Testing n.d. *op.cit.*'). The focus of a limited prototype may distract developers from properly analysing the complete project. This may lead to more suitable solutions being overlooked (adapted from *ibid.*). Both users and developers could become attached to prototypes (adapted from *ibid.*).

Prototyping/Mock-ups	
Advantages	**Disadvantages**
May highlight need for changes earlier when they are cheaper to implement and easier to make (adapted from *ibid.*). Users may understand prototypes better than paper specifications (adapted from Maner *op.cit.*). More likely to produce systems that satisfy requirements (adapted from Lo *op.cit.*). Can help to define system requirements and functionality (adapted from HN Computing, 2007). Can help ensure that the solution meets user requirements (adapted from *ibid.*). Allows developers to provide users with an insight into a system (adapted from *ibid.*). Prototyping can help to explore ideas and exchange feedback with end users; this can assist in the development of a solution that is fit for purpose (adapted from *ibid.*). Helps the developer to finalise requirements for a product with acceptance from the end user, allowing the developer to focus on what still needs to be achieved (adapted from *ibid.*). Can give the client a greater sense of ownership and a better appreciation of the final solution (adapted from *ibid.*).	Can be an expensive process (adapted from One Stop Testing *ibid.*). Many companies expect higher productivity if prototyping is used. However, if it is not fully implemented and given the required backing, lower productivity may result (adapted from One Stop Testing *ibid.*). May cause products to be left unfinished before they are ready (adapted from Sauter *op.cit.*).

Prototyping/Mock-ups	
Advantages	**Disadvantages**
Can help the developer estimate practical considerations such as time, cost and resources (adapted from *ibid.*). Can serve as a reference point or reminder that can be referred back to as necessary (adapted from *ibid.*). May enable usability testing to take place early in the development process as long as the prototype is functional and clearly demonstrates what will happen at each step of the process (adapted from Hoekman, 2006). May reduce development time and costs (adapted from Sauter, 2000). Developers may receive quantifiable feedback from users (adapted from *ibid.*). Can facilitate systems implementations as users will know what to expect (adapted from *ibid.*). May expose developers to potential future enhancements (adapted from *ibid.*)	

Table D.16 Advantages and disadvantages of the prototyping method

In conclusion, prototyping appears to be a useful method that can be used at different stages during design and evaluation processes. However, no evidence can be found of its suitability for use with SCAN participants.

2.17 Cultural probes

Cultural probes "…*originated in the traditions of artist-designers and have been deployed in a number of innovative design projects…"* (Gaver *et al.*1999) *"They were initially developed in the Presence Project* (Gaver, Hooker and Dunne 2001), *which was dedicated to developing technologies for the elderly, as a way of facilitating collaborative design with end-users*." With the primary aim of being "…*an information input for design.*" (Blythe *et al. op.cit.*)

They were first used by Gaver, Dunne and Pacenti (1999) as part of a European Union project which examined "…*novel interaction techniques to increase the presence of the elderly in their local communities"* (Gaver, Dunne and Pacenti *ibid.* pp 22).

They take the form of *"…self-report packages of artifacts, questionnaires, and exercises that encourage users to reflect on their experience…provocatively.*" (Dourish, 2006:549)

Boehner *et al. (op.cit.*) contends that cultural probes are designed to provoke inspirational responses, for example, to allow designers to explore deeper than conventional design concerns.

Edwards and Grinter (2001) state they are one way in which a major obstacle can be overcome i.e.

> *"…to pay heed to the stable and compelling routines of the home, rather than external factors, including the abilities of the technology itself. These routines are subtle, complex, and ill-articulated, if they are articulated at all…only by grounding our designs in such realities of the home will we have a better chance to minimise, or at least predict, the effects of our technologies."*

> *There use "…has generated a number of fundamental design requirements through facilitating a consideration of everyday, yet important, individual activity patterns and needs; illuminating the rhythms of daily life as well as the possible problems and difficulties that people are faced with in relation to technology in their homes."* (Dewsbury, Rouncefield, Clarke and Sommerville *op.cit*.)

They are ideally suited for research in domestic contexts because the highly personal character of these settings presents conventional research techniques with obdurate problems that can make research practically and ethically difficult. Researching domestic spaces and domestic values requires different methods to understand the unique needs and experiences of residents (adapted from *ibid.)*.

Cultural probes	
Advantages	**Disadvantages**
Can allow the drawing out of *"…narratives, insights and discussion into interests, beliefs and feelings."* (Axelrod *et.al. op.cit.*) Can be a very powerful medium for communication (adapted from *ibid.* pp 37*).* Are flexible as they can be utilised in a variety of contexts (adapted from Boehner *et al. op.cit.* pp 1077). Can be an engaging approach to design for users as they are playing an active role in the process (adapted from Gaver *et al. op.cit.*). Can encourage and promote empathy with users (adapted from *ibid.* pp 1).	Data can be difficult to interpret because of its subjective nature (adapted from Gaver *et al. op.cit.).* Can produce incomplete, biased and unclear conclusions (adapted from *ibid.* pp 1). It can be difficult to implement the information gathered into design ideas (adapted from *ibid.* pp 6). Not a scientific method (adapted from Dourish *op.cit.).* Can sometimes be deployed as a poor substitute for ethnographic and other methods (adapted from *ibid.*).

Cultural probes	
Advantages	**Disadvantages**
Can provide a variety of new design ideas (adapted from *ibid.* pp 6). Can provide a rich and detailed understanding of the users' life contexts (adapted from *ibid.* pp 6). Can help designers to explain the issues that their designs address (adapted from *ibid.* pp 6). May bring out issues that cannot be seen or revealed through observation or in an interview setting (adapted Jaasko and Mattelmaki, 2003:130). Can be used to supplement traditional methods (adapted from Boehner *et al*. *op cit.*). Can provide a *"…valuable way of gaining a deeper and more empathic insight into people's use of technology.*" (Battarbee and Mattelmaki,2004) adapted from Dewsbury, Rouncefiled, Clarke and Sommerville *op.cit.*). Can provide a holistic understanding of users (adapted from Boehner *et al*. *op.cit.*). Provides a way for users to interpret and explain their own practices (adapted from Boehner *et al*. *op.cit.*) Can be highly useful when gathering information on personal and emotive subjects (adapted from Boehner *et al*. *op cit,* Dewsbury, Rouncefield, Clarke *op.cit.* and Sommerfield n.d.). Can be easy to apply (adapted from Mattelmaki and Battarbee, 2002:5)	Not designed to provide data about settings (adapted from Boehner *et al. op. cit.).* When using them in a group setting, such as families, there can be issues with privacy and the differences in motivation and participation (adapted from Horst *et al*. 2004:4). When analysing groups such as families analysis can be complicated as *"…there is no single set of values, beliefs and needs."* (Horst *et al*. *ibid.* pp 4).

Cultural probes	
Advantages	**Disadvantages**
Are appropriate in settings such as residential care where more traditional methods, for example, participant observation may not be appropriate (adapted from Crabtree *et al*. *op.cit.*). Can be used to ensure the early active involvement of users in the design process (adapted from Crabtree *et al*., 2003:8). Can help establish a conversation with a user group (adapted from Blythe *et al*. *op.cit.*). Can be used for groups that are difficult to research by conventional means (adapted from Blythe *et al*. *ibid.*). Can help to uncover users' social, emotional, aesthetic values and habits (adapted from Blythe *et al*. *ibid.* pp 3, adapted from Dewsbury, Rouncefield, Clarke and Sommerville *op.cit.).* Can help to open up and maintain communication channels (adapted from Blythe *et al*. *ibid.* pp 3, adapted from Dewsbury, Rouncefield, Clarke and Sommerville *op.cit*.). Can help a researcher to overcome some of the distance between themselves and users (adapted from Blythe *et al*. *op.cit.*). Allows a designer to gather a rich set of *"…materials that grounds designs in the lived realities and textures of everyday life."* (*ibid.* pp 3). Can be deployed to *"…provide 'inspiration for design activity'"* (Gaver *et al*. *op.cit.).*	

Cultural probes	
Advantages	**Disadvantages**
May give an insight into the *"…varying motivation underpinning technology adoption and use."* (Dewsbury, Rouncefield, Clarke and Sommerville *op.cit.*). Help to *"…understand people in situ uniquely, not en masse…"* (*ibid.*) Allow designers *"…to consider both appropriate and inappropriate aspects of design, by, for example, unearthing tales of woe from respondents."* (*ibid.*) Enables the designer *"…to focus on specific bespoke dependable socio-technical designs that meet the real needs of the user."* (*ibid.*) Illuminates design criteria from the perspective of the user (adapted from *ibid.*). Can be used to find out about peoples' everyday lives (adapted from Blythe *et. al. op.cit.*).	

Table D.17 Advantages and disadvantages of employing cultural probes

2.17.1 Using cultural probes with SCAN users

This method is particularly suitable to use when working with SCAN participants because it can be difficult to obtain access and user requirements (adapted from Crabtree *et al.*, 2002:2) leading to requirements that are *"...derived from service providers' perspectives and rarely from the needs of recipients as articulated by them."* (*ibid.* and adapted from Dewsbury, Rouncefield, Clarke and Sommerville *op.cit.*) Furthermore, due to their life circumstances and daily routines they are particularly useful when working with such groups as these can be particularly complex thus they can provide *"fragmentary glimpses*" of an individual's life circumstance which is useful for informing design.

This is because probes enable an understanding of people in the situations in which they find themselves and not abstractly or en masse (adapted from Dewsbury *et al.* (2003:196), Dewsbury, Rouncefield, Clarke and Sommerville *op.cit.*).

Additionally, Dewsbury *et al*. (*op.cit.*) also concludes that probes gather material that can provide a clear snapshot of an individual's life; this can be complemented by interview material and other data gathering techniques. Crabtree *et al*. (*op.cit.*) contends that there is further value to using probes with people that have SCAN; this is because they are particularly useful for dealing with sensitive issues, he feels that probes provide a "*fruitful means"* of gathering sensitive information.

Furthermore, probe exercises are often "*highly individual*", this is advantageous when working with people that have SCAN as they are very unique individuals with very specific needs (Crabtree *et al*. *ibid.* pp 3).

In conclusion, it is clear that there are many benefits to using probes with this group, the main one being that they give an overview of an individual's life from their view point; however, care must be taken to ensure that the probes are accessible to the user groups in which they are deployed.

2.18 Personas

The concept of personas was first introduced by Cooper (2004:124) in his book 'The inmates are running the asylum' and these are defined as;

> *"Not real people but they represent them throughout the design process…they are hypothetical archetypes of actual users, although they are imaginary, they are defined with significant rigor and precision...[and]...personas are defined by their goals…goals of course are defined by their personas."*

It is important to note that unlike other methods discussed above, personas do not aid in understanding the difficulties of a single user as they are fictional but may enable designers, if created correctly, to understand and research difficulties faced by a group of users with a particular impairment. It is for this reason that they are discussed here. They are created by successively refining ideas during initial investigation of a problem domain, which may involve using interviews, observations and other quantitative and qualitative techniques (adapted from *ibid.* pp 124). These methods may then impact on the design of the persona (Blomquist and Arvola's, 2002). According to Cooper (*op.cit.*) the key to successfully using personas is to enforce that everybody in a development team buys into it and thinks in terms of what they would require when developing the product. "*Personas aim to give an understanding and a description of the users to a certain degree."* (Blomkvist *op.cit.*)

Given this, it is not unreasonable to suggest that personas could be used as a tool for teaching empathy, in a similar way to that of a pregnancy suit. This is due to the fact that empathy tools share a common characteristic with personas that is they can give an understanding of the user and may be effective in helping the designer understand the psychological implications of life with an impairment. Whereas conventional empathy techniques mainly focus on the physical aspects of the impairment thus using personas may enhance the designers understanding of a user group.

Personas	
Advantages	**Disadvantages**
Can help design teams understand the lifestyles, aspirations, social circumstances and ability losses across different market segments (adapted from Waller, Langdon and Clarkson *op.cit.*). "*Are powerful because of their flexibility."* (*ibid.* pp 22) Allows design teams to focus on design for a specific individual (adapted from Blomquist and Arvola *op.cit.*). Can be used informally (adapted from Goodman, Clarkson and Langdon, 2006:1). Can be used in a variety of different situations (adapted from *ibid.* pp 1). Are inexpensive (adapted from *ibid*. pp 1). Can be used quickly (adapted from *ibid.* pp 1). Regard personal objectives as important; these are often neglected in other methods (adapted from Blomkvist *op.cit.*). Focus more on user goals than tasks (adapted from *ibid.*). *"Help define the product by replacing the abstract, elastic user with the vibrant presence of a specific user who becomes a part of the design process."* (Sinha, 2003:830) Allows designers *"…to put themselves in someone else's shoes."* (adapted from Jacobs *et al*. 2008:81)	When discussing users, design teams can have differing views on whom the user is and what their goals are (adapted from Blomquist and Arvola *op.cit.*). If designers do not feel confident with the method it can prove difficult to communicate it to others (adapted from *ibid.* pp 199). Reliable and representative personas can be time consuming to create (adapted from Goodman, Clarkson and Langdon *op.cit.*). Not well suited to presenting detailed technical information, for example disability (adapted from *ibid*. pp 1). Because they are focused on representative individuals this can make it difficult for designers to understand the range of abilities and disabilities within a given population (adapted from *ibid*. pp 1). Only useful in the context of specific design problems (adapted from Blomkvist *op.cit.*). Designers may easily be carried away and invent them without carefully analysing real users (adapted from *ibid*. pp 7). The relevance of them has not been confirmed in scientific studies (adapted from *ibid.* pp 7).

Personas	
Advantages	**Disadvantages**
Can allow designers to switch between developers and users' perspectives (adapted from Johansson & Messeter, 2005:231). Allow a substantial amount of information to be shared in a well-known and attractive manner (adapted from Pruitt & Grudin, 2003). Can be well defined and clear and therefore provide a good starting point for design (adapted from Johansson and Messeter, 2005). Social and political aspects of design are brought to the surface (adapted from Ronkko *et al*. 2004:112). Can be an effective tool for engaging designers (adapted from Pruitt & Grudin *op.cit.*). Can both complement and amplify the effectiveness of other design methods (adapted from *ibid.* pp 3). Can create a strong focus on users and their contexts (adapted from *ibid.* pp 9). "*Can be used to explore user needs, inspire creativity and evaluate designs from the perspective of the users."* (Waller, Langdon and Clarkson *op.cit.)*	The temptation of reuse after the investment in developing them and acquainting people means it may be difficult to avoid overextending their use (adapted from Pruitt & Grudin *op. cit.*). Can be difficult to assess if a persona is a representative sample of a user population because they are not related to real user data (adapted from Budde, Stulp and Sancho-Pradel, 2008:2). Can be less effective if the user groups being designed for have diverse needs (adapted from Laurel, 2003:28). User research is needed to ensure *"...that the set of personas best reflects the true diversity evident in different market segments and across the whole customer base."* (Waller, Langdon and Clarkson *op.cit.*)

Table D.18 Advantages and disadvantages of using the persona method

2.18.1 Using personas with SCAN participants

Goodman, Clarkson and Langdon (*op.cit.)* state that personas are good for encouraging *"…empathy with the end users and provide in-depth insight into their needs and lives."* However, they may create problems when designing for SCAN users; for example, they do not allow the presentation of detailed disability information. Additionally, Carmichael, Newell and Morgan (*op.cit.)* state that *"…the diversity of older and disabled people limit the ability of personas and scenarios to produce more 'inclusive' designs."* Budde, Stulp and Sancho (*op.cit.*) also state that with some adaptations personas can prove a useful tool when designing for elderly and disabled people. Their adaptations to the standard creation process involve integrating group specific information throughout the creation process. First the behavioural variables are analysed with respect to physical and cognitive impairments and common age-related changes. This is based on data relating to the target group and on experience of medical experts. The outcome of the clustering process is then integrated into the persona development process by incorporating information at several steps in the traditional process (adapted from Budde, Stulp and Sancho-Pradel *op.cit.*).

The authors comment that using this approach provides personas that:

- Reflect real data
- Comprise the specific user needs and goals
- Are understood by all experts in the development team

(adapted from Budde, Stulp and Sancho-Prudel *ibid.* pp 4)

Personas have advantages and limitations, the biggest disadvantage when designing for SCAN users is the diversity of old and disabled people limit the ability of personas to produce inclusive designs.

However, the biggest advantage is that because they replace the construct of an abstract user with that of a specific person they can be an effective tool for both engaging designers and may encourage them to empathise (Newell *et al*. *op.cit.).*

2.19 Capability simulators

According to Tzekakis *(op.cit.)* capability simulators were first developed in the 1980's and the first simulators involved a group of architects wearing spectacles while they carried out various tasks. The Inclusive Design Toolkit (2007) defined physical capability simulators as devices that can be worn (either alone or in combination to simulate desired effects) for example, impaired movement or vision. Alternatively, software simulators can be used to modify an audio or visual clip *"…so that someone who is fully able perceives the information as though he or she has a capability loss.*" (Inclusive Design Toolkit *ibid*.) They can help designers to *"…develop skills, gain knowledge or change their attitude about that reality."* (Duke 1986; Hertel and Millis, 2002)

Their underlying goal according to Tzekakis (*op.cit.*) is to;

> *"Illustrate how everyday products often disregard a large number of users because of the lack of consideration for their capabilities throughout the design process."*

They are often developed in the form of toolkits which allow designers *"…to choose the type and level of capability they wish to simulate."* (adapted from Cardosa and Clarkson, 2006)

Capability simulators	
Advantages	**Disadvantages**
Can provide an interactive and exciting way to *"…understand how ability loss affects real-world tasks."* (Waller, Langdon and Clarkson *op.cit.*) Can help designers experience the *"…frustration and difficulty that may be associated with ability loss."* (*ibid.* pp 22) Can help a designer to *"...evaluate alternative products with simulated ability loss."* (*ibid.* pp 22) Because of the cost, speed and ease of access they can be used early and repeatedly throughout the design process (adapted from *ibid.* pp 22). Can reproduce the effects of different types of motor and sensory impairments (adapted from Inclusive Design Toolkit *op.cit.*). "*Simple simulators can be created from everyday products." (ibid.)* Can help designers to empathise with users (adapted from Goodman *et al*. *op. cit.* and Inclusive Design Toolkit *op.cit.).* Can help designers to gain an understanding of capability loss (adapted from Goodman *et al*. *op.cit.*). Is a quick and cheap method (adapted from Inclusive Design Toolkit *op.cit.*). Can easily be worn or viewed (adapted from Tzekakis *op.cit.*).	No simulator can ever really model what it is like to live with a particular capability reduction on an everyday basis (adapted from Inclusive Design Toolkit *op.cit.*). Some aspects of capability loss cannot be effectively reproduced by simulation (adapted from *ibid.).* Some people develop coping strategies in order to cope with capability loss; it is unlikely that such strategies can be accounted for when using a simulator (adapted from *ibid.*). Only certain type of capability loss can be effectively simulated, for example suitable and realistic methods of simulating cognitive impairments are yet to be found (adapted from Goodman *et al*. *op.cit.*). They cannot simulate social and interactional problems (adapted from Reed and Monk n.d.). Do not suggest ways of overcoming these (adapted from *ibid.*). May be unsuitable in paradigms of disability studies (adapted from Burgstahler and Doe *op.cit.*). "*There is a risk of long-lasting unintended negative results."* (*ibid.* pp 3). Simulations that are created poorly can create attitudinal shifts, misunderstandings about disability experiences and an increase in anxiety (adapted from *ibid.* pp 10).

Capability simulators	
Advantages	**Disadvantages**
Can allow a designer to assess the accessibility and usability of a product or service from the perspective of a person with the capability loss (adapted from *ibid.* pp 1). Stimulate interest in a topic and increase the desire to learn more (adapted from Brendemeier and Greenblat, 1981). Well designed simulations can reduce potential negative consequences whilst ensuring that participants explore reasonable adjustments in addition to the design of environments that are accessible to all (adapted from Burgstahler and Doe *op.cit.*). Can be engaging (adapted from *ibid.* pp 2). Can identify design aspects that could cause difficulty and thus aim to eradicate them (adapted from Coleman *et al*. 2006). Can help to change a person's perspective, increase self-awareness and tolerance of ambiguity (adapted from Burgstahler and Doe *op.cit.*). Can provoke discussions regarding disability and from these social reactions may result (adapted from Kiger, 1992).	May not always show the true representations of a given reality (adapted from *ibid.* pp 5). Focusing on the disability of a person *"…does not point to the way the design of the environment discriminates against people with a wide range of differences."* (Donaldson, 1980, Siperstein & Bak, 1980). Can help reinforce the Medical model of disability (adapted from Burgstahler and Doe, 2004:5 and Pfeiffer, 1989:53). Because they focus on physical impairments, many do not consider that political and social structures can also be a cause of disability (adapted from Scullion, 1996:501). May accidentally reinforce negative behaviours (adapted from Bruschke, Gartner & Sieter,1993). *"No simulation can ever truly model what it is like to live on an everyday basis with a particular capability reduction."* (Waller, Langdon and Clarkson *op.cit.*).

Capability simulators	
Advantages	**Disadvantages**
If they are conducted well it can allow participants to identify stereotypes and myths they may hold thus increasing their basic knowledge of disability therefore they can form realistic perspectives on how society views it (adapted from Pfeiffer, 1989).	

Table D.19 Advantages and disadvantages of using capability simulators

2.19.1 Examples of successful design with capability loss simulators

When the Ford Focus was designed, its designers were encouraged to consider both its younger target market and the needs of older drivers, from this exercise, Ford developed the 'Third Age Suit' (see figure D.2 below). It was designed to add the equivalent of thirty years of age to the wearer and to enable the designers to empathise with older users by allowing them to experience some of the difficulties faced by such drivers. As a result, the Ford Focus offers many features that cater for the needs of the older driver such as wider front doors. Not only do these features make it easier for older drivers but they also increase the cars usability for mothers with young children. Furthermore, the car also appeals to younger drivers (adapted from Keates and Clarkson *op.cit.).*

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Figure D.2 Ford Third Age Suit

Another example of a capability simulator is Mobilistrictor, this is a full body suit that when worn gives an appreciation of the loss of mobility and sensory acuity (see figure D.3 below). The suit provides an immediate appreciation at a very personal level of the issues, both physical and psychological relating to reduced mobility and sensory acuity (adapted from Understanding the suit: Mobilistrictor, 2008). The wearing of the suit enables somebody to empathise and gives insight into how a person with a restricted mobility may tackle life and overcome its challenges.

Figure D.3 Mobilistrictor

The AGE EXPLORER ^{TM} is another example of a capability loss simulator (see figure D.4 below).

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Figure D.4 Age Explorer Suit by Blum

This is a full body suit that is designed to mimic the effects of aging and decreasing mobility. The suit is used in kitchen design by Blum. It *"…consists of different components that simulate physical changes and limitations"* (The Age Explorer: about Blum, 2008). The aim of the suit is to provide wearers with first hand simulated experience of the limitations encountered by those with physical impairments and thus help kitchen designers to develop products that will continue to provide ergonomic advantage throughout a person's life (adapted from The Age Explorer: about Blum *ibid.*).

In conclusion, if capability simulations and simulators are well designed they can allow designers to experience both physical and social aspects associated with aging and disability. They may also help designers to design for the old thereby including the young (adapted from Isaacs n.d.). According to Sinclair (2006) the future market will be mainly composed *"...of older people for whom new product development must cater."*

However, to ensure their success in the design process they must mimic disabilities' physical aspects and be followed up by detailed debriefing sessions which allow the participant to explore both how and why they felt like they did. This debrief should provide an insight into the social constraints of the disability being simulated. Furthermore, it is important to note that not all social aspects of disabilities can be effectively simulated, for example, chronic pain or coping strategies.

Burgstahler and Doe (*op.cit.*) state that;

> *"Appropriate use of simulations and other exercises can demonstrate the relationships between the environment and individuals with a variety of characteristics, and can show how ... [inclusive] ...design and appropriate accommodations can enable and empower people with disabilities."*

Given this, it is reasonable to suggest that the use of simulations and simulators may be enhanced when combined with other methods such as disability information and role play.

Finally, it is important to understand that a simulation is only as good as the person who facilitates or designs it and that the success of this method is dependent on the skill and expertise of the facilitator. It may also prove advantageous to involve people with disabilities in simulations as advisors or facilitators (adapted from Burgstahler and Doe *op.cit.*).

2.20 Role play

Role play as defined by the Design Council (2006) is physically acting out what happens when users interact with products or services. According to Burns (n.d.a) the technique of role play has been developed to help designers to grapple with the conceptual design stage for technology products in highly active usage scenarios. Additionally, he also states it builds on principles of empathic design techniques where its aim is to place the design activity within re-enacted user scenarios for the environments and artifacts being designed.

Furthermore, Blatner and Blatner (1997) contend that it *"…is a natural vehicle of learning because it's an extension of the imaginative, pretend play of childhood…*" thus this technique can help designers to imagine and empathise with how users may feel when interacting with their product or service and as a result that can inform design decisions.

Role play	
Advantages	**Disadvantages**
Can make the process of design fun and exciting (adapted from Simsarian, 2003:1012). Can complement traditional design techniques (adapted from Simsarian *ibid.* pp 1012). Provides an opportunity to explore possibilities that may not be available in the real world (adapted from *ibid.* pp 1012). Can be used throughout the design process (adapted from Inclusive Design Toolkit *op.cit.* and Simsarian *op.cit.* pp 1012).	Only effective when the activity is properly debriefed and effective feedback is given (adapted from The Training World n.d.). May create discomfort and anxiety (adapted from The Training World *ibid.*). If used in a large group setting this can lead to extreme compromise between participants thus meaning that learning does not occur or is interfered with (adapted from *ibid.*). Not all situations can be effectively simulated (adapted from *go2itech.org).* Can be time consuming (adapted from *ibid.).*

Role play	
Advantages	**Disadvantages**
Allows designers to simulate situations physically thus it may contribute to designers understanding and empathy with real users (adapted from *ibid.* pp 1012). Allows participants to keep focused on the activities at hand (adapted from *ibid.* pp 1012). Allows participants to build a deep understanding of the situation (adapted from Simsarian *ibid.* pp 1012). Can help communicate design intentions (adapted by Burns a *op.cit.*). Can help imagine new design approaches (adapted from *ibid.* pp 6). Can be used to explore design concepts with users in the early stages of projects (adapted from Svanaes and Selend, 2004:479). Requires very little training due to the fact that it is an extension of the basic play we learn when we are children (adapted from *ibid.* pp 479). Can help prompt more intuitive responses to design problems and refine the responses (adapted from Design Council *op. cit.).* Useful for simulating expected reactions between users (adapted from *ibid.*). An effective tool for teaching designers the interpersonal skill of empathy (adapted from Blatner *op.cit.*).	Requires participants to be mature and willing to take part (adapted from *ibid.).* Experience of the method is required (adapted from *go2itech.org op.cit.).* If the facilitator is inexperienced, the role play may lose its educational value (adapted by Van Ments, 1999:15). A variety of resources such as space and special items may be required (adapted by *ibid.* pp 16). It may simplify life which in turn may mislead (adapted from *ibid*. pp 16). The educational value of the role play can depend on what designers already know i.e., if they are not well informed about a user group there is little value in asking them to participate (adapted from *ibid.* pp 16).

Role play	
Advantages	**Disadvantages**
Can *"…enable the individual to know what it is like to be in situations which are beyond [their] realm of experience."* (Clore and McMillan, 1971:15) Can verbally sketch their experiences quickly and easily (adapted from Buxton, 2007).	

Table D.20 Advantages and disadvantages of using role-play

2.20.1 Using role play to simulate disability

Clore and McMillan (1971) utilised this method in a study which required participants to take on the role of a wheelchair user on a university campus. They found that it changed the participants' attitudes towards both disabled people and issues affecting them. Additionally, the experience appears to be capable of producing significant and lasting changes in one's perception of other people and their different life circumstances.

The results also indicated that this *"…led to more positive responses …(1) to a specific disabled person; (2) to a series of issues concerning disabled students in general.*"

Furthermore, the responses of participants who said they felt weak, bad, anxious, and empathic provide evidence to support these conclusions.

Iacucci, Kuutti and Ranta (2000:193) developed two variations of the role play method, one of which is a role playing game with toys, and the other SPES (Situated and Participative Enactment of Scenarios).

The authors contend that the games helped players (users, experts and designers) *"…to envision and act out new product concepts."* Furthermore the way in which the games are developed helps them to consider the three key aspects of mobile device and service development.

> SPES "*includes following the users in their normal life and providing them with very simple mock-ups of future devices, the users use the mock-ups to envision ideas of services and product features acting out use scenarios as interesting situations arise."* (*ibid.* pp 198)

SPES aims to:

- Take into account real life circumstances.
- Help the users articulate their point of view.
- Contribute with creative ideas.
- Talk with users about scenarios in their natural settings.
- Allow users to act out their ideas as opposed to having a discussion or formulating a storyboard.

(adapted from *ibid.* pp 198)

The conclusions of this work state the following:

- The techniques allow for co-discovery or co-development of device and service features.

- The methods are not limited to one specific domain and because of this they allow for the exploration of such issues as lifestyle and culture.

- The two methods provide a platform that enable designers and users to discover use scenarios that take into account the mobility and situatedness of human action.

Whilst this work does not examine using role play with SCAN participants it does offer some interesting conclusions that may be helpful to designers when trying to understand the needs of SCAN participants, for example, this technique allows the co-discovery and co-development of features, something in which is to be encouraged when working with those that have SCAN.

Another variation of the role play method is to use "*scenario based drama"* (Faulkes *et al*. 2003:1) in order to gather user requirements (whilst this research does not focus on gathering user requirements, role play may be an effective tool for designers to develop empathy with user groups they are designing for). Role play in this context can either take the form of live theatre, or video based scenarios. Three studies: Faulkes *et al*. (*ibid.* pp 1), Newell *et al*. (*op.cit.*), and Faulkes *et al*. (2005) evaluated the use of scenario based drama when eliciting user requirements from elderly people for a fall detection system.

According to the authors of these studies the major strengths of these methods are:

- They provide a highly accessible way for users and designers to discuss design within the context of the problem.
- Focus discussion on specific scenarios in which the system may be deployed.
- Can allow users to imagine themselves in the scenarios acted out; this can lead to discussion of relevant details that may inform the design and evaluation process.
- Participants found it both interesting and enjoyable; this ensured that the requirements of users were explored early in the design cycle.
- This ensured a creative approach to design.
- It has been shown to be an effective mechanism that enables users to focus on aspects of system usage before important design decisions are made.

These methods would appear to be highly flexible, versatile and engaging. It has the potential to engage users with SCAN in design and evaluation processes in an engaging, enjoyable and interesting way (adapted from Faulkes *op.cit.*). Nevertheless it would need to be tested with such users. However, based on the study examined it is clear the method has potential.

Role play appears to be a fun and engaging way to allow both users and designers to contribute to design and evaluation processes in a formal but none threatening manner. When combined with other methods, for example, capability loss simulators, it also allows a designer to develop the empathy they will require in order to design effectively for SCAN users. However, the role play should be properly facilitated and where appropriate, debriefed to ensure that the required learning experience has taken place.

2.21 Task analysis

According to Kirwin and Ainsworth (1992) task analysis can be defined as the study of what a user is required to do in terms of actions and/or cognitive processes in order to complete an activity, for example, system login (adapted from *ibid.* pp 1).

Task analysis consists of a range of techniques used by ergonomists and designers *"…to describe and in some cases evaluate the human machine and human-human interactions in systems."* (adapted from *ibid.* pp 1)

Task analysis can be performed using a variety of methods such as GOMS (Goals, Operators, Methods and Selection rules) and EPIC (Executive Process Interactive Control). The choice of method is dictated by what the designer or evaluator needs to investigate, for example, if information is required relating to key stoke interactions, GOMS may be used (adapted from *ibid.* pp 4).

