USABILITY TESTING REPORT

1. INTRODUCTION

The Sungale Model AA850 Digital Photo Frame (DPF) is an electronic device that is ideal for storing and displaying up to 600 photos in a small amount of space at home, school, or work. A Viewing Instruction Guide for the Digital Photo Frame was created to help the primary and secondary users upload, save, and display photos. The Viewing Instruction Guide was tested in a usability study to determine if the guide was effective in enabling the user to quickly and easily complete the basic operations. The study was video recorded and analyzed to identify potential areas for improvements to the instruction guide. The members of Maysenman Productions conducted the usability study. The study incorporated six versions of the Viewing Instruction Guide, a Usability Test Consent Form, Usability Pre-test Form, Moderator Script, Data Collection Form, and Usability Post-test Form. The Recorder and Moderator were present in the testing room with the participant during the study.

2. TESTING METHODS

Users

The primary users of the DPF are adults over age 50 or grandparents who receive the frame as a gift. The primary users are not technologically adept and are not familiar with camera cards and flash drives. They will use the DPF to display photos of family members, friends, and trips.

The secondary users are college students, young parents, or twenty-something-year-old business owners who purchase the DPF for themselves. The secondary users are technologically adept and frequent users of devices like camera cards and flash drives. They will also use the DPF to display photos of family, friends, trips, and additionally as an advertising medium for business products.

Three study participants were chosen from the secondary user group for this formal usability study. Constraints placed on the usability team restricted participant selection to fellow classmates. However, in an attempt to balance the validity of the study, two participants from the primary user group and one from the secondary group were used informally to test the DPF guide during the initial creation of the original draft of the DPF Viewing Instruction Guide.

Team Members

The usability team consisted of three members: Robin Andersen, Paulette Bowman, and Theresa Maynard. All team members input on each aspect of the study. Robin created the remote control graphic and instructions, wrote the post-test questionnaire, and participated in three group usability studies. Robin wrote the main draft of the Results and Conclusions portion of this report and transcribed the audio session. Paulette developed the creative and visual layout of the instruction guide, pre-test questionnaire, data collection form, and recorded the usability testing sessions. Paulette wrote the Title Page, consolidated and edited the final report sections, created the tables, and compiled the appendices in this report. Theresa tested and created the quick start guide instructions, usability study script, and consent form; she moderated during the usability

testing sessions. Theresa wrote the Introduction, created the DVD, and described the Research/Testing Methods in this report.

Objectives

This usability study attempts to determine where the Viewing Instruction Guide needs to be improved to increase usability.

To assess whether the guide was effective in instructing the participant in performing tasks, each participant was asked to use the instructions to do the following tasks:

- Prepare the DPF for use.
- Turn on the DPF.
- Insert the camera card or USB jump drive into the DPF.
- Upload, view, and save photos.
- Find and use the correct remote control keys to do the above actions.

To assess whether the guide effectively used appropriate terminology at the correct technology level, each participant was asked to rate these factors:

- Their understanding of the terms as used in the guide
- Their ease of relating the steps to the graphics in the guide

To assess whether the guide incorporated effective design elements, each participant was asked to respond as indicted below:

- Verbalize thoughts on the use of headings and the use of white space
- Verbalize thoughts on use and placement of graphics and icons
- Follow instructions in the guide as written and be observed on ease of locating information within the guide

Procedures

Two participants were videotaped by a digital camcorder during the formal usability test session. The third participant was audio-taped on a pocket digital voice recorder during the formal usability testing session. After the first two tests video tapings, the remaining battery power on the Digital Camera was insufficient for videotaping the third test, and a decision was made to continue the third test using audio only.

The digital camcorder was placed on a tripod about three feet from the testing area. The placement of the camera allowed for recording of the participant's facial gestures, spoken words, general demeanor, and actions. The third test involved placing the digital voice recorder on the table close enough to the participant to record the participant's voice clearly. The audio recording allowed the team to capture the spoken words and voice inflections of the participant.

