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E-mail Interfaces for Older People

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Abstract: The work introduced here concerns the user interface requirements of older users of e-mail. The main goal is to understand better the e-mail needs of older people, and to form a foundation for further developments in simplified and rationalised e-mail interfaces. The approach involved working closely with older computer users to establish their essential requirements, attempting thus to reduce complication and excess functionality in the interface, with the intention that users should find the system easy to learn and use. Requirements were established through interviews and consultation, and once the necessary functionality was identified, prototype interfaces were developed from which older volunteers selected preferred forms. A simulated e-mail system was then built around these preferred forms. Trials with older participants indicated that the design was popular, and gave insights and outcomes which helped form the agenda for a major project on e-mail for older people.

Keywords: E-mail, older people, older adults, alternative man-machine interaction, ageing, accessibility, usability, human-machine systems.

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1 Introduction

The purpose of this work was to explore the needs of older users of e-mail in terms of the types of user interface which they require. The number of older people in society is growing as significant demographic changes occur [15]. In an inclusive society, it is essential that older people should be able to access and use new electronic communication media, including internet applications such as e-mail. One of the main barriers preventing older people from using computer technology is the complex nature of application user interfaces. Most e-mail programs provide a multitude of features, many of which go unused, but which can discourage older people from attempting to learn to use e-mail facilities. The overall aim of the research which this paper introduces is to understand better the e-mail needs of older people and develop better solutions to these needs; the paper describes foundation work performed towards that goal. With a small number of exceptions, relatively little work has been done in this area in the past, and it is an area of high social need which requires much closer attention.

2 Older people and computers

Older adults encounter two main barriers to computer use: inexperience with modern computers and age-related impairments. These barriers are likely to interact and both must be addressed in the design of genuinely appropriate systems. Older adults generally have much less computer experience than younger people do: they are less likely to use computers (recent figures [9] indicate that only 8% of those over 65 use computers). In addition, as a group they find it harder to learn how to use a computer and are likely to make many more errors [5] from which they will find it harder to recover [12]. Some research has suggested that older people may have difficulty learning to use computer systems because they did not encounter such systems during their ‘formative years’ [13]; experience with mechanical devices rather than electronic interfaces, it is argued, predisposes people to expect computer interfaces to behave mechanically, complicating the learning process.

2.1 Age-related impairments

As people age they are also more likely to suffer from age-related impairments, which can act as a barrier to successful computer use. With age-related visual impairments, for example, text and buttons in industry-standard software are difficult to see clearly. This is partly because of the small size of the letters, but is also influenced by font style and low contrast between text and background colours (such as black text on grey backgrounds often used for button and menu text). The visual difficulties that many older people encounter will have a broader effect on their ability to use software effectively: the user’s ability to scan a page in search of a particular target will be degraded by the difficulty of distinguishing what is on the screen as well as by screen complexity and the user’s own inexperience. Decline in motor skills also complicates use of standard software: cluttered screens with small targets can make ‘pointing and clicking’ time-consuming and frustrating [2]. Cognitive impairment, also associated with aging, can add to these problems: short-term memory decline makes it harder to remember the steps in computer tasks, and the unfamiliar nature of these tasks will increase the difficulty of remembering steps.

2.2 Older people and E-mail

Although people encounter barriers to computer use, there is considerable evidence to indicate that older people want to use email [1, 14] and also some evidence that such use has distinct benefits in terms of psycho-social well-being, particularly for frail elderly people [10]. Despite evidence that a significant number of older people do use e-mail, or would like to, relatively little research has been carried out on appropriate e-mail interfaces for this user group. Given the specific difficulties that older adults face in using computers, and the importance of positive experiences for enabling continuing computer use, it is likely that appropriately designed interfaces could make a significant contribution to helping older people use computers.