However, all forms of task analysis *"…are concerned with the description and representation of tasks or activities.*" (adapted from Userfit tool task analysis n.d. 19-20)

According to Crystal and Ellington (2004:1) modern day task analysis has its roots in the work of Taylor (1911) who developed standards for the time required to complete a particular task. Initially this work did not include human factors and limitations involved in the performance of the task. However he quickly realised the importance of such factors and their impact following his initial work (adapted from Crystal and Ellington *ibid.* pp 1).

Further studies that influenced the development of modern day task analysis include the Hawthorne studies (between 1927 and 1932) and Hertzberg (1966). Both of these studies found that social aspects such as an individuals' work motivation, attitudes and values all contributed to how people carried out their jobs and what they expected to gain from them. Given the above, it is only sensible to conclude that such factors should be included in a task analysis to obtain a clearer understanding of what is being observed.

Additionally, according to Userfit (*op.cit.*) there are two processes that occur. The first is to gain some understanding of sequence or dependency between activities and the second is to represent how those activities or tasks fit together to accomplish goals (adapted from Userfit tools task analysis *ibid.* pp 20).

Task analysis	
Advantages	**Disadvantages**
Can help designers to understand the difficulties faced by users (adapted from Userfit tools task analysis *op.cit.*). Helps in the design of products as it may predict how people utilise them (adapted from *ibid.* pp 19). Can provide a vehicle for communication between developers, designers and end users (adapted from *ibid.* pp 19). Can assist in the development of training manuals for products as the structure that is implicit within an interface is more easily revealed when represented in this way (adapted from *ibid.* pp 19). Can be used to formulate evaluation strategies as it can help identify what tasks may be important to the user or tasks that are safety critical (adapted from *ibid.* pp 19-20). Provides a structured method for recording and analysing tasks (adapted from *ibid.* pp 20). Can help designers understand the wider contexts of the task (adapted from *ibid.* pp 21). Simple task analysis can be straight forward and can be quick and easy to conduct (adapted from *ibid.* pp 21). Can help designers understand user requirements (adapted from *ibid.* pp 31). Can be useful for describing activities/tasks performed by people (adapted from *ibid.* pp 20).	Can be a time consuming activity if conducted in detail (adapted from Userfit tool task analysis *op.cit.* pp 21). It is possible that a never ending cycle of analysis may occur where more and more detail is investigated (adapted from *ibid.* pp 21). Complex use of task analysis can be difficult and can require specialist expertise (adapted from *ibid.* pp 21). Some techniques in task analysis have unproven practical value (adapted from *ibid.* pp 31). Some of the more advanced techniques in task analysis can be difficult to learn and understand (adapted from *ibid.* pp 31). If the task analysis becomes laborious motivation can be an issue (adapted from Gatewood, Field and Barrick, 2008:280). If task analysis is not applied to the task as a whole its effectiveness is reduced (adapted from Userfit tool task analysis *op.cit.).* Is not well suited to simple or open ended tasks due to its formal nature (adapted from Maguire and Bevan *op.cit.*).

Task analysis	
Advantages	**Disadvantages**
Defines and models tasks in such a way that user needs are easily recognised (adapted from Maguire and Bevan, 2002:10).	

Table D.21 Advantages and disadvantages of the task analysis method

2.21.1 Using task analysis when designing for SCAN users

Given the definition of task analysis by Kirwin and Ainsworth (*op.cit.*) it is reasonable to conclude that this method may prove to be an extremely useful tool when designing or re-designing interfaces of systems for SCAN users. The justification for this conclusion is that according to Kirwin and Ainsworth's definition, it involves the study of actions or cognitive processes in order to complete an activity. It is through the study of these that the shortcomings of a systems design may be identified. This knowledge may prove highly valuable when making design decisions because it can give developers an insight into the difficulties faced by SCAN users.

One note of caution, however, is that the method is only able to identify issues that occur. It is less effective at clearly explaining why these issues have occurred. This may be a crucial aspect of understanding why a user has a particular problem and thus it may be more effective when combined with other methods, such as interviews. This will enable developers and designers to obtain further understanding of why a problem is occurring.

2.22 Immersive experience

According to Tzekakis (*op.cit.*) immersive experience can be defined as a person completely engaging with and being absorbed by a situation, for example, a designer may choose to become a user for an extended period of time *"…requiring wardrobe, prosthetics and any additional means to achieve total likeness."* (Tzekakis *ibid.* pp 1)

The method was used with great effect by Patricia Moore who spent three years (1979-1982) experiencing life from the perspective of an elderly women. To achieve this *"…she not only dressed as an old woman, she also restricted her joints, her hearing, her vision and so on."* (adapted from Clarkson, Coleman, Keates and Lebbon, 2003:20) Her work shaped her thinking about design and influenced the growing universal design movement in America. Moore's work was valuable because it was developed over an extended period of time.

Immersive experience	
Advantages	**Disadvantages**
Favourable for learning and the development of insights and empathy (adapted from Jackson, 2008). Can allow the experience of physical and mental aspects of a user's situation such as emotional and social implications (adapted from Burns *op. cit.*). May provide deep and direct information not obtainable by other methods such as observational research (adapted from *ibid.* pp 18). Can be highly valuable where such factors as attitudes and quality of life are considered crucial to the effective design of a product (adapted from *ibid.* pp 18).	Total immersion is rarely feasible as it can be a time consuming approach (adapted from Clarkson, Coleman, Keates and Lebbon *op.cit.*). Can be inflexible and slow to give insight into a user's situation (adapted from *ibid.* pp 483). It can lead to the immersed person having to deal with situations and emotions for which they are not prepared (adapted from Westbrook, 2010).

Immersive experience	
Advantages	**Disadvantages**
Can enable designers to examine issues from a user's perspective (adapted from Clarkson, Coleman, Keates and Lebbon *op.cit.*). Effective for increasing designers' empathy with users (adapted from Tzekakis *op.cit.*).	

Table D.22 Advantages and disadvantages of the immersive experience method

2.23 Technology biographies

Technology biographies are a combination of various elements:

1) Technology Tours (Baillie and Benyon, 2001), where participants show the researcher around their home and answer questions about their use of technology.

2) Last Time questions which were adapted from the critical incident method (Flanagan, 1954), these can elicit patterns, routines and disruptions (adapted from Blythe, Monk and Park, 2002:658).

3) Personal History interviews focusing on technology and routines that participants remember from the past (adapted from Blythe, Monk, and Park *ibid.* pp 658).

4) Guided Speculation on possible future developments- what are the participant's hopes and fears for the future (adapted from *ibid.* pp 658).

5) Cultural probes (Gaver *et al*. 1999) these are adapted to elicit Three Wishes for products. This aspect of the technology biography can be particularly useful and should ideally be completed when a participant encounters a problem with a product they are currently using (adapted from *ibid.* pp 658 and Burrows, Mitchell and Nicolle, n.d.).

They were originally used to develop *"…assistive technologies for user groups with varying support needs…"* (Blythe *et al*. 2003)

Their aim is to *"... produce a close reading of everyday objects and situations. It identifies: past development and historical trends of importance to the participants; current uses of domestic technology; concerns, problems and, by implication and elicitation, desirable future developments."* (Blythe, Monk and Park *op.cit.*)

Technology biographies	
Advantages	**Disadvantages**
"...combines and adapts a number of qualitative data collection techniques to focus on past, present and possible future domestic technologies." (Blythe, Monk and Park *op.cit.*). *"Processes concerns and problems of domestic life are identified in order to develop illustrative product suggestions to inspire or provoke designers."* (*ibid.* pp 658). Provide*"...rich and interesting..."* data. (Blythe, Monk and Park *ibid.* pp 658,) Can give *"...valuable design insights..."* (Blythe, Monk and Park *ibid.*)	Focuses on understanding older adults' experience of interactive consumer products rather than developing technological solutions (adapted by Burrows, Mitchell and Nicolle *op.cit.*). Some elements of the technology biography, for example, the Technology Tour may not be suitable for those with mobility difficulties (adapted from *ibid.*) Is intrusive by nature therefore sufficient trust needs to be established between the researcher and the participant beforehand (adapted from *ibid.*).

Technology biographies	
Advantages	**Disadvantages**
"...may prove a useful part of the researcher's methodological repertoire." (Blythe *et.al op.cit.*) Generates "*...critical and creative responses..."* (*ibid.)* Can be tailored to elicit relevant data according to the purpose of the study (adapted from *ibid.*). Provides an *"...engaging way of opening up a dialogue..."* (Burrows, Mitchell and Nicolle *op.cit.*). Can provide a means or researching user groups that are difficult to reach using conventional methods (adapted from *ibid.*). An effective way of eliciting information (adapted from *ibid.*). Encourages participants to reflect on both positive and negative aspects of technology (adapted from *ibid.*). Can establish a rapport between the researcher and participant because of the informal nature of conversation used thus putting the participant at ease (adapted from (*ibid.*). May provide rich contexts for the design of new products (adapted from *ibid.*). May help stimulate additional research on older adults (adapted from *ibid.*). Can allow the building of semi-factual narratives from which design proposals can emerge (adapted from Blythe *et al. op.cit.*).	Provides a clear focus on what technology enables people to do rather than the product itself (adapted from *ibid.*). Offers fragmentary glimpses into peoples' lives (adapted from Blythe *et al. op.cit.*) The Critical Incident technique used as part of the technology biography lacks *"…strong theoretical underpinning…"* (Hughes, Lip, Lloyd and Willimason, 2007:11) The Critical Incident method which is part of the technology biography uses binary responses, for example, effective/not effective, this is not always appropriate for describing human feelings and emotion (adapted from *ibid.* pp 11). Analysis of data gathered from technology biographies is *"…painstaking and time consuming…"* (*ibid.* pp 11) Critical incident technique is sometimes challenged (adapted from Chell 1998 and Kain, 2004:11). Only focuses on critical incidents (adapted from Usability Body of Knowledge, 2012). Critical Incident technique can be poor if used as a tool for task analysis (adapted from *ibid.).* Relies on the memory of a participant which may be distorted or non-existent if the data is collected sometime after the incident (adapted from *ibid.*).

Technology biographies	
Advantages	**Disadvantages**
Can convey a user's emotional, social and psychological habits, this can be difficult to research by conventional methods (adapted from *ibid.*).	Can be difficult to analyse the data gathered (adapted from Baillie and Beyon *op.cit.*).

Table D.23 Advantages and disadvantages of using technology biographies

2.23.1 Using technology biographies with SCAN participants

Blythe *et al*. (*op.cit.*) conducted a study which had the aim of developing

> *"...'enabling' or 'assistive' technologies for user groups with different support needs in a variety of care settings where research suggests technology may enable differently-abled people to lead a better quality of life."* (Dewsbury, 2001, Dewsbury and Edge, 2001)

When using this method there is a need to be sensitive to the feelings of the participants thus being sympathetic and sensitive to their needs (adapted from Blythe *et al. op.cit.*).

The authors found that technology biographies help to achieve this as they *"...offer fragmentary glimpses into the rich texture of people's home lives..."* and allowed them to *"...build semi-factual narratives, from which design proposals..."* can emerge (Blythe *et al. op.cit.*) Furthermore, they also found that they can be particularly useful as a means of reaching users that are difficult to research by any other means. This is because they provide an interesting and engaging way of eliciting information about participants' *"...emotional, psychological and social habits."* (*ibid.* pp 5*)* These insights can be particularly useful when working with SCAN users as an understanding of the difficulties they face can help designers.

Blythe *et al.* (*ibid.* pp 2) comments that using technology biographies allowed them to look at the "... *'thick descriptions' generated by varieties of ethnographic techniques and the emphasis on understanding a social setting as a precursor to design."* This is crucial because they are made at home with the social organisation of the domestic environment (adapted from Sacks, 1995).

This method is particularly good at obtaining information on aspects of a user's daily routine. Thus the method can help designers to create interventions to support *"...everyday activities in various ways by impacting on timeliness, reliability, dependability, safety or security."* (Blythe *et al*. *op.cit.*) therefore this method could be one tool that designers could use to achieve a better understanding of them. In conclusion, technology biographies may help in the perceptual shift that is required to understand *"...the needs of...occupant(s) and reflect these needs within the overall design."* (Dewsbury *et al. op.cit.*)

Furthermore, technology biographies require the active participation of end users, and one of the major purposes is to support the understanding of care settings from the perspective of SCAN users themselves (adapted from Blythe *et al*. *op.cit.*).

Additionally, *"…as designers increasingly turn away from quantitative methods as stimuli for design towards research methods that bring them closer to people's aspirations and their lives as really lived, so user-oriented qualitative investigative techniques have increasingly been deployed*." (*ibid.*)

Technology biographies are an example of such methods.
Burrows, Mitchell and Nicolle (*op.cit.*) conducted a study using technology biographies with the aim of investigating what benefits older adults *"...expect to gain from the technological products they acquire and use..."* they found that in general, this was *"...an effective method of eliciting information as the participants were enthusiastic to share stories about the products they own."*

This method also helps participants to share both positive and negative feelings towards products because it encourages them to do this. It was also found that the tour element proved a useful way of gaining rapport between the user and the researcher because it enabled participants to feel that they were not being evaluated but rather showing a friend around the house.

Despite its many advantages one limitation of this method as stated by Burrows, Mitchell and Nicolle (*ibid.)* is that when it is employed with users that have mobility problems these users may not be able to conduct the tour. Additionally, this method is intrusive by nature therefore it is important to build sufficient trust between the researcher and the user. Despite these limitations, it was found that this method provided *"...a clear focus..."* on what *"... technology enables people to do rather than on the characteristics of the product itself..."* which may be important when designing for SCAN users as a major goal maybe to increase independence.

However, designers will need to communicate these benefits with SCAN users (adapted from *ibid.*) and careful consideration of the needs of the user group will have to be undertaken before the method is deployed weighing up its advantages and disadvantages and/or any necessary adaptations.
Burrows, Mitchell and Nicolle (n.d.) found that where this method was utilised to obtain a more empathic *"...insight into older people's use of technology…"* it allowed them to tailor it to the needs of the research. This maybe highly advantageous when working with SCAN users as many will have varying needs that will require highly adaptive methods in order for them to provide an effective input. The authors found many of the same advantages and disadvantages as stated by previous studies. It is therefore reasonable to conclude, based on the evidence seen that technology biographies go beyond traditional requirements gathering methods and are more focused on what may be termed, soft or social design requirements.

This is because the technology biography gathers information such as how a participant feels about a technology, what they do with it, what they like or dislike about it. Therefore, technology biographies may be a solution to filling a gap left by traditional design methods because of the lack of information that is concerned with how a product is used and perceived socially.

Therefore in conclusion, technology biographies have many benefits when working with SCAN users. However, the one major disadvantage is that users with a mobility difficulty may not be able to complete the tour. Additionally users with severe cognitive difficulties may not be able to access the method because it requires the building of a professional relationship with the researcher. Such factors will need to be considered before research involving users commences in any project.

3. Tacit knowledge and the argument for its value in design and evaluation processes

In this section, the importance of capturing tacit knowledge in the design and evaluation process will be discussed. This is vital because participants (users and designers) often possess useful knowledge that can assist in the design or evaluation of a solution. Tacit knowledge is a concept that was first introduced by Michael Polanyi (1966) in his book the *Tacit Dimension* (adapted from Wood 2005:3). However, much of a participants tacit knowledge is deeply internalised (adapted from *ibid.*) and because of this the participants may know more than they can articulate (adapted from Still 2007:108) therefore that it is not processed *"…in a focused cognitive manner but rather lies at a not quite conscious level where it is accessible through acting, judging or performing…*" referred to as the *'tacit dimension'* by Polanyi (*ibid.* pp 4) adapted from Higgs 2008:77). This means that tacit knowledge often consists of *"…habits and cultures that cannot be recognised easily in people."* (Polanyi, 1965:2)

Gourlay (*op.cit.)* states six uses of tacit knowledge:

1	Someone can perform a task but cannot articulate how it is done. This use of tacit knowledge could be quite common in a design or evaluation process in that a user may be able to propose a solution to a designer but may not be able to explain why it is needed. Another example is where a designer may be able to generate a solution but not be able to easily articulate the steps they took to arrive at it.
2	Someone has a feeling for which they cannot account. This use of tacit knowledge may be present in a design or evaluation process as a user may be shown a prototype design and may get positive or negative feelings towards it based on their intuition.
3	A person may be able to accomplish a task but not be able to explain how it is done. However, later, and if questioned, that person is able to give an account of how it was achieved. This use of tacit knowledge may be present in product evaluations where a designer may ask 'how did you perform a certain function in a piece of software?' The participant may reply 'I don't know' but later when asked may be able to give an account of how the task was completed.
4	Knowledge can exist before the situation in which it is effective. This is often due to a participant's life circumstance. This source of tacit knowledge could be extremely useful in a design and evaluation process, as it may help a participant advise designers regarding a solution based on previous experiences with similar artifacts.
5	Knowledge can exist before the situation in which it is effective due to cultural and social factors – see above.
6	A situation where a designer of a product, may have knowledge a fellow designer does not, even though they are designing the same product and follow the same practices. This source of knowledge may be useful in a design or evaluation process as designers may share tacit knowledge between them.

Table D.24 Outlines the uses of tacit knowledge and how they may be applied in a design process (adapted from Gourlay *ibid.*)

Tacit knowledge	
Advantages	**Disadvantages**
Can be easy to use (adapted from Rooney, Hearn and Ninan, 2005:1990). In terms of knowledge management, it is an easy approach and inexpensive process to begin (adapted from *ibid.* pp 199). The conversion of tacit knowledge into explicit knowledge can create an asset (adapted from *ibid.* pp 199). *"Powerful form of knowledge as it's drawn from experience."* (www.processrenewal.com n.d.) Sources of creative advantage (*ibid.*). Includes insights, feelings, culture and values (*ibid.*). Is required for confident human action (*ibid.*). Can help individuals deal with new situations (adapted from Gourlay *op.cit.*). "*Is unique and difficult to copy, imitate or substitute.*" (Gacitua *et al.* n.d:2) Can be seen as strategically important or offering a competitive advantage (adapted from Schweir, Campbell and Kenny n.d.). Can help with the understanding of new tasks and explicit knowledge (adapted from Goffin *et al.* 2010). Can be the source of innovation ideas (adapted from Nonaka 1991; Ichijo *et. al.* 1998: 180; Nonaka & Takeuchi 1995).	Can be difficult to capture, disseminate and articulate (adapted from Goffin *et al. op.cit.*). Its benefits may be limited (adapted from Rooney, Hearn and Ninan *op.cit.*). Individuals may not have the knowledge they claim to have (adapted from *ibid.* pp 199). Can be hard to share as it can only be shared indirectly (adapted from Goffin, Baxter, Vanderhover *op.cit.*). Can be challenging to formulate requirements or generate solutions (adapted from Gacitua *et al. op.cit.).* Requires close personal interaction and trust (adapted from *ibid.* pp 2). Is personal and contextual Gacitua *et al. ibid.* pp 2). Sometimes contain naïve and wrong theories (adapted from Herbig *et al.* 2001:688). Can be conservational rather than innovative (adapted from (Johannessen *et al.* 2001:11; Fleck 1996, Johannesen *et al.* 2001). Can be personal and context based (adapted from Torff 1999: 195; Fleck 1996 quoted in Johannessen *et al.* 2001: 4; Boiral 2002: 296; Spender 1996: 58; Nonaka & Takeuchi 1995, Wagner & Sternberg 1986; Wagner & Sternberg 1991).

Tacit knowledge	
Advantages	**Disadvantages**
Can *"…encompasses expertise, intuitive understanding, and professional insight formed as a result of experience."* (Woo *op.cit.*) "*Can be a source of highly effective performance in the workplace.*" (*ibid.* pp 15) Can be a *"…significant and advantageous part of the knowledge base of both individuals and organisations.*"(Murray and Hanlon, 2010:2) Can assist organisations with change (adapted from Madhavan and Grover, 1998). Can help an organisation improve knowledge creation, innovation and product development capacities (adapted from *ibid.*). May improve a company's decision making abilities (adapted from Murray, 2007). May be beneficial to a company's training and development of staff (adapted from Muscatello, 2003).	Difficult to know what constitutes tacit knowledge as the term can have many different meanings (adapted from Ambrosini & Bowman 2001:811; Leonard & Sensiper,1998:127; Spender, 1996:58). Peoples' understanding of tacit knowledge is still developing (adapted from *ibid*.). *"Not always readily apparent."* (Woo *op.cit.*). Due to its implicit nature it is often shared using strategies such as a face-to- face meeting, demonstration or learning by doing thus requiring the physical presence of knowledge holders (adapted from *ibid.* pp 3). *"Converting tacit knowledge to explicit is often time consuming and problematic."* (Herschel *et al*. 2001) Often becomes static when it is made explicit through language and thus knowledge sharing is more often than not limited to locating experts and encouraging them to share it (adapted from Sveiby,1997). May not be readily explained by explicit reasoning (adapted from Rust, 2004). Some tacit knowledge when made explicit may change in meaning (adapted from Gerard, n.d.). May be highly ambiguous (adapted from Murray and Hanlon *op.cit.*).

Table D.25 Advantages and disadvantages of tacit knowledge

In conclusion, the researcher believes tacit knowledge is of value in the design process because as stated by Gerard (*ibid.* pp 4) *"…whatever we may know about a certain subject explicitly, discovery must pull upon that which we know …tacitly*." Further evidence to support this conclusion is that *"…unspecified or tacit knowledge underlies and logically precedes explicit knowledge."* (*ibid.* pp 4) Additionally, Glasby and Beresford (2006:282) contend that the lived experience of service users/carers and the practice wisdom of practitioners can be just as valid a way of understanding the world as formal research (adapted from Glasby and Beresford *ibid.* pp 282).

It can be extremely valuable when working with SCAN participants, this view is supported by Luck (2003:530) who remarks that; when an individual shares their personal perceptions, which are based on their experience this can give the designer insight into the factors that influence a disabled person's experience, of their physical environment and life circumstances (adapted from *ibid.* pp 530).

It would appear from the literature reviewed that it is both a useful and powerful tool that when properly extracted and utilised may greatly assist designers in design and evaluation processes as the tacit knowledge of a SCAN user may provide real insight to the barriers they face and how best to design a solution that meets the needs of a defined user group.

However, it is difficult for users to both communicate and articulate this knowledge, meaning that its extraction will have to be achieved with the upmost care to ensure what is gained is both valid and useful.

4. Conclusion

This appendix has outlined some of the many and varied methods that can be utilised in order to understand and gather both user requirements and feedback. Particular attention has been paid to the usefulness of the methods for gathering user needs and feedback when working with SCAN participants. It is therefore hoped that the information gathered in this appendix will be of use to designers in their work with this user group. Where possible, references and supporting literature have been examined that deal with the use of particular methods when working with such participants.

Appendix E: Terms used throughout the thesis

1. Introduction

The following terms and definitions are used throughout the thesis unless otherwise stated. The terms used have been adapted or created for this thesis and hence may not be the same in other contexts.

2. Terms

AT:	Assistive Technology Is *"...an umbrella term for any device or system that allows an individual to perform a task that they would otherwise be unable to do or increases the ease and safety with which the task can be performed."* (Cowan and Turner-Smith, 1999)
BPS:	British Psychological Society
BSI:	British Standards Institution
CAOT	Canadian Association of Occupational Therapists
CCG:	Clinical Commissioning Group
CD-ROM:	Compact Disk. Read-Only Optical Memory Device
Cf:	Confer
Ch:	Chapter
CITD:	Centre for Technology and Inclusive Design

CP:	Cerebral Palsy
CSAD:	Coventry University: Coventry School of Art and Design
D4D:	Devices for Dignity Healthcare Technology Co-operative
DBS:	Disclosure and Barring Service
DDA:	Disability Discrimination Act
DVD:	Digital Versatile Disk
E-book:	Electronic Book
EPIC:	Executive Process Interactive Control.
et al.:	*"If there are more than three authors use 'et al.' is used which is short for 'et alii' meaning 'and or others' in Latin*"(Deane, 2006)
GOMS:	Goals, Operators, Methods and Selection Rules
GTAP:	Gestural Think Aloud Protocol'
HAS:	Home Automation System
HCI:	Human-centred Interaction/ Human-centred Interaction Design

HDIT: Coventry University: Health Design and Technology Institute

***ibid.*:** This is an abbreviation of the Latin term 'ibidem', which means 'in the same place'. The term 'ibid.' is used in some referencing systems to indicate that information is repeated in a reference. (Deane *ibid.* pp 32)

ID: Industrial Design

Inclusive design: The design of products and services to ensure they meet the requirements of the widest possible population (adapted from Keates and Clarkson, 2003). In order to do this, designers and manufacturers of goods and services must ensure that all stages of the process (conceptualisation, development and manufacturing) are completed in such a way that the product or service is usable by as many people as possible (the product should work for any person irrespective of age or ability) (adapted from IET 2006, adapted from Rosen, 2007:16) and as such should take into account *"...aging-in-place, passing injuries, fluctuating health, and functioning and permanent impairments*."(Sandler, 2010) The architect "*Ron Mace is credited with originating the concept of...[inclusive design]... in the last half of the 20th century."* (Bjork, 2009:118., adapted from Behar 1991, Center for Universal Design 1997a).

PAR: Participatory Action Research

Participant:	Is a person that takes part in a design or evaluation process in order to provide feedback (adapted from Farlex, 2011a).
PDF:	Portable Document Format
PIS:	Participant Infomation Sheet
ISO:	International Standards Organization
MSRTA:	Modified Stimulated Retrospective Think-Aloud
NASA:	National Aeronautics and Space Administration
N.D.:	Undated reference
NHS:	National Health Service
SCTA:	Synchronized Concurrent Think-Aloud
SENDA:	Special Educational Needs and Disability Act
Skype:	"*Software that enables the world's conversations. Millions of individuals and businesses use Skype to make free video and voice one-to-one and group calls, send instant messages and share files with other people on Skype. You can use Skype on whatever works best for you-on your mobile, computer or tablet."* (Skype, 2018)
SPES:	Situated and Participative Enactment of Scenarios

Tacit knowledge: Knowledge which is highly personal, hard to formalise and therefore difficult to communicate to others. It consists of elements including mental models, technical skills, beliefs and perspectives, these can be so ingrained that we take them for granted and cannot easily articulate them (adapted from Nonaka,1991:98).

In the context of this research, this could imply that a person has a unique method of giving informed consent, for example, and the method may have been in use for a long time so therefore it is deeply rooted.

It may consist of technical skills, mental models, beliefs and attitudes, and these may be so ingrained in the person's life that it may be taken for granted and they might not be able to easily articulate how it works.

TAP: Think Aloud Protocol

TRTA: Traditional Retrospective Think-Aloud

TLX: Task Load Index

Op.cit.*:** ***"*An abbreviation of the Latin term 'opere citato', which means 'in the work cited'. In some referencing systems, this is used after the author's name to refer again to the work previously cited."* (Deane *op.cit.*)

User-centred design:

Is a *"…design process that places the user at the centre of the design rather than the object to be designed."* (University of Minnesota Duluth: Information Technology Systems and Services, 2009).

UEM/UEMs: Usability Evaluation Methods/Usability Evaluation Methods

UK: United Kingdom

UPIAS: Union of the Physically Impaired against Segregation

US: United States/United States of America

USB: Universal Serial Bus

User/User group: Is a person (or a group) that makes use of an artifact (adapted from Farlex, 2011b).

Users with Specific, Critical, Additional Needs (SCAN):

Individuals that have specific critical needs (in relation to them and these needs have to be met in order to maintain their quality of life, (health, safety and wellbeing) but are additional to that of common everyday critical needs (needs we all have as human beings, for example, the need to sleep). An example of a Specific, Critical, Additional, Need, is that of a person who is unable to feed themselves and thus needs assistance to eat.

SCAN users may also operate in contexts very different from the norm and may have some or many of the following characteristics:

- Cannot see or may have difficulty seeing.
- Cannot hear or may have difficulty hearing.
- Cannot move or have difficulty moving.
- May have difficulty in processing some types of information easily or at all.
- May have difficulty reading or comprehending text.
- May not speak or understand spoken or written language (this list is not exhaustive) (adapted from Curran, Walters and Robinson, 2007:448).

The seven principles that underlie inclusive design are:

1) **Equitable use**-*"...the design is useful and marketable to people with a diverse range of abilities."* (Bjork *op.cit.*)

2) **Flexibility in use**-"*...the design accommodates a wide range of individual preferences and abilities..."* (*ibid.* pp 119)

3) **Simple and intuitive use**-*"...use of product or services is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level."* (*ibid.* pp 119)

4) **Perceptible information**-*"...the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities."* (*ibid.* pp 119)

5) **Tolerance for error**-*"...the design minimises hazards and the adverse consequences of accidental or unintended actions."* (*ibid.* pp 119)

6) **Low physical effort**-*"...the design can be used efficiently and comfortably and with a minimum of fatigue."* (*ibid.* pp 119)

7) **Size and space for approach and use**-*"...appropriate size and space is provided for approach, reach, manipulation, and use, regardless of user's body size posture or mobility."* (*ibid.* pp 119) (adapted from Centre for Universal Design 1997a *op.cit.,* Bjork *op.cit.*)

Also inclusive design is empowered by some important characteristics:

- *"Expands the focus of design from people with disabilities to a much broader population..."*

- *"Striving for new thinking in the development of initiatives and strategies for creating new solutions..."*

- *"Strives for full social participation for everybody over a whole life span through the creation of flexible products and environments with good usability..."* (Bjork *ibid.*)

In brief, inclusive design*"...attempts to provide maximum inclusion of all people."* (Swann, 2007:289) and should be seen as *"...a continuous process, producing tools that benefit both people with and without impairments."* (Swann *ibid.* pp 289)

According to Fletcher (2001) inclusive *"...design is a product of the simultaneous evolution of both social and legislative progress."* (Bjork *op.cit.*) This is where the origins of inclusive design began with the barrier free design movement at the Federal level in the 1950s (Wilkoff and Abed,1994), followed by the 1960's civil rights movement. *"The civil rights movement inspired the disability rights movement, generating new legislation in the 1970s, 80s, and 90s...*" (Story, Mueller and Mace n.d., Story,1998).

With the above in mind, it eliminates *"...discrimination and thus supports social participation for all members of society."* (Bjork *op.cit.*) As a result of this it focuses on aspects such as *"...aging, gender, cultural differences and sustainability*." (Bjork *ibid.* pp 118)

However, the key to inclusive design is to understand population diversity and the impact of design decisions on particular user groups (adapted from Clarkson 2007 and adapted from Waller, Langdon and Clarkson 2010:22) to enable this to be achieved *"...tools and processes are needed to...[facilitate] ...sufficient exploration of the user... [for example]...direct involvement with users..."* (Waller, Langdon and Clarkson *ibíd*. pp 20).

The approach of inclusive design is given many different terms around the world (Shea, 2003:712,Tsutanini,2005:47-53) for example, 'design for all' (Buhler and Stephanidis 2004, Bauer and Lane 2006:68.), 'lifespan design' (Universal Design and Lifespan Design 2009, Beran 2007:12) , 'barrier free design' (Herwig 2009) and 'transgenerational design' (Monaghan 2010:2, Bauer and Lane *op.cit.*). However, as stated by Sandler (*op.cit.*) *"...people often use words like accessible, adaptable, and universal design interchangeably...[but]...each term has a generally accepted definition or is defined by law or regulation."*

User sensitive inclusive design:

“The use of the term "inclusive" rather than "universal" reflects the view that "inclusivity" is a more achievable, and in many situations, appropriate goal than "universal design" or "design for all".”Sensitive" replaces "centred" to underline the extra levels of difficulty involved when the range of functionality and characteristics of the user groups can be so great that it is impossible in any meaningful way to produce a small representative sample of the user group, nor often to design a product which truly is accessible by all potential users.” (Newell and Gregor, 2000:42-43)

Appendix F: Insights shared by designers in relation to working with SCAN users

1. Introduction

The suggestion by designers is that a user's carer or spouse can be used as a design informant was also tested by questioning SCAN users about their preferences and experiences in this matter. One explanation as to why designers choose to utilise carers in this way, as stated by one of the participants from this study, is because it's *"…much more of a normal interaction… [as]…you invite people to talk to you…"* therefore the process is less complex than talking to SCAN users.

