

**Designing CIRCA (Computer Interactive Reminiscence and Conversation Aid).
A Multimedia Conversation Aid for Reminiscence Intervention in Dementia Care Environments**

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Abstract

There are approximately 18 million people in the world with dementia, and with continually expanding growth in elderly populations these numbers are steadily growing . One of the most devastating effects of Alzheimer's Disease (AD) and other forms of dementia is the loss of short term memory which radically impairs the sufferers ability to communicate. A fundamental problem for people with dementia - and subsequently their carers and relatives - is the 'dehumanizing' effect engendered by the loss of cognitive abilities.

We know that, despite experiencing deterioration in short term memory, people with dementia often retain a facility for long term memory which can function strongly given appropriate conditions and triggers. Reminiscence intervention/therapy has proven to be an effective way of tapping into long term memory, to elicit reminiscences and emotional responses and prompt conversation, even in people with advanced AD. A variety of methods and media are currently employed in reminiscence intervention . Often these methods are time consuming, requiring a good degree of physical and mental effort to organise and action - sessions often become repetitive and employ cumbersome technology such as video players, audio cassettes, photo albums etc.

CIRCA (Computer Interactive Reminiscence and Conversation Aid) is a three year EPSRC (Engineering and Physical Sciences Research Council) funded project developed in a tripartite initiative between the Design School, Duncan of Jordanstone College of Art and Design and the Department of Applied Computing at the University of Dundee and the Department of Psychology at the University of St. Andrews, Scotland.

We will demonstrate how - through the employment of good design practice and collaborative interdisciplinary research - we can engender a greater sense of value and worth in a reminiscence session, enhancing the experience for carers, relatives and people with dementia by facilitating access to a multimedia database using interactive media and touch-screen technology to prompt and stimulate conversation.

We will discuss the exciting results of our prototype evaluation (one year into the project) and demonstrate how field tests (with our expanding volunteer user-group of 40+ people with dementia and 30+ carers) inform our design development and the importance of multi-disciplinary collaboration and the cultivation of appropriate partnerships in funding, concept development, design for, and testing of assistive technologies.

Introduction

It is estimated that approximately 15% of people over 65 have some form of dementia, rising to 35% in the over 85 age group. There are approximately 18 million people in the world with dementia, and with an ever-expanding growth in the elderly population, these figures are set to rise proportionately.

One of the most devastating effects of Alzheimer's Disease (AD) and other forms of dementia is the progressive degeneration of short term memory which, allied to cumulative impairment in cognitive function in general, radically impairs the sufferers ability to communicate:

'In a typical test for mild cognitive impairment (MCI), a patient is asked to repeat a string of unrelated words . . . A person with normal memory may falter, but given a hint (for example, that one of the words was a color) might reply, "Oh yes, a red Oldsmobile with a cabbage inside". . . But a person with MCI is not helped by hints because the memory was never stored'

(Dr Jeffrey Cummings, Director of the Alzheimer's Disease Centre, University of California, Los Angeles, 2002)

How we are perceived as individuals is largely determined by our ability to express thoughts and ideas - to display emotions through verbal or physical means - to communicate. These interactions describe our personality to the world and the world at large depends on this discourse to understand us. A fundamental problem for people with dementia - and subsequently their carers and relatives - is the 'dehumanizing' effect engendered by the loss of these cognitive abilities.

It has been noted that cognitive under-functioning is commonplace in dementia and is often related to the 'devaluing, invalidating and dehumanizing aspects of the social environment' (Kitwood, 1990 in Woods, 1994) and it appears evident that this process can begin to effect people very quickly following prognosis - *'You are not the confident, competent person you once were . . . Knowledgeable professionals begin to bypass you and give pertinent information and eye contact to your caregiver'*

(Patient diagnosed with 'Mild Cognitive Impairment, Gina Kolata, 2002).

We know that, despite experiencing deterioration in short term memory, people with dementia often retain a facility for long term memory which can function strongly given appropriate conditions and triggers.