2.3 Previous research

Some previous work has been carried out on ways of making e-mail more accessible for older people. Czaja et al showed that an appropriately designed and very basic text-based e-mail system could be used “with a minimal amount of difficulty” by older women living independently, although on-screen instructions were necessary to remind the users of the order of procedures [4]. That study took place over ten years ago. A more recent project is Hawthorn’s SeniorMail [8], a re-development of the Microsoft Outlook Express interface to support use by older adults. SeniorMail addresses the two fundamental barriers

to computer use for older people by altering the visual presentation of the system (e.g. bigger buttons, larger font size) and addressing the problems older novice users have learning or remembering procedures, by having a list of possible actions presented in a simplified menu system and simplifying navigation [6], [7]. SeniorMail is a rare and important example of e-mail development for older people. It is based on adapting an existing e-mail system rather than developing a new one from first principles.

2.4 Simplified and rationalised interfaces

The aim of the work described in this paper was to form a foundation for further developments in e-mail design by investigating older users' preferences in simplified and rationalised e-mail interfaces. The approach taken involves working closely from the outset with older computer users to establish a set of essential requirements for e-mail functionality, using interviews and prototyping to identify key features which older users indicate that they want or need. An existing e-mail system or interface is not assumed as a starting point, rather the process is to elicit what older users would like to have in a new system. Excessive functionality and complication should thus be avoided, with the intention that users should find the system easy to learn and use. Similar simplification strategies for novice users in other contexts have been found to be beneficial; Carroll and Carrithers [3] stripped down the available functionality on a word processor, making many confusing options inaccessible, and found that this aided the learning process considerably.

3 Requirements of older people

3.1 Interaction with older people and helpers

The project developed a simulated e-mail system with a simplified and clear user interface which had been created in consultation with older people. The work therefore involved a number of stages, including:

- Background research and requirements gathering
- Design and review of prototype interface layouts
- Development and trial of the e-mail simulator

The emphasis was on creating a usable system which would make e-mail more accessible for older users, hence a thorough requirements investigation was carried out. This involved visits to homes and community centres where older volunteers were interviewed concerning their views and requirements regarding e-mail. A questionnaire was administered to elicit their awareness and experience of computer use and existing e-mail systems. It was apparent that the volunteers had some experience and knowledge of computing and were therefore able to express informed opinions on their requirements. Tutors from the community centres were also interviewed in order to gain a better understanding of the problems faced by the older people. Workers in the area of computer systems for older people were also consulted. From these visits and consultations, requirements were derived for e-mail interfaces, and from these requirements, a number of prototype user interface layouts were designed in graphical form. The functionality which was eventually incorporated in the simulated e-mail system derived originally from this series of interviews and consultations.

3.2 Prototype interface layouts

Prototype user interface layouts were then developed for the following cases:

- Main system Welcome window
- Read Mail window
- Write Mail window
- Address Book window
- Attachment window

with several layouts being developed for each. A total of 21 different layouts were created. The layouts made use of simple metaphors, such as postcards, letters and postboxes, as well as more conventional e-mail symbols and designs. The prototypes illustrated concepts upon which the volunteers would be invited to pass comment, rather than presenting finalised designs. Examples are shown in Figures 1, 2 and 3, which show three of the prototype layouts for a *Read Mail* window.

Figure 1 shows a relatively conventional interface for *Read Mail* using a list for the e-mail messages which have been received, and a pane to display the selected message. The new messages (the top two in Figure 1) would be highlighted in red in the list on the actual interface, with messages which have been read listed in black. A toolbar along the top of the window gives options for *Read Mail*, *Write Mail*, *Address Book* and *Help*. On some of the other prototypes, these four options were represented as large text buttons without the graphic icon, and placed in different locations on the interface, e.g. down the left-hand side (as

in Figure 2). It transpired that the volunteers preferred to have the toolbar along the top of the window, with graphic icons included to reinforce the meanings of the buttons. Action buttons (*Delete* and *Reply* in this instance) relating to the displayed message are placed at the bottom of the window; other locations were also tried for them, but this position was preferred by the volunteers.



Figure 1. Prototype *Read Mail* Interface showing list of received messages. (All names are fictitious.)

