

**Interface between two disciples,
the development of Theatre as a Research Tool**

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Abstract. Dundee University's School of Computing is researching technology for older users, whose difficulty with technology often exclude them from its benefits. This paper discusses the problems raised in consulting potential users who feel they do not understand technology and are anxious about using it. How should the technologists and designers get over to this clientele the somewhat abstract concepts of 'what might be developed' and how it might affect the users' quality of life? How could they keep the focus of discussion while giving the older people the confidence to be truthful?

Experiments made with video and live theatre in consulting with older users, requirements gathering and evaluation of designs are described. This paper addresses: the process of scientific data being transformed into appropriate and useful 'stories' to the satisfaction both of writer and researchers: the role of actors and facilitator: the impact on the 'extreme users' in the audience: and the data thus gained by the researchers.

Keywords: Older users, accessibility, user centred design, theatre in usability studies

Background: Research into the Interface with Older Users

Dundee University's School of Computing has several research projects concerned with the interface between older users of technology, and have developed methods for consulting with these potential users at all stages of design, including the very early conceptual stage [8]. The researchers work regularly with older volunteers, both individually and in small groups as appropriate. The School has a cohort of over 200 interested volunteers, which shows that older people's interest in the usefulness of technology can be generated when they are given an opportunity for their voices to be heard.

Early research showed that older users tend to miss out on the progress of technology, at a time when they are living longer, demand better quality of life and ultimately will need a good quality of care. Older people have not been brought up with fast moving technology: feel excluded: do not understand the language of, for example, computers: are afraid they might 'break' the machine: avoid feeling stupid: tend to blame themselves, not bad design: and do not understand the potential benefits and relevance of new technologies. In addition the increasing minor disabilities that come with age: worse sight, hearing and dexterity: short term memory problems: and lack of general mobility, exacerbate this trend.

The changing demography, with a rapidly increasing older population in many parts of the world, means there will be a shortfall of carers, both formal and informal, to look

after people as they become increasingly frail. Technology should have an important role in improving an old frail person's quality of life, giving him/her more control over his/her environment, and in giving support to the carers. In order for such technology to be successful, however, older people should be consulted as part of any design process [3]

Problems of consultation

Consulting older people about the design of potential technology raises a number of questions:

How do you translate rather abstract scientific concepts into a 'reality' that older people can relate to and apply to their own lives?

How can you make older people really understand a piece of technology that has not yet been developed?

How can you make it easier for older people to be critical? They often do not want to 'upset' designers and their responses aim to please.

How can you create a 'safe' method of lively discussion between older people and designers, without the older people feeling intimidated and ashamed of their 'ignorance' or the designers either being unwittingly patronising or frustrated?

The Introduction of Drama

The School Computing is experimenting with using drama, both video and live theatre, to address these problems [7]. This is based on the following premises:

Theatre, whether live or on video, has the ability to 'pretend' - so undeveloped technology can be presented as real and working.

Scientific concepts and novel technology, with their esoteric language and jargon, can be translated into everyday life. This enables the audience to apply them to their own situation; thus facilitating significant information transfer between researchers and older users.

Stories, with 'real' characters, with whom the audience can identify, help the audience engage with problems and questions encountered [4,5,11]

All discussion, debate and criticism are focussed on the story and the characters; no-one is going to be offended. This enables both older people and designers to discuss, argue, inform and share needs and experience in a very safe way. This very safety helps older people and designers to draw on and share their experiences. This can be particularly useful in an area where individual needs and disabilities are subject to very wide

variation. The roles of researchers, writers, actors and facilitators within this process are all very important, and will be discussed later in this paper.

Artist in Residence

The Scotland-based Foxtrot Theatre Company, which specializes in interactive forum theatre, provided Maggie Morgan, a theatre writer, director and interactive theatre facilitator, to work with researchers, write scripts and produce video for two research projects within the School of Computing. The success of these resulted in her being awarded a Leverhulme Art-in-Residence Fellowship for the academic year 2005-6, with the remit to further develop the role of theatre as a research tool within computing.

The Fall Mentoring Project – requirements gathering using video

A group of researchers were developing a mentoring system which detected falls which involved video cameras within an old person's home. The pictures would be transmitted to a computer which would alert a carer if it detected the person suffering a fall [6]. The initial reaction of people to the idea of having cameras in the home can be completely negative, but is perhaps an uninformed judgement. To address this issue in more depth, Morgan and the researchers devised four different situations which would inform the viewers, open up wider discussion, and provide valuable data for the researchers. Videos of these scenarios were then made using professional actors and video engineers.

