Teaching Senior Citizens to Use Web-Based Email:

A Design Study Proposal

Cognitive Design Project Study Proposal

ED 333A

Submitted to Dr. Deedee Perez-Granados

Karenina Susilo, Eileen O’Brien, Iram Mirza

July 21, 2004
Introduction:
During the past several decades, the Internet has evolved as the communication medium of choice. Because of its almost ubiquitous assimilation in today’s society, there is no denying that the Internet has impacted most social and personal institutions. One of the most important uses of the Internet is as a communication tool.

According to the Nielsen Norman Group, in 2004, there are about 8 million senior citizens (aged 65 and above) online; however they find that “current websites are twice as hard to use for seniors as they are for younger users”. (2004) Senior citizens might feel hesitant using the Internet as a tool for communication for various reasons such as declining learning abilities, techno-phobia, lack of social pressure and lack of motivation.

Learning Problem:
Senior citizens are reluctant to use email as a communication tool because they do not have an effective mental model of how web-based email works. While many seniors begin to investigate using email, they may not be well acquainted with computers and Internet usage. Individuals who have had minimal contact with the Internet do not possess a clear conceptualization and understanding of how the Internet operates. Many older individuals have other, younger people interact with the Internet on their behalf. Some are not comfortable with sending email without someone’s assurance that everything is “right”; others follow explicit procedural instructions when performing some task requiring Internet usage; while others yet always relent and disengage themselves from the problem if they run into unexpected occurrences while using the Internet.

Design Principle:
Our proposed study is based on the following principle of cognitive learning theory as documented by Greeno, et al. (1996):
“Explicit attention to generality.” The curriculum of a subject matter domain can be organized so that students come to understand the major unifying principles of the domain. Information and problem-solving methods can be presented and discussed in ways that make their general significance and usefulness salient.” (C3)

Learning Aim/Goal:
The goal of our study is to determine whether the cognitive based curriculum approach will help to increase the domain knowledge and problem-solving skills of senior citizens learning to use web-based email. The ability to have a clear and effective mental model of the workings of the Internet may make senior citizens feel at ease when using web-based email, better able to troubleshoot novel circumstances that occur while connected to the WWW, and help them take advantage of the many services email has to offer to improve quality of life.

Proposed Study
This study will involve 20 participants divided into two groups – a control group and an experimental group.

Participants
- Participants aged 65 and above whose immediate family members live at least 2 hours driving distance.
- Participants live in their own house and do not belong to retirement homes.
- Participants have a working computer and understand the basic operations.
- Participants regularly communicate with their family members.
- Participants have heard about email and may have tried to use it initially.

Timeline
- The study will span 3 months.
We are going to conduct a pre-study interview with each participant to gather the following background information:

- How they currently communicate with their family members and friends (i.e., write and send letters or call)
- How they initially learned about or were introduced to email
- Frequency of outside help requested to use email or to troubleshoot
- How they think email works – we will ask them to draw their mental model of what email and the Internet is to them.
- What their views are on communicating digitally
- What they think the advantages and disadvantages of email are

**Methodology**

**Control Group (Procedural Model):**

Many senior citizens learn how to use email by following step-by-step instructions. In this control group we are trying to re-create this typical learning process. We will ask the users to follow step-by-step procedural instructions on how to write and send email in the Hotmail web-based email application as follows:

1. Double-click the “e” icon on your desktop
2. Move the cursor to the browser address bar
3. Type in [http://www.hotmail.com](http://www.hotmail.com)
4. Hit Enter
5. In E-mail Address field, type in your email address
6. In Password field, type in password
7. Double-click “Sign In” button
8. Single-click on “New Message” link
9. In new email screen, click on the “To” link to pull up your address book
10. Single-click on the name of the person you wish to email
11. Single-click “OK” button at bottom of address book window
12. Single-click in “Subject” field and type in subject
13. Single-click in body field and start typing message
14. When done typing message, check the “Copy Message to Sent Folder” checkbox
15. Scroll up in window and click the “Send” button
Users will be asked to reference these written instructions while writing their initial emails (maximum of 5). We will then require that the users send all subsequent emails without referencing the written step-by-step procedure guidelines. We will observe them in situ and ask them to talk through their understandings while going through the process of writing and sending emails.

**Experimental Group (Cognitive Model):**

We will teach this group how to send email by simulation and abstraction. Our goal is to provide a deeper conceptual understanding of how email and the Internet function, in order to provide a comfort-level with web-based technology. We hope that this deeper understanding will allow the users to gain more critical thinking skills and not immediately turn off the computer when they encounter unforeseen circumstances or novel situations (i.e., a pop-up advertising window appears on top of their email draft window).

We will begin by showing the participants a mental model of how the writing, sending and receiving of an email works in the case of a mother sending an email to her daughter. This cognitive map is listed below in Figure 1.

---

**Figure 1**

![Diagram of email process](image)

**MOTHER**

**DAUGHTER**
We will provide this visual as we walk the participants through the writing and sending of an actual email. We will then proceed with another example in the form of an analogy.

As most of the seniors are familiar with writing letters and mailing them, we will show them conceptual maps in order to provide them with a mental model comparison. We will first show the conceptual map of how the US Mail service works, as seen below in Figure 2.