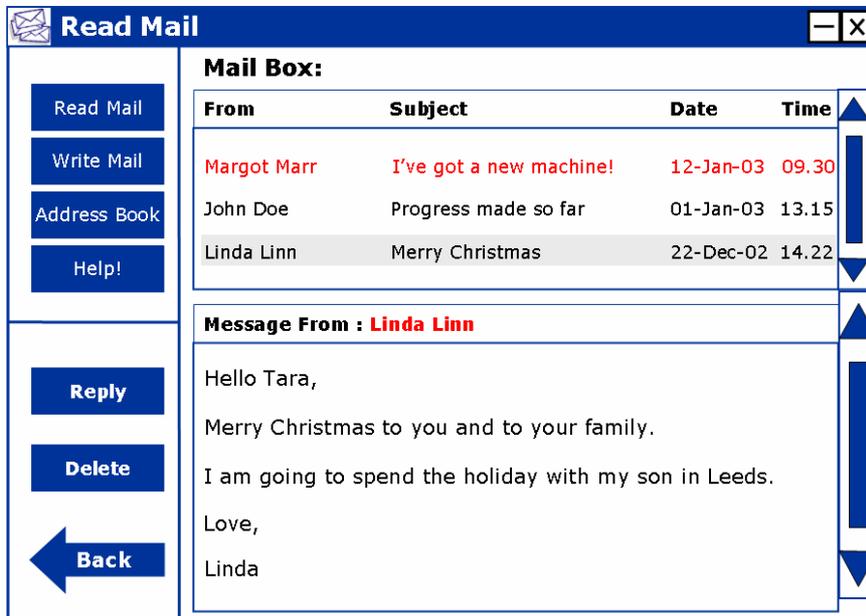


Figure 2. Prototype *Read Mail* Interface with buttons down left-hand side. (All names are fictitious.)

Figure 3 shows another of the prototype *Read Mail* interfaces. This one makes use of the visual metaphor of postal letters (one which should be very familiar to older people) with new e-mail messages being represented as unopened envelopes, displaying their postage stamps on the front (left-hand side of the window in Figure 3), while messages which have been read are depicted as opened sheets of writing-paper

(right-hand side of the window in Figure 3). Another metaphor which was used, this time in the context of a *Write Mail* window, was that of a post-box to symbolize the *Send* action once the e-mail message had been written and was ready for sending. The volunteers tended to prefer a more conventional approach, however, and metaphors such as these generally did not gain much support from them.

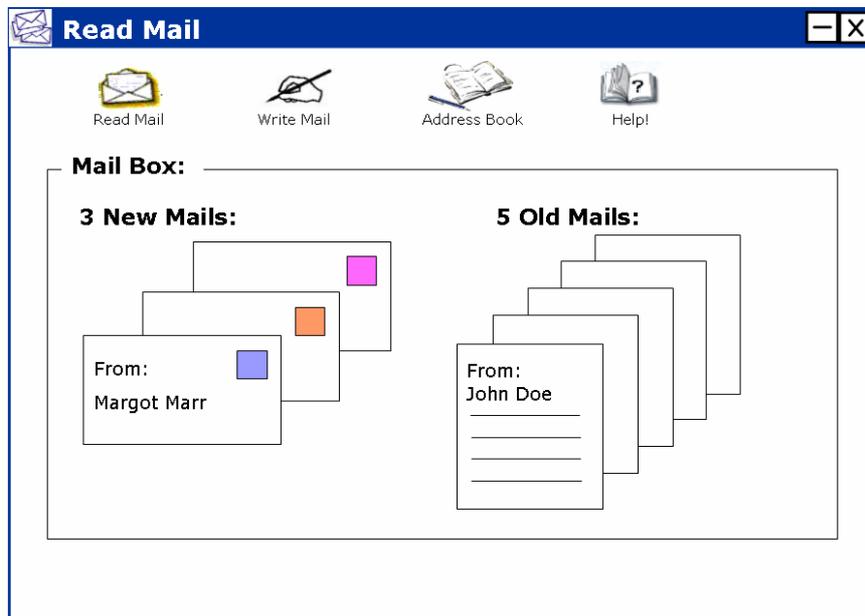


Figure 3. Prototype *Read Mail* Interface using a postal letter metaphor. (All names are fictitious.)

3.3 User responses to prototype layouts

The 21 interface layouts were presented to the volunteers and tutors in the community centres, and their responses were noted. From this exercise, preferred interfaces were developed (e.g. one *Read Mail* window, one *Write Mail* window, one *Address Book* window) for inclusion in the final simulation system which was being designed. A key outcome from the prototype investigation was the point that the volunteers preferred relatively conventional symbols and designs to those employing metaphors such as letters and post-boxes, although large “up”, “down”, “back” and “forward” buttons were noted by most users as possible alternatives to scroll bars. The preference for conventional symbols may have been influenced by the fact that the volunteers had some experience of computer use, and understood basic features such as windows and buttons. A further finding was that the volunteers did not favour menus, particularly drop-down menus, as they tended to cause problems for them. This echoes a result of Hawthorn [8], who also found that menus were not popular with older users. The approach adopted therefore was to use relatively conventional symbols and icons, but not menus, in the design of the e-mail simulator interface and to focus on producing simple, clear layouts which reflected the preferences expressed by the volunteers during the prototyping phase.

4 Development of E-mail simulator

An e-mail simulator called “Simple Mail” was developed and equipped with preferred interface features. The principal features of the interface are illustrated here. Figure 4 shows the *Welcome Window* which offers the five options of *Read Mail*, *Write Mail*, *Address Book*, *Help* and *Close Simple Mail (Exit)*. This layout follows from the advice of the volunteers who favoured its bold, clear design that made the important features stand out and made it clear where the user should click to activate an action. (Hawthorn [8] adopted a similar opening interface in the SeniorMail system for similar reasons.) The simulator is designed to contain only essential features that the volunteers required, hence the interface can be equipped with a relatively small number of buttons to cater for these essential features. This means that the buttons can be made large and clear, which is beneficial for older users who may have problems targeting small buttons on a more detailed and cluttered interface.

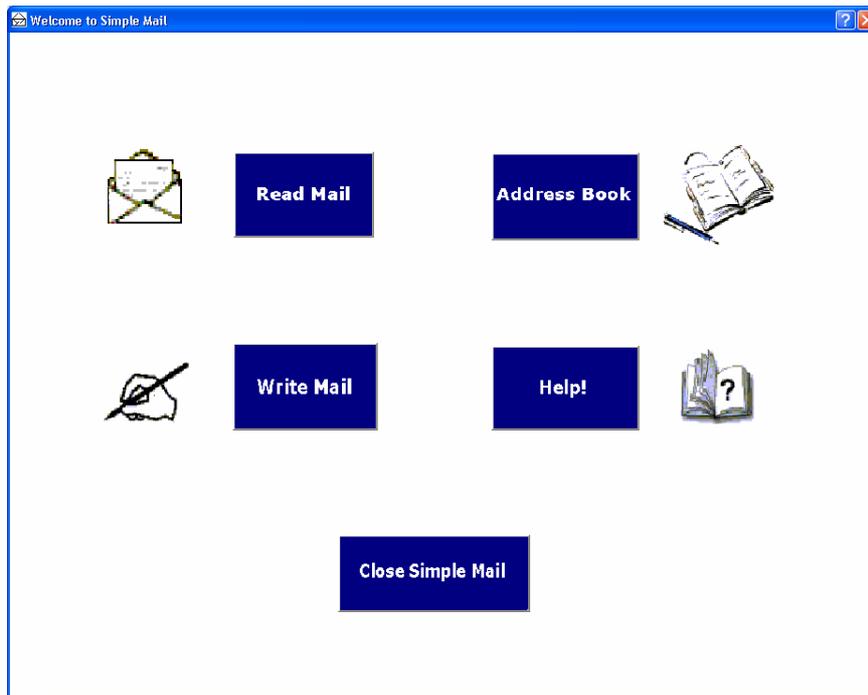


Figure 4. *Welcome* Window on Mail Simulator

Figures 5-to-7 show the windows for *Read Mail*, *Write Mail* and *Address Book* respectively. Key features in these designs had been commended and endorsed by the volunteers in the prototype designs, such as placing the toolbar along the top showing the (small number of) important tools which they needed, the list on the *Read Mail* interface showing the titles and senders of received messages, the simple layout of the *Write Mail* interface and the small number of key action buttons (e.g. *Reply*, *Send*, *Edit Contact*) displayed in bold textual form at the bottom. The designs throughout emphasise simplicity and lack of clutter, with only essential functionality included; these were key themes emerging from the prototyping phase with the volunteers. The designs also avoid the alternative metaphors which were presented in some of the prototypes (e.g. representing messages as letters to be read or written onto) and drop-down menus.

5 Trial of the E-mail simulator

The simulator was trialled with eleven participants from the group of older volunteers. They had varying degrees of computing experience, and nine of them had not used e-mail before. Task sheets were administered to the participants, who were observed during completion of the tasks, and qualitative outcomes derived from their performance on these. A questionnaire was also used to elicit opinions from the participants.

5.1 Task sheet evaluation

For the task sheet evaluation, nine task sheets were given to the eleven participants to perform. Typical tasks were: add a new contact to the address book; read mail message; reply to mail message just read; write a mail message and then cancel it. Each task sheet contained a sequence of steps which the participant should follow in order to complete the task. The observer noted the progress of the participant through the task steps, and recorded qualitatively how they performed on it and where any difficulties occurred.

Outcomes of the observed tasks indicated that the participants found the interfaces very usable and easy to understand. Most of the participants could complete the tasks without any assistance. Some detailed suggestions were made by participants for improvement of aspects of the prototype interfaces, but these generally indicated that the prototypes were very acceptable to the participants in terms of their overall attributes. The main problems that were encountered arose when some participants (those who had less computer experience) were not aware that they had to select a message or contact address before they could delete it or edit its details. This issue did not occur with the more experienced participants. The majority of participants who had not used e-mail before said that overall it was very easy to get used to the system and they would not have these problems if they were asked to use it again.

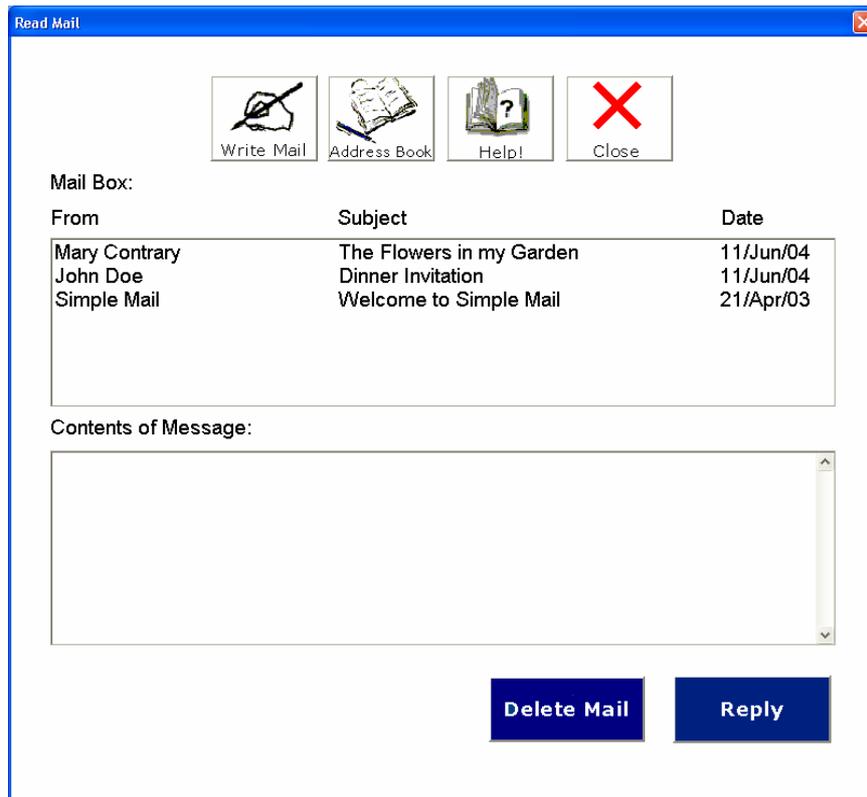


Figure 5(a). *Read Mail* Window on Mail Simulator with no message selected.
(All names are fictitious.)

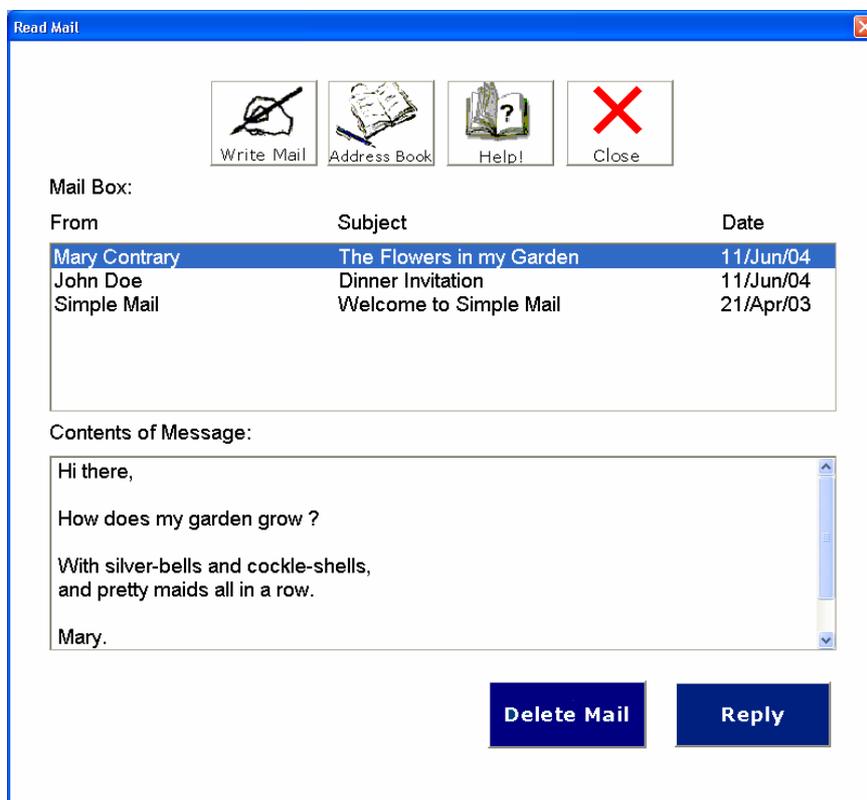


Figure 5(b). *Read Mail* Window on Mail Simulator with a message selected.
(All names are fictitious.)

