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Usability of Consumer Software - Report Series # 9

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Report Series - # 9

Usability of Consumer Software

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About SERC (Sheridan Elder Research Centre)

Through applied research the Sheridan Elder Research Centre (SERC) will identify, develop, test and support implementation of innovative strategies that improve the quality of life for older adults and their families.

1. Wherever possible, older adults participate in the identification of research questions and contribute to the development of research projects at SERC.
2. We conduct applied research from a psychosocial perspective which builds on the strengths of older adults.
3. Our research is intended to directly benefit older adults and their families in their everyday lives. The process of knowledge translation takes our research findings from lab to life.
4. SERC affiliated researchers disseminate research findings to a range of stakeholders through the SERC Research Report Series, research forums, educational events and other means.
5. A multigenerational approach is implicit, and frequently explicit, in our research.
6. To the extent possible our research is linked to and complements academic programs at the Sheridan College Institute of Technology and Advanced Learning.

EXAMPLES OF SERC RESEARCH

The Built Environment	Information & Communication Technology (ICT)	Human Communication	Public Policy	Other research interests
<ul style="list-style-type: none"> - Indoor/Outdoor Design - Graphic Design 	<ul style="list-style-type: none"> - Accessible computing - Age appropriate games 	<ul style="list-style-type: none"> - Hearing/low vision - Vision - Language 	<ul style="list-style-type: none"> - Elder Abuse - Ageism 	<ul style="list-style-type: none"> - Self image/self esteem - Care-giver support

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1. Purpose

This is an observational study with the aim of identifying the problems that the elderly experience in the use in using technology. The reasoning behind this study is rooted in the nature of aging – the baby boomers of the post-war era are now entering their 60s, at a time when technology is more prominent than ever before. It is therefore imperative that technology be made to accommodate the needs of this demographic.

2. Methodology

2.1 Usability in Computing

After selecting a variety of software packages, we asked participants what they would be interested in trying out (Appendix A.2). On a weekly basis, participants would come in to the SERC Internet Café, to meet with one of us for a 90-minute session. Each session would focus on a single application. During the session, the participant would use the software independent of our input. Once the participant encountered a difficulty in usability of the software, we would intervene.

2.2 Project B: Where are the issues of usability arising?

With one twenty-four exposure disposable camera, participants were instructed to carry it around in their daily lives. Whenever they would encounter a problem in usability, they would take a photo of that object.

2.3 Project A: Research design

In week one, after developing our proposal and plan for research, we began recruiting participants for this research project. In the following weeks, we interviewed our recruited participants to collect demographic data. As an incentive to aid the recruiting process, the flyer announced that we were inviting elders to bring in any small (or “portable”) device that they were having trouble using, so that we may help them. During the interview process, in addition to noting demographic and control data, we also asked what pieces of software they would like to work with, such as a greeting card creation program or a game (Appendix A.2).

In March, we prepared the tools of our study, which involved the installation of software on the computers, based on the requests of our participants. We made a point of using the software ourselves, to get acquainted with what we would be using with our participants.

Following that preparation phase, we then began this study. The subjects would operate and experiment with the software while we observed and assisted them in using the software. These sessions were run twice a week, for an hour and a half, based on previous findings of what constitutes appropriate time management.

In the latter half of April, we invested our time in the processing of documentation, digitizing our notes and analyzing the results to reach conclusions regarding the

usability of software.

2.4 Project B: Research design

The period for this project was seven days, allowing a full week of one's daily life of chance to uncover the issues they encounter. On the seventh day, we took each of the cameras back, and had them developed. From the printed photos, we analyzed the captures to find what the participants had trouble with, such as portable devices like cell phones.

We would start by assisting them with oral instruction as to what to do, and would only take control of the computer if that oral input did not resolve their concerns. We would observe and document what usability problems were encountered by the participant. After each session was finished, we would digitize our notes and analyze them to uncover where the user interface issues were most commonly occurring. The guide used in this process was the Seven Principles of Universal Design (Appendix A.1).

2.5 Data collection methods

The data was collected by way of handwritten notes, composed during the session, and subsequent typed notes, entered after each session. At the end of the study term, we digitized the entirety of this documentation, based on a structure that we applied to each session's file.

2.6 Data analysis process

For each session, we produced a qualitative analysis of what the participant's objective was, such as the checking of their daughter's typed essay difficulties were experienced, and

3. Results

3.1 Project B Results

The documentation of the usability sessions was processed and recorded using a format of total reporting, featuring the intention, original solution, applied solution, and usability issues. Please refer to Appendix A.3 for this documentation.