We will explain the mental model from the perspective of a senior citizen who is corresponding with her daughter. She writes a letter and takes it to her local post office. From the local post office, the letter travels to the central US Postal Mail Distribution Center. It then travels to her daughter's local post office, where it then gets sorted and delivered to her daughter's home mailbox. This is something that clearly most people are familiar with and comfortable with reviewing.
We will draw on this example to extend the concept to the structure of the Internet and the network involved. We will walk through the concept of the Internet as a network that connects actual computers much like our roads/transportation system connects the postal service trucks on their path from home to the local post office, to the distribution center to the second local post office and to the point of delivery.

![Diagram of Internet structure](image)

**Figure 3**

We will again walk the experimental users through the writing and sending of an email while we discuss what is actually happening based on the more large-scale cognitive model above. We will observe the participants *in situ* as they write and send their own emails. We will ask them to discuss which specific component of the mental model they are experiencing and the reasoning behind their actions.

In the next phase we will provide the participants with a board game in which they will have to construct a path of the nodes and links representing the process of writing and sending emails.
Both Control and Experimental Groups:

After one month, we will ask users in both groups to send emails to their family members. They will not be allowed to ask for assistance while drafting and sending the emails.

Understandings we will evaluate in both groups over the 3-month study include:

- Observation of participants in the home. We will observe the participants sending emails, taking note of any unforeseen event that may occur and how they react. We will evaluate their success rate at trouble-shooting technical issues.

- Using animated screen studio capture software, Snaps-Pro, we will track how the users are composing their emails and what actions they take.

- We will provide the users with an additional task to observe how they apply their knowledge to more complex tasks. (For example, sending an attachment with an email).

Assessments:

We plan to qualitatively analyze the data we gather from the 3-month study. At the end of the study we are going to conduct a post-study interview with each participant and some of their family members with whom they communicate regularly. The interview will include similar questions asked in the pre-study interview, focusing on the senior citizen’s change in attitude towards using email as a tool of communication. We are interested in determining how their conceptual understandings have improved since the pre-study interviews.

The family-member interviews will include questions related to:
• The frequency of emails they receive from their parents/grandparents
• The frequency of their parents/grandparents responding to their emails
• The frequency of their parents/grandparents asking for help in using and troubleshooting email
• Family members’ observations on their parents/grandparents attitude towards digital communication

Finally, we will ask the seniors to demonstrate to us their process of writing emails using Yahoo! Mail instead of Hotmail. The purpose of this is to see if they can transfer their knowledge and accomplish the same task using a slightly different application.

**Potential Findings of Study**

From the post-test interview and our direct observations, we find that 9 out of 10 senior citizens in the experimental group exhibit more confidence in writing emails. Before the study, they sent an average of 2 emails per month. After the study, they sent an average of 8 emails per month.

When interviewed, participants in the experimental group expressed that now that they had a better understanding of how email works, they are no longer afraid of having their email getting lost or going to wrong recipients. They also do not heavily depend on their children or grandchildren to tell them what to do when they encounter minor errors such as sending the email and forgetting to include the email address. They now realize such errors are common and easy to troubleshoot. In addition, some participants in the experimental group also convey their interest in learning more complex email tools such as sending pictures as attachments.

We found that 8 out of 10 experimental group participants successfully sent emails using Yahoo! Mail instead of Hotmail. This is a significant sign that they actually can transfer their knowledge and accomplish the same task using a slightly different application.
Interestingly but understandably, the participants in the control group did not show significant changes in their attitude towards email. During direct observation, the participants largely depended on the step-by-step instructions to write email. We observed increased anxiousness when some participants misplaced the instructions and declared that they would not try to write emails without having the instructions with them.

Family members reported that control group participants asked questions and required help at the same pre-study frequency, when encountering a situation that was not outlined in the provided instructions. The participants in the control group also showed reluctance and even resistance when asked to send emails using Yahoo! Mail. They felt insecure with the unfamiliar interface and were afraid to experiment for fear of making mistakes.

We conclude that participants in the experimental group were more likely to retain and transfer their domain knowledge. Having the seniors initially draw their own concept maps, then learn from our cognitive models and verbalize their thought processes while engaged in the activity of sending emails, proved to increase their understandings and device knowledge and allowed them to transfer their knowledge to novel situations.

**Proposed Design Solution**

Based on our study findings, we feel that a curriculum that makes use of cognitive modeling and abstraction would be the best approach to teach senior citizens the concept of web-based email and Internet basics. We suggest that children conceptually explain email to their parents in an abstract format rather than providing step-by-step instructions. We can help family members to do this by providing printable versions of concept board games and cognitive maps as a starting point for instruction. Children should first gauge their parent’s current understanding of email by asking them to draw or talk about their understandings and then build upon their existing domain knowledge.
Conclusion:
Because most senior citizens have not had to interact with today’s emergent and budding technologies during the course of their personal and professional lives, they are hesitant to assimilate the usage of the Internet into their lives. The Internet has become ingrained in most daily aspects for a majority of the population. Thus to keep up with family and friends, it would be advantageous for senior citizens to interact with the Internet, especially usage of web-based email to improve their communication with the rest of the world. Bearing in mind the changes that occur due to the aging process in cognitive abilities and vulnerability while interacting with other people and devices, it will be beneficial to create instructional programs and systems that will ensure senior citizens develop a concise mental model of how the Internet works. This abstract conceptualization of the workings of the Internet will elevate the understandings of senior citizens to a greater level of cognitive development, hence improving their chances of leveraging technology to meet their needs.

References:
