



Enhancing the Visitor Experience: National Museum of the American Indian

Formative Evaluation Results: Round One: Usability Test
By Unified Designs, Group 1

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Introduction

This report summarizes the results of a formal round of usability testing that Unified Designs conducted to identify enhancement opportunities within our prototype mobile application designed to address educational opportunities at the National Museum of the American Indian (NMAI). We created the prototype to enhance the visitor experience at NMAI by providing an additional depth of information not available in the museum itself and interactive, augmented reality experiences to entertain and inform visitors.

Focus of the Testing

We had two main issues that we wanted to explore in this round of testing:

1. *Navigational Features*
 - a. How intuitive do users find the navigational features of the prototype? Do users get lost? Are the navigational controls confusing or out of place?
2. *Tours*
 - a. How easy do users find it to create and launch a tour? Are there aspects of creating a tour that the prototype does not address, yet would be beneficial?

Sample Method

We recruited participants who represented our previously developed personas, beginning with a screener survey. We gave potential participants a blog address that introduced the usability test, provided a brief overview of the screener process, and provided a screener survey for individuals interested in participating. Surveys were reviewed for both demographic and motivational characteristics to ensure users fit the target audience. After signing a human testing informed consent form, participants were observed and interviewed by a team member, and the session was recorded either by audio or video. We used a crafted script to guide each session and ensure consistency. The tests were performed synchronously, either in person, or via web-conferencing or via conference call. Each team member provided the team lead detailed notes, audio/video recordings, and an overview of their general observations of the test.

NOTE: the blog address, informed consent form, and the usability test script are included in the appendices at the end of this document.

Participants

Charles

Charles is a 25-35 year old male who lives in Virginia within an hour of the NMAI. He uses an Android Razor smart phone. He uses mobile apps on a daily basis for social networking, gaming, information-seeking (e.g., sports news), and trip planning (GPS/maps). On a scale of one to five (one being not interested, and five being very interested), Charles rated his interest in Native Indian Culture a three. He

has visited NMAI twice, and overall he visits museums about five times a year. When visiting museums, he often attends with others; sometimes attending with a person under the age of 10. Charles visits museums for personal, professional, and academic reasons. Charles has never used a mobile application to enhance a visit to a museum.

Marcie

Marcie is a 25-35 year old female who lives in Virginia within one hour of the NMAI. She uses a Samsung Galaxy Smartphone. She uses mobile apps on a daily basis for social networking, GPS/maps and information-seeking applications (i.e. real estate.) On a scale of one to five (one being not interested, and five being very interested), Marcie's interest in Native Indian Culture is ranked at a three. She visits museums several times a year, mostly for personal reasons and normally with family members; including family under the age of 10. Her visits are for personal reasons. Marcie visited NMAI once with family. Marcie has never used a mobile application to enhance a visit to a museum.

David

David is a 51-70 year old male who lives in Virginia within one hour of the NMAI. He owns a Samsung Galaxy Smartphone. He uses mobile applications daily for social networking, gaming, reading and music downloads. On a scale of one to five (one being not interested, and five being very interested), David's interest in Native Indian Culture is ranked at a five. David averages one museum visit per month. David's visits range from personal, professional and academic reasons. He often visits museums alone and with family members; some family members are under the age of 12 years old. He has visited the NMAI once. David has never used a mobile application to enhance a visit at a museum.

Catherine

Catherine is a 25-35 year old female who lives in New Jersey more than 3 hours away from the NMAI. She owns an iPad. She uses mobile applications for gaming and social networking. On a scale of one to five (one being not interested, and five being very interested), Catherine's interest in Native Indian Culture is ranked at a four. She visits museums twice a month with family members. Catherine's visits are primarily for personal reasons. She has never visited the NMAI. She has never used a mobile application to enhance a visit at a museum.