2. Insights shared by designers when working with SCAN users

The research indicates that designers do have challenges when working with SCAN users in the following areas:

2.1 The ethics of working with SCAN users

Ethics was raised by participants in all groups as they felt ethical issues could limit the level of testing that can be undertaken and thus reduced the amount of feedback they could gather. This is not dissimilar to the findings of Sandler (2010) who states that "...*we were constrained by federal regulations governing the way public institutions use humans in research studies."* It was also highlighted that designers see the area of ethics as one that is important because as stated by a participant *"...adequate ethical guidance for designers is pretty important really..."* this may indicate that such guidance is lacking when working with SCAN users. In addition, it was felt that any ethical guidance that is produced will need to be particularly targeted at new designers as they may not have the experience of their older colleagues.

It was also highlighted that it may not be appropriate to use certain methods such as observation in some circumstances, for example, when doing research with young children.

The need for ethical guidance is particularly acute within the private sector, as a participant highlighted: guidance in this area for private sector businesses is not available. This may be because *"...university researchers often have access to human subject populations (elders, people with disabilities) that manufacturers have difficulty reaching."* (Bauer and Lane *op.cit.*) therefore their knowledge of ethical issues in these areas may be greater than that of a designer working in the private sector.

> However *"...university researchers mistakenly assume that the end users are their customers. They are not. End-users are the intended beneficiaries, but the benefit is only packaged and delivered to them through manufacturers."* (Bauer and Lane *ibid.* pp 71)

Given the above statements, it may be advantageous for both manufacturers and university staff to create partnerships in order to share expertise and resources.

2.2 Use of intermediaries

It is clear from those that took part in the study that guidance is needed on the appropriate use of carers/support workers in the design or evaluation process. This is because 87% made use of some form of intermediary as well as or in place of the end user. This approach is recognised by Cogher (2005) but does have its disadvantages as outlined by Blow (2008).

In addition to the above, it was also highlighted that as a designer you should *"…be very aware…of the user and the carer, they all have different requirements…"* and in some cases, the requirements of the primary and secondary users i.e. the user and the carer *"…may well be areas that don't overlap and maybe even conflicting requirements…"* However, both the client and carer should be asked about their needs in relation to the product being designed because they can often notice *"…things that the person themselves don't notice…"* for example, where equipment might be stored.

This information may be important to know because:

1) It could present significant design challenges e.g. space available in the home and feelings about different spaces within homes.

2) It may help designers ensure that what is designed is able to meet the changing needs of a user and fit their existing environment (adapted from Axelrod *et al.* 2009).

To do this *"...it is vital that we gain an understanding of the different interests of individuals and configurations of the homes."* (adapted from Axelrod *et al. ibid.*). Both these issues with intermediaries could be resolved by providing a section in the guidelines that gives information on effectively working with intermediaries.

2.3 Engaging users

It is clear that the majority of designers questioned (73%) made use of methods that may not fully involve users i.e. those between rungs 1 and 4 of Arnstein's ladder, with a participant stating "...*I think …involvement of the user is poor ...but it's difficult..."*

Some of the reasons given for poor user involvement include:

"…*the type of products that [the designers]…work with…it can be difficult..."* From the evidence gathered in the study it appeared there may be a cultural difference because the majority of UK based designers (73%) used methods between rungs 1 and 4 on Arnstein's ladder whereas the 2 US designers used methods between rungs 4-7. Additionally, this difference could be explained by the type of products those questioned in the sample were designing.

The 27% who did use methods between rungs 4 and 7 tended to design bespoke solutions whereas the rest designed generic disability aids.

This issue could be addressed by ensuring that the guidelines include information on a wide variety of methods and explain the benefits of using methods that fully engage the user in the process i.e. those between rungs 4 and 7 of Arnstein's ladder.

2.4 Use of language

It was highlighted by a significant minority (27%) that designers need to be careful of the language they use when working with SCAN users because this can be problematic as stated by a participant "*…but if you then inadvertently, in a particular context start saying carers, instead of care giver, in some circles you'd be in trouble for that…but sometimes you won't."* Given this, it is advisable to check with your users before you start working with them how they see themselves e.g. disabled person, wheelchair user, deaf, hearing impaired, blind or sight impaired. The key to getting it right is to be considerate. These remarks are given credit by the findings of Sandler (*op.cit.*) who found that *"...only six residents responded "yes" to "do you have any functional limitations?" However, more responded "yes" when the functional limitations were more specific..."*

Furthermore, language is an important factor to consider because *"…you want to get the best interaction and you want people to be engaged…"*

2.5 Maintaining professional boundaries

It was stated by a significant minority (27%) that the giving of personal contact details is not advised as this may have unintended consequences, for example, users may believe because designers have solved some of their problems they may be able to solve all their problems.

Also, designers need to keep a professional distance when working with users so that they can see the whole picture. However, sometimes they may have to get more involved in order to see the real benefit of their work with that person but at the same time remembering to remain professional.

2.6 The nature of working with SCAN participants

It was highlighted by some in the sample that a problem when working with SCAN participants is that they may have health related difficulties which may make it difficult for them to partake in research, for example, if a member of the design team had a cold a user may not wish to be exposed to it, as a consequence the dropout rate may be higher.

It was also highlighted that another potential issue when working with SCAN participants is that some carers and parents will accept a persons' SCAN more readily than others. Additionally, parents or wider family with children or elderly people may not wish to accept the SCAN and/or the onset of old age.

2.7 Format

Participants felt that the final guidelines will need to contain predominantly visual material. Their reasons for this are because they felt that "...*designers don't use alpha numerical judgement. The metrics they use may be spatial and visual the majority of the time...*"

Six possible formats were suggested. Whilst the most popular format was a web based resource, there was not a significant majority that favoured a particular format. As a consequence, the guidelines may be produced in several different formats in order to be accessible to the widest possible population.

Appendix G: Format of guidelines

1. Introduction

This appendix examines possible formats for the guidelines. It outlines the advantages and disadvantages of these. It also discusses learning styles and how these might affect decisions in relation to formats. It concludes by offering some general conclusions in relation to the format of the guidelines based on the research undertaken and the literature reviewed.

As part of the focus group discussions, the designers were asked about their views on the format of the guidelines. In terms of general advice, the designers suggested they would like material which had a visual component. The advice provided by SCAN designers was more specific, including that such guidelines should be written:

- With great care in order to not simplify complex impairments and conditions. From the literature, it is noted that the selection of information by designers reinforces and creates their perception of the world (Powell and Newland, 1994:289).
- Containing information on different disabilities and their implication for SCAN users, with a designer commenting *"...I don't feel like I really have an understanding of what dementia means…"*

2. Formats discussed by designers

The designers mentioned seven possible ways in which the guidelines could be delivered. These are presented in order of their popularity and the reasons for their selection in table G.1.

Format	Rationale	Frequency
Website	A website was seen as having potentially the widest impact, as it can: Reach the largest number of designers. Be an efficient means of disseminating research. Include multimedia content (for example, PDF, MP3 and PowerPoint) with a balance of different media. Be linked to other resources. Be updated frequently. Be relatively easy to create and maintain. Be accessible and interactive. Encourage discussion and knowledge sharing. Be a widely used format. Be low cost. Be accessed by a worldwide audience.	13
Facebook or LinkedIn	Could provide a gateway to the guidelines as "…*what you're doing is highly searchable…and would really get your information out very, very quickly…"* Would reach a large population. May reduce the amount of time spent looking for relevant information	3

Format	Rationale	Frequency
PDF, PowerPoint or audio	Would be accessible to the widest possible population. Easy to share, and compact.	2
Booklet	Accessible. Inexpensive to produce. Be made available through a website. Could be suitable for those with a preference for a hard copy.	3
Workshops and academic courses	Useful to talk with and listen to somebody who has a disability. May help a designer feel engaged, involved and part of a design effort.	1
Exhibitions and tradeshows	Useful way of targeting the proposed audience.	1
DVD/video	Useful for a designer who cannot gain practical experience of working with an end user.	1
YouTube	Increasingly popular as an educational tool.	1

Table G.1 Format of guidelines

The advantages and disadvantages associated with each of these methods were explored in a further literature review, the results of which are summarised below:

2.1 Interactive websites

Interactive websites	
Advantages	**Disadvantages**
Can provide a medium through which people from all backgrounds can access information (Hargittai, 2003).	*"...inequalities in access to and use of the medium with lower levels of connectivity among women, racial and ethnic minorities, people with lower incomes, rural residents and less educated people … [the digital divide]* (Hargittai *op.cit.*).

Interactive websites	
Advantages	**Disadvantages**
Would allow users to get the most up-to-date information in relation to the guidelines (Heller-Ross, 2008).	No face-to-face contact available through a website, no opportunity to ask questions, share opinions (Kiang and Chi, 2001:159).
Proven to be a cost effective manner of presenting the guidelines (Peterson *et al.*1997).	Requires management to facilitate them and provide content as well as technical assistance.
Interactive and can provide information on demand (adapted from Peterson *et al*. *ibid.*).	Cost.
Provides a superior visual experience when compared with printed form (Peterson *et al*. *ibid.*).	Need to be computer literate.
Continuously available (Peterson *et al. ibid.).*	
Effective medium for accessing, organising and communicating information (Kiang and Chi 2001:158).	

Table G.2 illustrates some advantages and disadvantages of interactive websites

2.2 Workshops/Academic courses involving real users

Workshops/Academic courses	
Advantages	**Disadvantages**
Those attending are usually highly motivated (adapted from Stanford University Libraries, 1997).	Users may have a very different range of skills (computer and language) (Stanford University Libraries *ibid.*).
May lead to the development of innovation and tacit skills which could be especially useful when working with SCAN users (adapted from Barber 2004).	Effectiveness may depend on the way the training is delivered or the sort of task that is being trained (adapted from Aguinis and Kraiger *op.cit.*).
May improve planning, task co-ordination, problem solving and communication skills (adapted from Aguinis and Kraiger, 2009:456).	It may not be possible to deliver everything in one workshop, so there may be a need for multiple workshops to be held, increasing cost to participants.
Training workshops can contain a number of elements including continuing professional development activities, "…*team building, communications and breaking down*	The attendance rate often determines the success or failure of the training (adapted from Jie and Zhen, 2007:1).

Workshops/Academic courses	
Advantages	**Disadvantages**
barriers motivation and planning…" (EPICC n.d.)	
Training workshops can facilitate development of individuals (EPICC n.d. *ibid.*).	People may be critical of the academic theory taught and may dismiss it as irrelevant to the real world (Hackett, 2004:57).

Table G.3 illustrates some advantages and disadvantages of workshops/academic courses

2.3 Facebook/LinkedIn

Facebook/LinkedIn	
Advantages	**Disadvantages**
A Facebook page may allow the researcher to reach "*mass audiences"* (adapted by Bushelow 2012 and Facebook Newsroom 2012) as it has two billion users (Chaykowski, 2017).	Is not the most effective communication tool (adapted from Bushelow *op.cit.*).
LinkedIn is widely used by professionals in a variety of domains (adapted from Stein, 2009:2).	Requires on-going time and effort for up-keep (adapted from Stein *ibid.*).
Facebook can offer a broad source of information, providing information facilities for information exchange to make connections with professionals (Gafni and Deri, 2012:1).	Facebook can provide a variety of distractions such as uploading pictures, playing games (Gafni and Deri *op.cit.*).
Facebook would allow the researcher to create a central platform in relation to the guidelines; this would facilitate the sharing of related media (Gafni and Deri *ibid.*).	Facebook can be a distraction allowing the user to waste time and procrastinate (Vivian 2011, Ulusu 2010).
Facebook can also allow for activities such as getting assistance/sharing notes (Gafni and Deri *ibid.*)	Facebook can be addictive (Kuss-Griffiths 2011and Ulusu *op.cit.*).

Table G.4 illustrates some advantages and disadvantages of Facebook/LinkedIn

2.4 Booklet

Booklet	
Advantages	**Disadvantages**
May be a good medium for providing in-depth information. It may explain or expand on what is stated on a website (Heller-Ross *op.cit.*).	The information provided within a booklet may not always be the most up-to-date (Heller-Ross *ibid.*).
Can be reviewed and re-read (UWI: 2011).	Little room for participation (UWI *op.cit.*).
Can be good if providing instructional information (adapted from UWI *ibid.*).	Limited potential for feedback from audience (UWI *ibid.*).
Inexpensive to produce (UWI *ibid.*).	They may be disregarded as junk (McCarthy, 2004:77).
A cost-effective way of producing the guidelines (Cambridge City Council, 2013).	The production of paper needed to produce the leaflets has environmental costs (adapted from Judson n.d.) for example *"...the production of 1 tonne of 100% recycled paper is estimated to release 1.6 tonnes of greenhouse gases."* (Environmental Defence Paper Calculator)
	Design of the guidelines need to be tailored to the intended market (Woodcock, 2013).
	Distribution needs to be considered either through downloadable on a website, or posted to individual design companies (Woodcock *ibid.*).
	Relies on good literacy skills, people need *"...literacy to cope with the flood of information they will find everywhere they turn."*(Clark and Rumbold, 2006:5)
	"Literacy means being able to read and write." (Boyce, 2010)
	"As healthcare professionals we are often reliant on people's ability to read and understand written literature in making health choices." (Davis *et al.* 2011:106)

Table G.5 illustrates some advantages and disadvantages of booklets

2.5 Exhibiting at trade shows

Exhibiting at trade shows	
Advantages	**Disadvantages**
Provides face-to-face contact with the author of the guidelines and other experts (Beier, Dambock n.d.:11, AUMA 2007:10).	Attendance is often by invitation only thus reducing the audience (Beier, J., and Dambock n.d.10).
Are multifunctional[1] .	Limited availability as the date and time is fixed (Beier and Dambock *ibid.).*
They can be an important tool for marketing because they can be efficient, wide-ranging and innovative[2].	Can represent a challenge in terms of logistics and planning (AUMA *op.cit.).*
They can provide an intermediary between producers and buyers (adapted from AUMA *ibid.*).	There are financial constraints that need to be considered when choosing this method (AUMA *ibid.*).
Offers a platform for dialogue between different stakeholders such as companies and associations (networking) (AUMA *ibid.* and Shenkar, 2006:42).	The attendance rate often determines the success or failure of an exhibition (Jie and Zhen *op.cit.).*
Is a good way of getting ad-hoc instant feedback/comments this could be a useful source for future revisions of the guidelines (Charwood n.d.).	
Can be a cost-effective way of promoting services (Colorwave Graphics n.d.).	

Table G.6 illustrates some advantages and disadvantages of exhibiting at tradeshows

[1] Can be informative and commercially advantageous (adapted from Beier and Dambock *ibid.).*

[2] This would be particularly advantageous for the guidelines as the intention is to increase awareness of them (adapted from AUMA *op.cit.*).

2.6 DVD

DVD	
Advantages	**Disadvantages**
Permanence[3].	Not participatory (UWI *op.cit.*).
Can give people time to contemplate, deliberate and consider the content of the DVD before they interpret and use what they have learnt (Erickson, 1992).	May not be able to portray a complete picture of the subject area (DuFon 2002:45).
Ability to convey *"…thoughts, emotions and atmosphere better and faster than any other communication medium…"* (CIARD 2009 *ibid.*)	Just because a video is watched this does not guarantee the viewers attention (CIARD *op.cit.*).
Especially useful to demonstrate a specific skill, for example, how to conduct a focus group or interview (ASTD, 2008:115).	In order to be effective the quality of the DVD must be of a high standard (ASTD *op.cit.*).
	There may be ethical issues in relation to consent and use of public/private spaces for video recording (Roschelle, 2000:726).
	Costly and time consuming to produce, requiring scripting and production of video content (Woodcock *op.cit.*).
	Building awareness of availability of DVD difficult (Woodcock *ibid.*).
	Could require pro-action and costs for end users, who might not be willing to pay for DVD (Woodcock *ibid.*)

Table G.7 illustrates some advantages and disadvantages of DVDs

[3] *"…allows us to experience an event repeatedly by playing it back…"* (Grimshaw, 1982)

2.7 YouTube

YouTube	
Advantages	**Disadvantages**
"YouTube allows billions of people to discover, watch and share originally created videos…YouTube provides a forum for people to connect, inform and inspire others across the globe and acts as a distribution platform for original-content creators." (YouTube n.d.)	It was not originally designed for collaboration and synchronous interaction (Chau *op.cit.*).
Third most popular site on planet (Kaattari *op.cit.*).	Hackers may be using websites such as YouTube (and other online resources) to spread viruses and spy ware (Burke and Snyder 2008, Trier 2007,Snyder and Burke *ibid.*).
Can help you reach a global audience (CIARD *op.cit.*).	Searching for the appropriate video clips on YouTube may prove challenging and time consuming due to the vast size of the video library (Burke, Snyder and Rager 2008).
Popular medium for delivering training (Kaattari *ibid.* and Burke, Snyder and Rager 2009:1).	There are no distinctions between professional or amateur videos (Burke, Snyder and Rager *op.cit.*).
Would allow the creation of a channel specific to the guidelines which will mean that videos can be stored and accessed in a central location (Kaattari *ibid.*).	In order for YouTube to be an effective medium new content will need to be consistently and frequently published (Reinhard, 2009).
Free to use (Chau 2010; and Burke, Snyder and Rager *ibid.*).	
Supports the formation of a participatory culture among members, this could be particularly advantageous through obtaining feedback in relation to the guidelines (Chau *ibid.*).	
May be particularly useful for attracting younger designers and creating an awareness of the guidelines because *"…the barriers for them to participate are low…"* (Chau *ibid.*)	

YouTube	
Advantages	**Disadvantages**
Can be an effective teaching resource (Burke, Snyder and Rager *op.cit.*).	
Most people are familiar with the technology (Burke, Snyder and Rager *ibid.*).	
May greatly expand the audience for the guidelines because YouTube is not restricted by geographical boundaries (Burke, Snyder and Rager *ibid.*).	
Accessible scholarly content which can demonstrate applicable skills and real life situations (Burke, Snyder and Rager *ibid.*).	

Table G.8 illustrates some advantages and disadvantages of YouTube

From comments from a participant such as: *"…many people are now making short YouTube videos and are posting these…"* and "…*I have used YouTube for looking at academic resources and it is very effective.*" It is clear from both this feedback and the advantages outlined in the table and the feedback given from a participant that the use of such a medium as a means for delivering the guidelines could be effective and will need to be considered.

2.3 Other potential methods of disseminating guidelines

Although not mentioned by designers, other formats are considered. These are discussed below.

2.3.1 Blog

"A weblog (blog for short) is an "editable webpage" in which posts are arranged in reverse chronological order. A blog is an online journal that can host links, resources, images, and text." (Alaniz and Pryor n.d.)

Blogs are increasingly popular, used by educators and practitioners and the design community.

Their advantages are that they:

- Are easy to use, set up and maintain.
- Are free to access (Kaattari, 2011).
- Can provide a wealth of information that can be extremely useful for furthering knowledge and learning (adapted from Kaattari *ibid.*).
- Are flexible. They can be public or private, one-way conversations or highly interactive (adapted from Kaattari *ibid.*).
- Can incorporate pictures, videos, audio, embedded links and other useful content (Kaattari *ibid.*).
- May help the guidelines gain search engine prominence (Sessum, 2005).
- Can be used to create a permanent record of thoughts and ideas (Wood, Behling and Haugen *ibid.*).
- Can enhance communication within small groups (Hargis and Wilson, 2006), allowing interactions, comments and linking to other sources.
- Are widely used by the design community.

In terms of their disadvantages, blogs can:

- Require writing-communicating effectively in writing may be difficult.
- Time consuming to maintain (McGovern, 2004). Blogs require on-going commitment from their creators and regular updating.
- Include personal bias (Wood, Behling and Haugen *op.cit.*).
- In writing and expressing ideas, may show weaknesses of individuals (Wood, Behling and Haugen *ibid.*).
- Be abused if firm guidelines are not established. As blogging is a recent phenomena there is a lack of guidance regarding effective use (Wood, Behling and Haugen *ibid.*).
- Be difficult to verify whether the information provided is accurate (Wood, Behling and Haugen *ibid.*).
- Be difficult to build up a following.

2.3.2 E-books

"An electronic book, or e-book, is a portable hardware and software system that can display large quantities of readable textual…" and other formats such as multimedia *"…to the user...and that lets the user navigate through this information."* (Borchers, 1999:1)

A key benefit is the searchability,for example, full text searches of a book or a library of books, making them ideal for research purposes (Wasshuber n.d. and Springer n.d.).

The advantages are as follows:

- Are mobile. With e-books it is possible to carry a complete portable library at all times (Wasshuber *ibid.*; Philip 2005:5).
- Have a lower price, as e-books are typically cheaper than an equivalent paper book (Wasshuber *ibid.*).
- Suit a range of requirements. E-books can often become instant audio books, and this may be advantageous as a way of ensuring that the guidelines are accessible to the widest possible population (Wasshuber *ibid.*).
- Can incorporate a variety of media elements such as text, image, audio and video. This could be especially advantageous for the guidelines given that it is proposed that whatever is produced will need to be highly visual (Wasshuber *ibid.*).
- Are both easy and economical to produce updates to e-books as and when they are required this makes e-books an extremely dynamic format (adapted from Wasshuber *ibid.* and Barker *op.cit.*).
- Economic and large amounts of content can be economically produced (adapted from Wasshuber *op.cit.*).
- Disaster proof. Unlike paper books, backup copies can be made for example, in the event of a flood, or fire (adapted from Wasshuber *ibid.*).
- Can supply current and up-to-date knowledge on demand (adapted from Barker *op.cit.*).

- Can be used to support teaching, learning and knowledge dissemination (adapted from Barker *ibid.*).
- Are easy to design, create and publish (Barker, 2004).
- Are environmentally friendly (Corlock and Perry *op.cit.*).

In terms of their disadvantages, they:

- Cannot replicate the exact look and feel of a book (Wasshuber *ibid.*).
- May have data security and copyright difficulties (Wasshuber *ibid.*).
- Have to be read from a display/screen. This can be difficult (for some users) and may cause health problems if used excessively (Springer *op.cit.*).
- Can be hard to read if you are not sure what you are looking for (Anaradha and Usha, 2006).
- May not be usable in some disciplines as they do not reproduce content accurately, for example, graphical content (Corlock and Perry, 2008).
- Are not tactile (Corlock and Perry *ibid.*).

2.3.3 Podcast

A podcast may be defined as a *"...digital recording…made available on the Internet for downloading to a personal audio player."* [Safire, 2005, par. 1]

The advantages of podcasts are that they:

- Can provide flexibility and mobile learning opportunities (Kazlauskas and Robinson, 2012:321).
- Are convenient, always available whenever, wherever (Smith, Salaway and Caruso, 2009).

- Provide an alternative media for learning that is easier to use (Lum, 2006).
- May suit those who are auditory learners (Dearman and Galloway, 2005).
- May assist those for whom English is not their first language (Dearman and Galloway *ibid.*).
- Can allow for the easy and efficient distribution of audio through the Internet (Chabolla and Leh *op.cit.*).
- Are simple and easy to use (Chabolla and Leh *ibid.*).
- Offer an innovative way for the delivery of audio content (Fichter, 2006).
- Provide an alternative media for learning that is easy to use (Lum *op.cit.*).
- May offer a different pedagogical approach to information processing and conceptual learning (Hargis and Wilson *op.cit.*).
- May be able to help a learner visualise the content and better relate to the situation if the podcast contains original background sounds (Chabolla and Leh *op.cit.*).
- Appeal to students who may be impatient with traditional ways of learning (Chan and Lee *op.cit.*).

The disadvantages of podcasts are that they:

- Do not allow for the most effective use of time (Kazlauskas and Robinson *op.cit.*).
- Require hardware and software, also setup and maintenance costs (Chabolla and Leh *op.cit.*).
- Are a developing technology conceived in 2000, and the full potential is still being explored (Chabolla and Leh *ibid.*)
- Can, in some institutions, focus on the infrastructure needed to create podcasts rather than strategies needed for effective delivery (Chabolla and Leh *ibid.).*
- Can, if used in conjunction with an academic course, serve as an excuse for students not to attend lectures (Read, 2005).
- Can lead to concerns regarding podcasting and intellectual property rights (Read *ibid.*).

- Can, as podcasting is an audio method, be less effective if there is provision of detailed information that may need to be heavily processed mentally or requires a great deal of concentration (Chan and Lee *op.cit*.).
- Can, as podcasting is an audio method, depend on the quality created by the sender and the ability of the receiver to decode any messages (Heinich, 1982).
- Can, as podcasting is an audio method, fail to provide the flexibility of a conventional presentation (Romiszowski, 1988).
- Can be both costly and time consuming as necessary infrastructure needs to be set up effectively to deliver content. High quality audio equipment is needed in order to maintain the quality of the recordings produced (Chabolla and Leh *ibid.*).
- Can demand a lot of storage space (Chabolla and Leh *ibid.*).
- Can involve a lack of best practice methods (Chabolla and Leh *ibid.*).
- Are not accessible to those who have hearing impairments (Chabolla and Leh *ibid.*).

2.3.4 Flash cards/Index cards

Cards have a question on one side and the answer on the other side. They are often used as a learning aid (adapted from Lee *et al*. n.d.).

The advantages of flash cards are that they:

- Can offer flexible solutions to fit user's learning needs (for example, portable and available anywhere, anytime) (Lee *et al*. *ibid.,* Basoglu and Akdemir 2010:1, Van-Houten and Rolider 1989).
- Can help students memorise learning materials such as vocabulary (Lee *et al*. *op.cit.*).
- Are convenient and a simple format for presenting stimulus items such as keywords and definitions (Kupzyk, Daly and Andersen, 2011:781).
- Can help a person determine what they do and do not know (Schneiderman and Werby 1996:35).

- Are a common method of self-study (Schneiderman and Werby *ibid.*).
- Can help cement the association between two related pieces of information, for example, a research method and its disadvantages (Schneiderman and Werby *ibid.*).
- Are useful and is a versatile method because they have multi-sensory appeal (Schneiderman and Werby *ibid. and* Stutz 1992).
- May be an ideal method for designers to use as the text density on a card is usually low and designers are predominantly visual people (Dizazzo-Miller and Pellerito, 2011:41).
- Can be particular useful when memorising large amounts of information (Leeds University n.d.).
- Are cost effective and can be made by the individual learner thus the method is easy to implement, and can be implemented in any setting (KG Support n.d.; Glover, McLaughlin, Derby and Gower, 2010:458; Van-Houten and Rolider *op.cit.*; Skarr *et al.* 2012; Erbey, McLaughlin, Derby and Everson, 2011:221).
- Are portable and convenient (KG Support *op.cit.*).
- Can be a fun and enjoyable method (adapted from Basoglu and Akdemir *op.cit.*).
- Can be used to teach discrete skills (Heron, Heward, Cooke and Hill 1983; Maheady and Sainato 1985; Kaufman *et al.* 2011; Olenick and Pear 1980; Van-Houten and Rolider *op.cit.*,; Young, Hecimovic and Salzberg 1983).
- Are accessible to both young and old (Glover, McLaughlin, Derby and Gower 2010:461; Hopewell).
- Can increase confidence and is accessible to a wide range of abilities (Jasny, Chin, Chong and Vignieri, 2011).
- Can allow self testing of knowledge (Son and Kornell n.d.).

The disadvantages of flash cards are that they:

- Can be used incorrectly because, if people do not separate the facts they know from those that they do not know, they can often think they know all the material (Schneiderman and Werby *op.cit.*).
- Are not suited for the learning of complex principles and concepts (DiZazzo-Miller and Pellerito *op.cit.*).
- Using small stacks of flash cards can create the illusion of effective learning (Kornell, 2009:5).
- Can lead to false confidence if flashcards are used as an aid to learning. People can often be notoriously bad at judging when they have understood the material and wrongly judge something as learnt when it is not; this is known as 'dropping' a flashcard (Glenn, 2007 and Son and Kornell *op.cit.*; Kornell and Bjork, 2008:125).
- Do not support learners who need the motivation that comes from successful study sessions (Edge, Fitchett, Whitney and Landay, 2012).
- Should not be used in isolation (Edge, Fitchett, Whitney and Landay *ibid*. pp 9).
- May be too brief to be helpful (Select Knowledge n.d.:169).
- May get out of order (Select Knowledge *ibid.* pp 169).
- Can raise problems in working out what needs to go on each individual card (Edwards, 2007:53).
- May not always aid understanding of a concept, as they are more suited to rote repetition (Notbohm and Zysk, 2010:89).

2.3.5 Mobile applications (Mobile apps)

"A mobile web app is a piece of software specifically designed to run on a mobile device such as a smart phone or tablet." (Salz and Moranz, 2013:14)

The advantages of mobile apps are that they:

- Provide information that can be accessed anywhere at any time (Basoglu and Akdemir *op.cit.;* Pennington *et al.* 2010*;* Creijo-Roibas and Arnedillo-Sanchez 2002).
- Are becoming an increasingly popular method of searching for and viewing information (adapted from Chen-Chung, 2007).
- Can be a convenient and interactive way of searching for information/ learning (Nah, White and Sussex, 2008).
- Can enable users to access what they require on their terms, therefore it is a person-centred approach (Nah,White and Sussex *ibid.,* Kukulska-Hulme, 2009).
- Are a widely used technology with a range of features including personalisation, localisation and mobility (Nah, White and Sussex *ibid.*).
- Can be a flexible and novel way of searching for information/learning (Basoglu and Akdemir *op.cit.*).
- Can be an effective and entertaining way of searching for information/learning (adapted from Basoglu and Akdemir *ibid.*).
- Can establish a one-to-one relationship and create or manipulate data in ways not possible on a static content website (Rolnitzky, 2010:1).
- Do not require technological training and do not intimidate users (Nyiri, 2003).
- Are easy to learn and use (Houser *et al.* 2002).
- Are faster than the mobile web (Salz and Moranz *ibid.* pp 16).
- Use features of the mobile device and can store larger levels of content for viewing offline (adapted from Salz and Moranz *ibid.* pp 16).

Some of the disadvantages of mobile apps are that they:

- Are a relatively recent development (Pennington *et al. op.cit.*).
- Are not necessarily available as not everyone may have the technology to use a mobile app (Pennington *et al. ibid.*).
- Can use different operating systems, though with six major operating systems and hundreds of different devices, there is a considerable amount of fragmentation in the mobile market (Rolnitzky *op.cit.*).
- Can be difficult to update and fix, this adds to the expense of development (Rolnitzky *ibid.* pp 6).
- Need power and web connectivity to operate (Goundar *op.cit.*).
- Require users to have some level of competency with technology (Goundar *ibid.* pp 1).
- May not be suitable for distribution (Goundar *ibid.* pp 22).
- Do not stand alone as distribution may be linked to a third party (Salz and Moranz *op.cit.*).
- Can be restrictive in searching, as general discovery may be far more restricted as content cannot easily be presented to search engines (Salz and Moranz *ibid.* pp 16).
- They can be off putting as the need to download the app may be a deterrent (Salz and Moranz *ibid.* pp 16).

2.3.6 Interactive DVD/CD-ROMS (Software)

"*Interactive media is the integration of digital media including combinations of electronic text, graphics, moving images, and sound, into a structured digital computerised environment that allows people to interact with the data for appropriate purposes."* (England and Finney, 2011)

The associated advantages of DVD/CD-ROMS are that they:

- Can be used to create high quality learning environments which can actively engage learners, in turn this can promote deep learning (Cairncross and Mannion, 2001:156).

- Allow the user to control the delivery of information (Cairncross and Mannion *ibid.*).

- Can enhance the learning process because of the interactive nature of the media, for example: explanation can be combined with illustrative examples, online assessment with feedback, provides the user with opportunities to practice and experiment (Cairncross and Mannion *ibid.* pp 156).

- Allow the user a range of media elements; this may be particularly advantageous given that designers are primarily visual people.

- Allow the user to study at a time and place convenient to them (Cairncross and Mannion *ibid.* pp 156).
- Can strengthen the transfer from short-term memory to long term memory and support the process of conceptualisation (Cairncross and Mannion *ibid.* pp 159).
- Use multiple elements that may increase the user's enjoyment and engage them in a way that static material does not (Cairncross and Mannion *ibid.* pp 159).
- Allow users to learn at their own pace allowing them to concentrate on material they are unfamiliar with or leave out material which is irrelevant or with which they are already familiar (adapted from Cairncross and Mannion *ibid.* pp 159).
- Can involve multimedia applications that can be structured to provide for both linear and holistic approaches to learning (Cairncross and Mannion *ibid.* pp 160).
- Allow for individual preferences to be catered for by utilising the flexibility that multimedia offers (Cairncross and Mannion *ibid.* pp 161).
- Can support reflection and discussion (Cairncross and Mannion *ibid.* pp 161).
- Are easy to store. As a flexible, low cost medium CD-ROM delivers large quantities of media-rich information in a convenient manner (Vanbuel, Boonen and Scheffknecht 2000:41).

- Are a convenient method of distributing information (Vanbuel, Boonen and Scheffknecht *ibid.* pp 41).

Some of the disadvantages of DVD/CD-ROMS are that they:

- May be ineffective if the system is not designed with knowledge of human factors, else it can cause cognitive overload, divided attention and disorientation (Cairncross and Mannion *op.cit.*; Moreno,2006).
- Are not suitable for all types of learners. It is reported that, for example, video can hinder learning with some learners not attending to all multiple representations (Cairncross and Mannion *ibid.* pp 159).
- Can be 'cherry-picked'. Some learners may seek out one element, for example, incorporated video clips; in turn this may have a detrimental impact on their learning (Hutchings *et al.* 1993).
- Can present problems for the learner, for example, some learners become uncomfortable when navigating in hyperspace which in turn can affect performance (Ford and Ford, 1992).
- Can lead to a superficial approach to learning. As multimedia can be explored in several different ways users can be highly selective over the material they choose to access, this can lead to fragmented, superficial learning (Rogers and Scaife, 1998:3).
- Can be difficult to navigate. In many educational CD-ROMS the different multimedia elements such as text or video are often presented as separate elements, that is: text appears in one window whilst video clips and diagrams appear in other overlapping windows. The problem then is that it can be difficult for the user to understand how the individual elements relate to each other (Rogers and Scaife *ibid.* pp 3).

- May in certain circumstances hinder learning, for example, where the multimedia application does not take account of human factors in its design (Plass *et al*. 2003:236) that can be unsuitable for some learners. It has been suggested by Sweller (1999) that multimedia learning is carried under the constraints of limited working memory, thus the limited capacity of such working memory can impact learning negatively (Plass, Chun, Mayer and Leutner, 2003).
- May be difficult to use as an introduction to a new topic. It has been contended by Seufert (2003) that the effective use of multiple representations (multimedia) often depends on students' prior knowledge of subject material.

2.3.7 Online learning courses

These may be defined as training or instruction delivered over the Internet which can include real time (synchronous) and anytime, anywhere (asynchronous) activities (Feldman *et al.* n.d.:5).

The advantages of online learning courses are that they:

- Can be used to support individualised learning. If the online system uses adaptive learning this may allow students to customise their learning environments and choose flexible solutions that fit their needs (Lee *et al. ibid*.).
- Provide a flexible medium for learning (Ally, 2004; Hiltz & Turoff, 2005; Oblinger & Oblinger, 2005; Radović-Marković 2010:292). In other words users are able to proceed at their own pace and place through a training programme (James *op.cit*.).
- Can promote varied interactions (Ally *ibid.,* Hiltz & Turoff, *ibid*.; Oblinger & Oblinger *ibid*.; Hiltz and Turoff, 2005).

- Can be accessed any time from a variety of locations (Ally, *ibid.'* Hiltz & Turoff, *ibid*.; Oblinger & Oblinger *ibid*.)
- Promote more effective discussion. Learners may feel a significant amount of anonymity that makes them less inhibited in discussions etc. (Serlin 2005).
- It has been suggested by Serlin (*ibid.*) that the use of online learning is time saving because students do not have to attend classes and can spend more time on other tasks such as research and reading.
- Can be economic. An online course does not require a physical classroom thus saving on the associated costs (is available anytime, anywhere) (Serlin *ibid.* pp 4; Álvarez-Trujillo n.d.).
- Can be cost effective, with inexpensive worldwide distribution (James *op.cit*.).
- Are easy to amend and update, with changes to content being immediately available worldwide (James *ibid*.).
- Are readily available. Most people have access to the Internet (James *ibid.*).
- Are a popular way of getting access to education (Álvarez-Trujillo *op.cit.*).
- Enable a higher degree of activity between lecturers and students (Radović-Marković 2010:292).
- Can provide a deeper sense of self-fulfilment (Radović-Marković *ibid.* pp 293).
- Students have far less practical considerations, for example, how to get to class (Alexander, Truell and Zhao 2012:199).
- Mean that learners do not have to deal with others disrupting classes or asking questions (Alexander, Truell and Zhao *ibid.* pp 199).

Some of the disadvantages of online learning courses are that they:

- Have no face-to-face instruction thus no hand gestures, voice intonation, and facial expression. These are often important to pick up meaning (Serlin *ibid*. pp 9).

- (The students) are not forced to pay attention, participate in class discussion; these activities can aid learning (Serlin *ibid.* pp 9).
- Have environmental limitations, for example, bandwidth/browser limitations may affect the content that can be used and its delivery (James *op.cit.*).
- Involve cost, as web server access has to be provided along with control usage, and users must be billed (James *ibid.*).
- Assessment and feedback is limited (James *ibid.*).
- Rely on the student being computer literate (Álvarez-Trujillo *op.cit;* Li and Irby, 2008).
- Do not provide structure. There are no set times for classes thus this may not be an effective medium to learn for those that are not disciplined (Álvarez-Trujillo *ibid.).*
- Require the learner to have access to software and hardware that betters or exceeds the requirements of the online learning system (Álvarez-Trujillo *ibid.*).
- Can lead to procrastination (Alexander, Truell and Zhao *op.cit.*).
- Lack face-to-face support if content is not understood (Alexander, Truell and Zhao *ibid.* pp 199).
- Allow for distraction from learning course material and use the computer for other tasks such as social networking (Alexander, Truell and Zhao *ibid.* pp 199).
- Need self-discipline, as the amount of time and work required for success in online learning is not always understood by learners (Alexander, Truell and Zhao ibid. pp 199).

3. Discussion

It is clear that there are many formats that could be viable for dissemination of the guidelines both used in combination and alone. Both the essential factors and a discussion of these are outlined below.

In selecting the most appropriate format for the guidelines, the following factors need to be considered:

3.1 The requirements of the designers

It was stated by designers in the study that any guidelines produced will need to be highly visual as "...*designers don't use alpha numerical judgment. The metrics they use may be spatial and visual the majority of the time..."* therefore in terms of requirements, the designers require a resource that is highly visual with limited text. This requirement would appear to be similar to that of architects who have an unwillingness *"…to consult written data even when in exemplary formats."* (Newland, Powell and Creed, 1987:3).

In addition to this, it is also reasonable to assume that as in the case of architects the "…*traditional 'chalk and talk' teaching of accepted knowledge of 'facts' about the world will in the main fall on deaf ears."* (Newland, Powell and Creed *ibid.* pp 3) Finally, presentation style and tone is important as it can encourage *"…the transfer process of available literature."* (Goodey and Matthew, 1971) However, presentation style alone does not guarantee *"…the confidence, acceptance or interest of the design profession to an extent where they actually use information…more readily."* (Powell and Newland 1994:286) Indeed, Powell, (1987) states *"…most of it is just too diffuse to aid designers' recognition of necessary distinctions, or worse it often appears in opposition to their predisposed view of what constitutes relevant and useful information."*

The researcher acknowledges that he is not a designer by background and sees himself positioned within the humanities. As a result, his style of learning may be very different to that of a designer because, as stated by Powell and

Newland (*op.cit.*), *"…in order to give meaning and value to their world, this group should favour a learning strategy which necessitates a keen awareness of people."* Whereas a designer may have a style that *"...places others in a submissive role making them wary of the consequences that may ensue if false information is conveyed."* (Powell and Newland *ibid.* pp 3) Therefore close attention will need to be paid to how the information is produced so that it meets the learning style of designers.

3.2 The nature of the guidelines

Given the six key themes highlighted by designers[4] it is reasonable to assume that these issues may be explored sufficiently by the use of multiple media elements.

3.3 Impact (in terms of number of designers reached)

Given that one of the objectives of the research is to produce reference material in a clear, accessible format that offers guidance to designers to support user-centred evaluation or design when working with SCAN participants, it would be reasonable to assume this would be best achieved with the use of multiple media elements in combination.

3.4 Ease of creation

Whilst the researcher accepts that the guidelines produced have to be thorough and have to be presented in a manner that is clear and accessible, a balance must be struck between them meeting these requirements and being easy to create in terms of time, expertise and cost.

[4] As discussed in chapter 4

3.5 Maintenance and updating of information

Any guidelines produced will require revision and update therefore the formats chosen must support this.

3.6 Cost

Given the costs of design materials such as IDEO Methods Cards[5] and ISO Standards[6] it is felt that any costs associated with the guidelines will need to reflect production but not be prohibitive in order to make the guidelines accessible to the widest possible population. Given the overall aim and objectives of the research which included making the research accessible to the widest possible population, the knowledge of the target audience's preferences for web based material and in relation to the content of the guidelines it would appear that a medium that allows the presentation of multiple types of media elements would be favourable.

This conclusion is given credit by the information presented in the table below. The most appropriate medium YouTube allows presentations of multiple media elements (sound, video, presentation) and easy updates/addition of elements.

[5] £32.50

[6] ISO TR 16982:2002 £149

Format type	Design requirements for guidelines					
	Requirements of the designers	Nature of Guidelines	Impact/ Ease of access	Ease of creation	Ease of updating information	Cost
YouTube	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
PDF, PowerPoint or audio	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
Blog	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
On-line learning courses	✓✓	✓✓✓	✓✓	✓✓	✓✓✓	✓✓
Facebook or Linked In	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Flash cards	✓✓	✓	✓✓	✓✓✓	✓✓✓	✓✓✓
Website	✓✓✓	✓✓✓	✓✓	✓	✓✓	✓✓
Booklet	✓✓	✓✓	✓✓	✓✓✓	✓✓	✓✓
E-books	✓✓	✓✓	✓✓	✓✓	✓✓✓	✓✓
Interactive DVD/CD-ROMS (Software)	✓✓	✓✓✓	✓✓	✓✓✓	✓✓	✓
Podcast	✓✓	✓✓	✓✓	✓✓✓	✓✓	✓✓
Blog	✓✓	✓✓	✓✓	✓✓✓	✓✓✓	✓✓✓
Mobile Apps	✓✓	✓✓✓	✓✓	✓✓	✓✓	✓
Workshops and Academic Courses	✓✓	✓✓	✓✓	✓✓	✓✓	✓
DVD/Video	✓✓✓	✓✓✓	✓✓	✓	✓	✓
Exhibitions & Tradeshows	✓✓	✓	✓	✓	✓	✓

Table G.9 Extent to which different formats meet the requirements for the guidelines

✓ One tick represents the least appropriate medium against the set criteria, for example, it would be costly, difficult to update information, difficult to create, access would be limited or it would not be appropriate because of the nature of the guidelines.

✓✓ Two ticks represent a neutral stance, for example, it would meet all the requirements for designers but not perhaps in the best way, it would require some effort to update, it would cost less than some methods but more than others, it would present some challenges in terms of creation.

It may be appropriate for the nature of the guidelines but may not be the best way of presenting them.

✓✓✓ The most appropriate medium against the set criteria, for example, it provides excellent value for money, access would be easy, it fully meets the requirements of designers, it would be extremely easy to update and create, and appropriate given the nature of the guidelines.

Table G.9 summarises the extent to which the different formats meet the overall needs of the research[7]. The number of ticks on each column represents the appropriateness of each format in meeting the design requirements. The rankings were made based on a combination of the experience of the researcher and the research undertaken into the advantages and disadvantages of each method outlined.

4. Consideration of learning styles

4.1 What is a learning style?

A learning style can be defined as a set of *"…distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment."* (Gregorc 1979) and can be influenced by:

- Brain hemisphericity
- Age
- Gender
- Intelligence
- Personality traits (Durling 1994:5)
- Genetics
- Life experience
- Environment (Cherry 2013)

[7] To develop and disseminate guidelines on how to work with SCAN users during a user-centred design lifecycle.

4.2 Gardner's Multiple Intelligence theory

Gardner (1983) proposes seven intelligences, these are:

- Linguistic intelligence
- Logical-mathematical intelligence
- Musical intelligence
- Bodily-kinaesthetic intelligence
- Spatial intelligence
- Interpersonal intelligence
- Intrapersonal intelligence

As Gardner claims these intelligences "…*rarely operate independently*." (Smith 2002-2008) and are used at the same time and complement each other. It is acknowledged that not all of Gardner's proposed intelligences may apply to designers.

Based on the descriptors given by Gardner it is likely that designers will have spatial intelligence i.e. *"...involves the potential to recognise and use the patterns of wide space and more confined areas..."* and logical-mathematical intelligence i.e. the ability to analyse problems logically (Smith *ibid.*).

4.3 Kolb's learning style inventory

Kolb (1981:238) proposes four distinct learning styles, these are:

- Convergers
- Divergers
- Assimilators
- Accommodators

It is likely, based on Kolb's descriptions that designers have elements of converger's [8] i.e. active experimentation, carrying out plans and experiments and becoming involved in new experiences.

4.4 Why should learning styles be considered in the development of the guidelines?

According to Honey and Mumford (2000:1) an awareness of learning styles can be advantageous because it can:

- Make people more effective learners
- Lead to more effective and economical learning provision.
- Less likely to lead to a 'Shakespeare effect' where unfortunate experiences can have a negative impact.
- Help identify and improve a person's less effective learning processes.
- Influences the way you help others to learn.
- Helps the learner takes responsibility for their own learning.

In addition to the reasons given by Honey and Mumford, Kornhaber (2001:276) states that consideration of learning styles is important because;

> *"…students think and learn in many different ways. It also provides educators with a conceptual framework for organising and reflecting on curriculum assessment and pedagogical practices. In turn, this reflection has led many educators to develop new approaches that might better meet the needs of the range of learners in their classrooms."*

Furthermore, Gardner (*op.cit.*) contends that all seven intelligences are needed to live life well therefore teachers need to accommodate these (adapted from Smith *op.cit.*).

[8] Abstract conceptualisation and active experimentation and accommodator's

This contention could also be applicable to the production of guidelines i.e. in order for the guidelines to be effective and efficient they must accommodate designers' various learning styles. However, a major criticism of Gardner's work is, as he admits, there is an *"…element of subjective judgement involved*." (Smith *ibid.*) Further criticism is that some of the intelligences identified by Gardner (*op.cit*.) may not be intelligences such as musical intelligence and bodily-kinaesthetic intelligence; these may be better described as talents. The final criticism of Gardner's work is that the work is based on his own intuitions rather than grounded in empirical research (adapted from Smith *op.cit.*).

In a study by Kolb and Goldman (1973) a correlation between learning styles and the participant's chosen subject of study (adapted from Cherry *op.cit*.) therefore it is reasonable to suggest that if the learning styles of designers are accommodated the guidelines will be accessible to them. However, despite the many advantages of considering learning styles, they may be of limited value and, like Gardner's theory of multiple intelligences, they should not be seen in isolation, for example, an individual may be *"…concrete in interactions with people and abstract in work*." (Stabel, 1973) This perceived weakness of learning styles provides reasoning for the conclusions drawn below.

5. Conclusions

In conclusion, it would appear from the literature reviewed and the research conducted that there is no existing research that seeks the views of users and designers in order to assist designers to make reasoned methodological choices when working with SCAN participants. It is this problem the research attempts to solve.

Additionally, based on the rankings in table G.9 it would appear the most suitable formats for the guidelines may be YouTube, blogs, PDFs and PowerPoint. However, it should be noted that there are many formats including websites and academic courses that have lower rankings in terms of their appropriateness, as it may cost more to produce a website but that increased cost may be viable, as a website may be more suitable for meeting the requirements of designers.

Given the benefits of learning styles (see section 4) and the remarks of Newland, Powell and Creed (*op.cit.*) *"...no matter how good or appropriate, if designers do not choose to access information, cannot access it, cannot understand it or cannot apply it readily, then it is of no value to them…[and] …clearly at the most personal and psychological level all individuals learn in their own particular and rather idiosyncratic ways..."* therefore it is reasonable to propose that the guidelines will have to be produced in different formats including a booklet, website, PDF and PowerPoint so that they can be accessible to the widest possible population and accommodate a variety of learning styles. However, creation of these will be post doctoral work.

S2-SCAN-PY-04: Interview on 21.02.2015 at 2:20pm

***Please note that the names in this document are not the real names of people/participants these have been changed to protect anonymity.**

Transcript

Time Stamp	Theme Number	Transcript
00.00		Researcher: There you go...Hi *Peter S2-SCAN-PY-04: Yeah Researcher: Alright, I'm just gonna put that up there. Right, so what we're gonna have a chat about today is...basically I'm looking to interview people that have got disabilities like yourself about their experiences of being involved in design or evaluation processes ...yeah? S2-SCAN-PY-04: Okay Researcher: Yeah? So that's you might have been involved like for example erm if you been asked to comment on like a design for something or you might have been asked your opinion on a service that, that you use so something like that, d'ya know what I mean?
1.00		S2-SCAN-PY-04: Yes kind of...er....although when it comes to those sorts...when it comes back to design if I go into the sports side of things it's a bit different? Researcher: Yeah that's fine we can still have a chat about and, and you can teach me I mean there's nothing wrong...with what...I'm sure you've got some valuable insights it's, it's, it's nothing you know there's no hard or fast rules so do you wanna give it a go? S2-SCAN-PY-04: Yes of course Researcher: So, so did you sign the consent form? S2-SCAN-PY-04: ..erm signing yeah but...but Researcher: Yeah S2-SCAN-PY-04:...erm I'll print it off and then I'll sign it and then I can erm scan it back to you and e-mail it? Researcher: Okay S2-SCAN-PY-04: Is that alright? Researcher: Is that, are you happy with that?

2.00 3.00		S2-SCAN-PY-04:Yeah I'm happy Researcher: So in, in this big booklet that I've got there's a number of terms that I wanted...that I want to use yeah? S2-SCAN-PY-04: Yeah Researcher: So, basically I'm looking to talk to people that have got additional needs like yourself, yeah? S2-SCAN-PY-04: Yeah Researcher: Yeah, like for example you, you need certain help doing certain things don't you...don't you? S2-SCAN-PY-04: Yeah of course erm Researcher: Yeah of course...yeah erm so, so and we call, well I call those, the people that I've called with additional needs...I've said they've got something called SCAN which stands for Specific, Critical, Additional Needs, so you know like we all, we all have needs to go to the, like to go to the toilet and stuff yeah? We have to do that to keep S2-SCAN-PY-04: Yeah Researcher: ...alive. Well some people have additional critical needs that they need...they might need help to get dressed or washed or whatever do you understand what I mean? S2-SCAN-PY-04: Yeah...erm I kinda get that Researcher: Yeah S2-SCAN-PY-04:...I understand where you're coming from Researcher: So, so that's what basically I've, I've said that and what we found that is people like yourself often don't get asked or designers have problems with using people...erm...talking to people like yourself because they don't often get faced with it so they don't know...they kinda fear the unknown do you know what I mean? S2-SCAN-PY-04: Yeah I get Researcher: Yeah so when I talk about design or evaluation process I basically mean anything where someone's asked you for your views on something...so can you think of an occasion where someone's asked you for your views...on something?

		S2-SCAN-PY-04: You slightly broke up then Researcher: Yeah S2-SCAN-PY-04: Could you repeat the question? Researcher: When, when I talk about design and evaluation process I really mean an occasion where somebody's asked you for your views on something...yeah?
4.00		S2-SCAN-PY-04: Yeah Researcher: Do you get what I'm saying? S2-SCAN-PY-04: Yeah Researcher: So, are you happy to take...based on what I've told you are you happy to take part in the project? S2-SCAN-PY-04: Erm...the issue is Researcher: Yeah S2-SCAN-PY-04:...the only issue is erm...is erm...is...if erm...it's the type of questions I'll be answered...if I can actually answer it...and that is...the actual issue I have or the concerns not the issues Researcher: If you can't don't, don't we'll give things a go and if you feel you don't think you can answer it just say to me no yeah? S2-SCAN-PY-04: Okay, cool Researcher: Or, would, or would you rather leave it? S2-SCAN-PY-04: Erm I'd rather give it a crack Researcher: You're gonna give it a go?
5.00		S2-SCAN-PY-04: Yeah Researcher: Good...good on ya ...good on ya young man. Right, so the first questions are just some demographic information really (S2-SCAN-PY-04's name) so, so erm so the first thing we wanna know is what age group do you fall into? Is it, is it 18 to 24, er is it 25 to 34 or?
	1	S2-SCAN-PY-04: 25 to 34 Researcher: 25 to 34, alright okay and what sex are you, are you male or female?
	1	S2-SCAN-PY-04: (laughing) I'm male Researcher: You're male? Okay that's a good start

		S2-SCAN-PY-04: I can't help laughing about that
6.00		Researcher: That's alright and you...you know, you know when people ask you to define what ethnicity you are, what would you say?
		S2-SCAN-PY-04: Erm you're thinking about religion actually?
		Researcher: Pardon?
		S2-SCAN-PY-04: Are you talking about religion?
		Researcher: What race do you think you are you White?
	1	S2-SCAN-PY-04: Yeah I'm White British
		Researcher: White British? That's good erm okay and the next thing asks you have...do you think you have a disability?
	1	S2-SCAN-PY-04: Yes
		Researcher: Yeah, so you think you have a disability, that's great...erm how does your disability affect your life?
	1	S2-SCAN-PY-04: Erm...it's erm basically erm...er I have to adapt erm ...to...which...to actually explain it...erm
		Researcher: Take...take your time I'm in no rush at all
7.00		
	1	S2-SCAN-PY-04: ...some things in life I...I struggle to do...like getting around erm so...erm...on...on say...it's like trying or perhaps...struggle where I need to sit down
		Researcher: Yeah
	1	S2-SCAN-PY-04:... more often than to stand
		Researcher: Yeah
	1	S2-SCAN-PY-04: ...so I'm always adapting to every situation that I'm in [?]
	1	Researcher: So you need, sometimes you need do you have trouble walking sometimes?
	1	S2-SCAN-PY-04: Erm wal..wal...walking's okay
		Researcher: Yeah
	1	S2-SCAN-PY-04: ...it's just standing is...is...is an issue

	1	Researcher: So, you can't stand for long periods of time?
	1	S2-SCAN-PY-04: I can't...I can only stand...erm for about 5 minutes until my feet really hurt me and then I have to sit down
	1	Researcher: And then your feet really hurt you and you have to sit down yeah?
		S2-SCAN-PY-04: Yeah
8.00	1	
	1	Researcher: Okay, is there anything else that your disability...about your disability that you want to tell me?
		S2-SCAN-PY-04: I'm partially sighted so I cannot drive so when it comes to travelling from getting to A travelling to B
	1	
		Researcher: Yeah
	1	S2-SCAN-PY-04: ...er that can be a struggle when I rely on transport and book cabs [?]
		Researcher: Yeah
		S2-SCAN-PY-04: ...to get me to places
	1	
		Researcher: Yeah
		S2-SCAN-PY-04: ...erm...and that is mainly it actually
	1	
	1	Researcher: So, so you have trouble, you can't stand for very long and what was the other thing you said to clarify?
		S2-SCAN-PY-04: Erm...I...I'm partially sighted so
	1	
		Researcher: You're partially sighted
		S2-SCAN-PY-04: ...so stuff can be all a blur
	1	
		Researcher: Yeah
		S2-SCAN-PY-04:... and I have to be more vigilant when I'm out
	1	
		Researcher: Yeah
		S2-SCAN-PY-04: ...er I have to take care of myself more because
	1	
		Researcher: Yeah
9.00		
		S2-SCAN-PY-04: ...because I can only er see....what's in front of me
	1	
		Researcher: Okay, okay is there anything else you wanna tell me mate?
		S2-SCAN-PY-04: That's all...that's fine

		Researcher: That's it for the disability is it?
		S2-SCAN-PY-04: Yeah
		Researcher: Yeah, okay are you happy with the sort of questions at the moment (S2-SCAN-PY-04's name)? Yeah?
		S2-SCAN-PY-04: Yes they're actually fine
		Researcher: You're happy and you understand?
		S2-SCAN-PY-04:Yeah it's just like doing a
		Researcher: Good cus
		S2-SCAN-PY-04: ...doing an application form
		Researcher: ...cus I want you to feel like we're just talking down the pub really and you know what I mean?
		S2-SCAN-PY-04: Yeah I know
		Researcher: Okay, so, so if you feel upset you gotta tell me or anything cus I only
		S2-SCAN-PY-04: I'll tell ya
		Researcher: Yeah please do
		S2-SCAN-PY-04: ...I'll tell ya
		Researcher: Yeah please do, please do cus it's really important to me...like you're help...cus without your help I wouldn't be able to do the research
		S2-SCAN-PY-04: Of course
		Researcher: Okay, right so do you want to move onto the next set of questions?
		S2-SCAN-PY-04: Yeah definitely
10.00		Researcher: Okay,this is about when you've been involved in design or evaluation processes. So have you ever been involved in a process in a design or evaluation process for something like a product? Has anybody ever asked you what you think of a product?
	2	S2-SCAN-PY-04: Erm, I've never really been involved in a product itself not really
	2	Researcher: Yeah, so you would say no for that one? Yeah?

	2	S2-SCAN-PY-04: Yeah Researcher: Okay, next question then...okay have you ever been involved in...have you ever been involved in any sort of research where someone's asked for your views?
	2	S2-SCAN-PY-04: ...Erm...that was yes actually erm...erm my friend was doing a ...erm...a dissertation on, on, on the importance of a team captain Researcher: Yeah
11.00	2	S2-SCAN-PY-04: ...so I had to, had to fill out a...a...questionnaire and to, and to state like erm what erm what...what happened and state what I've done in the past as a team...captain Researcher: Yeah
	2	S2-SCAN-PY-04: ...and, and what, and what that took in takes to be a team captain and that sort of stuff Researcher: Yeah, that's really great, that's really great and the next, the next question so you've said what was it for, it was for your friend's dissertation and he was into something about team captains what was, what was the actual thing you had to fill in?
12.00	2	S2-SCAN-PY-04:That he was...erm...it was called erm it was the...the effects of team...team...team erm let me rephrase that it was called the effects of...of a captain in a team sport Researcher: Yep, okay and did you, did you enjoy that when you took part in it?
	2	S2-SCAN-PY-04: It was okay Researcher: Yeah
	2	S2-SCAN-PY-04:... it was just it waaaas standard for...for me so Researcher: Right
	2	S2-SCAN-PY-04: ...so I was just helping out a friend...so I'd put yes
	2	Researcher: Yeah, was there anything you didn't like about it when you did it?
	2	S2-SCAN-PY-04: No I felt pretty comfortable answering all the erm...I felt comfortable answering all of the questions actually Researcher: Yeah...yeah okay...erm are you ready to move onto the next question now (S2-SCAN-PY-04's name) or anything S2-SCAN-PY-04: Yeah, yeah

		Researcher: ...more you want to say?
		S2-SCAN-PY-04: Yeah, no move on it's fine
	2	Researcher: Okay, right, so have you ever been offered the chance to do, to take part in research but have you ever said no I don't want to do that?
13.00		
	2	S2-SCAN-PY-04: Er...on one occasion yes
		Researcher: Yeah?
	2	S2-SCAN-PY-04: ...er ...erm I can't remember what it was though...I forgot the
		Researcher: Yeah
	2	S2-SCAN-PY-04: ...name of it
		Researcher: Yeah
	2	S2-SCAN-PY-04: ...but the, the
		Researcher: Yeah
	2	S2-SCAN-PY-04: ... yes I have done
	2	Researcher: Can you remember why you didn't want to take part?
	2	S2-SCAN-PY-04: Oh why...erm...it was...one it was because...because I would didn't have the time
	2	Researcher: You were busy?
	2	S2-SCAN-PY-04: ...secondly erm because it was to do with my work there was other agents
		Researcher: Yeah
	2	S2-SCAN-PY-04: ...that, that, that...were...were just as qualified to er ...to,...to...to do the ...to actually...erm volunteer to
14.00		
		Researcher: Yeah
	2	S2-SCAN-PY-04:... to, to ,to the participate basically
		Researcher: Yeah ...so
	2	S2-SCAN-PY-04: ...I thought I was letting them have a go
	2	Researcher: Yeah so you just thought I'm busy I'll let someone else have a go, yeah? Is that what you're saying?

	2	S2-SCAN-PY-04: Yeah
		Researcher: Good, good, right are you ready to move onto the next set of questions? Yeah?
		S2-SCAN-PY-04: Yeah
	14	Researcher: This one talks about how you like to communicate...yeah so when you're talking to somebody or you're writing or you're doing whatever you're doing how easy is it to make your views known?
	14	S2-SCAN-PY-04: Er...it's usually er face-to-face erm conversation
15.00	14	Researcher: You like face-to-face conversation?
	14	S2-SCAN-PY-04:Yeah
	14	Researcher: So, so what...do you not like writing questionnaires?
	14	S2-SCAN-PY-04: Erm...I don't mind to be honest I like...doing that as well [?]
	14	Researcher: Yeah...yeah...yeah so, so why do you prefer face-to-face then questionnaires? Why do you like them the best?
	14	S2-SCAN-PY-04: Er...what's more comfortable for me?
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...it's...it's because when I'm face-to-face with someone erm I feel more confident because and I don't...I don't feel any anxiety and
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...when I feel anxiety that increases my erm
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...my stammering
	14	Researcher: Yeah, so it's because of your stammering basically that the, the?
	14	S2-SCAN-PY-04: Yeah
16.00		
	14	Researcher: ...that...the...the...you prefer face-to-face...is that...is that right?
	14	S2-SCAN-PY-04: Yeah
	14	Researcher: How...how are you feeling about me and you talking now?

	14	S2-SCAN-PY-04: I've known you for ages so, so that's erm I'm talking absolutely
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...fine at the moment
		Researcher: Yeah, yeah
	14	S2-SCAN-PY-04:... it depends on who, it depends on who I talk to
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...I'm relaxed
	14	Researcher: ...does it help if you know the participant, if you know the person?
	14	S2-SCAN-PY-04: Yeah
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...it's much better [?]
		Researcher: Okey dokey? So...next...are you ready to move onto the next one (S2-SCAN-PY-04's name)?
		S2-SCAN-PY-04: Yeah
		Researcher: Yeah? ...just tell me if there's anything you wanna say....just, just...so just say to me I'm not quite ready...but you're okay to move onto the next one?
		S2-SCAN-PY-04: Yeah I'm okay
		Researcher: Okay so...
		S2-SCAN-PY-04: ...there was actually a few on the disability area if we later on if we go back to the question I may try and add more bits in because it's not as clear
17.00		Researcher: What your speech?
		S2-SCAN-PY-04: ...I'll try and improve it but I'll do that at the end
		Researcher: Alright mate, okay that's fine well it's, it's your interview you, you, you are in charge basically so you tell me what to do I don't tell you what to do (laughing) alright...okay?
		S2-SCAN-PY-04: Yeah that's cool
		Researcher: Right, so do you wanna go back now and talk a bit more about that what you wanted to talk about cus we've got time?

		S2-SCAN-PY-04: Erm...don't have...erm if you ask me the question again and then I'll answer it actually that'd be best Researcher: What...what question is that do you remember? Was, was it how easy it is to make your views known? S2-SCAN-PY-04: Say that again? Researcher: Was it the one about how easy it is to make, to tell, to talk to people and make your views known? I think, or was it about disability? S2-SCAN-PY-04: Disability, it was at the beginning
18.00		Researcher: Right, so let's go back and do that then, okay so the question on disability was (looks at questions in the pack) whoa it's hot in here, it's hot in here, right the question on disability was...do...do you think you've got a disability which you said yes S2-SCAN-PY-04: Yeah Researcher: ...and then, then we talked about how, how it affects you so, so which one was it (S2-SCAN-PY-04's name)? S2-SCAN-PY-04: Erm it was how it affects me Researcher: How it affects you? S2-SCAN-PY-04:Yeah ...yeah Researcher: So what do you want to add my friend?
	1	S2-SCAN-PY-04: Erm al...although...although I have physical complications over my...physical disability Researcher: Yeah
	1	S2-SCAN-PY-04: well...where...where I have to adapt to different ...different...erm things in life...erm...cus ...like wh...what...what ...what...what also affects me is...is that erm when...when I'm...erm when I'm in...in er sssss...so I'll rephrase that
19.00		Researcher: Take your time there's no rush
	6.3	S2-SCAN-PY-04: ...erm...the...the issues I have is...is kinda around sssss society and how people perceive me as a person...because some people with disability stereotype...some...some people don't mean it but it's just, it's just where...it's just where...they're...they, they, they can be ignorant and not understand

20.00		Researcher: Hmmm
	6.3	S2-SCAN-PY-04: ...the effects of one's...ones dis...disability so and sometimes they're, their, their behaviours can, can be rather more...more... negative so and, and for a disabled person that, that can be hard to deal with
		Researcher: Yeah
	6.3	S2-SCAN-PY-04:...because ...it's a big thing to try and to fit in into society and for me sometimes I can feel like I'm an outcaste
		Researcher: Okay
21.00	6.3	S2-SCAN-PY-04: ...so it's always like...it's always a challenge...erm to...erm...to...actually...so...to...to...do different things in everyday life
		Researcher: Yeah, okay, is there anything else you want to add there (S2-SCAN-PY-04's name)?
		S2-SCAN-PY-04: That's fine
		Researcher: That's alright. So, so where were we with the questions? Are you okay to carry on with the other questions now
		S2-SCAN-PY-04: Yeah I'm
		Researcher: ...or is there anymore you want to add?
		S2-SCAN-PY-04: Yeah I'm alright to carry on
22.00		Researcher: Okay, right so, where were we, what was I asking you...erm we were...we were talking about so, so, yeah I suppose this fits in so we were talking about how easy it is for you to make your views known so you said sometimes you feel like an outcaste? So I'm guessing that means it can be harder for you to make your views known?
	6.3	S2-SCAN-PY-04: Yeah...it's erm sometimes erm...sometimes erm actually did I actually say that an outcaste...like...erm it's really hard to deal with this memory...cus because when I want to make my views known sometimes I can't get my words out and people
		Researcher: Yeah
	6.3	S2-SCAN-PY-04:...can be...be in a rush er now...nowadays
		Researcher: Yeah
23.00	7, 8& 18	S2-SCAN-PY-04: ...and...so...so...er...so sometimes you just need people to be a bit more patient

		Researcher: Yeah, but that's not your problem that's their problem isn't it? S2-SCAN-PY-04: Yeah Researcher: Yeah? And, and I have to say you are doing really, really well (S2-SCAN-PY-04's name)...yeah are you happy to carry on? S2-SCAN-PY-04: I'm happy to carry on Researcher: Okay, so what would make it easier for you to express your views? Well, you've just said something about people being a bit more patient? S2-SCAN-PY-04: So...erm...yeah so what would actually make it easier to express my views? Researcher: Yeah S2-SCAN-PY-04: ...er being like Stephen Hawking and having a robot erm talk my words for me (Researcher laughing) Researcher: So, so sometimes would you prefer to use S2-SCAN-PY-04: ...I was literally joking about that seriously (laughing)
24.00	7,8 & 18	Researcher: Yeah, so if you couldn't have that is it just about people being more patient and giving you more time?
	7,8 & 18	S2-SCAN-PY-04: Yeah basically Researcher: Would you prefer a communication aid sometimes? S2-SCAN-PY-04: Erm no Researcher: No? S2-SCAN-PY-04: No that would be a complete Researcher: Yeah, I know what you...but it's interesting you say that...interesting (laughing) I think we all wanna be like Stephen Hawking I'd...I'd like his brains S2-SCAN-PY-04: (laughing) Researcher: Yeah
	6.3	S2-SCAN-PY-04:.I, ...I...I[?]..if I'm being honest...it's, it's the hardest thing sometimes when...when you go into a shop and you're asking for something and you're having a bad day generally, people think you're, that, that you've got learning difficulties Researcher: Yeah

	6.3	S2-SCAN-PY-04: ...that is the hardest bit and when people finish your words off for you...that's what's frustrating
25.00	6.3 & 8	Researcher: Yeah, do you not like it when people finish your words off?
	6.3 & 8	S2-SCAN-PY-04: No I hate it
		Researcher: No...okay
	8&	S2-SCAN-PY-04: ...I'd rather just...just let them suffer the stammering and try (Researcher laughing) and understand me
		Researcher: Why it's... their, it's their problem not your problem (S2-SCAN-PY-04's name) ...why, why shouldn't they suffer your stammering (S2-SCAN-PY-04 laughing) you have to?
	6.3	S2-SCAN-PY-04: Sometimes...some people talk so quiet I can hardly hear them
		Researcher: Okay, so you're just saying like people need to be patient and people just need to suffer the stam...stammering so is that what would make it easier to express your views, is that...is that about right?
		S2-SCAN-PY-04: Erm...to...to...that doesn't wouldn't make it actually easier to express
		Researcher: Yeah
		S2-SCAN-PY-04: ....my views on a communication level erm what would make it easier
26.00		Researcher: Take your time *Peter no rush
		S2-SCAN-PY-04: ...it's a thing to think about actually
		Researcher: Yeah ...okay so do you wanna move on?
		S2-SCAN-PY-04: I...I would...I would be able to... answer this probably to do with presentations actually
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...when doing talks
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...that would make it easier to express...my...my view ...cus...yeah because I'm quite good at doing presentations and standing up and talking
		Researcher: Yeah...so

		S2-SCAN-PY-04: ...actually
	8 & 18	Researcher: So you like it...do you like it when people give you time and space to express your views?
	8 & 18	S2-SCAN-PY-04: Yeah
		Researcher: Yeah
	8 & 14	S2-SCAN-PY-04: ...yeah...and understand
		Researcher: Yeah ...I'm getting it...okay are you...is that it for that question or you got any more things that would make it easier?
		S2-SCAN-PY-04: Yeah it's just a greater awareness and understanding
27.00	7	
		Researcher: Greater...greater awareness and understanding, I think we'd all like that (S2-SCAN-PY-04's name) I think you can come and do my research for me
		S2-SCAN-PY-04: (laughing)
		Researcher: ...I think you're absolutely fantastic...alright
		S2-SCAN-PY-04: (laughing) thank you
		Researcher: So, shall we move on?
		S2-SCAN-PY-04: Yep
		Researcher: Okay
		S2-SCAN-PY-04: ...you can move on
		Researcher: ...okay right ...so this question asks does your impairment make it difficult for you to express your views?
		S2-SCAN-PY-04: Erm
	6.3	Researcher: So does, does your disability make it difficult for you to express your views?
		S2-SCAN-PY-04: ...to be ...sorry, actually this is quite similar to the other questions (Researcher's name) there
		Researcher: Yeah
	6.3	S2-SCAN-PY-04: ...erm I would say...I would say, I would say...my stammering er does
		Researcher: Yeah

	6.3	S2-SCAN-PY-04: ...definitely...er yeah...so I would say yes
	8 & 18	Researcher: Yeah, so, so for example, you probably find it hard to be interviewed if the patie...if the person is not very patient?
28.00	8 & 18	S2-SCAN-PY-04: Yeah
		Researcher: Yeah?
	8 & 18	S2-SCAN-PY-04: Absolutely
	14	Researcher: Do you prefer to write things down or do you prefer to speak?
	14	S2-SCAN-PY-04: Erm...I ...yeah I do actually...erm writing things down does help
		Researcher: Yeah
	14	S2-SCAN-PY-04: ...definitely
	2	Researcher: Yes, okay erm...erm so, so when you did your research with your friend about, about ...about for his dissertation...erm did he do anything that made it difficult for you to give your views...or was he?
	2	S2-SCAN-PY-04: Erm, no because...it was a...erm...cus it was a questionnaire ...a...a...erm...and all these questions was in front of me on a computer screen
		Researcher: aah
29.00	2	S2-SCAN-PY-04: ...so what I had to do was just erm ...er write...write
		Researcher: Yeah
	2	S2-SCAN-PY-04: ...my answers in these boxes and...and...and do...and some questions were...were...were...were a yes or no answer
		Researcher: Yeah, okay, so, so but they didn't do anything that made...made it difficult for you?
		S2-SCAN-PY-04: Nope
		Researcher: So, you ready to move on from that one?
		S2-SCAN-PY-04: Yeah
		Researcher: Yeah?
		S2-SCAN-PY-04: Yeah

	2	Researcher: Right, so when, when he did do his, his research did he make anything, did he do anything to make it easier for you to give your views?
	2	S2-SCAN-PY-04: Er...right...erm because I...because I...because ...because I was fine because everything he did er...didn't actually affect me or made things difficult
30.00		Researcher: Right
	2	S2-SCAN-PY-04: ...so...so...so...for so everything was all fine on that side of things
		Researcher: Yeah, okay are you ready to move onto the next...next set of questions?
		S2-SCAN-PY-04: Yeah...yeah
		Researcher: Okay, this is, this is your time to give advice to designers this one so the first question (S2-SCAN-PY-04's name) and I'm really interested to hear your advice cus I think you give some good advice erm would be is there any advice you'd give to people that are wanting to know your views?
		S2-SCAN-PY-04: ...Erm...the advice ...wanting to know....on any areas that they could want so it could be any areas
31.00		Researcher: Yeah
		S2-SCAN-PY-04: ...that they wish...yeah er...yeah erm...if they...if they show...show a to...to...to...to...to achieve something
		Researcher: Yeah
		S2-SCAN-PY-04: ...that, that...that...that they have the...the ...the and determination [?] and commitment for or then...it's all about working hard erm knuckling down and...just...and...and achieving your dream
		Researcher: But if they wanna talk to you directly, is there any advice you'd give about talking to someone like you?
		S2-SCAN-PY-04: Erm...is there any advice coming from?
		Researcher: Yeah so you already said earlier
32.00		S2-SCAN-PY-04: ...erm
	8 & 18	Researcher: ...that they might need a lot of patience
	8 & 18	S2-SCAN-PY-04: Yeah, yeah
		Researcher: Yeah?

	8 & 18	S2-SCAN-PY-04: ...yeah basically...with...with they can try and listen to the person
	8 & 18	S2-SCAN-PY-04:...be non...non-judgmental...do not judge the...do not judge the person
	8	S2-SCAN-PY-04: ....erm and...and...and try to do...to put yourself in their person's...in that person's shoooo shoes as well erm...and when
	8	S2-SCAN-PY-04: ...and try not to stereotype...type that person as a regular in...in individual
33.00		Researcher: Yeah, any more advice that you would give them? S2-SCAN-PY-04: Erm...that's it at the moment Researcher: So, that's all you can think of at the moment, alright. Next question then *Peter why, why would you give them the advice you've just given them so, so what would be the reason for saying the advice? S2-SCAN-PY-04: Erm...be....because...because it gives them it... Researcher: Yeah S2-SCAN-PY-04: ...I would say it helps them to understand different disabilities a bit more ...it makes them so see to see...see and it also...obviously...er what's the word I was trying to use Researcher: No rush S2-SCAN-PY-04: ...No rush...if you can wait just one second
34.00		Researcher: Yeah, I'll wait…I'll wait as long as you need (12 seconds pause) what erm...what have you put down so far Researcher's name on that question? Researcher: Okay, the question was why would you give the advice that, that you've given? S2-SCAN-PY-04: ...okay...erm I would do that...I've done that so that people would have a greater understanding Researcher: Yeah
35.00	8	S2-SCAN-PY-04: ...and an aware....an awareness of dis...disability and ...and also...erm to...to...cannot feel erm er concerned...it's like erm when, when, when coming up to someone who's got a disability you don't have to worry about...about er offending anyone er you can just be yourself and treat them like any other individual Researcher: Good, good, okay any more

		S2-SCAN-PY-04: ...I hope I've answered that? Basically Researcher: No...you've given very good answers (S2-SCAN-PY-04's name) erm any more, any more you wanna say on that question? S2-SCAN-PY-04: That's okay so far
36.00		Researcher: Okay, right so number 2 in this block of questions. Do you think it's important for, for people that want to talk to you to consider your life circumstances? S2-SCAN-PY-04: Er...do I think it's important? For me to erm say that again sorry?
	8	Researcher: No, do, do you think it's important if someone wants to talk to you and get your views do you think it's important that they should understand erm how, how you live your life, and the circumstances in your life?
	8	S2-SCAN-PY-04: It depends...it...it...it depends on what...what the situation is about...that is one that it's hard to...to actually answer because it depends on the situation
	8	Researcher: Yeah okay, so, so what sort of situation do you find it an important would you say was important for them to understand your life circumstances?
37.00		
	8	S2-SCAN-PY-04: Erm...if you're doing a sort of erm...like if you're doing a needs...a needs test
		Researcher: Yeah
	8	S2-SCAN-PY-04: ...when you're being you sort of get what I mean?
		Researcher: Yeah...yeah, yeah
	8	S2-SCAN-PY-04: ...so...yeah, so, so ,so ,so for instance say you need erm equipment
		Researcher: Yeah
	8	S2-SCAN-PY-04: ...and, and er...for your... erm...erm with your lifestyle
		Researcher: Yeah
	8	S2-SCAN-PY-04: ...to assist you in...with your life ssss style
		Researcher: Yeah
	8	S2-SCAN-PY-04: ...then, then, then those people...er would it'll be ...you need to sss sort of understand their situation

	8	Researcher: Yeah, yeah I get that, I get that. Alright are you happy to move onto the next...next one (S2-SCAN-PY-04's name?) S2-SCAN-PY-04: Yeah, yeah Researcher: ...or is there anything new that you wanna add? You want...? We can move on yeah? S2-SCAN-PY-04: Yeah...move on
38.00	8	Researcher: Okay, so how important do you think it is that people understand, so if they're doing a needs test how important a factor do you think in understanding somebody's...how they live their life ...how...how important do you think that should be? S2-SCAN-PY-04: Erm...is that on a scale of 1 to 10 or actually explain it? Researcher: Erm...no just, just do you think it should be very important, not important at all and just me a bit about why you think that as well?
	8	S2-SCAN-PY-04: Erm...again it's about un....understanding and to acknowledge actually isn't it? Researcher: Yeah
	8	S2-SCAN-PY-04: ...again I think it should be Researcher: Yeah
39.00	8	S2-SCAN-PY-04: ...I think it should be, be, be important cus...because then...then...then those people have...will have a better under....ssss understanding of...of what needs basically Researcher: Yeah
	8	S2-SCAN-PY-04: ...or it needs someone to have understand Researcher: Yeah
	8	S2-SCAN-PY-04: ...and what needs to be put into place Researcher: Yeah
	8	S2-SCAN-PY-04: ...erm to help cater for their...their needs Researcher: Yeah
	8	S2-SCAN-PY-04: ...and their lifestyle it's much...much better Researcher: Okay, anything more on that question matey?

		S2-SCAN-PY-04: Er no
	23	Researcher: Okay, so do you think that people...that designers that who want to talk to people could benefit from some formalised guidance like they, they could have a little booklet produced which tells them about maybe like talking with people like yourselves what to do, what not to do kind of thing?
	23	S2-SCAN-PY-04: Yes
40.00		Researcher: Do you think that would?
		S2-SCAN-PY-04: ...I think erm...actually
		Researcher: Yeah
		S2-SCAN-PY-04: ...no
		Researcher: Actually no? Why do you, why do you think that?
		S2-SCAN-PY-04: I think...because...because if...right ...erm ooh I'm gonna get this straight...I'll answer it erm...if it's regarding someone's dis...disability
		Researcher: Yeah ...yeah regarding someone's disability
		S2-SCAN-PY-04: ...of what to say and what not to say?
		Researcher: Kind of yeah
		S2-SCAN-PY-04: ...that will possibly...yeah
		Researcher:...or what to do and what not to do and how to behave and sort of how...how what, what, what you prefer...the best methods of getting your views and sort of
		S2-SCAN-PY-04: Right
41.00		Researcher: ...any ethical issues that might come about when working with you
	8	S2-SCAN-PY-04: The best thing is to tell me
		Researcher: Yeah
	8	S2-SCAN-PY-04: ...ask them what
		Researcher: Yeah
		S2-SCAN-PY-04: ...what they want...what erm...how er...and how and

	8	what to do and what not to do Researcher: Yeah
	8	S2-SCAN-PY-04: ...because it depends on people's preferences, some people like so sss some, some disabled people are very erm Researcher: Yeah
	21	S2-SCAN-PY-04: ...how can I put it are piss takers Researcher: Yeah
	21	S2-SCAN-PY-04: ...so, so, sorry for the language Researcher: It's alright
42.00		S2-SCAN-PY-04: ...sometimes like society...people er...erm can feel more relaxed if they don't take everything too seriously Researcher: Yeah
	21	S2-SCAN-PY-04: ...so...so from my point of view Researcher: Yeah
	21	S2-SCAN-PY-04: ...I'm...I'm...I'm relaxed so...so....so when it comes to people erm talking at me I try and make them feel...feel more relaxed and
	21	Researcher: Yeah S2-SCAN-PY-04: ...and...and...and basically...they...they say what...what...they want at me and...that...and if they say something that's not
	21	Researcher: Yeah S2-SCAN-PY-04: ...that's not very...that's not really politically correct then it's like things you just try and start
	21	Researcher: Yeah S2-SCAN-PY-04: ...because it depends on people's preferences Researcher: Yeah
	8	S2-SCAN-PY-04: ...it's all different for everyone
43.00		Researcher: So if we put that in a little book for designers like gave them guidance on what to do, what to say, what not to say, what to do,

	8	what not to do, do you think, do you think that might help them? Or not? S2-SCAN-PY-04: It might but...but...but again it depends on people's preferences
	23	Researcher: Yeah S2-SCAN-PY-04: ...but sometimes...because
	23	Researcher: Yeah S2-SCAN-PY-04: ...we're all individuals so that's why
	23	Researcher: Yeah S2-SCAN-PY-04: ...it might be good...it might be good but erm
	23	Researcher: Yeah S2-SCAN-PY-04: ...there's a book that says something in those lines but basically
	23	Researcher: Yeah S2-SCAN-PY-04:...the ultimate thing is...is to ask
	23	Researcher: Is to ask the person isn't it? S2-SCAN-PY-04: ...how they want to be treated
	23	Researcher: Yeah S2-SCAN-PY-04: ...and that sort of stuff
	23	Researcher: I get ya, I get ya...you're doing really, really well we're onto the erm a couple more questions and then we're done alright? S2-SCAN-PY-04: So we're on the final stage
44.00	23	Researcher: Yeah, yeah we are...erm right so this one really talks about erm language and whether when you took part in ...in...in your research with your friend about for his dissertation on team captains did he...erm did the language used that he used in his questionnaire...did it make it easier or harder for you to understand the questions?
45.00	2	S2-SCAN-PY-04: Easy and...it was easy because...erm when I studied at Uni I learnt...and then...and then differently...the..the the...more in-depth...different erm academic words they...they used...so...so was how I completely understood his questionnaire
	2	Researcher: Cus you'd been at Uni and it was academic words you understood it yeah? Is that what you're saying?

		S2-SCAN-PY-04: Yeah ...definitely
	2	Researcher: Good...good alright then. Okay the next one is when you did your research with your friend again erm how was your involvement in the study presented to you?
	2	S2-SCAN-PY-04: How was my involvement?
	2	Researcher: Yeah
		S2-SCAN-PY-04: erm it was could you give me an example of that?
		Researcher: Yeah, so...so did he, did he say to you 'well I just want you to fill in this questionnaire er it's on the computer go and do it'
	2	S2-SCAN-PY-04: Yeah actually yeah Researcher:...or did he say to you I'll sit with you and
	2	S2-SCAN-PY-04: ...it was basically that (laughing)
	2	Researcher: Yeah...yeah...yeah but was...was did you understand what you had to do?
46.00	2	S2-SCAN-PY-04: Yeah because it...because it was explained...and
	2	there was a small introduction
	2	Researcher: Yeah S2-SCAN-PY-04: ...erm at the er...at the top of the er screen
	2	Researcher: Yeah
	2	S2-SCAN-PY-04: ...and it explained what to do and how...how...to...to ...to answer Researcher: Yeah, okay so that was quite straightforward for you, is that...is that what you're saying?
	2	S2-SCAN-PY-04: Yeah, yeah
	2	Researcher: Okay...number 3 asks did you understand what the study was about?
	2	S2-SCAN-PY-04: Yes I did Researcher: Yeah? So you understood what he was trying to do...what
	2	he wanted to find out, yeah?
		S2-SCAN-PY-04: Yeah
	2	Researcher: Yeah...okay...right number...

47.00	2	S2-SCAN-PY-04:254
	2	Researcher: ...yeah it feels like it *Peter but we're nearly there...erm (*Peter's laughing). Okay did you understand why you were being asked to take part?
		S2-SCAN-PY-04: Did I understand why I wanted to take part?
		Researcher: Did you understand why he wanted you...why he wanted to talk to you ...why he asked you to take part in his study?
		S2-SCAN-PY-04: Yeah because he actually needed participants otherwise he wouldn't have asked
		Researcher: So you understood that and it was all good? Okay
	2	S2-SCAN-PY-04: ...and erm there was actually...there was actually a friend, who's my friend's friend
	2	Researcher: Yeah
		S2-SCAN-PY-04: ...and she...she asked me to take part in her friend's erm
		Researcher: Yeah
		S2-SCAN-PY-04: ...er
		Researcher: Oh it was a lady was it (S2-SCAN-PY-04's name!)
		S2-SCAN-PY-04: Sorry?
		Researcher: It was a lady?(laughing)
		S2-SCAN-PY-04: (laughing)
		Researcher: I'm joking, I'm joking
		S2-SCAN-PY-04: ...it was...was a lady...she's taken now
		Researcher: (laughing) oh okay but did it make it easier when you found out she was a lady? (laughing)
		S2-SCAN-PY-04: (laughing) erm so
		Researcher: Yeah
		S2-SCAN-PY-04: ...so my friend's mate who's a he right?
		Researcher: Yeah
48.00		S2-SCAN-PY-04: ...it was his dissertation but my friend she

		Researcher: Yeah
		S2-SCAN-PY-04: ...erm said....said to me...can...can you fill out...er a questionnaire on...on...on erm team captains
		Researcher: Yeah
		S2-SCAN-PY-04: ...erm for his dissertation and I had nothing to do at the time so I thought I'd do it
		Researcher: Yeah, that's good, so when you were doing...when you were doing the questionnaire could you answer the questions were they ...could you understand....could you answer them?
		S2-SCAN-PY-04: Yeah
		Researcher: Yeah?
	2	S2-SCAN-PY-04: ...yeah I answered it
		Researcher: Yeah?
	2	S2-SCAN-PY-04: ...it was pretty ssss...straightforward and...er it was ...it was basic...because I'm...because I coach in
	2	Researcher: Yeah
		S2-SCAN-PY-04: ...and previously a team captain
	2	Researcher: Yeah
		S2-SCAN-PY-04: ... or my netball team
		Researcher: Yeah
	2	S2-SCAN-PY-04: ...in my past...I....I had all the basic
49.00		Researcher: Yeah
	2	S2-SCAN-PY-04:... knowledge
		Researcher: The knowledge that you needed?
	2	S2-SCAN-PY-04: ...erm to...to ...to understand why what I had to do
		Researcher: Yes...yeah anything else mate?
	2	S2-SCAN-PY-04: Nothing else
	2	Researcher: Okay erm right...next, we're going, we're going...we're going great guns through this okay, right okay what did we

		answer...what do we ask...erm did you think that...that the person doing ...doing the study understood the information that you gave them?
		S2-SCAN-PY-04: Well I hope so (Researcher laughing) otherwise...otherwise he wouldn't have got the grade [?]
	2	
		Researcher: Yeah
		S2-SCAN-PY-04: ...I...I should expect so...because
	2	
		Researcher: Yeah
50.00		S2-SCAN-PY-04: ...see....seeing what he's written and his writing skills ....and...and how he...how we produced his work it seemed he knew what he was doing
	2	
		Researcher: Yeah. Okay last question in this section do...do you know if ...do you know if the information you gave was used in his study?
		S2-SCAN-PY-04: Erm I don't know because he didn't contact me
	2	
		Researcher: You don't know?
		S2-SCAN-PY-04: ...so I don't know whether erm...I should imagine it
	13	was used...the study
	13	Researcher: Yeah but you can't be 100% sure...yeah is that about right?
		S2-SCAN-PY-04: Yeah
	13	
		Researcher: Anything else you wanna add?
	13	S2-SCAN-PY-04: No...I don't at the moment
		Researcher: Okay...next...next one...there's...okay so when we talk
	13	about language there's lots of erm...when you're disabled there's lots of people that use lots of different language don't they...they talk about impairment...disability...erm...er
51.00		
		S2-SCAN-PY-04: terminology [?]
		Researcher: ...they might say I'm deaf or...or I have a stammer or...do you know the sort of thing I'm saying?
		S2-SCAN-PY-04: Yeah
		Researcher: ...so how do you, how do you like to be referred to as? Would you say I'm (S2-SCAN-PY-04's name) I have a disability or I have an impairment or...or my feet hurt if I stand for long periods of time

		or...how...how do you like to be referred to as?
		S2-SCAN-PY-04: First of all is this being recorded?
		Researcher: Pardon? Yeah this is being
		S2-SCAN-PY-04: ...is this being recorded?
		Researcher: Yes this is being recorded only so I can analyse it
		S2-SCAN-PY-04: Cool
		Researcher: But...but...but you can be as open as you want
52.00		S2-SCAN-PY-04: Cool...yeah that's fine (laughing) erm...er...er yeah it's basically...Yeah I'd... that might...it depends on...it depends on that's fine ...yeah
		Researcher: But how do you like to be referred to as?
		S2-SCAN-PY-04: ...disability is fine ...or actually even my names *Peter
		Researcher: You're names *Peter?
		S2-SCAN-PY-04: ...er yeah
	22	Researcher: That's great and you just like to be referred to as S2-SCAN-PY-04's name?
	22	S2-SCAN-PY-04: Yeah
	22	Researcher: Yeah?
	22	S2-SCAN-PY-04: ...not...not...not (laughing) a spaz [?]
	22	Researcher: Not a what, sorry? (S2-SCAN-PY-04 laughing) Not a spaz did you say?
	22	S2-SCAN-PY-04: (laughing)
	22	Researcher: Did you say not a spaz?
	22	S2-SCAN-PY-04: ...Right I would joke around if I wasn't being recorded (laughing)
		Researcher: ...did you...is that what you said?
		S2-SCAN-PY-04: ...cus I don't want to offend anyone
		Researcher: No, that's alright, you can joke we'll take them out the transcript don't worry (laughing) so...so you just like to

		S2-SCAN-PY-04: (laughing) Yeah (Researcher's name) Researcher: I tell you what...this is about the most fun interview I've done I think so far (laughing)
53.00		S2-SCAN-PY-04: Oh really! Researcher: You're making me laugh (S2-SCAN-PY-04's name) S2-SCAN-PY-04: ...(laughing) because when Researcher: So (laughing) S2-SCAN-PY-04: ...you said that...right ....I kinda erm so when you said so...so...so to...to how would you like basically erm to be erm referred to Researcher: Yeah S2-SCAN-PY-04: ...I'm thinking cool there's a pseudonym [?] here Researcher: Yeah so you S2-SCAN-PY-04: (laughing) Researcher: So, so you're not a spaz S2-SCAN-PY-04: I could easy go through [?] Researcher: (S2-SCAN-PY-04's name) who's not a spaz S2-SCAN-PY-04: ...no there was like erm...autistic bhilf from Harold Hill (laughing) Researcher: (laughing) S2-SCAN-PY-04: ...or a spastic autisticus
54.00	22	Researcher: So, you just like to be referred to as (S2-SCAN-PY-04's name? S2-SCAN-PY-04: (S2-SCAN-PY-04'S name)...yeah
	22	Researcher: Yeah, is that what you're saying?
	22	S2-SCAN-PY-04: ...(laughing) it is Researcher's name (laughing) Researcher: Okay, right S2-SCAN-PY-04: Well at least you're having fun

	22	Researcher: Well...it's good, I hope you're having fun too *Peter S2-SCAN-PY-04: (laughing) Researcher: Are you...are you having fun? S2-SCAN-PY-04: Yeah it's good...it's really...it's really good Researcher: Alright, I've got a few more questions and then we're done alright? Alright? S2-SCAN-PY-04: That's cool. Researcher: Okay, so has there ever been any times when someone has used...sort of used inappropriate language? S2-SCAN-PY-04: Well...yeah many times Researcher: Yeah S2-SCAN-PY-04: ...erm do you...shall I tell you all the names? Researcher: You can do if you want to?
	22	S2-SCAN-PY-04: ...you're...you're gonna laugh well it's starts of as
	22	Researcher: It's only if you're happy to, are you happy to tell me all the names?
55.00		
	22	S2-SCAN-PY-04: Oh yeah... I'm well open Researcher: Okay S2-SCAN-PY-04: ...(laughing) Researcher: Well tell me all the names; tell me all the names then? S2-SCAN-PY-04: ...(laughing) Researcher: Go on... S2-SCAN-PY-04: ...so it starts of spastic, retard, mongrel er cripple... Researcher: Right
	22	S2-SCAN-PY-04: ... erm...yeah it's like...er loads of them four...four eyes, blindy, gammy-arm all of them so yeah Researcher: Right

	22	S2-SCAN-PY-04: ... and there has been times where ...where people have been nasty like oh you spastic
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...and in...I look back now
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...in the past I thought yeah spaz but sss I'm thinking
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...if I knew a bit more about my disability I would probably say 'you're right I am a spastic I've got spastic quadriplegia'
		Researcher: Yeah
	22	S2-SCAN-PY-04: (laughing) so
56.00		Researcher: Okay, is there any more names you wanna tell me
		S2-SCAN-PY-04: ...erm no accept for some...sometimes I get like ...any...anywhere I go could be like...I get
		Researcher: Yeah
	6.3 & 7	S2-SCAN-PY-04: ...get...get a look where it's like I'm different
		Researcher: Yeah
	6.3 & 7	S2-SCAN-PY-04: ...but I ignore that
		Researcher: Okay
	6.3 & 7	S2-SCAN-PY-04: ...I just get on with life
	6.3 & 7	Researcher: Yeah ...you're...you're doing very well (S2-SCAN-PY-04's name) I'm so proud of you today; you've done really, really well. Right just two more questions and then we're done alright?
		S2-SCAN-PY-04: Okey, dokey
		Researcher: Right, so, the next one is when...when somebody's called you er spastic or autistic bhilf from Harold Hill (laughing) (S2-SCAN-PY-04 laughing). How did that make you feel...when that happened how did that make you feel?
	22	S2-SCAN-PY-04: Oh I got my name back I thought
		Researcher: Okay

