

The Utopia Trilogy – using videos to represent the requirements of older users to designers.

A. Carmichael¹, A. F. Newell¹, M. Morgan³, A. Dickinson¹,
O. Mival²,

1. University of Dundee

2. Napier University

3. Foxtrot Theatre Company, Dundee

In: Include 2005 (2005). Royal College of Art, London, 5-8 April.

Keywords: Film/theatre, communicating user requirements, methodology, older people

Summary

A collaboration between academic researchers and a professional theatre company culminated in two set of videos. These video sequences were of a narrative type based on the Forum Theatre technique. The first addressed the ethical and usability issues of a video monitoring system for older people. They were successfully used in the requirements gathering phase of the project. The second set of videos –“the UTOPIA Trilogy” - were designed to raise designers awareness of the challenges older people find in using information technology products. An evaluation study showed that UTOPIA Trilogy was successful in producing significant changes to the mind sets of both computing students and Human Computer Interface professionals concerning older users of information technology. These studies indicate that Forum Theatre techniques can be used in a variety of ways to influence designers in from an inclusive design perspective.

Changing mind sets, and the need for data

Successful inclusive design requires designers both to achieve an empathy with their potential users, and to have access to sufficient relevant human factors knowledge about their intended end-users’ needs, wants and abilities. This can be difficult when the user population is older and/or disabled people, as these groups are unlikely to be well represented in the peer group of the designer. This is particularly noticeable amongst Information and Communication Technology (ICT) designers, where much current software seems to have been designed by young male computer scientists who have a limited, or even nonexistent, understanding of the physical and sensory characteristics of older people [Newell & Gregor 1997]. Danowski and Sacks [1980]comment that “older people differ from “typical” computer users in terms of experience, sensory, physical and cognitive characteristics, and, as a result, software designed for such “typical” users can present barriers to learning and use for older people. In addition, the less than positive

attitudes which many older people have of new technologies is very alien to a young person for whom its use is second nature.

Older people differ from ‘typical’ computer users in two essential ways. They are less likely to have experience of technology than younger people, and the physical, sensory and cognitive characteristics of ageing can be significant barriers to the use of computer systems in their present form. Eyesight, for example, ranges from 20/20 vision, through age related reductions in focal range (which can be corrected by spectacles), to legal and finally total blindness. All older people have minor age related visual impairments including reduction in light levels on the retina, peripheral vision, colour and contrast sensitivity. Although most will not consider themselves visually impaired, they will find the use of standard screens much more difficult than they did when they were younger. Age-related sensory, cognitive and physical impairments, ranging from minor to severe, are all associated with advancing age. Most older people have a combination of minor impairments and these impairments may also interact with one another, creating, in effect, a more serious handicap [Carmichael, 1999; Newell and Gregor 1997; Gregor and Newell, 2001].

Clearly it is important for designers to address these issues, and interact with older people, but older people can present particular communication challenges for designers. We have found that older people tend to be very positive about the prototypes which are presented to them – wishing to praise the developers rather than give an objective view, and, if they cannot cope with technology, they tend to blame themselves, and their own incompetence, rather than poor design. Their confidence in their ability to use technology can also be very fragile, and it is important from an ethical perspective not to put older people in a position where any confidence they have is under threat. Obtaining requirements and evaluation data from older people therefore is not straightforward [Zajicek, 2004; Eisma et al. 2004]. In addition, ‘older people’ are not a homogenous group; the characteristics and experiences of a fit 75 year old are very different to those of a frail person in their 60s, and, in addition to multiple minor impairments, a high percentage (approximately 50%), of people over 65 have a serious disability. There is thus much more variability in the over-60s than other age groups.

Guidelines

Many guidelines have been produced on “inclusive design” and “accessible design” [see World Wide Web Consortium, 1998, 1999; Office of the e-Envoy, 2002 a,b,c] and detailed analyses of the characteristics of older people have been published [Carmichael, 1999]. Automated accessibility checking tools, such as Bobby [Watchfire, 2002], have also been developed, but there is often inconsistency between automated tools in reporting accessibility barriers [Diaper & Worman, 2003]. There is a body of research information on the problems that older people face using computers [e.g. Coyne et al 2002, Williams et al 1997, Hawthorne 2002], but Robey and Markus [1998] report that many designers find academic papers unreadable. Following guidelines to achieve standards compliance is an important step, but this step needs to be taken in conjunction

with an overall awareness of inclusive design issues. Many designers still do not adhere to accessibility guidelines, and there is evidence suggesting that the use of guidelines and standards on their own have limited effectiveness [e.g. Sloan et al 2002; Kelly 2002; Diaper and Worman 2003]. It would thus seem that the mere availability of guidelines is not enough to ensure optimally accessible and usable resources, nor are legal imperatives to adhere to them effective [Gregor and Sloan, 2005].

Young designers cannot design for themselves and expect older users to find the system appropriate or usable. In order to design successfully for older people designers need to be made aware of the huge cultural and functionality differences between themselves and older users. Designers must develop a real empathy with users, which, is more difficult when the user group (older people) is so different from the population from which most designers are drawn. “User Centred Design” methodologies, and “usability testing” were designed to provide ways in which designers can take more account of the actual characteristics of their user population, and these have proved to be very useful in conventional software design. As Nielsen has commented, however, “usability” has no independent meaning: it can only be defined in terms of the specific user group for which the system is being developed [Nielsen, 1993, p.27]. Newell and Gregor [1997] have pointed out that older people provide greater usability challenges than younger, more computer literate people, and such methodologies do not cater well for the much wider spread of characteristics of this group of people. The wide ranging characteristics and functionality of older people, with the presence of multiple minor disabilities, and, in many cases, a serious disability makes it difficult, if not impossible, to find and recruit ‘representative’ users and to produce universal guidelines [Gregor and Newell, 2001]. Newell and Gregor [2000] suggested that a new design paradigm should be developed which they described as User Sensitive Inclusive Design. They believed that “Inclusive” was a more achievable objective than “for all” or “universal”, and “Sensitive”, rather than “centred” reflects the lack of a truly representative user group. Above all, however, they recommended that it is necessary to develop a different attitude of mind among designers. They suggest that this change of mindset requires novel ways of presenting information to designers for whom older people are an unfamiliar user group.