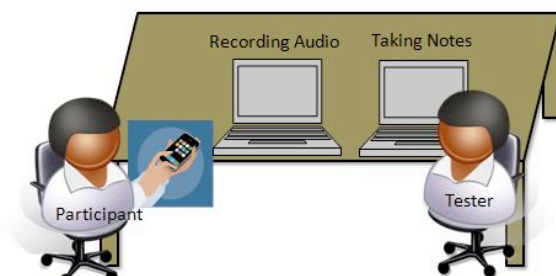
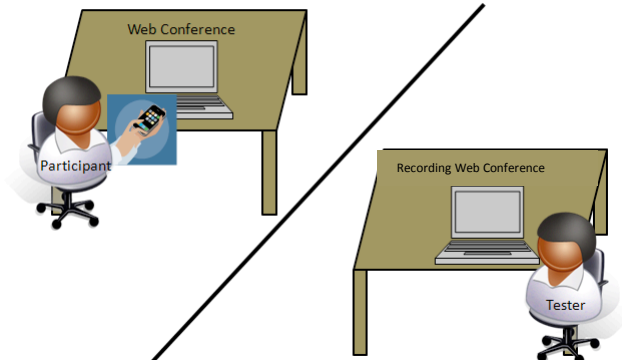
Robert

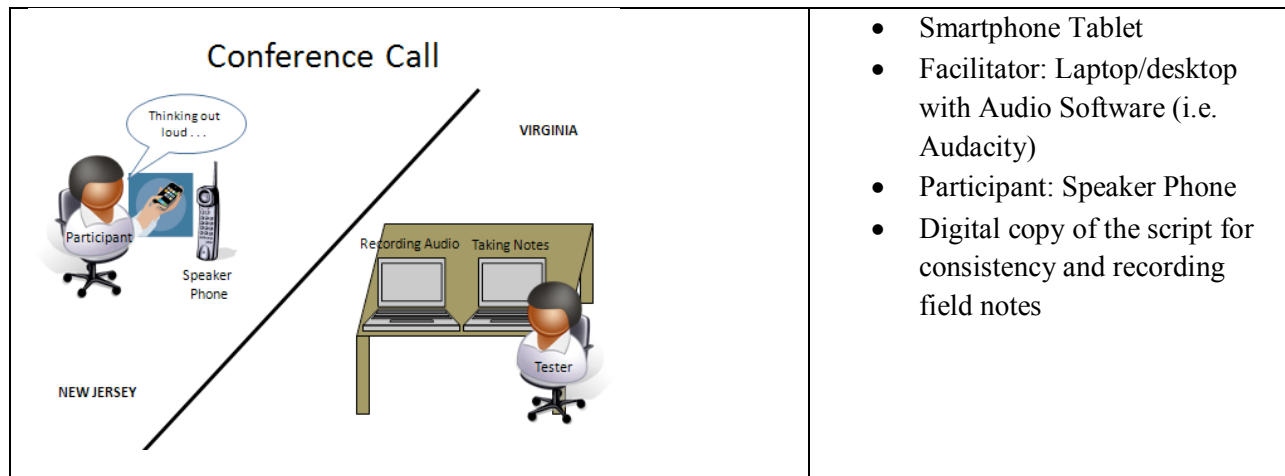
Robert is a 51-70 year old male who lives in MD within one hour of the NMAI. He owns an iPhone. He uses mobile applications for email, gaming and news (i.e. stocks, newspapers, etc.) On a scale of one to five (one being not interested, and five being very interested), Robert's interest in Native Indian Culture is ranked at a three. Robert visits museums about four times a year. His visits are primarily for personal reasons. Robert has never visited the NMAI. He has never used a mobile application to enhance a visit at a museum.

Materials

We conducted our usability tests in various locations as they were convenient and available to us and our participants. Each participant provided his or her own smart phone or tablet, ensuring that the participants' familiarity (or lack thereof) with the device did not affect results. We determined what

recording equipment would be needed for testing based on the location of the participant and the facilitator's access to hardware and software. The following diagrams represent our recording setups.

	Materials
<p style="text-align: center;">Same Location</p> 	<ul style="list-style-type: none"> • Quiet room • Smartphone or Tablet • Facilitator: Laptop/desktop with Audio Software and a microphone (e.g., Audacity) • Digital copy of the script for consistency and recording field notes
<p style="text-align: center;">Web Conference</p> 	<ul style="list-style-type: none"> • Smartphone or Tablet • Facilitator: Laptop/desktop with webcam and microphone • Participant: Laptop/desktop with webcam and microphone • Digital copy of the script for consistency and recording field notes



Testing Procedures

Evaluation Methods

We used Morrison, Ross and Kemp's formative evaluation method as the guide for our testing process. For more details on our execution of the eight phases of Morrison, Kemp and Ross' formative evaluation process, refer to Appendix A: Usability Test Planning, which is a high-level overview we prepared in the initial stages of test planning to guide the process.

We conducted pre- and post-test interviews with the participants, as well as direct observation during testing. Surveys and interviews with participants will provide the feedback necessary to evaluate the current state of the NMAI app regarding the initial issues to be address in round one of the usability testing.

The chart below lists the five tasks users were asked to complete during the usability test.

Tasks
Locate five objects of interest (Objects menu).
Locate a regional dish offered on the café menu and discover an object from the same region (Café and Objects menus).
Given a list of objects, create and launch a custom tour (Objects and Tours menus)
Check the calendar for events of interest scheduled during an upcoming visit (Calendar menu)
Share an object of interest with your online social community (Community menu)

If we were successful, the data we collected will provide unbiased responses from testers regarding the effectiveness of the navigational features and the “tour” functionality of the app.

Observations

General Observations

1. During the interface review, all the participants liked the graphics, colors and photo choices representing the options available within the prototype.
2. For most participants, the Community icon is the only icon that did not clearly convey its purpose.
3. Three out of five participants noticed inconsistencies in layout throughout the prototype.
4. The drop down menu was not used by participants when performing tasks and its function was not obvious to at least one participant.
5. At times, participants were misdirected by incorrect links within the prototype or confused to find themselves taken to external web sites.
6. Participants noticed inconsistencies in the object menu. Some objects were not listed by name, but by type or theme. This was a distraction during testing.
7. The social networking element of the prototype was well received, but participants were confused when accessing the functionality from an object-level page. They anticipated a more granular level of interaction than liking NMAI on Facebook, for example. There was some confusion as to what level they were interacting on: the museum's social networking presence, or their own.
8. The buttons on some of the pages were either too small or too close to the edge of the screen. This caused some participants to have to increase their number of touches to get to where they were going.

Tasks

Locate Objects of Interest

Participants had no trouble locating items for this task. The main issue within the prototype is the 'All Objects' page opens up to the middle of the alphabet. Although this task did not go into detail regarding the information pages for each object, participants noted it was not clear where some of the links would take them. In addition, not every object page looked the same, was laid out the same, or provided the same options.

Locating Food and Objects by Region

Participants responded positively to the menu options available within the prototype. Participants also liked the ability to view menu by regions; which is how the food stations are arranged in the Mitsitam Cafe. When asked to locate object from the same region as their menu choice, few participants found the objects link presently located at the bottom of the menu page. Three of the five participants found food by region through the Objects icon on the Main Menu. All participants found objects by region. Yet this task was not achieved easily or achieved by the shortcut created within the 'Food by Region' Menu option of the prototype design.

Customized Tour

This feature was well received by participants. Many feel the process is intuitive. Yet as each item was saved to the tour, there was no way to view the list of items added to the tour until the tour was launched. In addition, some participants were unclear on how to launch the tour once it was created, mostly due to labeling (i.e., Current Tour vs. My Tour vs. Launch Tour.) Inconsistent layouts were also mentioned

during the tour creation process, and at least one participant requested the ability to launch the tour from the Objects area.

Calendar of Events

This task was successfully and easily completed by all participants. Font size was mentioned by one participant. The option to sync the calendar to ones' personal calendar was well received.

Social Networking

Participants liked the concept of communicating with 'friends' about an NMAI experience. Most participants chose the Facebook option. Many participants were surprised to be directed to NMAI's page versus their own. The option to 'Like' the museum was accessible through the prototype, but not to share items within the community. One participant requested the 'check-in' feature for the NMAI similar to the application "Get Glue."