	22	S2-SCAN-PY-04: ...no...er...no (laughing) I thought...erm I thought it was hurtful
57.00		Researcher: Yeah
	22	S2-SCAN-PY-04: ...it was hurtful
		Researcher: Yeah
		S2-SCAN-PY-04: ...and...and then I thought ...I thought like
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...this is going back a little bit when I was younger erm
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...I thought it was...just erm ...people just being nasty
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...erm...yeah...so it did...it did erm...I have to admit it does...it can erm be...erm because it affects my self-esteem and confidence when people are nasty
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...like that and it can affect the way and it still affects at times
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...the way I was as well
		Researcher: Yeah...so, so it sounds like it really upset you?
58.00	22	S2-SCAN-PY-04: Yeah
	22	Researcher: Yeah
	22	S2-SCAN-PY-04: ...but that's...but that is college and school life for ya
	22	Researcher: Yeah ...but, but, but you deal with it...now you deal with it so well...you've learnt really well haven't you how to deal with it and?
		S2-SCAN-PY-04: Yeah
	7	Researcher: ...and...and you seem to laugh at it now and think it's their

		problem, would that be a fair estimate?
	7	S2-SCAN-PY-04: Yeah I mean and I encourage my friends to actually like do the same and call me names...like my family call me names because I call them names for a laugh
		Researcher: Ah...so you give it back to them basically?
	7	S2-SCAN-PY-04: ...yeah...and
		Researcher: Okay...
	7	S2-SCAN-PY-04: ...that is...going back to like the question you asked before
	7	Researcher: Yeah
	7	S2-SCAN-PY-04: ...if you'd...erm I'll rephrase that...going back to one of the questions
		Researcher: Yeah
59.00	7	S2-SCAN-PY-04: ...that's why when...when being with friends and family you can sort of take the piss and, and
		Researcher: Yeah
	7	S2-SCAN-PY-04: ...and say things that...that are nasty
		Researcher: Yeah
	7	S2-SCAN-PY-04: ...but...but are not
		Researcher: Yeah...yeah
		S2-SCAN-PY-04: ...when it's family and friends because it's banter
		Researcher: Yeah
	22	S2-SCAN-PY-04: ...because it depends on the environment (Researcher's name)
	22	Researcher: If I said to you...you big spaz you probably wouldn't take it as hard as if someone down the street did it...is that what you're saying?
	22	S2-SCAN-PY-04: Yeah, basically (laughing)
		Researcher: Yeah, Is that what you mean?
	22	S2-SCAN-PY-04: Yeah...absolutely

	22	Researcher: Yeah, yeah okay are you happy to move onto the last question now or anymore?
	22	S2-SCAN-PY-04: Yeah
		Researcher: Okay...erm
		S2-SCAN-PY-04: ...I'm happy to move on
		Researcher: Why did it make you...why...why when it first happened why did it make you feel sad though?
01:00:00		S2-SCAN-PY-04: Erm...because I know....I know everything was a challenge for me
	6.3	Researcher: Yeah
	6.3	S2-SCAN-PY-04: ...trying to fit in society and to...to...to...to...to be a ssss to fit in with others in my group
	6.3	Researcher: Yeah S2-SCAN-PY-04: ...and...and to be...an...an outcaste ...was...was not
		Researcher: Yeah
	6.3	S2-SCAN-PY-04: ...wasn't a great thing so Researcher: Yeah
	6.3	S2-SCAN-PY-04: ...so, so it's...it's kind of being ...it's kind of being noticed and being wanted and because I wasn't
		Researcher: Yeah
	6.3	S2-SCAN-PY-04:...it got me down
		Researcher: Yeah...yeah aah. Right, last question is there anything else that you wanna tell me that we haven't discussed that you think might be relevant to what I've asked you about?
	6.3	S2-SCAN-PY-04: Erm I think that's actually okay at the moment
01.01.00		
		Researcher: Okay, well if there is anything more you can always e-mail me, yeah?
		S2-SCAN-PY-04: No problem
		Researcher: So have you enjoyed taking...have you enjoyed today (S2-

		SCAN-PY-04's name?) S2-SCAN-PY-04: It's been super duper Researcher: Yeah? And has it been I haven't stressed you out at all...no? S2-SCAN-PY-04: No...erm so in the future would I refer to you as Dr (Researcher's surname)? Researcher: Erm, well hopefully if I can, if I get this research done hopefully...hopefully...but you can still call me (Researcher's name) you big spaz S2-SCAN-PY-04: (laughing) Researcher: Alright? S2-SCAN-PY-04: ...of course Researcher: So you can still call me a big spaz whatever you wanna call em S2-SCAN-PY-04: ...you big spaz! Researcher: Yeah if that's what you wanna call me S2-SCAN-PY-04: (laughing) aaah, I'll just call you (Researcher's name) Researcher: Okay, so, so, so you've had fun today yeah and you've enjoyed it?
01.02.00		S2-SCAN-PY-04: Yeah...yeah Researcher: And I...is there anything I've done at all that's made you feel unhappy? S2-SCAN-PY-04: No...erm...actually with...with...with regards to the disability one Researcher: Yeah S2-SCAN-PY-04: ...when you said how...like...how does that affect you? Researcher: Yep S2-SCAN-PY-04: ...well with my blindness as well ...I mean going into crowded places ...I'm having to turn my head a lot Researcher: Yeah
	1	S2-SCAN-PY-04: ... to see where I'm going and I do

		Researcher: Yeah
	1	S2-SCAN-PY-04: ...bump into people a lot and that can stress me out so, so
	1	Researcher: Oh yeah you bump into...you bump into ladies a lot do you? (laughing)
		S2-SCAN-PY-04: Well I hope so (Researcher laughing) but it doesn't seem
01.03.00		Researcher: But if you bump into people that can stress you out?
		S2-SCAN-PY-04: Yeah...yeah and it's just and yeah and...and trying to actually hold ...say...say basically it's to actually erm...I'm...I'm buying some products like food and...and shopping
		Researcher: Yeah
	1	S2-SCAN-PY-04: ...in a...in a supermarket
		Researcher: Yeah
	1	S2-SCAN-PY-04: ...I ...so I can't carry loads of them
		Researcher: Yeah
	1	S2-SCAN-PY-04: ... some of most of the time ...so there are some that gets frustrating ...so...so because I then have difficulty they don't understand
	6.3 & 7	Researcher: Yeah
01.04.00		S2-SCAN-PY-04: ...erm it can be hard to...to hold
		Researcher: Yeah
	6.3 & 7	S2-SCAN-PY-04: ...multiple things
	6.3 & 7	Researcher: Yeah ...it's hard for me to hold multiple things and I don't know about you but it's hard for me to hold multiple things sometimes mate
		S2-SCAN-PY-04: ...(laughing)
		Researcher: Yeah
	7	S2-SCAN-PY-04: ...but we learn to adapt and
		Researcher: Yeah

01.05.00	7	S2-SCAN-PY-04: ...to the situation and ...and break down barriers (Researcher's name) Researcher: Yeah we do...we do. Is there anything else you wanna add before we finish talking (S2-SCAN-PY-04's name?) S2-SCAN-PY-04: No, that's it actually Researcher: Okay S2-SCAN-PY-04: Thank you Researcher: It's been absolutely, it's been absolutely wonderful, alright to talk to you S2-SCAN-PY-04: And...and the same here as well Researcher: Okay, I hope you enjoyed it and we'll ...and when I'm home sometime we'll go for a drink down the pub or something...yeah? S2-SCAN-PY-04: Yeah of course Researcher: Okay then mate S2-SCAN-PY-04:...no problem, that was fantastic Researcher: You...you take care alright thank you for helping me S2-SCAN-PY-04: Thank you Researcher:...with the research S2-SCAN-PY-04: ...and good luck with your erm the...the...the degree erm you're doing a PhD right? Researcher: Yeah...yah S2-SCAN-PY-04: ...and...and how far have you got left before you're done? Researcher: I've got 2...we think I've got 2 more years ...we think I've got 2 more years but we're not entirely sure...yeah? S2-SCAN-PY-04: So, so this project is your...like from an undergraduate level? Researcher: No, this is ...this is S2-SCAN-PY-04: ...it's like a dissertation? Researcher: Yeah, yeah but it's a lot bigger a lot bigger than a dissertation

		S2-SCAN-PY-04: Yeah Researcher: ...I have to do 80,000 words S2-SCAN-PY-04: Well...I done 17,000 once when I was in college Researcher: (laughing) yeah S2-SCAN-PY-04: ...it took my tutor 2 days to read...read it (laughing) Researcher: (laughing) right S2-SCAN-PY-04: ... oh that's terrible but that 80,000 is a lot of words Researcher: Yeah it is isn't it, it is. Alright, well it's been absolutely lovely (S2-SCAN-PY-04's name) S2-SCAN-PY-04: Yeah you as well...take care Researcher: You stay in touch S2-SCAN-PY-04: Yeah Researcher: You stay in touch S2-SCAN-PY-04: ...and...yeah of course Researcher: Take care S2-SCAN-PY-04: ...and erm ...and good luck with your erm degree Researcher: Yep ...thank you mate...alright then see you soon bye... bye S2-SCAN-PY-04: Speak to you soon, bye...bye Researcher: Bye ...bye. **End of recording: 01:06:16**

Medium to High Risk Research Ethics Approval Checklist

1 Project Information (Everyone)

Title of Project Working together to ensure all users are included in design and evaluation processes
Name of Principal Investigator (PI) or Research or Professional Degree Student Mr. Wesley David Scott
Faculty, Department or Institute Coventry School of Art and Design, Industrial Design.
Names of Co-investigators (CIs) and their organisational affiliation N/A
How many additional research staff will be employed on the project? See above plus technical support staff. Focus Group Facilitator(s)
Proposed project start date December 2010
Estimated project end date March 2011
Who is funding the project? Myself Has funding been confirmed? Yes
Code of ethical practice and conduct most relevant to your project: • British Computer Society • **British Psychological Society X** • Engineering Council • Social Research Association • Socio-legal Studies Association • Other (Specify)

Students Only

Degree being studied (MSc/MA by Research, MPhil, PhD, EngD, etc) PhD
Name of your Director of Studies Professor Andree Woodcock
Date of Enrolment 21st September, 2008

2. Does this project need ethical approval?

Questions	Yes	No
Does the project involve collecting primary data from, or about, living human beings?	X	
Does the project involve analysing primary or unpublished data from, or about, living human beings?	X	
Does the project involve collecting or analysing primary or unpublished data about people who have recently died other than data that are already in the public domain?		X
Does the project involve collecting or analysing primary or unpublished data about or from organisations or agencies of any kind other than data that are already in the public domain?		X
Does the project involve research with non-human vertebrates in their natural settings or behavioural work involving invertebrate species not covered by the Animals Scientific Procedures Act (1986)?[1]		X
Does the project place the participants or the researchers in a dangerous environment, risk of physical harm, psychological or emotional distress?		X
Does the nature of the project place the participant or researchers in a situation where they are at risk of investigation by the police or security services?		X

If you answered **yes** to **any** of these questions, proceed to **Section 3**.

If you answered **No** to **all** these questions:

- You **do not** need to submit your project for peer ethical review and ethical approval.
- You should sign the Declaration in **Section 16** and keep a copy for your own records.
- Students must ask their Director of Studies to countersign the declaration and they should send a copy for your file to the Registry Research Unit.

[1] The Animals Scientific Procedures Act (1986) was amended in 1993. As a result the common octopus (*Octopus vulgaris*), as an invertebrate species, is now covered by the act.

3 Does the project require Criminal Records Bureau checks?

Questions	Yes	No
Does the project involve direct contact by any member of the research team with children or young people under 18 years of age?		X
Does the project involve direct contact by any member of the research team with adults who have learning difficulties?		X
Does the project involve direct contact by any member of the research team with adults who are infirm or physically disabled?		X
Does the project involve direct contact by any member of the research team with adults who are resident in social care or medical establishments?		X
Does the project involve direct contact by any member of the research team with adults in the custody of the criminal justice system?		X
Has a Criminal Records Bureau (CRB) check been stipulated as a condition of access to any source of data required for the project?		X

If you answered **yes** to **any** of these questions, please:

- Explain the nature of the contact required and the circumstances in which contact will be made during the project.

N/A

Note: that whilst the researcher does not intend to recruit specifically from any of the groups on the list above he cannot guarantee that members of the target group will not be part of any of the groups listed above e.g. a designer could, for example, be physically disabled or have a moderate learning disability such as dyslexia.

4 Is this project liable to scrutiny by external ethical review arrangements?

Questions	Yes	No
Has a favourable ethical opinion been given for this project by an external research ethics committee (e.g. social care, NHS or another University)?		X
Will this project be submitted for ethical approval to an external research ethics committee (e.g. social care, NHS or another University)?		X

If you answered **No** to **both** of these questions, please proceed to **Section 5**.

If you answered **yes** to **either** of these questions:

- Sign the Declaration in **Section 16** and send a copy to the Registry Research Unit.
- Students must get their Director of Studies to countersign the checklist before submitting it.

5 More detail about the project

What are the aims and objectives of the project?

Aim:

To produce guidelines to assist designers in the selection of the most appropriate methods to support user centered evaluation and design when working with participants with Specific, Critical, Additional Needs (SCAN).

Objectives:

1) Investigation of designers' experiences of working with SCAN users.

2) An investigation of the way in which SCAN and other users are treated as part of the design and evaluation processes.

Note that, where the term 'designer' is used in the context of this project; this term refers to any member of a design team and/or clinicians that have worked closely with end users (a single person or a specified user group) that have additional needs, in order to design a specified artifact.

Briefly describe the principal methods, the sources of data or evidence to be used and the number and type of research participants who will be recruited to the project.

The principal method of data collection in this stage of the project will be by means of focus group sessions and video and audio recordings plus written notes of these.

3 focus groups consisting of between 5 and 8 designers that have worked on projects where users with additional needs formed part of the target user population will be conducted. A further control group of designers who have not worked with SCAN users and not designed assistive technology products will also be conducted to establish if there are any underlying differences or similarities in opinions, attitudes and selection of methods. The designers in the control group will have had significant experience of designing within a user centred context with participants that do not have additional needs.

During the focus groups, designers will be invited to discuss their experiences in relation to working with users that have additional needs; specifically, the user centred design or evaluation methods they used when working with these users. They will also be invited to share any advice they may have in relation to working with SCAN users that they would consider helpful to designers that have not worked with SCAN users before and are about to start doing so, this can be in the form of general advice or methods specific.

In the control group participants will be invited to talk about the methods they have used when working with participants without Specific, Critical, Additional Needs and to give any advice they may have in relation to appropriate method selection when working with these participants.

Where designers have expressed an interest in attending the focus group but are unable to do so because of other commitments, they will be offered the opportunity to have a telephone conversation with the researcher to enable them to present their input to the project; these interactions will be conducted using the discussion themes for the focus group as a guide in order to facilitate the discussion.

What research instrument(s), validated scales or methods will be used to collect data?

See Appendix D for a list of themes to be used in focus groups with SCAN designers and Appendix E for a list of themes to be used in focus groups for non SCAN designers.

If you are using an externally validated research instrument, technique or research method, please specify.

N/A

If you are not using an externally validated scale or research method, please attach a copy of the research instrument you will use to collect data. For example, a measurement scale, questionnaire, interview schedule, observation protocol for ethnographic work or, in the case of unstructured data collection, a topic list.

See Appendix D and E attached.

6 Confidentiality, security and retention of research data

Questions	Yes	No
Are there any reasons why you cannot guarantee the full security and confidentiality of any personal or confidential data collected for the project?		X
Is there a significant possibility that any of your participants, or people associated with them, could be directly or indirectly identified in the outputs from this project?		X
Is there a significant possibility that confidential information could be traced back to a specific organisation or agency as a result of the way you write up the results of the project?		X
Will any members of the project team retain any personal or confidential data at the end of the project, other than in fully anonymised form?		X
Will you or any member of the team intend to make use of any confidential information, knowledge, trade secrets obtained for any other purpose than this research project?		X

If you answered **No** to **all** of these questions:

- Explain how you will ensure the confidentiality and security of your research data, both during and after the project.

Data collected will be stored in electronic and/or paper based forms. In the case of electronic data, this will be stored securely either on the researcher's networked home drive at Coventry University (requires password for access) or on the researcher's personal computers (these also require password for access).

All documents relating to the project will be password protected and the researcher and his support workers will be the only people who have access to these documents. In the case of hard copy data and DVDs of session recordings, these will be stored under lock and key (either in a locked box or filing cabinet) at all times when not in use. Again, the researcher, supervisory team and his support workers will be the only people who have access to these artefacts. All personal identifiable data will be destroyed at the end of the project or shortly thereafter and only data that is in a fully anonymised form will be kept.

To aid with the anonymisation process, each participant will be coded, for example S1FG:P01 would stand for 'Stage 1Focus Group: Participant 1' this is also how participants will be referred to once the data has been anonymised and written up in the thesis or any other publication associated with the research.

If you answered **yes** to **any** of these questions:

- Explain the reasons why it is essential to breach normal research protocol regarding confidentiality, security and retention of research data.

N/A

7 Informed consent

Questions	Yes	No
Will all participants be fully informed why the project is being conducted and what their participation will involve and will this information be given before the project begins?	X	
Will every participant be asked to give written consent to participating in the project before it begins?	X	
Will all participants be fully informed about what data will be collected and what will be done with these data during and after the project?	X	
Will explicit consent be sought for audio, video or photographic recording of participants?	X	
Will every participant understand what rights they have not to take part, and/or to withdraw themselves and their data from the project if they do take part?	X	
Will every participant understand that they do not need to give you reasons for deciding not to take part or to withdraw themselves and their data from the project and that there will be no repercussions as a result?	X	
If the project involves deceiving or covert observation of participants, will you debrief them at the earliest possible opportunity?	N/A	

If you answered **yes** to **all** these questions:

- Explain briefly how you will implement the informed consent scheme described in your answers.
- Attach copies of your participant information leaflet, informed consent form and participant debriefing leaflet (if required) as evidence of your plans.

The researcher is aware of the need to attain informed consent from all participants who partake in research activities related to the project. In order to meet the requirement to gain informed consent, before the start of any research activities, all participants involved will be asked to sign a consent form (Appendix A) stating that they wish to take part in the research and that they have understood its purpose. Before participants sign the consent form they will be given a copy of the participant information leaflet and have the opportunity to ask any questions they may have or ask for clarification of anything they do not understand.

All participants will be informed that participation in the research (focus groups) is entirely voluntary and they may withdraw from it at any time without repercussion or giving a reason for their withdrawal. Participants also have the right to refuse to answer a question if they deem it to be too personal or inappropriate etc. Additionally, participants may stop, suspend or terminate their participation in focus groups at any time without giving a reason.

However, participants will be made aware (on the participant information leaflet- see Appendix B) that it is not possible to withdraw their data after the analysis process has taken place; this is due to the fact that it will be in an anonymised form.

Additionally, at the end of the focus group session, all participants will be debriefed and be given an opportunity to ask any questions related to the research. Participants will also be given a copy of the debrief letter (see Appendix C). This explains the purpose of the research and how to contact the researcher should they have any remaining questions and/or want to obtain copies of any resulting publications. Where possible, copies of the 'Participant Information Leaflet' and 'Consent Form' will be provided to participants at least 2 weeks before their allotted focus group session, this is to enable the participant to read and understand the material, and if needed, contact the researcher in relation to any questions they may have. This material will be distributed to participants either by post or e-mail; participants will also be instructed to bring their completed consent form with them to the focus group. However, the facilitator will have copies available at the focus group should any of the participants lose or forget to bring the form with them.

If you answered **No** to **any** of these questions:

- Explain why it is essential for the project to be conducted in a way that will not allow all participants the opportunity to exercise fully-informed consent.
- Explain how you propose to address the ethical issues arising from the absence of transparency.
- Attach copies of your participant information sheet and consent form as evidence of your plans.

N/A

8 Risk of harm

Questions	Yes	No
Is there any significant risk that your project may lead to physical harm to participants or researchers?		X
Is there any significant risk that your project may lead to psychological or emotional distress to participants or researchers?		X
Is there any significant risk that your project may place the participants or the researchers in potentially dangerous situations or environments?		X
Is there any significant risk that your project may result in harm to the reputation of participants, researchers, their employers, or other persons or organisations?		X

If you answered **yes** to **any** of these questions:

- Explain the nature of the risks involved and why it is necessary for the participants or researchers to be exposed to such risks.
- Explain how you propose to assess, manage and mitigate any risks to participants or researchers.
- Explain the arrangements by which you will ensure that participants understand and consent to these risks.
- Explain the arrangements you will make to refer participants or researchers to sources of help if they are seriously distressed or harmed as a result of taking part in the project.
- Explain the arrangements for recording and reporting any adverse consequences of the research.

N/A

9 Risk of disclosure of harm or potential harm

Questions	Yes	No
Is there a significant risk that the project will lead participants to disclose evidence of previous criminal offences or their intention to commit criminal offences?		X
Is there a significant risk that the project will lead participants to disclose evidence that children or vulnerable adults have or are being harmed or are at risk of harm?		X
Is there a significant risk that the project will lead participants to disclose evidence of serious risk of other types of harm?		X

If you answered **yes** to **any** of these questions:

- Explain why it is necessary to take the risks of potential or actual disclosure.
- Explain what actions you would take if such disclosures were to occur.
- Explain what advice you will take and from whom before taking these actions.
- Explain what information you will give participants about the possible consequences of disclosing information about criminal or serious risk of harm.

N/A

10 Payment of participants

Questions	Yes	No
Do you intend to offer participants cash payments or any other kind of inducements or compensation for taking part in your project?	X	
Is there any significant possibility that such inducements will cause participants to consent to risks that they might not otherwise find acceptable?		X
Is there any significant possibility that the prospect of payment or other rewards will systematically skew the data provided by participants in any way?		X
Will you inform participants that accepting compensation or inducements does not negate their right to withdraw from the project?	X	

If you answered **yes** to **any** of these questions:

- Explain the nature of the inducements or the amount of the payments that will be offered.
- Explain the reasons why it is necessary to offer payments.
- Explain why you consider it is ethically and methodologically acceptable to offer payments.

The researcher will only reimburse the participants' travel expenses i.e. money spent so that the participant can attend the focus group. The researcher feels it is right to do this as the expenses would only be incurred if the participant were taking part in the project.

11 Capacity to give informed consent

Questions	Yes	No
Do you propose to recruit any participants who are under 18 years of age?		X
Do you propose to recruit any participants who have learning difficulties?		X
Do you propose to recruit any participants with communication difficulties including difficulties arising from limited facility with the English language?		X
Do you propose to recruit any participants who are very elderly or infirm?		X
Do you propose to recruit any participants with mental health problems or other medical problems that may impair their cognitive abilities?		X
Do you propose to recruit any participants who may not be able to understand fully the nature of the research and the implications for them of participating in it?		X

If you answered **yes** to **only the last two** questions, proceed to **Section 16** and then apply using the online NHS Research Ethics Committee approval form.

If you answered **yes** to **any** of the **first four** questions:

- Explain how you will ensure that the interests and wishes of participants are understood and taken in to account.
- Explain how in the case of children the wishes of their parents or guardians are understood and taken into account.

N/A

12 Is participation genuinely voluntary?

Questions	Yes	No
Are you proposing to recruit participants who are employees or students of Coventry University or of organisation(s) that are formal collaborators in the project?	X	
Are you proposing to recruit participants who are employees recruited through other business, voluntary or public sector organisations?	X	
Are you proposing to recruit participants who are pupils or students recruited through educational institutions?		X
Are you proposing to recruit participants who are clients recruited through voluntary or public services?		X
Are you proposing to recruit participants who are living in residential communities or institutions?		X
Are you proposing to recruit participants who are in-patients in a hospital or other medical establishment?		X
Are you proposing to recruit participants who are recruited by virtue of their employment in the police or armed services?		X
Are you proposing to recruit participants who are being detained or sanctioned in the criminal justice system?		X
Are you proposing to recruit participants who may not feel empowered to refuse to participate in the research?		X

If you answered **yes** to **any** of these questions:

- Explain how your participants will be recruited.
- Explain what steps you will take to ensure that participation in this project is genuinely voluntary.

As the research involves exploring issues relating to designers use of user centred design or evaluation methods for gathering either requirements or feedback from product evaluation. The researcher will need to have access to representatives of the design community that have worked with users with additional needs (and those that have not in the case of the control group). They will need to be recruited from companies or other sources that have had significant dealings with such user groups ,some of these may include:

- Coventry University HDTI
- Industrial Design staff (ID)
- Industrial Design students
- Contacts of ID staff
- ID departmental mailing list

- Personal and professional contacts

These will be recruited via an e-mail/letter; a copy of which can be found in Appendix F.

13 On-line and Internet Research

Questions	Yes	No
Will any part of your project involve collecting data by means of electronic media such as the Internet or e-mail?		X
Is there a significant possibility that the project will encourage children under 18 to access inappropriate websites or correspond with people who pose risk of harm?		X
Is there a significant possibility that the project will cause participants to become distressed or harmed in ways that may not be apparent to the researcher(s)?		X
Will the project incur risks of breaching participant confidentiality and anonymity that arise specifically from the use of electronic media?		X

If you answered **yes** to **any** of these questions:

- Explain why you propose to use electronic media.
- Explain how you propose to address the risks associated with online/internet research.
- Ensure that your answers to the previous sections address any issues related to online research.

N/A

14 Other ethical risks

Question	Yes	No
Are there any other ethical issues or risks of harm raised by your project that have not been covered by previous questions?	X	

If you answered **yes** to **this** question:

- Explain the nature of these ethical issues and risks.
- Explain why you need to incur these ethical issues and risks.
- Explain how you propose to deal with these ethical issues and risks.

Due to the nature of the research, there is a risk that participants may feel uncomfortable when talking about issues in relation to their work, especially where the experience was emotionally challenging for the designer, distressing for the participant or the work did not proceed as planned. This risk need to be taken as the aim of the research at this stage is to explore the designers' experiences and perspectives of working with SCAN participants. However, designers will be informed that they do not have to disclose anything that they may find distressing or upsetting to them.

15 Research with non-human vertebrates[2]

Questions	Yes	No
Will any part of your project involve the study of animals in their natural habitat?		X
Will your project involve the recording of behaviour of animals in a non-natural setting that is outside the control of the researcher?		X
Will your field work involve any direct intervention other than recording the behaviour of the animals available for observation?		X
Is the species you plan to research endangered, locally rare or part of a sensitive ecosystem protected by legislation?		X
Is there any significant possibility that the welfare of the target species or those sharing the local environment/habitat will be detrimentally affected?		X
Is there any significant possibility that the habitat of the animals will be damaged by the project such that their health and survival will be endangered?		X
Will project work involve intervention work in a non-natural setting in relation to invertebrate species other than *Octopus vulgaris*?		X

If you answered **yes** to **any** of these questions:

- Explain the reasons for conducting the project in the way you propose and the academic benefits that will flow from it.
- Explain the nature of the risks to the animals and their habitat.
- Explain how you propose to assess, manage and mitigate these risks.

N/A

[2] The Animals Scientific Procedures Act (1986) was amended in 1993. As a result the common octopus (*Octopus vulgaris*), as an invertebrate species, is now covered by the act.

16 Principal Investigator Certification

Please ensure that you:

- Tick all the boxes below that are relevant to your project and sign this checklist.
- Students must get their Director of Studies to countersign this declaration.

I believe that this project **does not require research ethics peer review**. I have completed Sections 1-2 and kept a copy for my own records. I realise I may be asked to provide a copy of this checklist at any time.	
I request that this project is **exempt from internal research ethics peer review** because it will be, or has been, reviewed by an external research ethics committee. I have completed Sections 1-4 and have attached/will attach a copy of the favourable ethical review issued by the external research ethics committee. Please give the name of the external research ethics committee here: Send to ethics@coventry.ac.uk	
I **request an ethics peer review** and confirm that I have answered all relevant questions in this checklist honestly. Send to ethics@coventry.ac.uk	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request new ethical approval if the project subsequently changes the information I have given in this checklist.	X
I confirm that I and all members of my research team (if any), have read and agreed to abide by the Code of Research Ethics issued by the relevant national learned society.	X
I confirm that I and all members of my research team (if any), have read and agreed to abide by the University's Research Ethics, Governance and Integrity Framework.	X

Signatures

If you submit this checklist and any attachments by e-mail, you should type your name in the signature space. An email attachment sent from your University inbox will be assumed to have been signed electronically.

Principal Investigator

Signed *Wesley David Scott* Principal Investigator

Date 21ST July 2010

Students submitting this checklist by email must append to it an email from their Director of Studies confirming that they are prepared to make the declaration above and to countersign this checklist. This email will be taken as an electronic countersignature.

Student's Director of Studies

Countersigned Andree Woodcock (Director of Studies)

Date 2nd Sept 2010

I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

Note: This checklist is based on an ethics approval form produce by Research Office of the College of Business, Law and Social Sciences at Nottingham Trent University. Copyright is acknowledged.

For office use only

Initial assessment

Date checklist initially received:	DD/MM/YYYY	
1. Ethical review required	Yes	No
2. CRB check required	Yes	No
Submitted to an external research ethics committee		
3. External research ethics committee (Name)	Yes	No
4. Copy of external ethical clearance received	DD/MM/YYYY	
Ethics Panel Review		
5. Date sent to reviewer 1 (Name)	DD/MM/YYYY	
6. Date sent to reviewer 2 (Name)	DD/MM/YYYY	
Original Decision (Consultation with Chair UARC/Chair RDSC)		
7. Approve	Yes	No
8. Approve with conditions (specify)	Yes	No
9. Resubmission	Yes	No
10. Reject	Yes	No
11. Date of letter to applicant	DD/MM/YYYY	
Resubmission		
12. Date of receipt of resubmission:	DD/MM/YYYY	
13. Date sent to reviewer 1 (Name)	DD/MM/YYYY	
14. Date sent to reviewer 2 (Name)	DD/MM/YYYY	
Final decision recorded (Consultation with Chair UARC/Chair RDSC)		
15. Approve	Yes	No
16. Approve with conditions (specify)	Yes	No
17. Reject	Yes	No
18. Date of letter to applicant	DD/MM/YYYY	

Some materials have been removed due to 3rd party copyright. The unabridged

Signature .... (Chair of UARC/Chair RDSC)

Date ..16.11.2010.. As Chair of CSAD SARC

Appendix A: Consent Form

Appendix A: Consent Form for Focus Groups

{Coventry University electronic letterhead}

Title of project: **Working together to ensure all users are included in design and evaluation processes**

Name of researcher: Wesley Scott

Supervised by: Professor Andree Woodcock

Please tick each box and sign at the bottom of the form;

1. I confirm that I have read and understood the Participant Information Sheet (PIS) for the focus groups regarding designers and their experiences of working with those with additional needs in relation to methods to facilitate the design or evaluation process. ☐

2) I understand that my participation is entirely voluntary and I am free to withdraw at any time, without giving a reason and without affect on my legal rights.* ☐

3) I agree that my speech and actions can be taped and video recorded. They may be used for analysis purposes/ anonymised, in the presentation of the research but will not be identifiable to me. ☐

4) I agree to take part in the above study. ☐

* However, it is not possible to withdraw data once it has been analysed due to it being in an anonymised form.

Name	Date	Signature
Researcher	Date	Signature

Appendix B: Participant Information Sheet

Appendix B: Participant Information Sheet

{Coventry University electronic letterhead}

Working together to ensure all users are included in design and evaluation processes

Thank you for agreeing to take part in the study. Please take time to read the information contained in this document. If you have any queries do not hesitate to ask.

What is the purpose of the study?

To explore your experiences and reflections on working with users that have additional needs (and those that do not in the case of control participants), specifically in relation to your choice of user requirements/user centred evaluation method and any issues you may have encountered as a result of using your selected method.

Why have I been chosen?