Lessons from the UTOPIA Project

The UTOPIA Project (Usable Technology for Older People: Inclusive and Appropriate) funded by the Scottish Higher Education Funding Council, led by Newell and Gregor of the Division of Applied Computing at the University of Dundee and including Abertay, Glasgow and Napier Universities, was established to examine the issues surrounding older people’s use (or non-use) of technology, and to alert both academia and industry to the need to design appropriate technology for this group [Dickinson et al 2002; Eisma et al., 2003; see also <http://www.computing.dundee.ac.uk/projects/UTOPIA>]. As part of this research project, contact was made with a diverse range of older people and a database of over 160 individuals and 24 groups was developed. There was a focus on ensuring diversity in aspects such as: demographics (age, gender, class), experience with technology (for example, computer users, novices), and inclusion of specific groups

(individuals who have specific difficulties, for example mobility, speech problems). The cohort is thus a diverse and representative sample which includes people from many different backgrounds, with various life experiences, ranging from Information Technology literate people living at home to people in day centres who have never used a computer.

The UTOPIA project contributed to a project established by the U.K. Department for Education and Skills (DfES) which addressed the divide created by the increasingly digital nature of contemporary U.K. society. They assisted in the development of a “Proof of Concept” internet portal which would be “attractive to older users (over 60 years of age) who were uninitiated and unconfident in the use of computers and for whom the internet was an alien territory” and which would encourage them to progress to more sophisticated Internet use.

This project is described in detail in an accompanying paper in this issue of the journal **[reference needed if other paper accepted]** The experience of this project underlined a major barrier to software design for older people. The company designers were excellent designers, who understood the traditional “user centered design” methodologies, were aware of the appropriate guidelines, and were given detailed briefings from experts in the field of design for older people. It was not until the designers actually saw older people trying to cope with the prototypes they had produced, however, that they discovered, the depth of ignorance of older people of the “internet” or even “email”. Comments from the developers included:

The first overwhelming observation is that some of our users start right back at the very basics. That is absolutely NO prior knowledge whatsoever!

In the first 5 minutes they were literally just beginning to make sense of what the screen might be about.

We have a ready-made framework for interpreting what’s on a screen. Our users don’t have this. They have to construct it as they go.

We take for granted all kinds of metaphors and conventions in user interface design. The lesson for me was that absolutely NOTHING can be assumed.

Thus, although the developers were well aware of the issues from a theoretical standpoint, the older users’ lack of understanding of many “basic” points came as a great surprise to the designers. It seemed that they needed to “see with their own eyes” the problems users encountered, before they fully recognised them.

How to change mind-sets

It was clear that the characteristics of many older users, and their attitudes to, and knowledge of technology, was so far removed from the those of the designers that they found it very difficult to put themselves in the place of older people and design for them. Clearly there are many pressures on developers to produce commercially viable systems quickly and these may conflict with the need to have a detailed knowledge of the needs

and characteristics of particular user groups. Another factor may be that designers are typically visually oriented, and a lot of design education is done by example. In contrast, most accessibility information is presented in textual and numerical form. Thatcher, [2003] has also pointed out that written accessibility guidelines and standards, are often inappropriately used without knowledge of the context of older and disabled users. Guidelines are simply directions for good design and need to be complemented by a deeper understanding of the issues. Accessibility specialists have, in general, failed to produce research results in a form that can be readily used by commercial developers. This effect can be more extreme when older people, with their very wide ranging and interacting disabilities, are the user group [Gregor et al, 2005]

Traditional usability evaluations are also not commonly carried out with older participants, and thus provide little information on the particular usability needs of older people. The historical marginalisation of older and disabled people in mainstream usability engineering means that traditional UCD provides little or no guidance about how to design for that user group [Newell 1993; Newell and Gregor 1997]. The inclusion of older people in such evaluations, however, present additional challenges - not only is the range of functionality much greater for the older age group, but also many older people are difficult to communicate with, and people with hearing difficulties often find it hard to contribute to group discussions. The large majority of older people have little knowledge of 'computer' language, thus complicating the communication process between such groups and technology specialists. We have found many older people have little understanding of what the Internet is, and what is contained in their own computers (some, for example, did not even realise that sending an email involved using the Internet). In addition, because of their unfamiliarity and fear of computers, a usability flaw in a prototype could have a catastrophic effect on an older person's confidence. User centered designers, therefore, need to be particularly sensitive not only to the sensory and cognitive abilities of older people, but also to their psychological state and their perceptions of technology.

Thus, although a large corpus of information exists about the abilities and requirements of older people, much of this is effectively inaccessible to, and thus not used by, designers. Designers also need more 'soft' data about users – such as their problems, preferences, lifestyles, and aspirations. Furthermore designers need much of this data at the earliest, conceptual stages of design. . Cost constraints on design projects may prevent designers from accessing 'real' users [Sims, 2003] and designers in many cases are forced to rely on their own experience or intuition to guide their assumptions about user characteristics - these may well have little relationship to the true situation ..