Reminiscence intervention/therapy has proven to be an effective way of tapping into long term memory, to elicit reminiscences and emotional responses and prompt conversation, even in people with advanced AD. Reminiscence sessions enable older people to socialise, to share *'past competencies and failures'* and encourage people to *'value their lives and achievements and to have their emotions and feelings validated by facilitators and other group members'* (Bass & Gregor, 1996; Brooker & Duce, 2000).

A variety of methods and media are currently employed in reminiscence therapy . Biographical painting, themed environments, music therapy, inter-cultural and inter-generational reminiscence and reminiscence theatre are just a few forms of intervention currently being employed. Quality of reminiscence therapy can vary and very much depends upon the dynamics of any given situation - availability of resources, location and the determination and dedication of individual carers and care institutions are all determining factors. Reminiscence Intervention is time consuming, requiring a good degree of physical and mental effort to organise and action - less ambitious sessions can become repetitive and therapy sessions will often rely on cumbersome aids such as video players, audio cassettes, photo albums, boxes of memorabilia etc. Project CIRCA (Computer Interactive Reminiscence and Conversation Aid) is designed to provide an intuitive, expansive and fail-safe reminiscence experience, utilizing contemporary computer touch-screen technology and interactive media design to assist people with dementia and their carers and relatives in prompting conversation in one to one and group situations. By facilitating fast access to a broad range of reminiscence material - including music, film clips, photographs, Quicktime VR scenes, and even animated virtual objects, at a fingers touch, we hope to provide an aid which is easy to use, requires little or no preparation time to set up, and will engender a naturalistic conversational atmosphere.

We hope to assist in developing and improving a small but significant aspect of the living/working environments in dementia care settings by promoting a greater sense of value, enjoyment and ease in a reminiscence session. By tapping into the long-term memories of individuals to gain a 'biographical impression' of who they are, we can - to some extent - reinvest them with a life-history/personality which has been lost to personal carers and relatives, and provide new and important information to inform and enhance patient/professional carer relationships - effectively combating the 'dehumanising' process.

The Computer in Assistive Technologies

The potential of computers to inform compensatory strategies against cognitive impairment has been noted since at least the early 1960's (Engelbart, 1963) and the term 'cognitive prosthesis' has been used to describe such human/computer interaction. Indeed advances in computer engineering and neuroscience research now proffer the concept of an implanted 'brain prosthetic'. . . 'A chip that mimics neurons, firing up the memory . . . a potential remedy for the ravages of Alzheimer's and stroke-related language deficits. ' . . . but this is clearly very early days. . ."At least in principle it looks as if a chip imitating some functions of the hippocampus could be implanted in the future." (Dr Prof. T W Berger, Director of Neurological Engineering, University of California, 2002)

With the ever-accelerating advance of computer technology, an expanding global computer culture allied to lowering hardware and software costs, computers have become an indispensable human tool and subsequently an equally important component in the development of assistive technologies. The development of successful computer-based prosthetic devices/systems will depend greatly on the seamless integration of these technologies into our living and working environment. Crucial to this process is the positive progression of the human/computer relationship and a 'human centred approach' in developing the interface with contemporary and emerging technologies:

'Today's technology, especially that of the Personal Computer, is too complex. But the potential is enormous . . . They make the invisible visible, they permit play and exploration of even the most complex of topics, and they allow groups of people to interact constructively, even when separated by time or distance . . . The goal is a human-centred approach rather than today's technology-centred one. People's needs first, technology second. We need to get away from the tool – the computer – and focus on support for human activities. The computer needs to disappear from sight, to become embedded in task-specific devices.

The real impact of the converging technologies is in the combination of communication and computation that thereby impacts social interaction, access to knowledge, just-in-time learning, and enjoyment.' (Donald A Norman, 1998)

Multi-disciplinary Team Approach

If we are to successfully engage in a 'human centred approach' to design, particularly with regard to assistive technologies, we may require to call upon a diverse range of knowledge and expertise, for example to gain an informed insight or indeed a detailed knowledge of the needs of our 'target user-groups'. This knowledge may be difficult to access and accumulate, for example when the target user-group includes people who are cognitively impaired. It becomes imperative then for us as designers to foster relationships and partnerships with a broad range of practitioners eg psychologists, sociologists, engineers, scientists, programmers etc. In this way we can tap into specialist areas of knowledge and practice to formulate and contribute to a more informed, coordinated and comprehensive approach to research strategies. We should aim to promulgate a diathesis for multi-disciplinary approaches which will help to inform the whole academic research process from fund- raising, concept inception, through research and development to production and dissemination.