The four brief video scenes consisted of –

Older man rushing to answer door bell, and tripping and falling when there was not monitor in his house to detect the fall.

Older woman who has a monitor in her room, reaches up to dust, loses her balance and falls. She is shocked and cannot get up. The monitor registers fall, and soon someone arrives, having been alerted.

False alarm: an older woman – with a monitor – drops a jigsaw, gets down on the floor to pick up the pieces. The monitor registers this and alerts her daughter, who rings her immediately. Music is playing so the mother does not hear the phone for a long time; the daughter rushes out from an important meeting and arrives to find her mother enjoying her jigsaw. She is both relieved and frustrated!

A daughter, talking to her father, describes the monitor her mother-in-law has, and that it has somewhat eased the burden of checking up on the old lady. The conversation is interrupted by a phone message from the computer connected to mother-in-law's monitor. The computer is letting her know that, although the old lady has not fallen, she is not moving around as usual. Daughter-in-law rings to check whether she might be ill. It's OK! It is Wimbledon fortnight, the

old lady is a tennis enthusiast and is hardly moving from the television!
Relief but some irritation – but father comments to his daughter that he might
be very glad of this function some day.

Pauses were built into these video scenes so that the audience could comment and discuss each scenario. The researcher facilitating the discussions, who had been trained in facilitation by Morgan, was able to answer questions about what happened to the ‘pictures’ the cameras took and how carers might be alerted. Audiences varied from relatively fit older people living independently in sheltered housing or their own house to very frail old people who needed a lot of care in order to stay at home and who came together at Day Centres. One audience consisted of a group of professional carers. Each audience brought its own experiences and perspectives; among the topics covered were anxieties about privacy; what support systems were already in use and how effective these were; anxieties about falling or becoming ill and this being detected; where falls were most likely; how their individual activities differed and false alarms.

The narrative form of the video clips engaged the audience and kept the focus of the discussion. Using drama was found to be an extremely useful method of provoking discussion at the pre-prototyping stage and provided many insights that we believe would not have been obtained without such techniques being used. This confirms the comments made by Sato & Salvador [13] that human centred stories lead to a more detailed discussion and that the drama provides a point of contact, which makes the evaluative task much easier. Although Strom [14] reported that he found it difficult to combine large or dramatic consequences with the exploration of an interface, this was not an issue in this piece of research.

The UTOPIA Trilogy video – an attitude changing exercise using video

A similar technique to the above was used to produce narratives for discussion aimed at communicating the essential findings of the UTOPIA group (Usable Technology for Older People: Inclusive and appropriate) [2] to designers of technology for older people. During the research phase of the project, which included discussions with individuals and groups of older people, important data emerged concerning older people’s problems with language; anxiety; assumptions of knowledge that they in fact lacked; confusing software and the increase of disabilities with aging. Designers, however – usually young – found it difficult to conceive of people who were totally unfamiliar with basic modern technology.

Three videos were produced, which focussed on: installing a web camera, a completely novice user attempting to use email, and a first time user of a mobile telephone [15]. The video stories were viewed and discussed by several audiences: some consisting of designers and engineers, some of older people, others of mixed audiences. Changes in audience attitudes were measured by identical questionnaires about perceptions of older people being filled in before the viewing and at the end of the event. Each performance provoked lively discussion and proved very enjoyable. Significant changes in attitude were noted in all audiences who viewed these videos [1].

The Rice Digital Television Project – live theatre for requirements gathering

Rice, a researcher in the Dundee University School of Computing, initially used focus groups in his initial requirements gathering for the design of a home telecommunication system for older adults, and subsequently used live interactive theatre as a method of holding in-depth discussions with a large groups of older people [12]. Although digital television and its possible applications is very topical many, particularly older people, neither understand how digital TV worked nor what its potential uses are, especially those which could enhance the quality of life of older people. The potential uses of digital TV examined were: a ‘chatting’ service, communication between homes via a camera: a ‘scrap book’. The problems of describing technology, which had not yet been developed, and therefore ascertaining how desirable or useful it might be seen to be were solved by the ability of theatre to ‘pretend’. A ‘multi-media’ production was scripted, developed and produced, using professional actors, on-stage props, and the projection of DVD onto a back screen. The situations chosen were those frequently found in real life experience – children and grandchildren living at a distance: having to move from the family home to a smaller place; becoming more forgetful

The creation of characters in life-like situations resulted in a ‘reality’ with which older audiences could identify and empathise, directly relating the action to their own experiences and expectations. The discussion was enhanced even further when the characters - i.e. the actors who remained in role - took part in the discussion with the audience. The characters bore the brunt of being unsure of the role of the technology and finding the possible disadvantages – but also discovered how it might help their human situation.

The performances, and all the audience interaction, were conducted in a purpose designed studio theatre within the School of Computing [9] and were recorded using four cameras and a high quality sound system. This ensured that all the interaction within the audience was faithfully recorded, and were subsequently transcribed. This provided extensive data which was extremely useful both in the decision making process for, and in the detailed development of digital television application.

Experiments with combining video and live theatre

Live theatre has a big impact, but the full rehearsed performance is not always feasible both practically and financially. We therefore also experimented with a mixture of video clips and live theatre. Showing a video clip was followed by the actors in that clip being present ‘in role’ to dialogue with the audience. The aim of the viewings was to measure change in attitude towards older people and technology with three audiences – undergraduate students, post-graduate students and professionals at an HCI conference.

The undergraduate and post-graduate students reported that, although the video was interesting and informative, being able to question and discuss with the ‘live’ characters had more impact. The response of the professional audience at the HCI conference [10], who were not specialists in designing for older people, was very mixed, but again the

session with the actors stimulated a huge amount of discussion and argument and made the session highly memorable for the audience.

With all three very different audiences, the fact that the characters were actually actors liberated everyone to say what they really thought. The 'characters' were highly believable and convincing, but the audience could attack the characters, knowing that the actors were not going to take their comments personally.

Continuing use of theatre in technological research

Plans are already being implemented by a group of researchers from four Scottish Universities, and involving "telecare", health and social work stakeholders, to use live theatre for requirements gathering, evaluation and inter-communication among audiences of older people, formal and informal carers, designers and engineers, health and social work professionals. Two different formats for discussion following the performances will be tested, and the results of this methodological experiment will be reported at the conference at HCI 2007.

How Does It Actually Work?

The essential constituents of Interactive Forum Theatre are quality of:

- The script,
- The performance ,
- The facilitation of interaction with the audience, and the use of
- Appropriate interaction techniques.

The Script – the “story of an interface”

The script must be the result of thorough collaboration between researchers and writer. The task of the researchers is to convey their aims accurately and clearly to the writer: the questions they want answers to and/or the information they wish conveyed. The writer's task is to understand clearly the aims of the researchers, and to translate their research issues into the form of a story.

This interaction between researchers and writer may sound simple, but is in fact complex. The researchers may well be anxious about their measured scientific data being rendered inaccurately: they may find the whole process very alien. Researchers with no experience of this method may feel a lack of trust both in the process and in the writer. The writer on the other hand may find their technical jargon impenetrable, and have to ask many 'idiot' questions in order to understand what is really required. The writer has to produce a good story that will work dramatically in performance - how can this be reconciled with scientific data and analyses? The writer too can feel frustrated if the researchers seem not to understand what (s)he is trying to do and are even suspicious

of the process. The process, however, gradually builds up a rapport between researchers and writer.

The writer goes through several stages of composition: they produce one or more outline ideas: then a first draft of script: then a second draft of script, then a 'working draft' that the director and actors can begin to rehearse with. At each stage, the writer's outlines and scripts are referred back to a working group of the researchers for checking out. The writer needs to be clear about her limitations and continually ask the researchers to amend or suggest. For example, when needing audience responses to technological help in the home, what pieces of technology would the researchers like to see in the story? What are the questions they would like asked around this piece of technology? How would the character make this work? An older person might have disabilities to take into account when operating it. Or even how might you persuade an older person that this facility would really benefit them?

Alien as this process may seem to traditional theatre, the structure of a dramatised story is actually very appropriate. Tension and conflict are need to achieve drama: characters resisting or struggling with pieces of technology introduces tension and asks questions, and, as with all HCI technology, the interface is with human beings, with their own psychologies, knowledge and context. Theatre can create the "story of an interface", where an audience can look at a piece of technology, its possible usefulness, design and usability, and how a human being interacts with it, the human being having attitudes, emotions, physical difficulties and needs.

The actors

Only professional actors have been used in the experiments reported. Minimal costume and only essential props were used and the actors were physically very close to the audience. This form of theatre requires experienced professional actors who can take direction and immediately, or almost immediately, to produce a three dimensional believable characters. The actors, which have been used in this interactive work, also are experienced in interactive theatre, and are able to 'suspend disbelief' and have the ability to engage an audience without the normal technical aids of a full theatre production.