In individual sessions, the moderator seated each participant at a table that was placed near an electrical outlet. The participant was asked to complete a Consent Form and a Pre-test Questionnaire. The moderator read the test script aloud to the participant then asked the participant to select from the six options of the Instruction Guide. After the participant selected a guide and explained his/her decision the boxed DFP was placed upon the table in front of them, and

they began to use the guide. The moderator encouraged the participant to think out loud to describe their thought process in these areas:

- What they are doing
- Why they are doing what they are doing the way they are
- What they are thinking about the instructions

The recorder used the Data Collection Form to record observations and participant's comments. A copy of the instruction guide was used to record user reactions like the following:

- What the participant was looking at when comments were made
- Where the participant was when encountering difficulty
- Which sections the participant used and which sections were ignored

After the testing portion, the participant was thanked for participating and given a Post-Test Questionnaire to complete. All documents were collected and stored by the recorder; these documents are available in the Appendix section of this report.

3. RESULTS

The usability team observed three participants, who shall be referred to as 001, 002, and 003, as they followed the Viewing Instruction Guide. Written feedback was also obtained from the supervisor (AKA Dr. Reyman). The following usability results are categorized according to general findings, responses to specific section of the guide, and the three objectives: performance, understanding, and design.

General Findings

All of the participants were from the twenty-something age group. Participant 003 did not consider herself to be very techie and was not familiar with either the camera card or the AC adaptors, yet she had no more trouble with the guide than 001 and 002, who considered themselves to be technologically literate. The only left-handed participant, 002, had the easiest control of the remote control. All participants worked well with both forms of instructions. See the following tables for more information.

	Personal Information		
	Male or Female	Left- or right-handed	Have PF Familiar with DPF
001	M	R	No/Yes
002	M	L	No/No
003	F	R	No/No

	Familiar with these Items			
	Camera Card	USB Flash Drive	Remote Controls	AC Adaptors
001	X	X	X	X
002	X	X	X	X
003		X	X	

	Works Best with these Instructions			
	Illustrated	Step-by-Step	Both	Never use
001			X	
002			X	
003			X	

Understands these Terms					
Save	File	Device	USB Flash Drive	Click	Select
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X

Response to Specific Sections of the Guide

Packing List of Items
The guide listed the items that should be included in the DPF packaging, and all three participants "verified that your Digital Photo Frame contains the following," but none of them read the complete guide before beginning. 002 commented, "This seems very professional, very thorough."

Directions for Attaching the Stand
All three participants were able to attach the stand. 003 initially put the stand on upside down. All the participants made the following comments on this section:
- Change "turn" to unscrew the large knob.
- Move "Lay DPF on [a] flat surface" to the beginning of the instructions.
- Improve graphics.
- Change the diagram to have an arrow going in only one direction.

Directions for Getting to Know Your DPF and Remote
This section includes two diagrams: the top view of the DPF ports display and the remote. 001 inserted the power cord into the wrong port. Although all of the participants liked the graphic of the remote control, they felt that the graphic needs to be sharper.

002 and 003 used the directions in the "learning about the remote" section. 002 read the directions aloud while looking at the remote control, and 002 read and practiced with the remote control. 001 missed the tip regarding aligning the remote control with the "eye" on the photo frame. 002 said this was a "great tip."

Directions for Showing Photos
The instruction guide repeats the remote graphic in the lower corner of this page and the two following pages. 003 liked this feature because it involved "no flipping back." 002 felt that the note about not needing to unplug the frame was obvious, "like any appliance." 003 felt that this sentence was inappropriate as "there is more to do." 001 thought that the numbers referring to the remote control diagram might be confusing.

Each subject used this section differently. 001 did not look at the media insertion diagram at all, and only used the USB flash drive without trying the camera card. Later he read the direction steps to himself. 003 read the directions aloud and felt that the term "USB flash drive" should be replaced with an easier term. 003 read through the first two steps of the direction before trying to insert the USB Flash Drive. Admittedly not a "techie," she was familiar with the terminology "USB flash drive". All of the subjects completed this section successfully.

Directions for Saving Photos
001 and 002 thought the note about maximum internal memory should appear earlier in the directions. 001 and 002 seemed confused by the directions in this section. This was brought up as a problem in an earlier section. Number references to buttons on the remote control diagram caused some confusion. 003 misunderstood the numbers in the steps to indicated the number of times a button should be pressed.