David Durling, Editor of Design Research News recently wrote that one of the vital factors in supporting growth in the field of design research would be '*. . . a richer flow of knowledge across the many disciplines of our interdisciplinary field. This requires a common body of knowledge, a rich shared vocabulary, and ability for scholars and professionals in design research to speak with each other from plural perspectives and backgrounds.*'. This, I believe, is certainly true but I would venture to add that if we are to successfully develop a genuinely progressive design research culture we need to engage pro-actively with the broadest spectrum of disciplines and institutions to explore opportunities for collaboration and exploit shared knowledge and expertise. In this way we may gain a better perspective of the divergent needs of our rapidly changing society, a perspective informed by the experience of researchers and practitioners from very diverse backgrounds:

' . . . practitioners from other disciplines need to participate in the design of multimedia systems. For example, artists, communication specialists, educational specialists, social scientists and cognitive psychologists are needed to structure and represent the contents of multimedia applications in accordance with peoples capabilities and to develop valid evaluation methods.'

(User Centred Design (Contours of Multimedia) Maddy D Brouwer-Janse, 1996)

The traditional logistical difficulties inherent in developing any multi-disciplinary collaborative project, particularly with teams working in widespread geographical locations, have become much less significant due to advances in electronic communication and the widespread use of digital media. Common working practices across many disciplines eg desktop publishing, electronic file formatting, communicating and creating and sending digital images through e-mail have all helped to improve this process.

Building the CIRCA Team

It was clear from early discussions between the primary investigators that there was a keen mutual interest in pursuing collaborative work, and that there were definite areas of convergence and common interest in our individual disciplines ie Applied Computing, Psychology and Multimedia Design. All of the investigators, including three subsequent additions to the team, have extensive professional and/or personal experience with dementia and a profound awareness of many of the problems experienced in dementia care environments. Interestingly each discipline is fundamentally involved with the processes of communication, whether investigating the fundamental nature of language or investigating the interface with technology driven systems.

The Department of Applied Computing, University of Dundee, has a well established, international reputation in research for assistive technologies, particularly in the area of support for communication by physically impaired non-speaking people. The School of Design, Faculty of Duncan of Jordanstone College of Art & Design, University of Dundee, can boast a history of international award winning design for electronic and interactive media whilst the Department of Psychology, University of St. Andrew's brings expertise in the cognitive neuropsychology of language and extensive experience in dementia related research. This collective experience and profile combined with a shared enthusiasm to build a new type of research team (certainly in respect of our own institutions) we believed was a solid foundation to progress collaborative research. All that was required now was a sound concept to develop and the funding to start the project.

An 'Electronic Scrapbook'

The idea of an 'electronic scrapbook' to assist cognitively impaired people was highlighted as possible research subject by The Department of Applied Computing, UoD, prior to the forming of our team, but the idea had effectively remained a two word concept awaiting attention. From a personal perspective those two words struck an immediate chord with me for two reasons. Firstly, as a designer with extensive experience in the field of interactive media, I felt that the idea was not so 'blue sky' that it might end up being grounded in pure theory. It would clearly involve a considerable amount of skill and effort in research and development to create a 'scrapbook' which could perform effectively for our target demographic - but this development of our 'take' on a cognitive prosthesis appeared to me to be a logical synthesis of our interdisciplinary skills allied to an appropriate use of contemporary technology. Importantly, at least for my pragmatic sensibilities, the job at hand seemed to be 'eminently doable'.

A Personal Perspective

The second reason stems from my own personal experience with dementia. In the two years prior to my own mothers death she was incapacitated by a succession of mini-strokes and suffered progressively impaired cognitive function and profound communication difficulties due to the loss of short-term memory. In our

family visits to the nursing home we experienced first hand the erosion of the personality we knew and loved so much, the awkwardness of repetitive, cyclical conversation and the constant searching and probing for topics to illicit inclusive conversation to bring light relief to a heartbreaking situation. Our main tool for prompting conversation was family photographs which worked reasonably well, but after a time this too became repetitive - you can only have so many grandchildren!

At some point I decided that I wanted to show my mother some of the work that I was currently involved in - she had always been interested in my career as a designer and at this time I was working toward an interactive exhibition at the Imperial War Museum, London, and doing design development for a childrens' animated television special for CITV. I had recently acquired a powerful laptop and put together a slide show of my illustrations, design work, animations and a selection of photographs. Upon using this multimedia presentation I was immediately struck not only by the effectiveness of the medium in streamlining the presentation of visual stimulus but also in its ability to support a diverse range of media content- as a multimedia designer I knew about the incredible capabilities of interactive media but had never viewed it in the context of a prosthetic aid. I had inadvertently become engaged in reminiscence therapy, but at the time it did not occur to me that this could point to an opportunity to progress a thoroughly new line of personal research.

Scrapbook Development

With the concept decided upon the project proceeded under the working title of 'A Multimedia Conversation and Memory Prompt Scrapbook for Elderly People with Memory Loss'- but feeling that this was rather unwieldy we came up with a series of new title options and finalised the project name as CIRCA (Computer Interactive Reminiscence and Conversation Aid).

Although our initial focus for provision targeted people with dementia, we quickly established a picture of the broader user-group demographic ie people with dementia, personal carers, professional carers and relatives/friends/visitors (diagram one)

INSERT DIAGRAM 1 HERE

Participation in Reminiscence activities has been shown to have a positive outcome for carers involved (Baines, et al., 1987). Baines et al. (1987) found that staff who ran a reminiscence group as part of a research project, continued with the group after the end of the project and reported more positive attitudes towards the people they cared for. In addition, the staff felt that the people with dementia enjoyed the group (Baines, et al., 1987). Jackson (1991) suggested that increasing the participation of people with dementia in their environment and improving the relationship between carers and people with dementia could be a most appropriate aim of dementia care.

CIRCA would not just be a tool to stimulate interaction but also a contributor to improved quality of life: 'The provision of a positive interaction, at whatever level a person with dementia understands it, can be considered a successful intervention' (Woods 1999)

An important feature of our proposal was the close collaboration with our prospective user-group throughout the development process. To facilitate this we made contact with various potential user-organisations to recruit a cohort of people with dementia, carers and families. A group of thirty carers and forty people with dementia were recruited as potential subjects for the testing and evaluation of our system. We expanded the team structure to include a Psychologist who would be responsible for developing and maintaining links with potential user-associations and clinical professionals, for collecting and collating feedback on the system design and for carrying out formal evaluations. A graphic/multimedia designer was added to the equation to ensure quality of design for the look and intuitive navigation of the system and a software developer with human-computer interaction expertise was added to design coding for the system structure and development of the authoring system. The Dundee Social Work Department and Alzheimer's Scotland Action on Dementia were allied to the project to contribute in an advisory/consultancy capacity.

The Bid

Now that the theoretical team structure was in place we coordinated our efforts to make a bid for funding (in this instance to EPSRC (Engineering and Physical Sciences Research Council). Detailed costings for the project based on a three year programme of development were then calculated and research into eminent published work from our three disciplines which supported our concept were collated to inform our proposal. Costings for staffing, equipment, travel and subsistence, consumables, overheads etc were produced. A draft proposal was developed through stages by the primary investigators and this document was circulated through our various departments for comment - was the proposal too expensive?, should we be less ambitious and 'cut some cloth', was there anything we might have missed or want to include?

Our instincts told us that our proposal was exciting, robust and founded on a strong body of research evidence and expertise. We agreed that we should not compromise the proposal by cutting our costs and that if our bid would succeed it would succeed on its merits. Importantly we agreed that if it should fail we would look further afield for funding and continue to develop ideas as a team until we were successful in securing resources to progress our concepts. Fortunately the bid proved successful and once the finances were put in place we were able to recruit quickly and make a start to the project with our full team compliment of six.

Design Beginnings

'Multimedia is making possible much more advanced, adaptive technology for persons with disabilities. The presence of several different media, together with sophisticated input and output devices, makes it much simpler to provide viable alternative presentation and input mode through which people with disabilities can gain access to the information and entertainment applications on their computer. Concerns have been expressed that developers should make every effort to ensure that their materials are accessible to all users.' (Tannenbaum, 'Theoretical Foundations of Multimedia' Summary Chapter 1, 1996)

We understood the dynamic of our user-demographic and we determined that the design for the interface would be developed with the view that the non-cognitively impaired members of the group would be the 'initiators' in a session – they would be the ones to interact directly with the system and 'action' the reminiscence 'events'. We also started with the premise that our user-group would be largely inexperienced with computers and would be first time users of touch-screen technology (our preferred tool to facilitate display and interactivity). We also felt that if the cognitively impaired members of the group were happy to physically interact with the system this would represent an 'added bonus'.

We were keen to develop a prototype which we could start testing in a few months and so, based on our knowledge of traditional reminiscence practices, we began to look at what might be contained in our CIRCA database. In an open floor discussion we debated possible content and the following media categories were suggested: Photographs, music, video/film, text, speech, computer generated environments and objects. In order to progress the prototype quickly we distilled this collection to three areas of media, namely, photographs, video and music. Subject matter was also discussed and archive material would figure prominently. Highlighted amongst other themes were: public events, media/film news, local life, travel/holidays, occupations, fashions, hobbies & recreation, sport, house & home. Again this information was distilled for our initial development and was restricted to, Recreation, Entertainment and Local Life (Dundee).

Consideration was also given to the duration of events - it was important to remember that we did not want to create a wholly 'immersive' experience and that our prime goal was to illicit memories to prompt and support reminiscence. We agreed that video should be pertinent in its editing whereas with music it was decided that it might be beneficial to retain whole songs as people may wish to join in.

The design team then started to collect and categorise archive material and develop initial concepts for the interface design. The database content was analysed to start organizing a navigable layout and a grid system was developed to structure particular information in regular and recognisable positions in order to promote continuity. We used a palette of muted pastel tones for the foundation of the interface to give contrast and strength to the photographic and video content.

While the design team progressed concepts for the prototype interface the Psychology Team worked on some initial studies examining the impact of Alzheimer's Disease on conversation and communication abilities, specifically looking at tapping into residual conversation skills using prompts. In the study twenty one people with probable Alzheimer's Disease (pAD) were shown photographs of six different annual events. Each event was depicted by images of food, scenes or people and presented in both black & white and colour formats. The participants' level of cognitive impairment was divided into 'mild', 'moderate' and 'severe', based on their Mini Mental State Examination score. Participants were invited to discuss their memories of each event with the alternate use of 'specific' and 'general' prompts.

Results

All six events in both black and white and colour and all image types were equally successful in eliciting recollections and exchanges. In terms of response types, more general memories and positive comments

were produced when specific prompts were used as opposed to when general prompts were supplied. The moderate group produced significantly more general memories, specific memories and total output than the severe group and significantly less total output than the mild group - moreover, the moderate group employed 'conversational tactics' in an attempt to mask their conversational difficulties.

These findings suggest that even in the later stages of Alzheimer's Disease people can interact meaningfully when prompted specifically. Furthermore, output in the moderate stage is often be characterised by 'cover-up' strategies, indicating both an awareness of conversational limitations and a desire to conceal them.

The sessions for these initial studies used video filming to record the reminiscence sessions and all of the footage was transcribed to inform our findings. This was a very useful but time-consuming process and it was agreed that we should work with a combination of assessment techniques for measuring interaction eg coding sheets which would allow us to record specific characteristics of responses eg laughter, smiles, singing, talking, eye contact etc. allied to selective video analysis. A questionnaire was also developed to record and gauge the impressions of both family and professional carers with regard to the design and usability of the system.

This process relies very much upon the expertise of the psychology team and most particularly upon their experience working with dementia and communication related research. Research in the field of cognitive impairment is further complicated by legal and ethical dimensions, for example issues relating to the question of 'consent'. Recently new laws passed by the Scottish Parliament relating to 'consent' further complicate the issue.

This suggests that as designers we may be ill-equipped to conduct appropriately robust and detailed studies in testing our product - particularly when designing for very specific user-groups like the cognitively impaired. We must therefore encourage a diathesis for interdisciplinary team work conducted within 'appropriate collectives', not only to inform design practice, but to open doors to opportunities for design research in previously unexplored areas. The example of CIRCA, I believe, significantly re-enforces this argument.

Continued Prototype Development and Testing

Traditional perspectives re. computer interface design have built up a series of do's and don'ts to formalise practice in developing intuitive navigational structures:

"Recognise Diversity - In order to recognise diversity, you, the designer, must take into account the type of user frequenting your system . . . Use the Eight Golden Rules of Interface Design: Strive for consistency; enable frequent users to use short-cuts; offer informative feedback; design dialogues to yield closure; offer error prevention and simple error handling; permit easy reversal of actions; support internal locus of control; reduce short term memory load . . . Prevent Errors . . . steps can be taken to design so that errors are less likely to occur, using methods such as organizing screens and menus functionally, designing screens to be distinctive and making it difficult for users to commit irreversible actions. Expect users to make errors, try to anticipate where they will go wrong and design with those actions in mind. (Schneiderman)

Some established principles of interface design are pertinent to CIRCA, others are not. Providing short-cuts

for experienced users becomes unnecessary since our user-group should not be in a hurry to go anywhere. Preventing errors and fail-safe interaction however are crucial to our equation - indeed an important principal of CIRCA which began to emerge and inform our thinking was that we were not trying to guide people to specific locations - in essence the end-user could not get lost because wherever they were in the system was the right place to be or, perhaps more accurately, not the wrong place to be - the journey could be a non-linear, random experience and still function effectively in eliciting appropriate results. This is, I would suggest, is an unusual situation and is informed by the specific nature of our end-users and by our particular criteria for successful engagement.

Our database expanded to include a selection of local traditional folk songs and famous recordings from the early 1930's through to the 1970's, while film featuring short scenes from classic cinema and local archive film of industry and recreation eg berry-picking were included. Photographic content included famous film stars of Hollywood's Golden Era with links to some film clips. Archive shots of street scenes, dance halls, football teams, jute mills (80% of Dundee's working population at one time were employed in this industry) etc added to the local content.

Once we had a foundation of preliminary content we decided to add a Quicktime VR scene of Dundee city centre - we felt that perhaps the sight of a familiar scene which could be viewed 360 degrees – literally 'letting your fingers do the walking' – might not only bring 'curiosity value' but perhaps could suggest a sense of being able to visit a location. This might be an important consideration for people with dementia who are very often 'house or institution-bound'.

In the music section we initially included an animated montage with some tracks eg with the old wartime favourite 'We'll Meet Again' by Vera Lynn a selection of period photographs were edited together in a series of transitions. Whilst this created a very aesthetic and highly enjoyable experience we felt that this encouraged people to watch the screen too intently, getting away from our intended goal of 'non immersive' participation. We replaced the montage sequences with a selection of animated music players, drawn in 'vector-based' styling to compliment the graphic interface. These graphic illustrations of a 1930's radio, a 1950's record player and a 1960's reel-to-reel tape provide very simple movement (eg the record revolving), which not only signals that the system is active ('Make it easy to evaluate the current state of the system' *The Design of Everyday Things*, (Norman, 1996)) but also provides an indication of where the music is coming from - an aspect which could be important with regard to orientation and perception in our cognitively impaired users. We also wrote a programme into the system to record user interaction eg time spent in particular subject areas or 'themes' and use of particular media.