You have been chosen because you are an experienced designer who has evaluated designs and products with end users (either those with or without additional needs) or you are an experienced designer of assistive technology solutions and have experience of using user centred evaluation or design methods or you are a health care professional such as a rehabilitation engineer that has had significant experience of designing, supporting, installing and evaluating systems with users that have additional needs or you have been a member of a design team in another capacity but have closely worked with users that have additional needs.

Do I have to take part?

No, you do not have to take part, your participation in this research is entirely voluntary and you are free to withdraw at anytime without giving a reason.

What are the possible disadvantages and risks of taking part?

No risks have been identified in relation to taking part in this research. However, you will need to be available to attend a focus group which should take no more than 90 minutes of your time. N.B. If you are unable to attend a focus group session but still wish to provide input to the project please contact the researcher (using the details at the end of this document) to arrange a telephone interview if you wish.

What are the possible benefits of taking part?

You will not benefit directly as a result of taking part in this research. However, your travel expenses will be reimbursed on presentation of proof of purchase and you will contribute to the development of guidelines that will aid designers when selecting user centred design and evaluation methods to use in projects with participants that have and do have additional needs.

What if something goes wrong?

If you do have any concerns or queries about this study, please feel free to contact the researcher who will try to answer your questions. Contact details are provided at the end of this document.

What will happen if I don't want to carry on with the study?

You are free to withdraw from the research study at any time without penalty. However, it is believed that you will find the experience interesting and will understand its necessity and long term objectives. However, if you withdraw your data it will not be used in the study as long as you inform the researcher of your intention to withdraw before the data is analysed.

What are the procedures for recording the research?

You will be asked to attend a focus group (lasting approximately 90 minutes) in this you and other designers will be asked to discuss your experiences, thoughts, feelings and observations in relation to working with those that have and do have (in the case of control participants) additional needs, specifically the methods you used in design and evaluation to either gather user requirements or feedback in relation to products you have designed. You will also be given the opportunity to share any advice you have for designers in relation to working with users that have and do not have additional needs in design and evaluation processes.

The focus group sessions will be video and audio recorded, also notes will be made for analysis purposes only. In the focus group, as stated above, you will be asked to discuss your personal experiences and where needed, questions will be asked by the facilitator to clarify themes of discussion or to stimulate discussion on a topic where needed.

Will my input be kept confidential?

Yes, all information will be securely stored and kept in accordance with the Data Protection Act 1998 and be destroyed after the study. Where information is published it will be in an anonymous form i.e. people will not know what comments you have made.

What will happen to the results of the research study?

The results will form part of a PhD thesis and therefore will be reviewed by the researcher, the researcher's supervisory team and examiners. Some of the results will contribute to the production of guidelines to aid designers in the selection of appropriate user centred design or evaluation methodologies when working with those that have additional needs and the results may be published in for example journals. However, no participant will be identifiable from any published results.

Who is organising and funding the research?

The research is being organised by Coventry University Design and Ergonomics Applied Research Group and is being funded by the researcher.

Who has reviewed the study?

The study was reviewed and given ethical approval by Coventry University Research Ethics Committee.

Who do I contact for further information?

If you need any more information contact:

Mr. Wesley Scott
Research Student
Coventry School of Art and Design
Maurice Foss Building
Room 305
Coventry University
Far Gosford Street
Coventry
CV1 5FB

Tel: 02477 653 086
E-mail: scottw@uni.coventry.ac.uk

If you are unhappy with my response, in the first instance you should contact my Director of Studies:

Professor Andree Woodcock BSc MSc PhD
Chair of Educational Ergonomics and Design
The Design and Ergonomics Applied Research Group
Coventry School of Art and Design
Graham Sutherland Building Room GS14
Priory Street
Coventry, UK
CV1 5FB

Tel: 02476 888 8061
E-mail: A.Woodcock@coventry.ac.uk

If you are still unhappy and wish to make a formal complaint about any aspect of the research please contact:

Professor Neil Forbes
Director of Research
George Eliot Building
Room GE317
Coventry University
Priory Street
CV1 5FB
Tel: 02476 88 5293
E-mail: n.forbes@coventry.ac.uk

Appendix C: Debrief

Appendix C: Debrief

{Coventry University Electronic letterhead}

Dear Participant,

Thank you for taking the time to participate in this research project. Your contribution has been invaluable in helping the researcher and Coventry University to understand your experiences of working with and designing products and services for those that have additional needs (and those that do not in the case of control participants) in the context of the user centred design or evaluation process. The information that this research has collected will inform the production of guidelines to aid designers in the selection of the most appropriate method for obtaining the views, tacit knowledge and feedback of those with and without additional needs. If you are interested in receiving copies of any of the publications resulting from this research or have any other questions please contact the researcher.

Thank you again, and please do not hesitate to contact me if you require any further information.

Yours faithfully,

Mr. Wesley Scott
Research Student
Maurice Foss building
Room MF 305
Coventry University
Coventry School of Art and Design
Coventry
CV1 5FB

Tel: 02477 653 086
E-mail: scottw@uni.coventry.ac.uk

Appendix D:

Focus Group Questions for designers that have worked with SCAN users

Stage 1: Exploring the experiences of designers who have worked with those that have Specific, Critical, Additional Needs in a design or evaluation processes

1) General Introduction

- How long have you been designing products for users with additional needs?
- What kind of additional needs did the users you designed for have?
- What sort of products have you designed, for example products to aid independent living or assistive technology etc?

2) The user in the design process

- How much value and emphasis do you place on input from users when designing or evaluating products?
- What sources of information (if any) did you have available to help you understand the users' disability and/or other information such as their daily routine, for example?
- How did the additional needs you have worked with make it difficult to elicit requirements or feedback for the product being designed?
- In what circumstances does it help you to conduct interviews with people who know the participant, their unique needs and situation well?

3) Methods used when working with users with additional needs

- In what way did the additional need of the user impact your choice of requirements gathering /user centred evaluation method?
- What common issues (if any) have you experienced in relation to working with users that have a specific disability in terms of requirements gathering or user centred evaluation methods?
- What does the group feel they have learnt in relation to appropriate and inappropriate method selection for either requirements gathering or user centred evaluation when working with users with additional needs?

4) Reflect on the methods you've used to either aid requirements capture or user centered evaluation where you've had to interact with users with additional needs:

a) What went well and why?
b) Were there any difficulties you experienced?
c) What could have been improved and why?
d) How did you overcome the difficulties you experienced?
e) What would you do, differently if you had to work with similar users in the future?

- Given your experience, which methods provide an accurate reflection (or do not) of either user requirements or user evaluation feedback and why?

- Have you ever had to modify the language used either in questionnaires, or interviews for example, with users with additional needs, if so how and why?
- Does what is being designed effect your choice of requirements gathering/ user centred evaluation method?

5) Producing guidelines to aid designers in the selection of appropriate requirements gathering/user centred evaluation methods when working with users with additional needs

- What advice would you give to designers who have not yet worked with those that have additional needs?
- If guidelines were produced to aid designers with method selection when working with users with additional needs, what format does the group believe would be most effective e.g. booklet, web pages etc?

6) Closing thoughts and debriefing

- Is there anything else the group would like to add on the subjects we have discussed today?

Appendix E

Focus group questions for control participants (Designers that have not worked with SCAN users)

Possible questions that could guide discussion for designers in the control focus group:

1) **General Introduction**

- What products do you design and for how long have you been a designer of these products?

2) **The user in the design process**

- At what stages of the design process do you begin to engage with users?
- How much value and emphasis do you place on input from users when designing or evaluating products?
- What sources of information (if any) did you have available to you to understand the users' life context?

3) **Requirements gathering/ user centred evaluation methods you have experience of in relation to the requirements gathering/user centred evaluation methods you use;**

- Which methods provide clear requirements/ evaluation feedback and which methods do not?
- Are there any factors that influence the choice of requirements gathering/ user centred evaluation method?
- Has the choice of method you used ever caused serious problems that have threatened the success of a project, if so how and why?
- Have you even been made aware by a participant that they are having difficulty understanding what is required in a process because of the language used?
- What does the group feel they have learnt in relation to appropriate and inappropriate method selection for either requirements gathering or user centered evaluation when working with users?
- Reflect on the methods you've used to either aid requirements capture or user centered evaluation:

a) What went well and why?
b) Were there any difficulties you experienced?
c) What could have been improved and why?
d) How did you overcome the difficulties you experienced?
e) What would you do differently if you had to work with similar users in the future?

- Do specific user groups have problems with specific methods? If yes, what are these and how might these problems be overcome?
- Which methods provide an accurate reflection (or do not) of either user requirements or user evaluation feedback and why?

Coventry University ETHICS

My ETHICS | My Projects | Support | Help

CU ETHICS Home › My ETHICS › Projects › View Project › Medium Risk

SUPERVISOR - Authorise Project Applications Sumitted for your attention. To Open a Project Select the Ref number
> Need the User Guide? SELECT User Guide (**Support** Sub menu - Options on **Left**)
> CAN'T SEE YOUR PROJECTS? You may be in the wrong academic year! Change the Data set - Use List box on **Search** form or **Help**

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- My Projects
- Create Project (New)

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- Read this first!
- User Guide
- Translation of Documents
- Contact People
- Documentation
- Health & Safety
- CU Disclosure Protocol
- Research in Sensitive Areas

Useful Links

- Coventry University
- OMIS
- CU Portal
- StaffNet
- EFAAF
- CMIS ePortal

Medium to High Risk Project

Project Details | Comments (6) | Downloads | Approval Steps

1. Project Information

Project Ref: **P1152**

Full name: Wesley Scott

Faculty: [FAH] Faculty of Arts and Humanities

School/FRC: [AD] School of Art and Design

Module Code:

EFAAF Number:

Supervisor: Andree Woodcock

Project title: **Working together to ensure all users are included in design and evaluation processes (Stage 2- Interviews)**

Project dates: 01/07/2013 - 01/07/2014

Created: 15/06/2011 20:01

Project summary:
This is the second stage of a three stage project which seeks to investigate the experiences of SCAN users and their carers in relation to their involvement in design or evaluation processes, specifically in relation to;
• How they are treated as part of the design process.
• The appropriateness (or not) from the participants'(and their carers perspective where appropriate)of the methods used to support their involvement in the process.
• Any problems the participant had in taking part in the process and from their (and their carers perspective where appropriate)the solutions to these.It is expected that at least 30 participants will be interviewed; half of these (15) will have some form of disability and have been involved in a design or evaluation process
5 participants will have no disability and will form the control group but will again have been involved in a design or evaluation process. A further 10 will either be PAs (Personal Assistants) who have supported SCAN individuals or relatives of those that have SCAN. These PAs or family members will

have been involved in a design process and had their views sought as well as or instead of the user with SCAN.

Names of Co-investigators (CIs) and their organisational affiliation:
N/A

How many additional research staff will be employed on the project? 0

Names and their organisational affiliation (if known):
N/A

Who is funding the project? Self funded

Has the funding been confirmed? Yes

Code of ethical practice and conduct most relevant to your project:
British Psychological Society

2. Does this project need ethical approval?	
1 Does the project involve collecting primary data from, or about, living human beings?	Yes
2 Does the project involve analysing primary or unpublished data from, or about, living human beings?	Yes
3 Does the project involve collecting or analysing primary or unpublished data about people who have recently died, other than data that are already in the public domain?	No
4 Does the project involve collecting or analysing primary or unpublished data about or from organisations or agencies of any kind, other than data that are already in the public domain?	No
5	No

8. Risk of harm	
1 Is there any significant risk that your project may lead to physical harm to participants or researchers?	No
2 Is there any significant risk that your project may lead to psychological or emotional distress to participants?	No
3 Is there any significant risk that your project may lead harm to the reputation of participants, or their employers, or of any other persons or organisations?	No
4 Is there any significant risk that your project may result in harm to the reputation or participants, researchers, their employers, or other persons or organisations?	No

2. Does this project need ethical approval?	
Does the project involve research with non-human vertebrates in their natural settings or behavioural work involving invertebrate species not covered by the Animals Scientific Procedures Act (1986)?	
6 Does the project place the participants or the researchers in a dangerous environment, risk of physical harm, psychological or emotional distress?	No
7 Does the nature of the project place the participant or researchers in a situation where they are at risk of investigation by the police or security services?	No
8 Does the project involve the researcher travelling outside the UK?	No

If you have answered **Yes** to **any** of these questions, please proceed to **section 3**.
If you answered **No** to **all** of these questions:

- You **do not** need to submit your project for peer review and ethical approval.
- You should sign the Declaration in **Section 17**, and keep a copy for your own records.
- Students must ask their Director of Studies to countersign the declaration, and they should send a copy for you file to the Registry Research Unit.

3. Does the project require Criminal Records Bureau checks?	
1 Does the project involve direct contact by any member of the research team with children or	No

9. Risk of disclosure of harm or potential harm	
1 Is there a significant risk that the project will lead participants to disclose evidence of previous criminal offences, or their intention to commit criminal offences?	No
2 Is there a significant risk that the project will lead participants to disclose evidence that children or vulnerable adults are being harmed, or are at risk of harm?	No
3 Is there a significant risk that the project will lead participants to disclose evidence of serious risk of other types of harm?	No

10. Payment of participants	
1 Do you intend to offer participants cash payments or any other kind of inducements or compensation for taking part in your project?	Yes
2 Is there any significant possibility that such inducements will cause participants to consent to risks that they might not otherwise find acceptable?	No
3 Is there any significant possibility that the prospect of payment or other rewards will systematically skew the data provided by participants in any way?	No
4 Will you inform participants that accepting compensation or inducements does not negate their right to withdraw from the project?	Yes

Further information:
The researcher will reimburse reasonable travel expenses for the

3. Does the project require Criminal Records Bureau checks?	
young people under 18 years of age?	
2 Does the project involve direct contact by any member of the research team with adults who have learning difficulties?	Yes
3 Does the project involve direct contact by any member of the research team with adults who are infirm or physically disabled?	Yes
4 Does the project involve direct contact by any member of the research team with adults who are resident in social care or medical establishments?	No
5 Does the project involve direct contact by any member of the research team with adults in the custody of the criminal justice system?	No
6 Has a Criminal Records Bureau (CRB) check been stipulated as a condition of access to any source of data required for the project?	No

Further information:
This project will employ the medium of one to one interviews to elicit the views of people that have additional needs and thier carers, (for example, a physical disability) in relation to their experiences and views of their involvement in the design or evaluation process. The interview will be semi-structured in order to allow the participant to share their views in a manner appropriate to them.
The interview will be conducted at a time, on a date, in a place appropriate to each participant (and their carer where appropriate), participants will be informed at the start of the interview that their participation in the research is entirely voluntary and they participant, and those of their support worker or family member on presentation of valid receipt or ticket.

Supervisor comments:
The researcher will reimburse the participant's travel expenses, and those of their attendants on presentation of valid receipt or ticket.

11. Capacity to give valid consent	
1 Do you propose to recruit any participants who are under 18 years of age?	No
2 Do you propose to recruit any participants who have learning difficulties?	Yes
3 Do you propose to recruit any participants with communication difficulties, including difficulties arising from limited facility with the English language?	Yes
4 Do you propose to recruit any participants who are very elderly or infirm?	No
5 Do you propose to recruit any participants with mental health problems or other medical problems that may impair their cognitive abilities?	Yes
6 Do you propose to recruit any participants who may not be able to understand fully the nature of the research and the implications for them of participating in it?	No

Further information:
See 'extension to ethics form' document.

(attached)

Supervisor comments:
Nothing provided

are free to stop, suspend or terminate the interview at any time without giving a reason. The participant will also be told they do not have to answer any questions they do not wish to and that time is not constrained and if they feel the interview is going too fast or too slow they should let the researcher know. Each participant will be offered frequent opportunities to have a break and additionally, if they feel it is needed the opportunity to have a friend, family member or support worker present in the interview.

Supervisor comments:
The interview will be semi structured

4. Is this project liable to scrutiny by external ethical review arrangements?

1 Has a favourable ethical opinion been given for this project by a social care research ethics committee, or by any other external research ethics committee?	No
2 Will this project be submitted for ethical approval to a social care committee or any other external research ethics committee?	No

If you have answered **No** to **both** of these questions, please proceed to **section 5.**
If you answered **Yes** to **either** of these questions:

- Sign the Declaration in **section 17** and send a copy to the Registry Research Unit.
- Students must get their Director of Studies to countersign the checklist before submitting.

5. More detail about the project

1. What are the aims and objectives of the project?

12. Is participation genuinely voluntary?

1 Are you proposing to recruit participants who are employees or students of Coventry University or of organisation(s) that are formal collaborators in the project?	Yes
2 Are you proposing to recruit participants who are employees recruited through other business, voluntary or public sector organisations?	Yes
3 Are you proposing to recruit participants who are pupils or students recruited through educational institutions?	No
4 Are you proposing to recruit participants who are clients recruited through voluntary or public services?	Yes
5 Are you proposing to recruit participants who are living in residential communities or institutions?	No
6 Are you proposing to recruit participants who are in-patients in a hospital or other medical establishment?	No
7 Are you proposing to recruit participants who are recruited by virtue of their employment in the police or armed services?	No
8 Are you proposing to recruit participants who are being detained or sanctioned in the criminal justice system?	No
9 Are you proposing to recruit participants who may not feel empowered to refuse to participate in the research?	No

Further information:
See 'extension to ethics form' document.

Aim:
To produce guidelines to assist designers in the selection of the most appropriate methods to support user centered evaluation and design when working with participants with Specific, Critical, Additional Needs (SCAN).
Objectives:

1) An investigation of how users with SCAN (including their carers) and other user groups are treated as part of the design and evaluation processes.

2) Identification of key themes and recommendations that will form the basis of guidelines produced to assist designers to make reasoned methodological choices when working with SCAN participants (and their carers where appropriate).

2. Briefly describe the principal methods, the sources of data or evidence to be used and the number and type of research participants who will be recruited to the project
See 'extension to ethics form' document.
(attached)

3. What research instrument(s), validated scales or methods will be used to collect data?
See "Questions For Use In Interviews"(attached

4. If you are using an externally research instrument, validated scale or research method, please specify.
N/A

5. If you are not using an externally validated scale or research method, please attach a copy of the research instrument you will use to collect data. For example, a measurement scale, questionnaire, interview schedule, observation protocol for ethnographic work or in the case of unstructured data collection a topic list.

(attached)

Supervisor comments:
The poster needs to be redesigned. 'hear me' is not inclusive and the text is very wordy and confusing. Keep it short and simple

13. Online and Internet Research

1	Will any part of your project involve collecting data by means of electronic media, such as the Internet or e-mail?	No
2	Is there a significant possibility that the project will encourage children under 18 to access inappropriate websites, or correspond with people who pose risk of harm?	No
3	Is there a significant possibility that the project will cause participants to become distressed or harmed, in ways that may not be apparent to the researcher(s)	No
4	Will the project incur any other risks that arise specifically from the use of electronic media?	No

Further information:
N.B Electronic media will not be used to recruit participants, however, contact may be made with participants via e—mail to facilitate the recruitment process.

Supervisor comments:
Nothing provided

14. Other ethical risks

1	Are there any other ethical issues or risks of harm raised by your project that have not been covered by previous questions?	Yes

Further information:

See "Questions For Use In Interviews"(attached)

6. Confidentiality, security and retention of research data

1 Are there any reasons why you cannot guarantee the full security and confidentiality of any personal or confidential data collected for the project?	No
2 Is there a significant possibility that any of your participants, or people associated with them, could be directly or indirectly identified in the outputs from this project?	No
3 Is there a significant possibility that confidential information could be traced back to a specific organisation or agency as a result of the way you write up the results of the project?	No
4 Will any members of the project team retain any personal or confidential data at the end of the project, other than in fully anonymised form?	No
5 Will you or any member of the team intend to make use of any confidential information, knowledge, trade secrets obtained for any other purpose than this research project?	No

Further information:
See 'extension to ethics form' document.

(attached)

Supervisor comments:
Nothing provided

7. Informed consent

1 Will all participants be fully informed why the project is	Yes

See 'extension to ethics form' document.

(attached)

Supervisor comments:
Nothing provided

15. Research with non-human vertebrates

1 Will any part of your project involve the study of animals in their natural habitat?	No
2 Will your project involve the recording of behaviour of animals in a non-natural setting that is outside of the control of the researcher?	No
3 Will your field work involve any direct intervention other than recording the behaviour of the animals available for observation?	No
4 Is the species you plan to research endangered, locally rare or part of sensitive ecosystem protected by legislation?	No
5 Is there any significant possibility that the welfare of the target species or those sharing the local environment/habitat will be detrimentally affected?	No
6 Is there any significant possibility that the habitat of the animals will be damaged by the project, such that their health and survival will be endangered?	No
7 Will project work involve intervention work in a non-natural setting in relation to invertebrate species other than Octopus vulgaris?	No

7. Informed consent	
being conducted and what their participation will involve, and will this information be given before the project begins?	
2 Will every participant be asked to give written consent to participating in the project, before it begins?	Yes
3 Will all participants be fully informed about what data will be collected, and what will be done with these data during and after the project?	Yes
4 Will explicit consent be sought for audio, video or photographic recording of participants?	Yes
5 Will every participant understand what rights they have not to take part, and/or to withdraw themselves and their data from the project if they do take part?	Yes
6 Will every participant understand that they do not need to give you reasons for deciding not to take part or to withdraw themselves and their data from the project and that there will be no repercussions as a result?	Yes
7 If the project involves deceiving, or covert observation of, participants, will you debrief them at the earliest possible opportunity?	Yes
8 Participant Information Leaflet attached.	
9 Informed Consent Form attached.	
Further information: See 'extension to ethics form' document.	

16. Blood Sampling / Human Tissue Analysis	
Does your project involve blood sampling or human tissue analysis?	No

(attached)

Supervisor comments:
Simplify the PIS sheet, it is a bit overwritten (eg (for you)). Change spelling of principal

17. Principal Investigator's Declaration

Most appropriate course of action:
I **request an ethics review** and confirm that I have answered all relevant questions in this form honestly.

I confirm that I will carry out the project in the ways described in this form. I will immediately suspend research and request a new ethical approval if the project subsequently changes the information I have given in this form.	Yes
I confirm that I, and all members of my research team (if any), have read and agree to abide by the code of research ethics issued by the relevant national learned society.	Yes
I confirm that I, and all members of my research team (if any), have read and agree to abide by the University's Research Ethics, Governance and Integrity Framework.	Yes

Attachments

- Participant Information Leaflet attached.
- Informed Consent Form attached.
- Health & Safety Assessment attached.
- Extension To Ethics Form Revised 13th Sept 2013
- Debrief Letter Stage 2 Revised 14th August 2013
- Consent Form For Those Who Cannot Sign Revised 14th August 2013
- Questions For Use In Interviews Revised 28th August 2013

[Close]

Coventry University, Priory Street, Coventry, West Midlands, CV1 5FB, United Kingdom.

Email Only

Send Support Request

***If you require this document in another format such as large print, please contact the Researcher using the details at the end of this document.**

Participant Information Sheet

Working together to ensure all users are included in design and evaluation processes

Thank you for agreeing to take part in the study. Please take time to read the information contained in this document. If you have any queries do not hesitate to ask the Researcher. You may keep this document for future reference.

What is the purpose of the study?

The overall aim in the study is to provide designers with guidance in how to select the most appropriate research methods when working with users that have additional needs. In order to do this, I need to understand your views and experiences of design and evaluation processes. For example, when you have been included in any product design and evaluation or when you have been consulted on the design of your social care package.

This information will be collected using a semi structured interview, or a method which is most convenient for you.

By investigating user experience it is hoped this exercise can contribute to the development of guidelines that will aid designers and other professionals in selecting the most appropriate methods for requirements gathering or user centred evaluation based on the needs of the user group.

Why have I been chosen?

You have been chosen because

a) you have been identified as somebody with additional needs and it is felt your contribution would be highly useful and valuable or you expressed an interest in taking part.

Or

b) You do not have a disability but have expressed an interest in taking part as part of the control group

Or

c) You are a carer/support worker/family member or other healthcare professional that either works with or is related to users that have additional needs and you have expressed an interest in the research or have been approached because of your experiences.

Do I have to take part?

No, you do not have to take part, your participation in this research is entirely voluntary and you are free to withdraw at anytime without giving a reason. All data will be pooled and anonymised, so you will not be identifiable from taking part in this research.

What are the possible disadvantages and risks of taking part?

No risks have been identified. However, you will need to be available to attend an interview session at a convenient time, date and venue. The interview will take about one hour (in most cases).

What are the possible benefits of taking part?

You will contribute to the development of guidelines that will aid designers when selecting user centred design and evaluation methods to use in future design research; thereby leading to greater sensitivity and awareness in designers and the creation of more appropriate, inclusive products and services.
Travel expenses will be reimbursed on production of a receipt.

What if something goes wrong?

The research has been approved as low –medium risk by the Ethics Committee at Coventry University. If you have any concerns or queries about this study, please contact the Researcher or his Director of Studies. Contact details are provided at the end of this document.

What will happen if I don't want to carry on with the study?

You are free to withdraw from the research study at any time without penalty. However, we believe that you will find the experience interesting and will understand its necessity and long term objectives (i.e. to produce guidelines to support designers in relation to method selection). However, if you withdraw your data it will not be used in the study as long as you inform us prior to the data analysis i.e. within a month of your interview.

What are the procedures for recording the research?

You will be asked to attend an interview session (lasting approximately 60 minutes in most cases) where you will be asked to talk about your experiences of being involved in design or evaluation processes, specifically, the methods used to gather your views. The interview will be video and audio recorded, and some notes will be made for analysis purposes. In the interview, you will be asked to discuss your personal experiences and where needed, questions will be asked by myself to clarify themes of discussion or to stimulate discussion on

a topic where needed However, as the information may be personal, for example, how your disability affects you if you do not want to answer any question asked simply inform the researcher and we will move on to a topic that you feel more comfortable with.

Will my input be kept confidential?

Yes, all information will be securely stored and kept in accordance with the Data Protection Act 1998 and be destroyed after the study. Where information is published it will be in an anonymous form.

What will happen to the results of the study?

The results will form part of a PhD thesis and therefore will be reviewed by the Researcher, the Researcher's supervisory team and examiners. The results will contribute to the production of guidelines to aid designers in the selection of appropriate user centred design or evaluation methods. The study may be published at research conferences and in research journals, but any quotations and information provided will remain anonymised.

Who is organising and funding the research?

The research is organised by Coventry School of Art and Design, specifically the Design and Ergonomics Applied Research Group. The project is self funded.

Who has reviewed the study?

The study was reviewed and given ethical approval by Coventry University Research Ethics Committee.

Who do I contact for further information?

If you need any more information contact:

Mr. Wesley Scott (Researcher)
Research Student
Coventry School of Art and Design
Maurice Foss Building
Room 128/9
Coventry University
Coventry
CV1 5FB

Tel: 02477 659 320
E-mail: scottw@uni.coventry.ac.uk

If you have any concerns about the research, please contact the Director of Studies:

Professor David Durling
Professor of Design Research
Coventry School of Art and Design
Coventry University
Graham Sutherland building
Coventry
CV1 5FB

E-mail: ab3814@coventry.ac.uk

or

If you are still unhappy and wish to make a formal complaint about any aspect of the research, please contact:

Professor Neil Forbes
Director of Research
Alan Berry Building
Room AB122
Coventry University
Priory Street
CV1 5FB
Tel: 02476 885 294
E-mail: n.forbes@coventry.ac.uk

Consent form for interviews

Title of project: "**Working together to ensure all users are included in design and evaluation processes**

*If you require this document in another format such as large print, please contact the researcher.

Name of researcher: Wesley Scott

Director of Studies: Professor David Durling

Please tick each box and sign at the bottom of the form;

1. I confirm that I have read and understood the Participant Information Sheet (PIS) for the interviews regarding my experiences of design and evaluation processes specifically the methods used to support them. ☐
2) I understand that my participation is voluntary and I am free to withdraw at any time, without giving a reason and without affect on my legal rights.* ☐
3) I agree that my speech and actions can be taped and video recorded. They may be used for analysis purposes/ anonymised, in the presentation of the research but will not be identifiable to me. ☐
4) I agree to take part in the above study. ☐

Name	Date	Signature
Researcher	Date	Signature

***Once you have completed this consent form please give it to the person conducting the interview.**

Coventry University

STUDENT RESEARCH PROJECT RISK ASSESSMENT

Person(s) undertaking project:	Mr. Wesley David Scott (07946 590 198)
Project supervisor:	Professor David Durling (Director of Studies)

Brief outline of project: *Outline the types of activities that will take place or items fabricated i.e. face to face interviews, public surveys, water sampling, machining vehicle parts, brazing etc.*	This is the second stage of a three stage project which seeks to investigate the experiences of SCAN users (and their carers where appropriate) in relation to their involvement in design or evaluation processes, specifically in relation to; • How they are treated as part of the design process. • The appropriateness from the participants'or carers perspective of the methods used to support their involvement in the process. • Any problems the participant/carer had in taking part in the process and solutions to these. Approximately 30 participants will be interviewed; half of whom will have some form of disability and have been involved in a design or evaluation process. 5 participants will have no disability and will form the control group; a further 10 will be carers, Personal Assistants (PAs) or healthcare professionals that have worked supporting those that have additional needs.

Dates of study (from – to)	1st September 2013-1st September 2014
Location(s) of activity: *Country and specific area.*	Coventry University Usability Lab (Bugatti Building) Coventry United Kingdom The location of the research will depend on the participant's needs and so may conducted in the participant's home or other appropriate medium/venue, for example Skype or telephone as determined by the participant and their carer. In such cases a full site analysis will be undertaken, risks identified and the student will be accompanied on the visit, Details of other venues will be provided to my Director of Studies as soon as they are known.

Will the project involve laboratory work? *If yes, you will be required to complete separate risk assessment(s) prior to carrying out any laboratory work.*	No
Will the project involve workshop work? *If yes, you will be required to complete an induction and may carry out a separate risk assessment(s) prior to carrying out any workshop work.*	No

Will the project involve travel? *(If yes, complete this section as fully as possible. The form may require review prior to travel to add missing details)*		Yes (within the UK)
Contact details at destination(s): Contact details of next of kin in case of emergency:	Researcher's mobile number: 07946 590 198 Mrs S.E. Cumberbatch +44 772418984	
Approximate dates of travel: *Your supervisor must have details of travel plans once confirmed.*	Not yet known as travel will be arranged as and when needed in order to conduct interviews. Travel may be needed. Given that some participants may be unable to travel, the researcher will have to go them. It is important that participants are not excluded from the research because of their disability.	
Arrangements to maintain contact with the University:	The majority of the interviews will be based at the University. The researcher will only spend a short time away from the university (no more than one day at a time) to travel to a UK venue and conduct the interview. He will inform his Director of Studies of all participants, their address and contact details. The researcher will be accompanied on visits at all times, and be contactable by mobile.	
Emergency contact information:	School/Faculty contact (Daytime): 02476 888 7544 24hr University contact (Protection Service): 02476 888 555 Local healthcare/emergency services: 024 7655 1725 (My GP-University Medical Centre)	
Has suitable travel insurance has been obtained? (*Please attach a copy of certificate*)		N/A
If EU travel, has EH1C card been obtained?		N/A
Has advice/vaccinations from GP been sought (*where appropriate*)?		N/A
Are medical kits required (*i.e. in countries with poor healthcare facilities*)?		N/A
Are there any warnings issued by the FCO* against travel to the area?		N/A
Have you registered with the FCO* service LOCATE? *(British nationals only)*		N/A

*FCO = http://www.fco.gov.uk/en/travel-and-living-abroad/travel-advice-by-country/

Assessment carried out by:	Authorisation to proceed:
Signature: W D Scott Position: Research Student Date: 14/08/2013	Signature: Position: Date:

Question 5.2

Briefly describe the principal methods, the sources of data or evidence to be used and the number and type of research participants who will be recruited to the project.

A wide variety of users with differing SCAN needs will be sourced, to ensure that the output from the interviews reflects the widest possible range of disabilities. It is expected that at least 30 participants will be interviewed. This data will then be analysed along with the data gathered from the focus group to form the basis of the guidelines produced. Participation in the research will be open to anybody aged over 18 years at least 5 of the 30 participants will act as control participants i.e. these participants will not have additional needs.

At least 10 participants will have a physical impairment, 5 will have a learning disability, 5 will consist of carers or parents of children or adults that have SCAN, and the final 5 will be healthcare professionals; care will be taken to ensure that there is a wide variety of physical and learning disabilities represented in the sample so that the diversity of disabilities within subsets of disability is reflected. Participants will not be targeted on the grounds of their disability neither will they be pressured into taking part.

This research seeks to employ face to face (video and audio recorded) one on one semi-structured interviews* as its main method of data collection. Notes will also be taken during interview sessions; it is these along with the audio and video recordings that will be used for analysis purposes.

*or any other method as directed by the participant that allows them to contribute to the project in a way that is accessible to them

Question 6:

Explain how you will ensure the confidentiality and security of your research data, both during and after the project.

Data collected that relates to participants will be stored in electronic and/or paper based forms. In the case of electronic data, this will be stored securely either on the researcher's networked home drive at Coventry University (requires password for access) or on the researcher's personal computers (also requires password for access).

All sensitive documents i.e. those containing participant identifiable information relating to the project will be password protected and the researcher and his support workers will be the only people that have access to these. In the case of hard copy data and DVD's (interview session recordings) these will be stored

under lock and key (either in a locked box or filing cabinet) at all times when not in use. Again, the researcher and his support workers will be the only people that have access to these artefacts. All personal identifiable data will be destroyed at the end of the project or shortly thereafter and only data that is in a fully anonymised form will be kept.

To aid with the anonymisation process, each participant will be coded, for example S2EG:P01 which stands for 'Stage 2 Experimental Group: Participant 1' this is also how participants will be referred to once the data has been anonymised and written up in the thesis or any other publication associated with the research.

Question 7

Explain briefly how you will implement the informed consent scheme described in your answers.

The researcher is aware of the need to attain informed consent from all participants who partake in research activities related to the project (for this stage interviews with SCAN participants). In order to meet the requirement to gain informed consent, before the start of any research activities, all participants involved will be asked to "sign" a consent form (see attached consent form) stating that they wish to take part in the research and that they have understood its purpose. Before participants sign the consent form they will be given a copy of the participant information leaflet and have the opportunity to ask any questions they may have or ask for clarification of anything they do not understand.

All participants will be informed that participation in the research (interviews) is entirely voluntary and they may withdraw from it at any time without repercussion or giving a reason for their withdrawal. Participants also have the right to refuse to answer a question if they deem it to be too personal or inappropriate etc. Additionally, participants may stop, suspend or terminate their participation in interviews at any time without giving a reason.

However, participants will be made aware (on the participant information leaflet- see attached) that it is not possible to withdraw their data after the analysis process has taken place, this is due to the fact it will be in an anonymised form.

Additionally, at the end of the interview session, the participant will be debriefed and be given an opportunity to ask any questions related to the research. Participants will also be given a copy of the debrief letter (see attached).

This explains the purpose of the research they have taken part in and how to contact the researcher should they have any remaining questions in relation to the research and/ or want to obtain copies of any resulting publications.

Question 11

Explain how you will ensure that the interests and wishes of participants are understood and taken in to account.

Explain how in the case of children the wishes of their parents or guardians are understood and taken into account

Because of the nature of this research and its aims and objectives, it is important to involve people whose voices may not "normally" be heard in research. However, it is such groups that are often considered to be vulnerable and therefore extra safe guards are put in place, and rightly so to protect them. This research is no exception to that, every participant will still be required to give informed consent, though not necessarily in the usual way (signing a consent form). Every effort will be made by the researcher to ensure that the participants selected understand both the purpose of the research and what it involves. Where appropriate, adaptations will be made to both enable the participant, to give informed consent (e.g. via video recording if they cannot write) and take part in the research (for example, simplifying interview questions so they can be understood in the research).

Additionally, with the permission of the participant a family member/support worker that knows the participant well may be present at the interview to help the participant understand the process and help the researcher understand the participants' needs. If the adult is considered vulnerable but still has views to express, additional consent will be gained from the responsible adult (family member or support worker) for the participant to take part in the research. Furthermore, if the support worker or family member feels that questions are asked inappropriately they may stop, suspend or terminate the interview if they deem it to be in the interest of the participant.

Question 12

Explain how your participants will be recruited.

Explain what steps you will take to ensure that participation in this project is genuinely voluntary.

Participants will be recruited via a number of sources, these are:

- Coventry University
- Friends and relatives of the Researcher
- Carers of Barking and Dagenham*

*These sources will only be used if permission of these organisations is given.

It is likely in the first instance participants will either be contacted through word of mouth (in the case of friends and relatives of the Researcher) or through an e-mail. No prospective participant will be targeted in any way by the researcher, it will be down to the participant to express an interest in taking part in the research before any practical research commences. Furthermore, participants will not be repeatedly asked to take part in the research and the final decision regarding their participation lies solely with them.

Equally participants will be made aware that they can and where appropriate given the opportunity to withdraw at any time (as long as their data has not been fully anonymised) without penalty or repercussion.

Question 14

Explain the nature of these ethical issues and risks.
Explain why you need to incur these ethical issues and risks.
Explain how you propose to deal with these ethical issues and risks.

Because this research asks participants to reflect on experiences where they have been involved in design and/or evaluation processes before, there is a risk that these experiences were distressing or upsetting to the participant thus making it difficult for the participant to talk about such experiences. Whilst the primary aim of this research is to help designers understand the unique situations and problems such participants may have had in the past, in relation to their involvement in a design or evaluation process, specifically in relation to the methods used to involve them, at all times the physical well fare and emotional well being of the participant remains foremost in the researcher's mind.

With this in mind, participants will be encouraged to be open and frank with the researcher about what their experiences and views on the subject are but only as far as they feel comfortable in doing so. They will be reminded frequently that they do not have to answer any question they do not feel comfortable with or tell the researcher anything they do not want to.

Debrief

{Coventry University electronic letterhead}

Dear Participant,

Thank you for taking the time to participate in this research. Your contribution has been invaluable in helping me understand your experiences of being involved in design and evaluation processes .The information you have provided will inform the production of guidelines to aid designers in selecting and using the most appropriate method for obtaining the views and feedback of those with additional needs when designing future products and services. If you are interested in receiving copies of any of the resulting publications or have any other questions please contact the researcher or his Director of Studies (contact details below)

Yours faithfully,

Mr Wesley Scott (Researcher)
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Coventry School of Art and Design
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CV1 5FB
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My Director of Studies can be contacted at:

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*If you require this document in another format such as large print, please contact the Researcher.

Consent form for Interviews

Title of project: Working together to ensure all users are included in design and evaluation processes

* If you require this document in another format such as large print please contact the Researcher.

Name of researcher: Wesley Scott

Director of Studies: Professor David Durling

Please tick each box and sign at the bottom of the form;

1. I have read (or have had read to me) and understand the leaflet (PIS 'Participant Information Sheet') for the interviews relating to my views and experiences of when people ask me what I think about or want from a new product or service, specifically the ways they get my views (the methods they use to get my views). ☐
2. I know that my participation is voluntary and I am free to say I do not want to take part at any time, without giving a reason. ☐
3. I agree that what I say and do can be video recorded and it can be looked at by the researcher (analysed) but I will not be identified when the research is written about. ☐
4. I want to take part in the research. ☐

Name	Date	Signature
Researcher	Date	Signature
Support Worker/ Family Member	Date	Signature

*Once you have filled in this consent form please give it to the person doing the interview.

Introduction

If you require this document in another format such as large print, please contact the Researcher.

Text in **red** is a simplified version of the question which may be used when the participant has:

- a language difficulty
- comprehension difficulty
- when participants do not understand the question as it has been first asked (version in black)

In this interview you may come across the following definitions:

SCAN -Users with Specific, Critical, Additional Needs: Individuals that have specific critical needs (in relation to them and these needs have to be met in order to maintain their quality of life) but are additional to that of common everyday critical needs (i.e. needs we all have as human beings for example, we all have a need to sleep). An example of a Specific, Critical, Additional Need, is that of a person who cannot feed themselves thus having to be fed so that they can eat.

Method:

By method we mean interview, questionnaire, focus group or any other method you use to present your views. See below for some examples of methods:

Image A: A focus group taking place

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Image B: An example of a questionnaire

Possible questions that could be used in interviews with SCAN participants:

Questions relating to design processes that participants have been involved in previously:

Demographic Information:

1) What is your:

- age;
- sex;
- ethnicity, and
- do you consider yourself to have a disability as defined by the Equality Act 2010 i.e. you have a physical or mental impairment, and it has a substantial and long-term adverse effect on your ability to carry out normal day-to-day activities? (Adapted from the Equality Act 2010) and if so what is the nature of it (e.g. physical, sensory, learning etc?)
- How does it affect your day-to-day life?

(Tell the researcher if you do not want to answer this question)

How old are you?

Are you male or female?

What is your ethnic origin? (Give examples)

Do you think you are disabled? If so what is the nature of your disability (this is for sampling purposes only)

How does it affect your day to day life? (give examples)

2) Have you ever been involved in the design or evaluation process for a product or service? If yes, please tell me a bit about it.

a) What was it for?
b) Did you enjoy it?
c) What did you like about it?
d) What aspects did you not like, if any?
e) What kinds of methods were used to obtain (get) your views, for example interviews, questionnaires etc?
f) Did the methods used allow you to sufficiently express your views?
g) On the whole was it a good or bad experience and why?
i) Do you know if your views were taken into account in the final design?
k) Did the designers make any efforts to accommodate your disabilities?
m) What stage of the process (for example design or evaluation?)
n) How were you recruited?
o) What were you asked about?
p) What did you do, for example, were you asked to test a product, were you interviewed in relation to what you thought about a product etc?
r) Were you informed of the purpose of the study?
s) Were you informed as to how the results would be used?

Have you ever been asked to give your views (what you thought) about a product or service? If yes, please tell me a bit about it.

a) What was it for?
b) What did you like or not like about it?
c) On the whole did you enjoy it?

This question will only be asked if the answer to Question 2 is "No".

3) If you have not been involved in a design process before, can you think of any other times where your views have been sought, what methods were used then? Were these accessible or not?

a) What was it for?
b) Did you enjoy it?

c) What did you like about it?
d) What aspects did you not like, if any?
e) What kinds of methods were used to obtain (get) your views, for example interviews, questionnaires etc?
f) Did the methods used allow you to sufficiently express your views?
g) On the whole was it a good or bad experience and why?
i) Do you know if your views were taken into account in the final design?
k) Did the designers make any efforts to accommodate your disabilities?
m) What stage of the process (for example design or evaluation?)
n) How were you recruited?
o) What were you asked about?
p) What did you do, for example, were you asked to test a product, were you interviewed in relation to what you thought about a product etc?
r) Were you informed of the purpose of the study?
s) Were you informed as to how the results would be used?

If you have not been asked what you think about a new product or service before, can you think of any other times where you've been asked for your opinion on something, in what ways were you asked? For example were you given a questionnaire to fill in? Also tell me, if the way in which your views were gathered (got) made it easy or hard for you to tell people what you thought?

4) Have you ever been offered the opportunity to take part in research but declined because for example:

a) you did not see how you would benefit;
b) you did not have time;
c) the time and place were not convenient;
d) product or service you were asked to comment on was not of interest;
e) the methods used to elicit your views were not appropriate;
f) other, please give details.

Have you ever been asked to take part in research but told the person asking you that you did not want to because:
a) you did not see how it would help you;
b) you were busy;
c) where and when the research was taking place were not convenient (right) for me;

d) I was not interested in taking part;
e) The way my views were got (the methods they used) meant that I could not take part, for example, they gave me a questionnaire and I cannot write,
f) or any other reason, please give me details.

5) a) How easy is it for you to make your views known?

b) What would make it easier for you to express your views?

How easy is it for you to tell people about what you think of things (products or services)?

What is an easy way for you to tell somebody what you think of things (products or services), for example 'I like talking' (being interviewed)?

Questions related to the accessibility of requirements capture or user centered evaluation methods that the participant has had experience of:

6) What were you asked to provide information about?

7) How easy was it for you to do this? How easy was it for you to tell somebody what you thought of a product or service? (e.g. it was very easy because they talked to me about what I felt)

8) In what ways could this have been made easier? If it was difficult for you to tell somebody what you thought about a product or service, how could they have made it easier for you? (for example instead me to write down what I thought they could have talked to me instead)

9) Were the methods used to gather your views accessible to you or not, if not why?

Did how you were asked about the product or service mean that you could tell people your feelings about it, if you couldn't why not?

10) Did your impairment affect your ability to provide the information you would have liked to (in terms of the methods you used to give your input) if so, how?

Does having (insert persons SCAN e.g. Cerebral Palsy) affect how you gave your thoughts and feelings about a product or service e.g. can you not write so you had to be interviewed?

11) When you gave your views on a product or service, including feedback about it, was there anything which made it difficult for you, for example, were you given a questionnaire to complete even though you cannot handwrite?

When you were asked to tell someone what you thought about a product or service was there anything they did that made it difficult for you to tell them what you thought, for example, they gave you a questionnaire when you cannot handwrite.

12) Did the project team make any adjustments to enable you to express your views, for example interviewing you as opposed to giving you a questionnaire? If so, were these adjustments successful?

When you were asked questions about the product or service did the people asking you make any changes which made it easier for you to tell them what you thought about a product or service, for example did they talk to you instead of asking you to write your answers?

13) In your opinion, did the methods used by the design team enable you to express your views fully?

Did the people allow you to talk to them in such a way that you could tell them what you really thought about the product or service?

14) a) When you took part in the design process what was your favourite part, for example did you enjoy being interviewed because you could talk to the design team or perhaps you enjoyed using the product and then giving your feedback?

b) Why was this your favourite part, maybe you like talking to people about new products or services?

In your opinion, when you were asked about the product or service could you say what you felt completely, for example did the questions they used in the interview help you to say what you thought or not or would it have been better for you to write what you felt (like a questionnaire)?

15) What advice would you give to designers on working with people like yourself in relation to the requirements capture or evaluation methods they choose to use and why?

When you are asked about a new product or service which way do you like to tell people what you think e.g. do you like to write things down or talk about things and why do you like doing it this way?

16) Do you think it is important that designers consider your life circumstances and disability when choosing which methods to use to gain your views? If so, how important a factor should it be?

What would you tell people to do to make it easier for you when they want to talk to you about what you think of a product or service? (E.g. they need to give me plenty of time and be patient and I would need to talk to them face to face).

Do you think it is important for people that ask you what you want from or think of a product or service to know about your (insert SCAN)?

How important do you think it is for people to consider your (insert SCAN needs) before they talk to you about what you think of products and services for example, is it very important as your SCAN needs can affect the ways people should talk to you? E.g. the participants may not be able to write so questionnaires should be avoided.

17) What information do you think designers could benefit from having an awareness of when working with people such as yourself, the following are some examples:
   a) ethical issues
   b) maintaining professional boundaries

Do you think it would be good if people that design products and services were given information to help them know:

a) the best way to get your views;
b) special issues they should consider when working with you, for example how they get your agreement for you to take part in a project;
c) how to act when they work with you.

18) When taking part in research does the language used in interviews or research materials e.g. questionnaires make it harder for you to take part, because you may not understand what is being asked?

When you take part in research:

a) How was the study and your involvement in it presented to you and did you understand the information presented?
b) Did you understand the language used in written material, for example, the participant information leaflet?
c) Did you understand the language used in questionnaires or interviews etc?
d) Did you understand what the study was about (the aims and objectives)?
e) Did you understand why you were asked to take part?
f) Did you understand the questions being asked?
g) Were you able to access (answer) the questions in such a way that enabled you to make a meaningful contribution?
h) Did you think the designer understood the information you gave them?
i) Do you know if the information you gave was used and if so, was it used in the way you expected?

When asked to talk to people about what you think of products or services does how they say or write things (language) make it hard or easy for you to tell them what you think?

- How were you told about the study and what you would have to do if you took part in it?
- Did you understand what you were being told (the language in anything that was written down, for example the information given to you about taking part in the project?)
- Did you understand what you were being asked or told when somebody spoke to you (interview) or you were asked to write down what you thought (questionnaire)?
- Did you understand what you were being asked to take part in and why?
- Did you think the information you gave was understandable to the people asking the questions?
- Did you know what you were told before you told the person you spoke to made any difference to the product or service?

19) Given that there are so many different terms used by people that have disabilities to describe themselves:

a) what do you like to be referred to as, for example disabled, wheelchair user, has an impairment etc, and
b) can you think of any occasions where a designer used what you would consider to be inappropriate language, for example maybe referring to your support worker as a carer;
c) how did you feel when this happened, did it bother you a lot, a little or not at all for example and why?

As there are so many different ways people that have disabilities that are talked about:

a) where people are talking about your disability how would you like them to talk about you, for example, he is in a wheelchair, he has difficulty talking, he cannot walk;
b) has there been any times where people have said things that you consider to be wrong in relation to your disability;
c) if people have said things that you consider to be wrong, how did you feel when they said it, were you happy, sad etc and why did you feel like this?

20) What format would you like to see any guidelines that are produced presented in, please give a reason for your choice, for example, you may feel a website would be the most appropriate format as it can be updated quickly and easily?

How would you like to see the information that is given to the people that make products and services presented, for example, you may like a website as this may be the easiest way to provide up to date information?

21) Is there anything else you wish to tell me about for example, you may wish to talk about your experiences when commenting/complaining about products or services?

Are there any other things you want to tell me about that relate to (are linked with) times when you've been asked to talk to people about your feelings on products and services, for example how you felt about it, what you thought of the way the people asked you for your feelings etc?

Use of Personal Assistants (PAs)/Intermediaries

1) Does you carer/support worker/PA/ family member help you to present your feelings/views about any product or services when talking to designers? If so,

   a) How do they help you?
   b) Do you find their input helpful?
   c) Are there any disadvantages to using a PA or family member to help you present your views e.g. the family member/PA takes over or talks too much?
   d) Do you think the PA or family member gives a true representation of your views, if not why?
   e) Do you think it is important for designers to talk to both you and your PA? If so, how (at the same time they are talking to you or at a different time?)
   f) Do you think your PA/family member can provide additional information that may be helpful to designers which you may not be able to give, for example, how a new shower chair will be stored?

Does someone you know help you e.g. your friend to talk with people that make products or services. If they do

a) How do they help you?
b) Does what they do help you?
c) Are there any problems when then help you?
d) Does the person helping you actually explain to the person how you feel about something/do something, if they don't why do you think this?
e) Do you think it is good for people who make products and services to talk to people that know you well, for example a friend, if you think it is a good thing, what is the best way of doing this, talking to you and your friend together or talking to you first and your friend?
f) Do you think a friend or family member may be able to give the people who make products and services more information than you can, for example, where something may be put in your home (stored)?

Introduction

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Text in **red** is a simplified version of the question which may be used when the participant has:

- a language difficulty
- comprehension difficulty
- when participants do not understand the question as it has been first asked (version in black)

In this interview you may come across the following definitions:

SCAN -Users with Specific, Critical, Additional Needs: Individuals that have specific critical needs (in relation to them and these needs have to be met in order to maintain their quality of life) but are additional to that of common everyday critical needs (i.e. needs we all have as human beings for example, we all have a need to sleep). An example of a Specific, Critical, Additional Need, is that of a person who cannot feed themselves thus having to be fed so that they can eat.

Method:

By method we mean interview, questionnaire, focus group or any other method you use to present your views. See below for some examples of methods:

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Image A: A focus group taking place

Image B: An example of a questionnaire

Demographic Information:

1) What is your:

- age;
- sex;
- ethnicity, and
- do you consider yourself to have a disability as defined by the Equality Act 2010 i.e. you have a physical or mental impairment, and it has a substantial and long-term adverse effect on your ability to carry out normal day-to-day activities? (Adapted from the Equality Act 2010) and if so what is the nature of it (e.g. physical, sensory, learning etc?)
- How does it affect your day-to-day life?

(Tell the researcher if you do not want to answer this question)

How old are you?

Are you male or female?

What is your ethnic origin? (Give examples)

Do you think you are disabled? If so what is the nature of your disability (this is for sampling purposes only)

How does it affect your day to day life? (give examples)

Possible questions that could be used with control participants in interviews:

1) Have you ever been involved in research where the choice of feedback method has made it difficult or impossible for you to give your views, if so what was the method and why do you feel the methods selected made it difficult or impossible for you to give your views?

2) If you have not been involved in a design process before, can you think of any other times where your views have been sought, what methods were used then? Were these accessible or not?

3) Do you have any advice that you would give to designers regarding selection of the methods they use to gain your views?

4) Is there anything else that can be done by the design community to make it easier for you to partake in design and evaluation processes, if yes , what could be done and how would this make it easier for you to partake in the processes?

5) How do you find the language used in research materials e.g. questionnaires and by designers when gathering requirements and/or asking you to evaluate products? Do you always understand what they've asked you to do?

6) Do you think designers could benefit from some formalised guidance in relation to:

a) appropriate method selection;
b) ethical issues when working with users;
c) maintaining professional boundaries when working with users;
d) any other issue you consider to be relevant to designers?

7) If guidelines were produced to advise designers on method selection when working with users; what format would you prefer these to be published in, please give a reason for your choice, for example you may prefer a website as this can be updated quickly and easily?

8) Do you think designers could benefit from some formalised guidance in the following areas:

   a) method selection;

b) ethical issues;
c) maintaining professional boundaries, and
d) any other issues you consider relevant?

9) What format would you like to see any guidelines that are produced presented in, please give a reason for your choice, for example, you may feel a website would be the most appropriate format as it can be updated quickly and easily?

10) a) In terms of language used by designers towards you as a participant, what do you like to be referred to as, for example, user, participant etc?

b) Have there been any times where the designer has used inappropriate language when interacting with you, for example swearing?

11) Is there any other information related to your experience of taking part in design processes (specifically in relation to the methods used and there accessibility to you) that you wish to tell me that we have not yet discussed?

Some questions will be used in both interviews with control participants and interviews with SCAN participants. Due to the fact that some SCAN participants can have difficulties in relation to language and comprehension, great care has been taken when preparing questions to ensure they're accessible to all, regardless of disability. Particular attention will be paid in the pilot stage to the accessibility of questions and it is expected that alterations will be made as a result of this. These questions are only used in the format of a semi-structured interview thus they may be adapted to enable the participants to express their views, for example, words may be changed and irrelevant questions omitted; this is a strength of the interview method as stated by Robson (2002:310).

Introduction

If you require this document in another format such as large print, please contact the Researcher.

Text in **red** is a simplified version of the question which may be used when the participant has:

- a language difficulty
- comprehension difficulty
- when participants do not understand the question as it has been first asked (version in black)

In this interview you may come across the following definitions:

SCAN -Users with Specific, Critical, Additional Needs: Individuals that have specific critical needs (in relation to them and these needs have to be met in order to maintain their quality of life) but are additional to that of common everyday critical needs (i.e. needs we all have as human beings for example, we all have a need to sleep). An example of a Specific, Critical, Additional Need, is that of a person who cannot feed themselves thus having to be fed so that they can eat.

Method:

By method we mean interview, questionnaire, focus group or any other method you use to present your views. See below for some examples of methods:

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Image A: A focus group taking place

Image B: An example of a questionnaire

Demographic Information:

1) What is your:

- age;
- sex;
- ethnicity, and
- do you consider yourself to have a disability as defined by the Equality Act 2010 i.e. you have a physical or mental impairment, and it has a substantial and long-term adverse effect on your ability to carry out normal day-to-day activities? (Adapted from the Equality Act 2010) and if so what is the nature of it (e.g. physical, sensory, learning etc?)
- How does it affect your day-to-day life?

(Tell the researcher if you do not want to answer this question)

How old are you?

Are you male or female?

What is your ethnic origin? (Give examples)

Do you think you are disabled? If so what is the nature of your disability (this is for sampling purposes only)

How does it affect your day to day life? (give examples)

Possible questions specifically for a participant's family member or personal assistant (support worker) to be used in a separate interview:

1) Is there anything you can tell me, from your perspective, as somebody who knows the participant well in relation to their involvement in any process (for example consultation, evaluation etc) where they were asked for their views/feedback about products or services e.g. they may have been asked for their views in relation to a new product?

2) Is there any advice you would give to designers regarding the methods they select to either gather requirements or evaluate what they have designed from your perspective as somebody who works closely with the participant/knows the participant well?

3) Have you ever acted as an assistant to the participant to enable them to take part in design and evaluation processes, in the capacity of an interpreter or practical assistant, if yes, what sort of assistance did you give, for example, communication support?

4) Have you ever acted as an advocate/proxy where you have given views on behalf of the participant? How easy was this? How did you put forward their concerns/views?

5) Have you ever had to interpret/provide support to enable what was said by the person with SCAN to be understood by the designer? If yes, what support was this and was it effective?

6) In your view, is there anything that can be done by the design community and/ or those that have additional needs to make design and evaluation processes more accessible, if yes, what are these and why?

7) Do you think designers could benefit from some formalised guidance in the following areas:
    a) method selection;
    b) ethical issues;
    c) maintaining professional boundaries;
    d) any other issues you consider relevant?

8) What format would you like to see any guidelines that are produced presented in, please give a reason for your choice, for example, you may feel a website would be the most appropriate format as it can be updated quickly and easily?

9) a) Has there ever been any occasions where the language used by a designer has been difficult for you to understand or interpret so that you can assist a participant?

   b) Have there ever been occasions where designers have used inappropriate language when interacting with you or the participant with SCAN?

10) Were any other people involved when you were asked for your views/feedback for example where your parents asked to provide information as well:
   a) If so, did you mind them being involved?
   b) Did you think what they had to say was relevant?
   c) If you did not like them being asked to give information, can you tell me why, for example the designer listened more to them than me?

11) a) What skills do you think it is important for a designer to have when working with you, for example, they must be a good listener and they must be able to think about, how things make me feel (empathise)? b) Why are these skills important in your opinion?

12) Is there any other information related to your experience of assisting people with SCAN to take part in design or evaluation processes (specifically in relation to the methods used and there accessibility to the person with SCAN) that you wish to tell me that we have not yet discussed?

All participants in interviews will be given the opportunity as far as possible to express their own thoughts and feelings without questioning. However, questioning will be used to focus the discussion or to focus in on an area of discussion that requires more detail.

Introduction

If you require this document in another format such as large print, please contact the Researcher.

Text in **red** is a simplified version of the question which may be used when the participant has:

- a language difficulty
- comprehension difficulty
- when participants do not understand the question as it has been first asked (version in black)

In this interview you may come across the following definitions:

SCAN -Users with Specific, Critical, Additional Needs: Individuals that have specific critical needs (in relation to them and these needs have to be met in order to maintain their quality of life) but are additional to that of common everyday critical needs (i.e. needs we all have as human beings for example, we all have a need to sleep). An example of a Specific, Critical, Additional Need, is that of a person who cannot feed themselves thus having to be fed so that they can eat.

Method:

By method we mean interview, questionnaire, focus group or any other method you use to present your views. See below for some examples of methods:

Some materials have been removed due to 3rd party copyright. The unabridged version can be viewed in Lancester Library - Coventry University.

Image A: A focus group taking place

Image B: An example of a questionnaire

Demographic Information:

1) What is your:

- age;
- sex;
- ethnicity, and
- do you consider yourself to have a disability as defined by the Equality Act 2010 i.e. you have a physical or mental impairment, and it has a substantial and long-term adverse effect on your ability to carry out normal day-to-day activities? (Adapted from the Equality Act 2010) and if so what is the nature of it (e.g. physical, sensory, learning etc?)
- How does it affect your day-to-day life?

(Tell the researcher if you do not want to answer this question)

How old are you?

Are you male or female?

What is your ethnic origin? (Give examples)

Do you think you are disabled? If so what is the nature of your disability (this is for sampling purposes only)

How does it affect your day to day life? (give examples)

Possible questions specifically for healthcare professionals:

1) In the context of your practice as a healthcare professional, have you even been asked to:
   a) provide your views in relation to products or services, if so what was it for or;
   b) provide information on behalf of or instead of service users (acting as a proxy) or;
   c) acting as advocate/interpreter for a service user?

2) If 'yes' to question1 (above) do you feel you were able to fully represent/advocate for the service users you represented, for example, did you feel that too much emphasis on your views instead of those of the service users?

3) Is there any advice you would give /techniques you have learnt in your practice as a healthcare professional relating to working with SCAN users that may be of benefit to designers, for example, you may have learnt that when working with a particular group of SCAN users some things work well, while others do not?

4) How much importance are your views given in relation to products or services by design teams?

5) Are there any challenges you face when working with designers of products or services, for example, they may use technical language you do not understand?

6) Could you give any advice to designers that have not yet collaborated with healthcare professionals, for example, what works well etc?

7) If you have worked with designers before:

   a) What worked well and why?

   b) What may you have done differently if asked to repeat the process?

8) Is there anything else you wish to discuss that you feel may be relevant?

Image sources:

Image A:
http://www.nottinghamcity.gov.uk/nottinghamjob/media/image/8/b/disabled-people.jpg

Image B: http://blogs.warwick.ac.uk/images/ahariri/2009/05/13/questionnaire.jpg

References:

Great Britain Parliament (2010) *Equality Act 2010* [Act of Parliament] London: HMSO [online] available from < <http://www.legislation.gov.uk/ukpga/2010/15/section/6> [28 August 2010]

Robson, C. (2002) *Real world research: a resource for social scientists and practitioners.* 2nd edn. Blackwell Publishing: United Kingdom.

Appendix J: Anonymised participant information

Stage 1: Focus groups with designers

Gender	Number of participants	Percentage %
Focus group with experience of SCAN users – Male	6	40
Control focus group (no experience) – Male Only	4	26.5
Telephone Interviews/Skype conversations	4	26.5
Focus group with experience of SCAN users – Female	1	7
Total Male	12	80
Total Female	3	20

Table J. 1: Gender of participants in stage 1

Academic qualifications of participants

Qualification	Number of participants	Percentage %
Masters	6	40
None declared	6	40
Undergraduate degree	2	13
PhD	1	7
Total	15	100

Table J.2. Qualifications of participants in stage 1

Design experience

Experience (Number of years)	Number of participants	Percentage %
1 - 5	6	40
6 - 14	0	0
15 +	6	40
20 +	1	7
None Declared	2	13
Total	15	100

Table J. 3 Number of years experience of participants in stage 1

Age group	Gender	Ethnicity	Disability
Stage 2			
Control group			
35 to 44	Female	White British	No
35 to 44	Male	Turkish	No
25 to 34	Female	Caucasian	No
25 to 34	Male	British Indian	No
25 to 35	Female	British Indian.	No
Family member /support worker			
45 to 54	Female	White British UK	No
65+?	Female	White British	No
35 to 44	Female	White British	No
55 to 64	Female	White British	No
55 to 64	Female	Afro-Caribbean	No
Health or Social care professional			
35 to 44	Female	White British	No
45 to 54	Male	White British	No
45 to 54	Female	White Caucasian	No
45 to 54	Female	White British	No
Hearing impairment			
55 to 64	Female	White British	Yes
Physical disability			
24 to 34	Male	White British	Yes
24 to 34	Female	White British	Yes
25 to 34	Female	White British	Yes
25 to 34	Male	White British	Yes
55 to 64	Male	Indian	Yes

Age group	Gender	Ethnicity	Disability
Stage 2			
Visual impairment			
55-64	Female	White British	Yes
25 to 34	Male	White British	Yes
65+	Male	White British	Yes
45 to 54	Female	Eastern European	Yes
45 to 54	Female	White British	Yes

Table J.4 Stage 2 Anonymised participant information