002 mentioned adding white space or screen shots to minimize confusion. All noticed that the frame gives no clear indication that the process has actually saved photos. 003 found this to be confusing. All participants were also confusion about what to choose during the copy process. All of the participants were able to complete this section successfully. 002 repeated the steps to "practice." 003 read through to step 6 before attempting the task and then read the remaining directions out loud. 002even shut off the frame in order to practice the first step, "power up."

Getting a Quick Start
All subjects were able to use the Quick Start successfully. 002 went through all of the directions a second time. All noticed a problem with the term "slide show" which should have been clarified.

Solving Problems
002 wanted more information on XD, SD, MMC, and MS and thought that the screen cleaning advice "good to know." 001 thought this information should have been located earlier in an earlier section of the instructions.

Understanding Terms
002 thought some of the definitions to be too simple. "[The] definition doesn't matter; [you] just need to use it." 001 already knew these terms and thought they would be somewhere in the box that the frame came in. 003 thought that this section should be situated at the beginning of the instructions.

Performance Objectives—Use of Instructions
The participants rated their ease-of-use for the following instructions.

Instruction Task	001	002	003
Preparing the digital photo frame for use	Average	Easy	Average
Turn on or power up the DPF	Average	Easy	Easy
Insert the camera card into the DPF	Easy	N/A	N/A
Insert the USB Flash drive into the DPF	Easy	Easy	Easy
Upload/save the photos	Average	Average	Easy
View the saved photos	Average	Easy	Easy
Using the remote	Average	Easy	Average
Following the steps	Average	Average	Easy

Understanding Objectives—Full Meaning of the Instructions
After the test, the participants rated their understanding of the technology and the technical terms used in the instructions.

Understanding	001	002	003
Understanding the terms	Easy	Easy	Average
Relating steps to the graphics	Average	Average	Easy

Design Objectives—Effective Strategies for Reading and Locating

After the test, the participants rated the use of headings, graphics, titles, labels, and other visual clues in the guide.

Design Elements	001	002	003
Readability of the fonts	Hard	Average	Easy
Usefulness of the headings	Average	Average	Easy
Usefulness of the tips and the notes	Easy	Easy	Easy
Seeing the remote control on each page	Average	Very Easy	Easy

Data Collection

During the usability session the recorder noted the following responses to the various tasks in the guide.

Task	001 Yes	001 No	002 Yes	002 No	003 Yes	003 No	Comments
Read the complete guide before beginning		X		X		X	No one read the guide completely before beginning
Checked the contents against the list	X		x		X		
Correctly installed the stand.	X		X			X	
Quickly attached the power cord			X		x		001 incorrectly attached cord
Inserted USB/Card easily	X		X		X		No one tried the camera card
Handled remote control easily	X		X		X		
Noticed the tips and notes			X		X		001 not always
Seemed to be confused frequently	X		x		X		002 just with saving function
Struggled with the instructions	X			x		X	001 had to reread b/c overconfident
Easily viewed from card							
Easily viewed from USB	X		X		x		
Easily saved photo		X	X		X		003 easily, esp. for not being techie
Easily viewed saved photos	X		X		X		003 very easily
Spoke out loud to self	X		X			X	
Seemed to enjoy the tasks	X		X		X		
Appeared to like the DPF	X		X			X	
Preferred the quick start instructions			x		X		002 Loved the quick start instructions
Referred to the Problem Solving section	X				x		003 Not for a problem, just to read
Had to look up terms		X				x	
Other							All had fun though appeared very intense and concentrating

4. CONCLUSION

The Viewing Instruction Guide for the Digital Photo Frame was created to help the primary and secondary users quickly and easily upload, save, and display photos. Was this guide successful? Yes, our participants successfully uploaded, saved, and displayed photos, but these tasks were not always done quickly. Based on the results of the usability testing we made the following changes. We expect the revised version of the guide to be much easier to use.

Recommendation	Justification	Action
Be aware that the user may not read the directions before beginning to use the DPF and will need to look back at the graphics and instructions.	A clear Table of Contents works for these folks who will want to easily find specific directions that they may have skipped over initially.	Added a table of contents to the front of the guide, enlarged the headings, and moved the page numbers to a more prominent position.
Be aware that the user may begin working with the frame and realize they don't understand a term.	A glossary of terms works better at the beginning of a document.	Moved 'Understanding Terms' from the end of the guide to the beginning.
Address the verbiage to the lowest common denominator of possible users.	In our case, this would be our primary audience of senior citizens with minimal technical knowledge.	Rewrote definitions to address someone with minimal technical knowledge.
Make sure that diagrams use graphics that are large enough to read with sharp and easy to view consistent labeling.	Our primary audience may also have vision difficulties or work in poor lighting.	Clarified the labeling on the graphics. Sharpened the quality of the graphics.
Increase white space where possible for easier reading.	White space draws attention to the graphics and text.	Increased white space and enlarged graphics by removing clumsy page numbers and lengthy instruction steps.
Reconsider the function of a Quick Start Guide.	A quick start is necessary for the user who is technically savvy and does not need lengthy explanations. The quick start should be at the beginning of the guide where the user will find it quickly not at the end after they have tried to use the frame.	Placed the true Quick Start instructions at the beginning where they will be a quick start. Left the simplified instructions at the end for reference after the detailed instructions have been used and understood.

One surprise finding concerned the remote control. The participants liked the graphic on each page so that they could easily refer to the numbers which corresponded to each key on the remote. We removed the numbering system and replaced it by using only the name of the remote control key. Now the user does not have to refer to the diagram in order to understand the remote, but can just look at the remote control. With no need for the diagram on each page, we have more white space and room to space out the instruction steps.

Summary of Dr. Reyman's Recommendations with Actions

The following recommendations made by Supervisor Dr. Reyman were incorporated in the final version of the DPF. Note page numbers on the final revision differ from the original.

Section	Recommendation	Action
Cover Page	▪ Add either overview of contents or a table of contents	▪ Added a TOC on the inside cover.
Page 1	▪ Put page numbers in a header or footer rather than in green oval text box. ▪ Define technical terms. ▪ Mention that the frame can be hung on a wall.	▪ Page numbers were moved to the more prominent the upper right-hand corner. ▪ Definitions were rewritten. ▪ Added a hanging option to setting up the frame.
Page 2	▪ Move tips and notes further the right. ▪ Make the remote diagram clearer. ▪ Keep the list of remote keys and functions.	▪ Moved the tips and remove the terms "tips" and "notes." ▪ Rescanned the remote and renamed the labels. ▪ Kept the list, but eliminated the numbering.
Page 3	▪ Move the note about plugging in the frame closer to the beginning of the document. ▪ Add "Where images are stored" after "media devices in page 3, no.1. ▪ Add "into the frame" after "flash drive" on page 3 no. 3. ▪ Condense the steps on page 3. ▪ Eliminate "you may or may not choose to unplug the frame."	▪ Move the note. ▪ Tried this but it really made the directions less stream-lined and more confusing. ▪ Same as above. ▪ The steps were greatly reduced and some were combined. ▪ Changed to not necessary to unplug the frame when not in use.
Page 4	▪ Remove the remote icon from each page. ▪ Explain advantage of sending files to the frame's internal memory. ▪ Clarify numbering on remote diagram. ▪ Clarify if you can select more than one file at a time. ▪ Review the difference between "tips" and "notes.	▪ Remote is only on one page. ▪ Added explanations in two places. ▪ Removed the numbering. ▪ Don't know if you can do this. ▪ Removed the words "tips" and "notes".
Page 5	▪ Specify the function of "Quick Start." ▪ Explain when to use each of the functions. ▪ Combine shorter steps.	▪ Moved the real quick start to the beginning of the guide and change the titles on the others to viewing. ▪ Change this, see above. ▪ Combined and shortened steps in the showing and saving sections.
Page 6	▪ Define "correctly stored" on Page 6 under "Photos do not appear." ▪ Suggestion to rewrite Definitions in simpler language.	▪ Eliminated and changed. ▪ Added more information with less jargon.

Overview	- Like the use of color. - Like "strong" the overall organization. - Need explanations for some novices by defining terms and providing explanations with the steps (i.e. what is "internal memory"?)." - Suggest that the guide "provide more info on why users would want to use certain functions or perform certain actions. What will it allow them to do with their photos? One way to do this is to create short intros to each section of the instructions. - Confused by "some labeling and referencing of images; they are not obvious enough."	- Kept most of the color except the bubbles with the page numbers. - Rearrange some of the order. - Added explanations. - Added lengthier headings to each section. - Enlarged section heading labels.

APPENDIX