Preliminary Feedback and Findings

We started using the prototype with our test subjects in late Spring/early Summer 2002 using video to record sessions and recording carers' feedback through our 'useability questionnaire'. The results from the questionnaire showed that all participants enjoyed interacting with the system and when asked could not identify anything they did not like. When care staff were asked what they particularly liked, diversity and choice of material proved significant – it was also stated that the system got clients talking more than usual and that the interface was easy to use. When asked if there should be more text based information some suggested this could be good for carers eg biographical information of the film stars. Issues relating to

readability were raised ie contrast and point sizes and this would feed back into to the design process. We also observed that our people with dementia were using the system and that from their seated positions this required a degree of effort. To alleviate some of the effort we decided to move all of our main controls for the interface to the bottom of the screen and debated whether perhaps an 'angle-poise monitor stand' could be found or developed to improve the ergonomics of the interaction.

Comparisons were also drawn with traditional reminiscence sessions. It was clear from our observations of a typical traditional one-to-one reminiscence session that the onus was placed upon the carer to initiate conversation and to chain-link topics in a spontaneous way. This can often lead to a repetitive strain of conversation relying on familiar/safe territory and a general feeling of artificiality (it should also be noted that the fact that the subjects were being recorded on video would no doubt contribute to this atmosphere). Conversely, and perhaps surprisingly, CIRCA appears to promote a much more relaxed atmosphere. In a number of similarly recorded sessions many of the people with dementia - inclusive of mild, moderate and severe subjects - happily sang along with the audio tracks which in themselves proved successful in prompting conversation. It was also noted that the CIRCA sessions prompted a good degree of 'humorous banter' which added to the fluidity of the experience and promoted a more natural atmosphere. Perhaps three of the most significant outcomes for us were that: (1) CIRCA was prompting memories from a number of individuals which none of the carers had heard before. (2) Some people who normally reacted poorly to traditional reminiscence intervention were more involved and alert (3) People with dementia enjoyed physically interacting with the system themselves.

Summing Up

CIRCA is one year into a three year project. We believe that we have come a long way in a short time and are excited to see that much of what we were hoping to achieve seems to be happening – this re-enforces my initial thought that this project does indeed seem to be 'eminently doable'.

New research data from our most recent studies is being collated as I write this conclusion, and I would like to add one quote from a selection of quotes which have just been dictated over the phone to me. One carer when asked if she felt the CIRCA project was worthwhile answered in the affirmative and added that she felt that she and the person with dementia '*... had actually achieved something together.*'

This sentiment, one might say, resonates through a fundamental theme of this paper ie that by working together in 'appropriate collectives' we can set achievable goals and hopefully enjoy the process and challenge of meeting them. Cynics may say for 'appropriate collectives' read 'select committees' and there are few designers who have not waved the 'design by committee 'joker"' at some point in their career. It is important then to ensure that the team dynamic works, that there is mutual respect and common endeavour, that a social dynamic is developed and good communication is maintained. At this point it may be worth bearing in mind that if 'the camel is a horse designed by committee', then perhaps some committees actually work.

Epilogue: Designing the Future

'The problem with dementia has always been that it is so foreign and so frightening that the impulse is to recoil from it' (Dienstag, 2002)

As a society we can no longer afford to recoil from such realities. Furthermore, as designers, these realities may offer an opportunity to explore exciting new avenues of research that can positively impact on the shaping of our future society and perhaps positively influence the development of more inclusive, 'barrier free' environments. If we are to embrace 'human centred design' then design should be inclusive, not only in terms of meeting the needs of the wider demographic of 'consumers' - eg the physically and cognitively impaired - but also in the nature of how we form 'appropriate collectives' to facilitate and forge a future for design research and development. The future proffers the prospect of virtual environments, computer prosthesis, smart clothing, smart houses etc and designers will inevitably be involved in the process of generating and developing these emerging technologies, but it is important to understand that now is an opportune time for design practitioners/researchers to engage in dialogue with the broadest spectrum of potential collaborators, to allow us to explore common areas of interest and to exploit shared knowledge and expertise in the interest of being effectively involved in 'designing the future'.