There is an urgent need to change the mind sets of many designers so that they can develop an understanding of, and empathy with, older users. This process should lead designers to be more cognizant of the particular challenges presented in designing for older people, encourage them to access more, and more appropriate data on older people, and thus design more inclusive systems. The question is how to produce this transformation in the mind sets of designers in an effective and cost efficient way?

The development of effective methods for presenting human factors research findings to designers who need them is a pressing issue within the context of designing for older people. The first challenge is to communicate a straightforward message about the characteristics of older people to designers in such a way as to create the maximum impact.

Personas and Scenarios

We reported above it was not until the designers actually saw older users interacting with technology that they began to understand the real issues. This is confirmed by Wixon [2003] who notes that “it is no accident that most usability testing involves encouraging entire design teams to watch the test, and it is well known that much of the effectiveness of the test comes from this active participation”. However, as also discussed above, this is not always feasible, and interacting with older people requires significant skills which some designers may not have. We thus addressed the issue of whether it was possible to give designers a greater empathy with users without them necessarily having to have one to one contact with users.

One approach is the development of “personas” which are fictional characters instantiating a array of qualitative data representing the user group [Cooper, 1999] and scenarios illustrating how users may react to equipment within realistic situations [Benyon & Macaulay 2002]. A growing body of literature indicates that these concepts are being taken up with enthusiasm by certain parts of the design community, particularly software and interaction designers [Pruitt & Grudin 2003; Head, 2003]. Personas are regarded as a positive complement to existing techniques such as scenarios and task analysis [Carroll 2000]. It is claimed that personas promote engagement of designers over a period of time, which in turn promotes insight into users’ goals and the way in which users might respond to design features.

The Use of Theatrical Techniques

In general such personas and scenarios are instantiated as text with relatively complete descriptions of potential users and user environments which essentially comprise a description of a “walk-through” of the usage of the product or system. Although these can be valuable, particularly with experienced designers, we were looking for more powerful communication tools aimed at designers with little or no experience of inclusive design. We postulated that the techniques of theatre could be more effective in transmitting important messages about user characteristics to this group.

Theatrical methods are beginning to be used in the context of product design. Howard *et al.* [2002] have used participatory design sessions, in which contextual scenarios are acted out. This work has followed that of Carroll [1997] on scenario-based design. The

use of actors in design development has been reported by Salvador & Howells [1998], and Sato & Salvador [1999] as a very useful and interesting way of establishing a common, shared context for audience participants. Dishman [2003] and others have used actors in unscripted live drama which Dishman calls “informance design” to address design requirements for older adults.

A range of theatrical techniques have thus been used including the documentary approach, actors performing various specified tasks with the technology and designers themselves acting out various scenarios in front of their peers. We wished to encourage dialogue within design communities, and between designers and users, as a way of changing the mind sets of designers. We needed a theatrical genre which was specifically designed to encourage audience participation. We thus studied the ideas of “Forum Theatre” as described by Boal [1995]. Boal’s work was a development of his work on “Theatre of Oppressed” in Brazil, and we wanted to make the voices of people who are oppressed by technology heard (although the oppression faced in Boal’s situation are of a different order of magnitude to that of our user group).

Foxtrot Theatre (in Education) Company

We approached the Dundee based Foxtrot Theatre [in Education] Company. This company had developed a version of Forum Theatre and used these techniques extensively within professional training of communication skills (e.g. within palliative care, and training medical students) and in community consultation (including with seniors). A script writer conducts detailed research on the subject area and then produces a series of short plays which address the important issues to be discussed within a narrative style with the emotional content and tension essential to good drama. In general these scripts have a “beginning” and a “middle” but no “end”. In live Forum Theatre, the play is performed and then the audience are encouraged to address the issues of the character’s different motivations and emotions, and to direct the rest of the play. This has been found to be a very powerful genre for facilitating the discussion of sensitive issues and, via dialogue within the audience and between the audience and the actors (who stay in role), changing mind sets of the professionals in the audience.

We first used a version of this technique within the requirements gathering phase of a project developing a video camera based monitor and fall detector for older people in their homes [McKenna et al 2003]. We wished to facilitate discussions on the technical and ethical issues of such technology within a range of focus groups of potential users of such a system. We believed that the use of theatre, rather than a more straightforward technical description of the system, would encourage older people with little or no technical knowledge to partake in realistic and useful discussions concerning a new technological solution. We followed the main techniques of Forum Theatre, but for reasons of cost used video rather than live theatre. On the basis of discussions with the designers and some older people, the script writer produced a series of short scenarios containing “human interest”, humor, and dramatic tension as well as illustrating how the system may work, the errors which could occur in its use, and the effects of these errors

on the participants. Videos were then produced of various scenarios using professional actors. In the style of Forum Theatre, the videos contained “stopping points” where the video was stopped and discussion with the audience encouraged.

These videos were then used to initiate discussions within focus groups of older people. We found that:

1. The dramas set a shared context for discussions between potential users and designers,
2. The dramas focused discussion on specific scenarios of likely system usage, and
3. The experience of watching the video provoked lively discussion of relevant details because elderly users could imagine themselves using the monitoring system

Overall the videos were found to be a very useful method for provoking discussion at the pre-prototyping stage, and one which potential users find interesting and enjoyable.

We believe the success of this experiment was in large part due firstly to the videos being narrative based – that is they illustrated how the equipment would work within interesting story lines with all the characteristics of a good narrative, humor, tension, human stories, antagonists and protagonists, and secondly because they were produced by theatre and film professionals.

The narrative approach versus the documentary approach

We decided to apply similar techniques to the challenge of changing the mind sets of designers concerning the needs of older people. Our research question was to examine the value of a narrative approach. This would have significant focus on the artistic merit of the narrative, which happened to present a particular message – rather than a documentary where the presentation of information was the focus. We wished to ascertain whether this technique would be as effective with professional designers as it had been with older users.

We wanted to produce a dramatization of the issues which we have encountered during our research and which would convey older people’s experiences of information technology and the situations they encounter when presented with the necessity of interacting with it. We commissioned the Foxtrot Theatre Company to produce a further series of narrative based videos to illustrate these problems.

The stories portrayed were to be an amalgamation of many older people's real experiences and the findings of our human factors and usability research with older people. These data, experiences and anecdotes were distilled by the scriptwriter into a series of narratives, which encapsulated many issues within an engaging and cohesive storyline. These were then produced as videos using professional actors, a director, and a video team. These video stories formed the “UTOPIA Trilogy” which is illustrated in figure 1. We believed that the use of professionals was very important, and also the fact that the script writer was an experienced theatre and video director, with a particular

knowledge of the use of Forum Theatre to encourage discussion on sensitive issues, had a major impact on the success of the project.

Communication between script writer & researchers to develop a script

The UTOPIA researchers had a great deal of background knowledge of the challenges faced by older users of technology from different types of technology, such as learning to work with computers, including use of the internet and email: playing computer games: use of mobile phones: using a computer based navigation aid. From all this information, the most important general principles and difficulties had to be distilled, then the different threads woven into the ‘tapestry’ of three different stories. Thus the first task of the script writer was to capture this knowledge, which was in the form of data concerning attitudes to technology, research results and a fund of relevant anecdotes. This was approached as an iterative, educational dialogue between the researchers and the creative team. The idea was to pass on the experiences of working with the user group and to give as wide a view as possible of the experiences that older people have learning to use computers.

The script-writers task was to instantiate these data as human interest stories – which would be interesting in their own right, but which implicitly transmitted the important messages. The script writer emphasised the importance of accurate research with experts in the field so that scripted material rings true, because, even if only a small factual detail is wrong, the illusion of reality is shattered. A number of meetings were held between the script writer and the researchers. The script writer also spoke directly with a number of the older volunteers involved in the UTOPIA project and read and viewed a great deal of background material provided by the staff, and visited sat in on their computer training groups.

The meetings between researchers and the script writer produced much tension, mainly due to a lack of understanding of the needs of the others in the group. The primary motivation of the researchers was transmitting information. The primary goal of the script writer was to produce well structured and tight scripting with good characterization – as required for any quality performance in any medium. Clearly what was required was a good story which transmitted the appropriate information. The researchers were fully aware of the issues which they wanted illustrating, and had many relevant anecdotes. They did not, however, fully appreciate the process by which a script writer could put these within a human interest context. Some of the aspects they felt were relevant became lost in the creative process, either because they were not especially interesting, or they did not make especially engaging stories, or they lacked dramatic interest. In particular two extremes were not covered (a) the successful computer user and (b) the absolutely naïve user who does not even know how the mouse operates.

The process itself, of a dramatist working with academic researchers, in a way paralleled the difficult process of technologists and designers trying to communicate with older people who were new to technology – and vice versa. Perspectives, expectations, past

experience, an understanding of each other's values and, of course, language were different. It was a fascinating if sometimes frustrating process, and provided a steep learning curve for all the participants. It was fortunate that one of the researchers was also an experienced film maker and his knowledge of both aspects of the challenge was very helpful in having someone who was aware of the problems and languages of both sides and was thus able to produce a bridge between the two disciplines. One particularly interesting event in this process was the use of 'method writing' to capture the accuracy of the scene in which Jane has a phone conversation with a technical help assistant. The script writer played the part of Jane (with a similar level of technological expertise) whilst the film maker researcher was the tech line assistant (again with a similar level of technological expertise). Much of the dialogue of this role play event constitutes the dialogue of this scene within the final film.

After researching the material, the script writer presented the group with outline ideas and after a great deal of discussion, decisions were reached on scenarios and what they were to demonstrate. These were finalized as:

A new (older) user of a mobile telephone,

A new (older) user of email both in the home and in a training workshop, and

The introduction of a new peripheral device within an (older) household (a webcam)

The script writer then produced draft scripts which were critiqued by the researchers. As is normal process within theatre and film, however, the script writer/director was ultimately responsible for the artistic merit of the production, and it had been decided that this was to be the foremost consideration in the endeavor. The script writer produced a final set of three scripts. The script writer then worked with the film maker researcher on developing a storyboard and shooting schedule to ensure the dramatic and research elements cohesively transferred to a visual representation. The video sequences for these were designed and shot with the scriptwriter and film maker researcher acting as co-directors which proved to be a very productive collaboration. Post production and editing was performed by the film maker/researcher, and was subject to a number of viewing with the other researchers to produce the final cut. The final trilogy was then authored to DVD and CD-ROM for distribution and viewing.

The UTOPIA Trilogy

The final videos as illustrated in figure 1 were:

Peter and Jane buy a web cam

This concerns an older woman who has limited experience of email, and who has just purchased a web cam so that she can send pictures to her daughter. Her original enthusiasm, supported by the claim on the box of the web cam being "easy to install", is eroded by repeated difficulties, even with the aid of an expensive "help line", of installing the software and her lack of understanding of terminology ("what is a USB port?") and is finally destroyed when she eventually discovers that her computer does not have a USB port.

Sandy's mobile adventure

This deals with the physical and cognitive difficulties older people have when faced with a mobile telephone and the methods they have to employ to be able to use it.

Email experience

Focuses on an older man who tries to use his wife's email system and, due to the complexity of the system, completely fails. His attendance at a computer class underlines the gulf between his knowledge and the knowledge assumed by designers ("what is a scroll bar?", "why does it work in the opposite way to which it ought to?", "why double click sometimes but not others?"). This culminates with his being shown a much simpler email system, and brings out how it is possible to design systems which are not frightening or overwhelming to older people.

Four professional actors experienced in Forum Theatre were employed - three men and a woman. The use of professionals ensured that a good performance could be mounted in a short time, and which would achieve the 'suspension of disbelief' required from the audience. A further advantage of using intelligent professional actors, especially on original material, was that they added significantly to the depth of the piece. For example, the actor in the role as the "Peter" character in the first part of the email scenario was very much at "Peter's" level of experience and was encouraged to 'freewheel' a little in the shot 'trying it out while the wife is out' scene. This rather took off, with the air "turning blue" as both actor and character's frustration mounted. This came as a surprise to the researcher whose older respondents had been much more polite and restrained, and to see someone being really angry at the failings of an email system was an unusual experience. However this successfully communicated the reality of the poor design, and the final product gained a great deal of humor, which audiences who identified closely with 'Peter's' struggles, have thoroughly enjoyed. It also resonated with the (polite) older people who were shown the final videos ("that is how I felt about the computer but did not say").

The videos were shot in domestic and outdoor locations. The budget meant that the three scenarios were shot in three days. This made for a very tight timetable and meant a slightly more 'theatrical' style of filming, was used rather than a more complicated 'filmic' style, which would have taken at least twice as long to shoot, and substantially longer to edit. Each day was a long one for the crew with careful timetabling of the actors keeping costs down. The weather being kind for the outdoor shots assisted in ensuring that the shoots were concluded within the three days.

Results to date

A variety of audiences including academics, practitioners, software engineers and relevant groups of undergraduates and trainees, and older people have been shown the Utopia Trilogy and have provided feedback about them. Evaluation questionnaires, ‘focus groups’ and other discussions (not reported here) have established that experts in usability for the elderly and elderly people themselves believe that the videos accurately portray the experiences that many older people have with modern technology.

A “before and after” questionnaire was developed which addresses some of the relatively stereotypical ‘attitudes’ which seem often to be held by many designers about older people and information technology. Respondents indicated their dis/agreement with each of eight statements on a five point scale (see Figure 2 below), before they had viewed the trilogy and again afterwards. It can be seen that “agreement” with these statements suggests a view that users (particularly older ones) are fairly incidental to the design process, whereas “disagreement” represents an ‘attitude’ more conducive to inclusive design. Care was taken to ensure respondents’ ‘before’ sheets were removed prior to viewing the videos and subsequent completion of the ‘after’ sheet.

<ol style="list-style-type: none"> 1. Most current interfaces are easy for most people to use. 2. Successful inclusive design is a matter of following the appropriate guidelines properly. 3. Older people are not interested in new technology. 4. A clear and comprehensive user manual is the key to usable technology. 5. Designing for older people is the same as designing for any niche market. 6. If an older person has difficulty with technology there will usually be a younger relative around who can help. 7. Older people have more in common than do younger people. 8. Specialist (rather than mainstream) companies should provide technology suitable for use by people with disabilities or impairments. 				
Response Categories				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Figure 2: the eight ‘attitude’ statements and associated response categories

At the time of writing, a sufficient number of responses for analysis have been obtained from two distinct groups. One group consists of first year Applied Computing Undergraduates (N=40) who have yet to study any usability/human factors modules. The second group is made up of HCI professionals and academics (N=52) attending a workshop on older people at the HCI 2004 conference. Although involved in HCI, many of this group did not have any particular experience with older people as users.

Figure 3 shows the responses for these two groups averaged across all the ‘before and after’ statements. An analysis of variance for the responses (averaged across all statements) given before and after viewing by the two groups showed a significant ‘improvement’ between ‘before’ and ‘after’ responses ($F(1, 89) = 40.96, p < .0001$). The HCI group showed more ‘disagreement’ overall than did the undergraduates ($F(1, 89) = 27.51, p < .0001$). The effects of these two factors also interacted significantly (F

(1, 89) = 10.59, $p = .0016$) such that, the Undergraduates' responses showed a greater degree of change than did those of the HCI group.

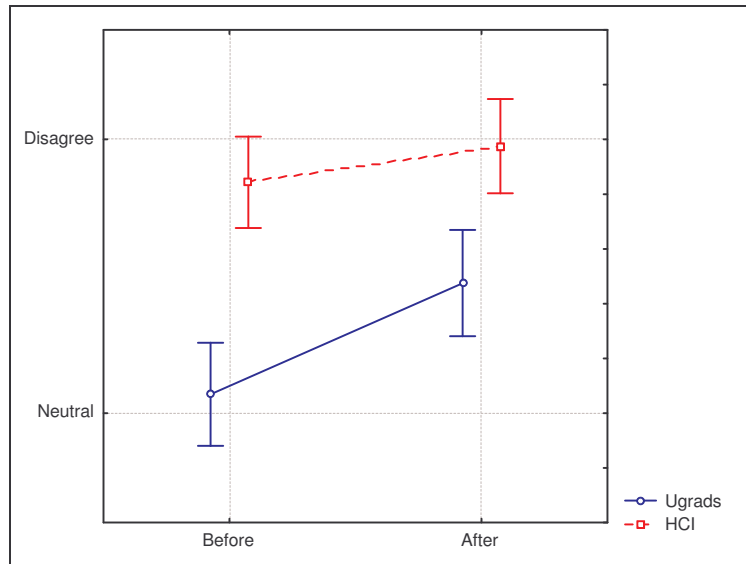


Figure 3: Averaged ratings given to all 'before & after' statements by computing undergraduates and HCI researchers

A more detailed breakdown of these groups' responses (Figure 4) showed that the overall pattern of effects is similar across the different statements. These findings suggest that this approach can have an impact on the mind set of people involved (or soon to be) in the design of ICT for older people. It is also interesting to note that the undergraduates showed the most change in regard to statement 1 "Most current interfaces are easy for most people to use", and statement 3 "Older people are not interested in new technology". These can be considered as basic but fundamental ideas in relation to inclusive design; such that the more you (actively) disbelieve them the more likely you are to consider the needs of a wider range of potential users.