The actors were very well briefed into the aims of the theatre: the way the pieces of technology were supposed to 'work': how it might relate to the life style and needs of the character: and what questions might arise in the audience that they may have to react to. It was extremely useful for one or more researchers to be present for some of the rehearsals. Questions inevitably arise about the technology during rehearsal, and a researcher can supply the information and explanation the actors need. This also assures the researchers that they still have control over the project and that their research is being respected in detail. For example, if a character is being 'hot-seated' – questioned 'in role' in a dialogue with the audience, (s)he needs to be well versed in the character's own story and circumstances and also the issues around the piece of technology.

Other dramatic possibilities with this format include, the audience being able to re-direct a character in the story. For example, one of the characters in the story may have explained the technology in a way that is either incomprehensible or patronising to the older person - the audience can be given the opportunity to replay that part of the story to see the effect of a different approach to the challenge of communicating technology to older people.

The Director and Facilitator

The director needs to thoroughly understand the research aims and brief the actors as they rehearse. The director and facilitator have to be as well briefed as the writer. In the case of the work reported here, the writer was also the director and facilitator. If this is not the case, the writer, director and facilitator must work very collaboratively.

The facilitator's role is crucial. (S)he must:

Thoroughly understand the issues which the researchers need investigated,

Explain clearly and simply to the audience how the process will work and how the facilitator will enable them to interact,

Particularly with older people, but in fact with any audience, have a brief, relaxed 'warm up' session, to begin the process of audience members responding and beginning to focus, to establish the rapport between facilitator and audience.

At the 'Pauses' for interaction, guide the audience through the techniques appropriate at that point.

Ask questions that are as open as possible, and accept contributions from the audience unconditionally. No one should be made to feel belittled by a facilitator's response.

Frequently repeat or paraphrase what an audience member has just said both to reinforce the point and also to make sure everyone in the audience has heard.

Where conflicting attitudes and perspectives come from the audience, briefly sum up the divergence, with respect, which often moves the discussion on. The different perspectives are aired and heard by everyone, but there is the safety of the differences being projected onto the characters and the situation in the story.

If the focus of the discussion is being lost, regain the focus by referring back to the story.

Co-facilitation

In some projects it is appropriate to have a co-facilitator who is a member of the research team. Whenever scientific issues or queries arise, the main facilitator can call on the co-facilitator to supply the information. In the case of a researcher / co-facilitator thinking an important issue or question is being missed in the discussion, (s)he can raise this with the audience. This method of co-facilitation worked well [12].

Focus

The performance of the story maintains the focus of the discussion, the characters bear the brunt of any negative comments, the audience increasingly engages and feels it's

comfortable to join in and a great deal of data emerges from the discussion. The whole process can be recorded unobtrusively (though with permission) for subsequent transcription and analysis.

Cost

Video and live theatre are both extremely useful for engaging and informing an audience and stimulating lively discussion. They can be used for requirements gathering and evaluation by large groups of people at a time. The impact of live theatre and the ability of the audience to respond, and often directly interact with the characters, cannot be underestimated. If a video is used the discussions following the viewing need to be as well facilitated, as those in live performances, though obviously there is no direct interaction with the performers.

The balance of costs between producing a DVD and live performances depends on the number of performances planned. Economically live performances need to be put on close together, so that the actors are employed for a single period and need only one rehearsal period as part of this. If the presentations are spread out in time re-briefing and re-rehearsal of the actors will be needed. The cost of producing a good quality video can be up to five times the cost of producing a series between 2 and 5 live performances within a single run of productions, but if researcher wish to use the performance many times but at intervals and in different places, the initial cost of a video may be more economical.

A useful compromise, where performances have to be at intervals, is to make a video and have at least one of the actors present in character for dialogue with the audience. This means that the actor(s) do not need a rehearsal period prior to the performance

Conclusions the appropriateness of theatre for HCI

The work reported has shown that theatre can be very effective in many stages of the development of technology. There is a logic to the use of theatre in HCI research. Human needs and wants should be the starting point with researchers frequently needing to consult potential users at the earliest stage, and theatre provides a very effective communication method.

Once technological ideas begin to be developed, further consultation is needed with potential users. At the pre-prototype stage, theatre is particularly useful to help the researchers create a 'reality', where we imagine these devices are being used, but raising questions about appropriateness of design for older people's life situations and for their usability by people who are unsure about technology and slower to learn than when they were younger. An interactive performance essentially provides a very flexible 'virtual' world in which an audience can play with novel technology and concepts.

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