3.2 Limitations: Project A

The limitations of this study included:

- Time constraints
 - Needed more time to recruit subjects
 - Needed more time to study more thorough usage of software
- Sample size
- Scope of study

- Would have liked to study two separate groups of participants, including
 - Users and Non-Users
 - A greater range of data collection tools would be useful
 - Example: a webpage design which measures reflexes based on a procedural set of tasks
- Lack of peripheral devices
 - Example: The printer we worked with could be very different from that which they have at home

4. Recommendations

4.1 Recommendations for usability research

In the future, research could be executed by way of a singular website design which all participants use (independently). This way, the research process would lose its subjective nature and gain a balanced level of both quantitative and qualitative results. The use of a standardized tool would allow for a scientific approach, while simultaneously leading to a greatly increased level of comfort on the part of the participants, in terms of using the computer and the World Wide Web.

4.2 Recommendations for software design

Our study revealed the need for software to be improved in many ways that applied to several different software packages, including:

- Navigating through a step-by-step instructional wizard
 - Too many areas of choice selection
- Menu bar usage
 - Saving and closing the document
 - Finding and importing images from file
 - Too dense with options
- Graphic User Interface
 - Distinguishing between main program window and "Help" window
- Saving images from the Internet
- Error messages
 - Clarity of what exactly is wrong
 - No clear indication of resolution approach
- Lack of instructional mode or step-by-step wizard to assist user
- Keeping the mouse steady enough to draw a line or move and resize an object
- Learning to type with the keyboard; was not familiar with layout of the letters, since it is not in alphabetical order, it took awhile to find each letter and type the words.
- Scrolling up and down a page.
- On the World Wide Web: Finding the main search page and navigating back and forth between previous pages.
- Whether a function needs a single click or a double click to execute it
- Saving process – where does the file go? (Windows file hierarchy structure)

5. Conclusions

This study has shown that technology has a long way to go in the realm of usability, and that this finding applies to both software and hardware. Regardless of what piece of software was being used, and regardless of the software maker, this study shows that there are an abundance of usability issues that are repeatedly experienced.

Furthermore, one's familiarity with computers often does not lead to these issues being avoided. In the World Wide Web, one finds that usability takes on a new form, as it becomes unpredictable, due to the lack of standardization that is present in website design. Each website presents its own set of usability problems and addressing these on a case-by-case basis would be too time consuming and impractical. The fundamental conventions behind website structure and navigation must be understood before one can easily traverse the World Wide Web with ease and clarity.

Rather than studying usability by measuring users' performance on a variety of different websites, future research projects should utilize a standardized tool for measuring website usability. This tool should address all the basic usability obstacles that have been discovered in this study, as well as provide a means of measuring user activity. This tool should represent a typical structure of a website and all its basic functions. It would educate novice users and provide them with a solid understanding of website functionality, which they could apply in their own personal interest in using the web.

6. Appendix A - Universal design principles

Principle One: Equitable Use

The design is useful and marketable to people with diverse abilities.

Principle Two: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

Principle Three: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Principle Four: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Principle Five: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Principle Six: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

Principle Seven: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

(Source: <http://www.design.ncsu.edu/>)

7. Appendix B - Software package options

- Adobe Photoshop Album 2.0
- Art Explosion Scrapbook Factory Deluxe
- eGames Galaxy of Sports
- eGames Puzzle Master 3
- Encarta 2006 Premium
- Family Tree Maker Deluxe
- Flight Simulator 2004: A century of flight
- Hallmark Card Studio 2005 Deluxe

8. Appendix C - Usability documentation

Photoshop Album Maker

Intention

The participant's primary intention for wanting to learn more about using a computer is for creative purposes. Photoshop Album maker allows the user to create and organize their own photo album for their digital photos. This software would enable the participant to create a photo album for their digital pictures they frequently capture with their digital camera.

Original Solution

The participant hoped the software would allow them to manipulate some of the images they captured and create a collage of images onto one frame.

Applied Solution

The software only works best for organizing and storing images into a created album. Using other off the shelf software we had to aid in the manipulation and juxtaposition of images were used. With the use of off-the-shelf software to manipulate their images, they were able to organize and store those images onto their created album.

Usability issues

- Difficulty in navigating through a step-by-step instructional wizard, due to various areas of choice selection;
- Difficulty with understanding and navigating the menu bar;
- Saving and closing the document;
- Finding and importing images from file; and
- Whether a function needs a single click or a double click.

Scrapbook Factory Deluxe

Intention

To create a collage of images that would allow the participant to utilize her creativity according to her original intention of computer accessibility. In this age of digital images, the participant's interest in scrap booking would give them the ability to work with Scrapbook Deluxe and their digital captures.

Original Solution

As what the software states and implements, the software would give the participant access to create a scrapbook.