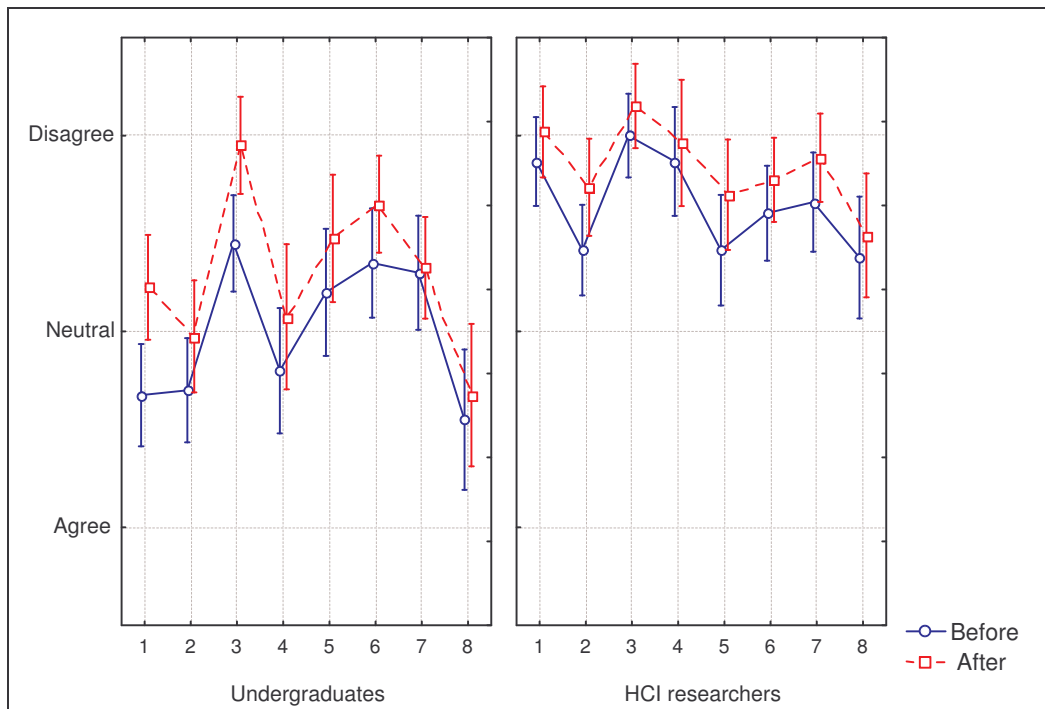


Figure 4: Difference in 'before & after' ratings between Undergraduates and HCI researchers

A more qualitative, but independent report was given by Light (2005) where she stated that “I found that (the Trilogy) largely does what the team hopes. The audience was appreciative; commenting that it took a holistic approach to the problems associated with technology and had been framed in contexts of use, making it informative and approachable. Ironically, they were concerned that the issues presented affected a wider population and that showing them as the preserve of older people might marginalise them. They also felt that the scenarios present difficult problems for designers to solve. But that is the point really – that there is an awful lot to think about and that thinking about how much is a good start”. Making that fear, frustration and joy more widely available can only be good for design.

Informal discussions with older users has indicated very positive reactions to the videos with the exception that older users complained that they did not illustrate the challenges presented to a completely naïve user, but they accepted that some of the subtleties of the ways in which poor design impacts on the user may have been lost in order to produce an engaging story.

Some respondents commented that the action was a bit slow in places. This was caused, to some extent, by time/budget pressures. The scripts, for example, would have also benefited by a developmental session with an invited audience where the actors, using scripts, acted out what had been developed so far. Comments from the audience, researchers and ‘older participants’ in the project, could have been added at that stage and the script be sharpened up in places. The planning of the video shoot is based on the script, and once the shoot is concluded there is only so much which can be done in the

cutting room, if further shooting days can not be fitted into the timetable/budget. We thus need to refine the process so that the final outcome is "tighter", and covers a greater range of interface challenges presented by older people.

Conclusions

The work of the Foxtrot Theatre Company has shown that video based Forum Theatre works well to promote discussions with older people on issues related to new technology. The techniques have provided an important input to the design stages by facilitating the exploration of the ethical and acceptability requirements of such systems.

The Utopia trilogy expanded on the concept of using narrative based videos to that of raising the awareness of designers of the challenges faced by older users of new technology. The results from questionnaires and focus group indicated that viewing and discussing these videos changed the perceptions of both students and mature designers of IT systems and products. Older users have confirmed that the videos accurately portray a range of challenges which they have found with new technology.

These were the first attempts at the use of genre and much was learned from the process. It is extremely important to ensure that researchers, the script-writer producer and the actors are all aware of the various agendas involved in producing an effective video. The tension between the artistic requirements of a rich and rewarding story and the technological requirements to convey particular important messages needs to be carefully managed to ensure that the videos capture the important messages which need to be conveyed. There is also a tension between a narrative which raises awareness of issues and questions for discussion and one which conveys "information". One video cannot achieve everything and it is important to use this genre where it is likely to be most effective, and for all the parties to have a clear idea of what is the major purpose of the video.

We have shown that the use of theatre (which includes humor and conflict) can be a very powerful method of communicating messages between designers and users of technology. We have concentrated to date on the issue of raising awareness amongst students and designers of the challenges of older people. Video was used as a cost effective way of interacting with large numbers, but this is more restricted than using live performances, and may not have the same impact. Live Forum Theatre has been shown in other areas to be very effective in stimulating discussion, and thus we will also be investigating the use this and other Boalian techniques both in conjunction with videos and live performances for promoting the "inclusive design" message within the design community.

Our results show that the techniques work well both in certain stages of requirements gathering and in raising awareness. Whilst it is not clear how other, perhaps more detailed forms of human factors information may be meaningfully portrayed in this way, the general insights which have been conveyed by the Utopia Trilogy represent an

important step forward. We are now investigating ways in which we can more closely link such theatrical presentations to scientific and demographic data about older users, so that the messages in such presentations can be grounded in scientific data as well as anecdotes, whilst still retaining the impact given by the genre

Acknowledgements

This research was funded by the Scottish Higher Education Funding Council, the Engineering and Physical Sciences Research Council, and the Department for Education and Skills.

References

- Boal, A. (1995). *The Rainbow of Desire*, Routledge, London
- Benyon, D. & Macaulay, C., (2002). "Scenarios and the HCI-SE design problem." *Interacting with Computers* 14 2002 397-405.
- Carmichael, A., (1999). *Style Guide for the Design of Interactive Television Services for Elderly Viewers*, Independent Television Commission, Kings Worthy Court, Winchester, 1999.
- Carroll, J.M., (1997). "Scenario-Based Design in Handbook of Computer Interaction" M. Helander et al 1997 Elsevier Science B.V.
- Cooper, A. , (1999). *The inmates are running the asylum*. Macmillan, USA.
- Coyne, K and Nielsen, J., (2002). *Web Usability for Senior Citizens*, Nielsen/ Norman Group.
- Danowski, J. A. and W. Sacks (1980). *Computer Communication and the Elderly*,. *Experimental Aging Research* 6 (2) 125-135].
- Diaper, D. and Worman, L. (2003). *Two Falls out of Three in the Automated Accessibility Assessment of World Wide Web Sites: A-Prompt v. Bobby*. In: Johnson, P. and Palanque, P. (eds.) *People and Computers XVII*. Springer-Verlag.
- Dickinson, A, Eisma, R, Syme A, & Gregor P. (2002), *UTOPIA: Usable Technology for Older People: Inclusive and Appropriate* In "A New Research Agenda for Older Adults" Proc. BCS HCI 2002, London 2002 (ed. S. Brewster and M. Zajicek) pp.38-39

Dishman, E., (2003). Designing for the New World. In Design Research, (Ed.) Laurel, B. MIT Press, 2003, pp 41-48

Eisma, R., Dickinson, A, Goodman, J, Mival O, Syme A and Tiwari L, (2003) Mutual inspiration in the development of new technology for older people. In: Include 2003, London, March 2003 pp.7:252-7:259

Eisma, R., Dickinson, A, Goodman, J, Syme A and Tiwari L, Newell A (2004) Early user involvement in the development of Information Technology-related products for older people, *Universal Access in the Information Society*, 3/2, 131-140.

Gregor P. and Newell, A. F. (2001). "Designing for dynamic diversity - making accessible interfaces for older people", in: WUAUC'01 (2001 EC/NSF Workshop on Universal Accessibility of Ubiquitous Computing: Providing for the Elderly, 22-25 May, Portugal 2001) (ed. A.C.M. J. Jorge, R. Heller and R. Guedj) pp.90 -92.

Gregor P., Sloan D., and Newell A. F., (2005). Disability and technology: building barriers or creating opportunities. *Advances in Computers* (in press)

Grudin J. & Pruitt J., (2002). Personas, participatory design and product development: An infrastructure for engagement. *Proceeding of PDC 2002* 144-161. Palo Alto, CA:

Hawthorn, D., (2002). Issues related to application complexity when designing for older users. SIGCHI-NZ Symposium, Palmerston North.

Head, A. J., (2003). Personas: Setting the stage for building usable information sites. *Online* 27(4), 14-21, July-Aug 2003.

Howard, S., Carroll J., Murphy J., Peck, J. and Vetere, F. (2002). "Provoking Innovation: Acting-out in Contextual Scenarios", *People and Computers XVI Human Computer Interaction Conference 2002*

Kelly, B., (2002),. WebWatch: An Accessibility Analysis Of UK University Entry Points *Ariadne Issue 33*. <http://www.ariadne.ac.uk/issue33/web-watch/>

Light, A (2005). Tools of Inspiration (Feature) *Usability News*
<http://www.usabilitynews.com/news/article2266.asp>

Mckenna, S.J., Marquis-Faulkes, F., Newell, A.F. & Gregor, P., (2003). Scenario-Based Drama as a Tool for Investigating User Requirements with Application to Home Monitoring for Elderly People. In *Proceedings of the 10th International Conference on Human - Computer Interaction*, Crete,

Newell, A.F., (1993). Ordinary and Extra-ordinary Human Computer Interaction, Keynote Address. Proceedings of the International Computer Human Interface Conference, Amsterdam, April 1993

Newell, A.F. and Gregor, P., (1997). "Human computer interfaces for people with disabilities", in "Handbook of Human-Computer Interaction", Helander, M., Landauer, T.K. and Prabhu, P. (eds), Elsevier Science BV, (ISBN 0 444 81862 6) pp 813-824.]