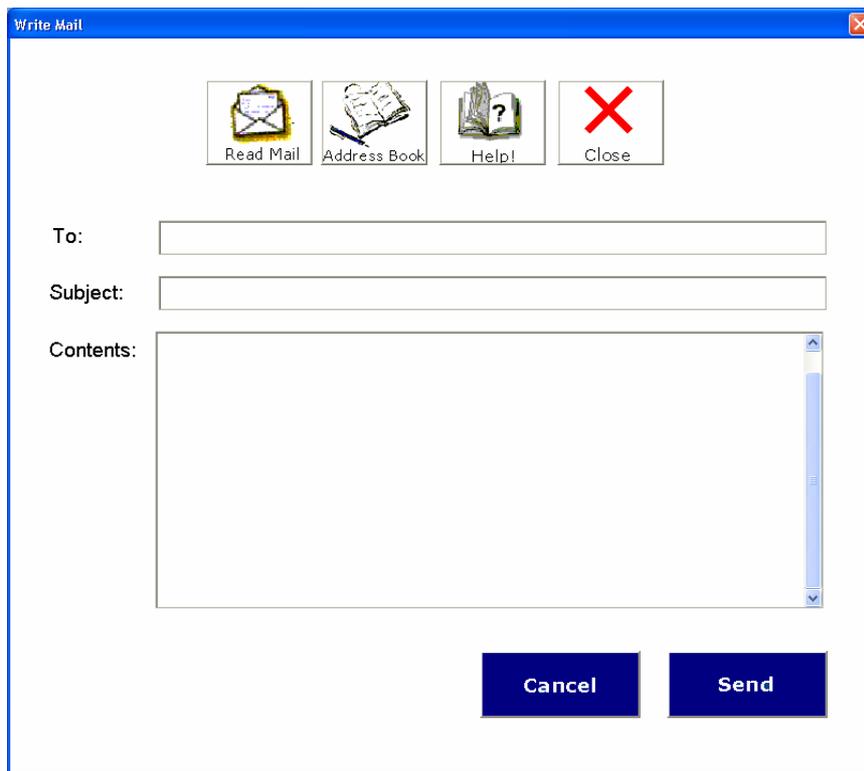


Figure 6. *Write Mail* Window on Mail Simulator.

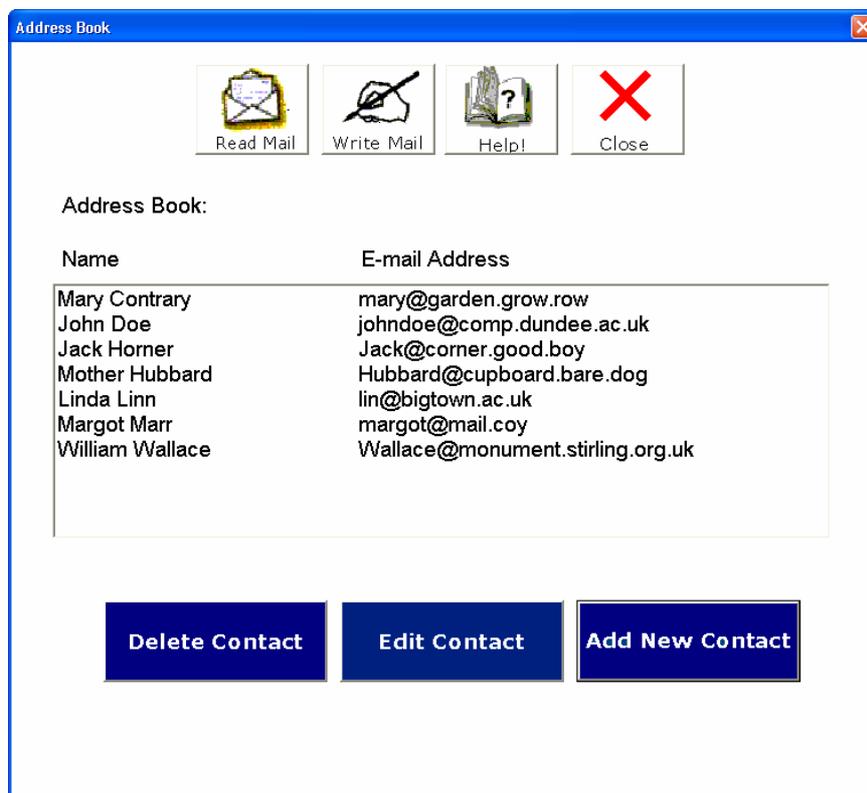


Figure 7. *Address Book* Window on Mail Simulator.
(All names and addresses are fictitious.)

5.2 Questionnaire on E-mail simulator

The questionnaire which was administered to the participants was intended to elicit their views on issues relating to usability, ease-of-use and user satisfaction in the simulator. Participants were unanimous in judging it easy to learn and in finding use of buttons, reading text and writing messages straightforward. Adding a new contact address to the address book and replying to a message were the next most popular features, followed by deleting a contact, reading a message, remembering what to do and the colour scheme and user manual. Editing of contact details was seen in a slightly poorer light, while the weakest aspect was judged to be the ease with which users could avoid making user errors. Despite this being the weakest feature, only one of the participants actually reacted negatively to it; the others were neutral or slightly positive about it. It emphasises however how important it is for users to be able to maintain a low error rate while using an interface; it is a key aspect of user acceptability.