Applied Solution

- Worked with images found and gathered on Google's image search;
- Played around with different creative tools the program had to offer;
- Tried tools such as paintbrush tool, line tool, and text options, etc.; and

- Worked with other features implemented with the software: T-shirt image creation, family tree creation, and greeting card maker.

Usability Issues

- Difficulty distinguishing between the main program window and the instructional window;
- Finding the saved image from the Internet;
- Choosing the right feature to work with based on a list of various choice features; and
- Navigating through the menu bar ("too many options").

Hallmark Card Studio 2005 Deluxe

Intention

As another software creation program, the participant would like to utilize their creative skills to create their own greeting cards that they can send to family and friends.

Applied Solution

Went through a step-by-step wizard to create and customize a greeting card. Selected the greeting occasion to work with (e.g. Birthday, Easter, etc.). Utilized the various paint tools and functions to customize, add pictures, and input own greeting.

Usability Issues

- A lot of options to choose from became confusing for the user; and
- Difficulty uploading own images from computer file.

Family Tree Maker

Intention

The participant wanted to map out their family history and keep track of all their family members.

Original Solution

- Creating an actual family tree where the user can visually see past and present family members branched out on the screen; and
- Designing or customizing their own family tree based on the participant's creative perspective.

Applied Solution

Inputting names of family members and other information (e.g. birthdays, place of birth, marriage date etc.) on a form.

Usability Issues

Upon opening the program, an error box appears stating: "Family Tree Maker 2005 cannot find your file. Please check the 'Directories' and 'Drives' fields to ensure that you

are supplying the correct path.”

- Error posed difficulty and confusion for the participant as they did not know how to solve the error;
- There is no instructional/step-by-step wizard to walk the user through the program;
- Most functions were not easy to find or they were not well defined; and
- Very confusing to navigate and change views.

Microsoft Paint

Intention

Being able to create and design images. The participant wanted the opportunity to experience creating an image using the computer. Since they love to create things artistically, this would be their first time creating something other than using the physical artistic tools (e.g. paintbrush, scissors, pencil, etc.).

Applied Solution

The participant used a variety of drawing tools the Paint program had to offer. They created different shapes and applied varying colours to their created pieces. Aside from shapes, they also attempted to draw nature shots and experimented with different brush sizes and strokes.

Usability Issues

Mostly dealing with stabilization of the mouse to draw a line or move and resize an object.

Flight Simulator

Intention

Wanted to know what else other software had to offer besides searching and looking at information. User wanted something that was more interactive.

Applied Solution

Read and went through instructional videos that taught user the different controls and gadgets in working a plane. Learned the controls in navigating the plane through the use of the keyboard.

Usability Issues

- Lack of a joystick made controlling the plane difficult;
- Too many functions on a plane to learn and remember; and
- Since users had never used a computer before, and were not familiar with using a keyboard, users had difficulty with using the keyboard.

Encarta

Intention

The participant wanted to use the computer to search for information, such as recipes and medical information. Using Encarta would give the participant the ability to search and read up on different information. The participant thinks this software would be a first step in searching, as they would like to use the Internet to further their searches.

Applied Solution

The participant typed in the search box anything they had an interest in. Reading through some of the articles, the participant also managed to watch a few videos regarding the topic.

Usability Issues

- Basic computer functions such as learning to type with the keyboard; was not familiar with layout of the letters, since it is not in alphabetical order, it took awhile to find each letter and type the word;
- Learning to scroll up and down a page; and
- Finding the main search page and navigating back and forth between previous pages.

Google Earth

Intention

Look and explore different places in the world, especially Hong Kong.

Applied Solution

Searched for Hong Kong and zoomed into a particular area. Also looked and navigated through different areas of the world, both locally (e.g. Sheridan – Oakville) and outside Canada (e.g. New York – Central Park). Got directions from place of residence to Sheridan.

Usability Issues

Navigation functions (e.g. zoom, tilt, directions) were difficult to understand and use.

Microsoft Word

Intention

The participant had received a 25-page word document from her daughter concerning her family's genealogy. Her daughter had asked her to read it over and to update any sections she deemed inaccurate. The participant was wondering if she could edit the document using her laptop.

Original solution

The participant's plan was to print out the entire document and to edit it by hand. She

intended to snail mail it to her daughter when she was finished.

Applied solution

The participant was ecstatic to learn that her needs could be easily met by the use of a word processing application. I had retrieved the document from her Outlook Express inbox and showed her how to save it. I opened it in Microsoft Word and showed her how to edit the document's text. She also learned how to change the font, its colour, and its size. Upon completion of this session, I had shown her how to save the document and how to attach to an email in Outlook Express.

Usability issues

- Page scrolling by clicking on the scroll bar (memory related);
- Page scrolling with the use of a scroll wheel on a mouse (memory related);
- Understanding the directory structure of Windows;
- Navigation through file chooser (while attaching);
- Changing the colour of text – location of colour chooser; and
- Whether a function needs a single click or a double click.

Suggested improvements

- Higher contrasting / larger buttons
- More intuitive button design
- Redesigned file chooser
- Simplification of file hierarchy in file chooser

Email with Outlook Express

Intention

The participant had a question concerning sending an email. Apparently, every time she had sent an email to a friend of hers, it would get returned. She was absolutely positive that her friend's email was correct. She wanted to know why this was happening and how she could fix it.

Applied solution

The problem lay in Outlook Express' auto fill function. Whenever the participant sent an email, she would type in the name of the recipient and Outlook Express would automatically fill in that recipient's email address. Outlook Express stored the first time the participant had sent an email to this person. The problem was that the participant had initially typed this person's email incorrectly. Outlook Express saved multiple instances of this person's email labeled under her name. Whenever the participant typed in her name, the default and incorrect email would automatically fill in. The situation was remedied by clearing the cache.

Usability issue

Poorly designed auto fill which allows for human error

Suggested improvements

- Auto fill that automatically checks if an email is valid; and
- An option allowing editing a single entry rather than having to clear the entire cache.

Internet: Purchasing books via amazon.com

Intention

The participants wanted to know how to purchase books online. They believed it was a complicated task, but were very eager to learn about it. They also wanted to be able to read abstracts from the book.

Applied solution

I had introduced the participants to Amazon.ca. They were mesmerized at how easy it was to search for books. I had shown them exactly how simple it was to browse for abstracts from the book. I also showed them where to find more descriptive information about the book, i.e.: hard/soft cover, dimensions, weight, etc., as well as readers' comments about a particular book. I went over the entire purchasing process.

Usability issues

- The Amazon.ca user interface felt a little overwhelming at first, but mostly due to non-familiarity;
- Browsing abstracts presented obstacles, especially when in pdf format (new interface);
- General screen scrolling presented issues; and
- Memory issues related to navigation (clicking through).

Suggested improvements

- Greater clarity of information organization (possible information overload);
- Abstract browsing integrated directly into the browser (non pdf);
- Better scrolling mechanism – organization of user comments; and
- Fewer screens to navigate through during shopping experience.

Internet: Booking tickets online for TV show ("City Line")

Intention

To purchase tickets online for a live taping of city line. The participant had said that her daughter told her it was possible to purchase tickets online. The participant was interested in learning how to carry out this task.

Applied solution

We navigated to the city line website and filled out a standard form.

Usability issues

- Difficulty jumping from one form field to another;

- Placing the cursor on the field to type text into it; and
- Scrolling of page necessary to fill out entire form.

Suggested improvements

- More pronounced visual feedback when entering data into form elements;
- Better-designed ticket booking system (website specific issue); and
- Clearer feedback pertaining to ticket availability.

Internet: Travel research using trip advisor

Intention

The participants wanted to learn how to book trips online. Their main area of interest was cruises, but they were also interested in finding information about flights and hotels. They wanted to find a website which could take care of their travel needs as well as provide customer feedback on hotels, flights and packages so they could make an informed decision.

Applied solution

I introduced the participants to a website called traveladvisor.com. It contained all the information they were looking for.

Usability issues

- Poor layout of website;
- The participants would get lost navigating through the website;
- Scrolling problem;
- Buttons were too small;
- Automatic redirection to non-relevant (inappropriate) websites;
- Pop ups creating confusion;
- Information overload; and
- Clicking on non-hyperlinked text.

Suggested improvements

- Streamlined information;
- Fewer screens to navigate through;
- Larger hyperlinks/ contrast to differentiate text and link; and
- Information presented in chunks (less scrolling).

Utilization of peripheral devices: scanning a document

Intention

The participant wanted to convert his physical photos and documents into a computer file, which he could then send to his colleagues. He had brought his scanner and a few photos he wanted to learn how to scan. The participant was unsure whether to scan using the software loaded on the computer or to scan by directly pressing the buttons on the scanner.

Applied solution

I had shown the participant how to scan in two different ways (each method had different settings). I also showed him to create presets. The scanning process was streamlined into a few easy clicks. I also went over saving the document and how to attach it to an email.

Usability issues

- Confusion related to scanning (hardware vs. software – which one is better?);
- Understanding how presets work – difficult to create;
- Saving process – where does the file go? (Windows file hierarchy structure); and
- Understanding image scanning (resolution, dpi, file formats).

Suggested improvements

- Easier preference creation and explanation about dpi, file formats, dpi, etc., and
- Automatic cropping/image balancing to avoid further editing