Newell A.F. and Gregor P. (2000). "User Sensitive Inclusive Design" - in search of a new paradigm, In: *CUU 2000 First ACM Conference on Universal Usability (USA 2000)* (ed. J. Scholtz and J. Thomas) pp.39-44.

Nielsen, J., "Usability Engineering", (1993). London, Academic Press

Office of the E-Envoy, (2002 a), Guidelines for UK Government websites: Illustrated handbook for web management teams (May 2002),

([http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/webguidelines-handbook-top/\\$file/handbookindex.htm](http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/webguidelines-handbook-top/$file/handbookindex.htm))

Office of the E-Envoy, (2002 b), Guidelines for UK government websites: Framework for local government (August 2002),

([http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/webguidelines-handbook-top/\\$file/handbookindex.htm](http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/webguidelines-handbook-top/$file/handbookindex.htm))

Office of the E-Envoy, (2002 c) Government Metadata Standard (April 2002), ([http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/guidelines-metadata/\\$file/index.htm](http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/guidelines-metadata/$file/index.htm))

Pruitt J. & Grudin J., (2003). Personas: Practice and Theory. In *Proc. DUX 2003*, CD ROM, 15 pages.

Robey, D. And Markus, M.L., (1998). Beyond Rigor and Relevance: Producing Consumable Research about Information Systems, *Information Resources Management Journal* 11/1, 1998, 7-15

Salvador T. & Howells, (1998). "Focus Troupe: using drama to create common context for new product concept end-user evaluations" in *Proceedings of the Conference on CHI 98 Summary* ACM Press, New York, 1998

Sato, S. & Salvador, T. (1999) "Playacting and Focus Troupes: Theatre Techniques for creating quick, intensive, immersive and engaging focus group sessions", *Interactions*, Sept-Oct, p35-41

Sims, R. (2003). 'Design for All': methods and data to support designers. PhD Dissertation, Loughborough University, 2003.

Sloan, D., Gregor, P., Booth, P., and Gibson, L. (2002). Auditing Accessibility of UK Higher Education Web sites. In: Novick, D. and Scholtz, J. (eds), *Interacting with Computers* 14 (4) Elsevier Science 313-325

Thatcher, J., (2003) Web Accessibility - What not to do, (2003)
<http://www.jimthatcher.com/whatnotp.htm> 2003

Wixon, D., (2003). Evaluating Usability Methods Interactions, *The Digital Muse*, July August 2003 x4, 29-34

Zajicek, M., (2004). Successful and available: interface design exemplars for older users. *Interacting with Computers*, 16, 411-430

Watchfire, (2002). available at: <http://bobby.watchfire.com/bobby/html/en/index.jsp>

Williamson, K., A., Bow and Wale K. (1997.) Older People and the Internet. Link-Up, March 1997, pp. 9-12 <http://infotech.monash.edu/itnr/reports/olderp2.html>

Wixon, D., (2003). Evaluating Usability Methods Interactions, *The Digital Muse*, July August 2003 vol. x4, 29-34

World Wide Web Consortium, (1999) Web Content Accessibility Guidelines 1.0, (May 1999), (<http://www.w3.org/TR/WCAG10>)

World Wide Web Consortium, (1998), Cascading Style Sheets, level 2, (revised May 1998), World Wide Web Consortium (<http://www.w3.org/TR/REC-CSS2>)



PETER AND JANE BUY A WEBCAM

Having been given her son's old computer, Jane has set about learning the basics and now feels confident using it for email and word processing. Having come across an article in a paper, she has decided to take the plunge and buy a webcam so that she can talk to her daughter and grandchildren in Australia.



SANDY'S MOBILE ADVENTURE

Sandy has been given his daughter's old mobile phone. He never uses it but carries it around with him to keep her happy. Today he finally finds a use for it when he locks himself out of his house...



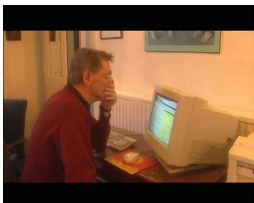
A few months later...

After his problems with the phone, Sandy's daughter gave him a quick lesson and a cheat sheet of simple instructions. Sandy still doesn't use the phone, but carries it with him in the car fully charged....just in case.



A year and a half later...

Since saving him a long walk home, Sandy has changed his attitude towards mobile phones and now uses his frequently. Over a glass of wine his daughter brings this change up...

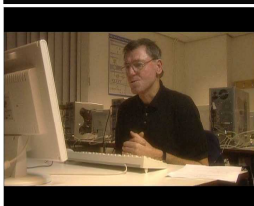


EMAIL EXPERIENCE

Peter is quietly jealous of his wife's confidence with using a computer, but is too proud to admit it. One day he finds that she's left it on when she's gone shopping. He decides that this is the chance to give email a go in privacy...



After the debacle of trying email on his own, Peter has bitten the bullet and signed up to computer classes at the local university. He's feeling his petulant self as ever...



Frustrated with his experiences so far, Peter decides to give email one last try. The computer class is demonstrating a new cut down email application which has been designed for simplicity, clarity and ease of use...

Figure 1 The Utopia Trilogy

These films are dramatisations of some of the issues we have encountered over the past two years. Based on real events, conversations and observations, they are not one person's story, but the amalgamation of many and are intended to convey older people's experiences with technology and the situations they encounter. They are intended to provoke a shift in attitudes towards the needs and wants of the older population regarding technology use.