5.3 Overall outcome

The overall outcome of the trial was that the various features of the e-mail simulator were well received by the participants, and indicated that the design was well-liked by them. A full e-mail system could be developed starting with this basic interface design.

6 Discussion

The original aim of the work described here was to establish a foundation for developments in the design of e-mail systems for older people, commencing without a pre-defined e-mail system or interface and building a system of clear usable features identified as essential by older people. The exploration has illustrated the importance of involving older people from the outset in the development of an application and of avoiding basic assumptions before commencing the design. The prototyping phase was a very valuable process in which the older volunteers participated enthusiastically. The simple and clear e-mail interfaces which emerged from that phase were judged in the simulator trials to be very usable; this encourages further and fuller investigation of minimal and intuitive e-mail interfaces for use by older people.

6.1 Novel symbols and metaphors

It transpired that novel symbols and metaphors may not be what older users want in an e-mail interface; they may want relatively conventional features. The participants involved here had varying degrees of computing experience, however, which may have influenced this particular outcome. While they had little prior experience of e-mail, their knowledge of other application interfaces could have affected their views on this point. Further work with novice older users may indicate different preferences, therefore, and this is one direction for future research to probe. An issue which relates to this is that skill transfer from special or unique interfaces to mainstream ones can be problematic, thus complicating user-migration to general-purpose applications. Caution must therefore be exercised in the use of novel metaphors with novice users if it is intended for these users to easily embrace mainstream software applications at a later stage.

6.2 Selection of on-screen items

An important observation made during the Task Evaluations was that the main problems encountered by (less-experienced) participants arose when they were not aware that they had to select an item in order to delete or modify it. Further work in the area has identified a core design rule in the removal of the need for a user to select an item before using or modifying it, as this is clearly a major impediment for novice and less-experienced older users. It is a difficult rule to uphold rigorously, however, as the alternative to allowing on-screen selection of items is to equip the user-interface with many more pages dedicated to particular actions. This can make processes longer in terms of the number of interface pages that a user needs to visit in order to complete said processes and greater emphasis is placed on the user's ability to navigate successfully through multiple interface pages. This tends to increase the development challenge involved in designing interfaces which are both efficient in use as well as reliable.

6.3 Development paths

The e-mail interfaces developed here have generally a simpler appearance than those of SeniorMail [8]. There are fewer buttons and other features displayed, for example. While this means that there will be less functionality available in many instances, this level of complexity was received well by the older people who were consulted in this investigation. SeniorMail is based on an existing e-mail system, with alternative interfaces developed for it. This is a different approach to that adopted here, where an e-mail simulator was

developed *ab initio* to give a new start to the development process. It is notable, none-the-less, that similar considerations have arisen on a number of points (see above) in the two projects, so confirming their relevance and importance. It will therefore be valuable to compare future developments and outcomes as the two research paths progress. The SeniorMail project has also considered File System and Information Storage Complexity, for example, in the context of e-mail of older people, and these are aspects that become more important as a person makes greater use of e-mail and the numbers of their messages and correspondents grow.

7 Conclusions

The work reported here has illustrated how detailed attention to user requirements, involving older users in discussions, interviews and prototype reviews, can lead to a successful outcome in the design of an application interface for use by older people. What has been explored in this project is only a part of what can be investigated in the context of e-mail for older people, however, and much more remains to be done. Detailed aspects of interface layout can be investigated further, for example, as well as other aspects of user interaction. The project has given an indication of what can be achieved, however, and the outcome has helped to inform the agenda for a much larger project (Cybrarian [11]) on e-mail for older people. Further research is therefore being conducted which will lead to more developments and outcomes in the field.

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