Quotations

Participant	Quote	Analysis
Charles	"If I wanna share something, I want to share it, not click like."	Currently, the Community page only lets you visit the blog and social media sites connected to the museum.
Marcie	"I would never think to look at or use a mobile application about a museum before I attended. I would be doing my trip planning and research on a PC."	This comment goes to the nature of the application itself and the habits of mobile application users. She goes to her mobile phone to locate a specific piece of information as quickly and conveniently as possible. We need to really think about how the AR experiences will be integrated with the application and vice versa, because this indicates that a lot of users may access the app first via an AR experience.
David	"Your tasks seemed pretty straight forward, yet this was a controlled customer acceptance test. You group should be sure to perform some form of customer acceptance test allowing participants free range to wander the app."	We have made some progress on building of the prototype. Yet we need to focus on how to 'truly' customize a tour or perform a real search so users can have a true customized experience with the prototype. If we do not build it, we should at least conceptualize the process in writing/framework.
Catherine	"I don't like typing on a touch screen."	This quote is a classic mobile usability response, and it confirms our approach of minimizing typing is valid.
Robert	The app "looks very cool, very slick. Nice. Easy to see and grabs your attention"	This validates our efforts to create a visually pleasing and intuitive prototype. This is a notable quote because he mentioned it several times during the usability test.

Recommendations

The following recommendations will be reviewed by Unified Designs. Upon final review necessary revisions and additions will be made prior to the final round of formative evaluation.

1. Page layouts need to be uniform. {i.e. Lacrosse Stick item versus Acatlan Bow and Arrow} Users should be able to locate the same functions/features in the same spot on each screen whenever possible.
2. Each page should offer the option to return to the home screen, and if we retain the context menu, it needs to be more obviously labeled.
3. We need to remove as many of the links to external web sites as possible, and replace them with app content.
4. Object pages need to consistently depict items on the same level (i.e., the Object level). In some cases this is a labeling issue (i.e., 'Oglala Lacota Headdress' versus 'Sioux' as noted on the All Object items page.)
5. Community/social networking feature should allow users to 'share' in addition to 'like' and item or event.
6. We should consider minimal instructions for selected features within the prototype the first time they are used, with the user having the option to dismiss them thereafter.
7. Cafe: Objects by region link needs to be placed in a prominent place for users, or its purpose more clearly conveyed.
8. One the pages which simulate or hint at Augmented Reality features, we need to do a better job of giving the user the control to go back or access the “flat” portion of the application.
9. Conceptualize or create true item search and customize tour capabilities within the prototype to allow users to have an authentic customized visitor experience at the NMAI.

Future Actions

The next steps for Unified Designs will be to revise the prototype to address layout issues and create a way for the search feature/tour with authentic customizable functionality. This will be followed by a second round of formative evaluation. At this time, Unified Designs is finalizing its process for the next round of user testing.

Appendices

Appendix A: Usability Test Planning

This idea is based upon the formative technique by Morrison, Ross & Kemp (*The Essentials of Instructional Design, Connecting Fundamental Principles with Process and Practice* by Abbie Brown & Timothy Green.)

Their approach is as follows:

- Phase 1: Purpose
 - Determining the evaluation purpose
- Phase 2: Audience
 - Determine the type of information that needs to be collected and reported
- Phase 3: Issues
 - Determine the issues to be addressed
- Phase 4: Resources
 - Determine who and what your resources are going to be
- Phase 5: Evidence
 - Determine what the types of evidence that are needed to address the issues (What does the evidence look like...)
- Phase 6: Data Gathering
 - Determine the data gathering techniques
- Phase 7: Analysis
 - Analyze the data to provide usable and useful information that will help to improve instruction
- Phase 8: Reporting
 - Create the Executive Summary that outlines the major findings, conclusions and recommendations

With this in mind, I think that Phases 1 can begin with the final presentation we gave at the end of last semester. As we review feedback from last term, we can move into the other phases.

My thoughts on a time/task line:

1. Update the prototype to include last term's detail
2. Supply answers for Phases 2-5
3. Perform Phase 6-7 with the earlier phases in mind (Formative Evaluation #1)
4. Update the Prototype based on the analysis from Phase 7
5. Revise/update the answers from Phases 3-5
6. Perform Phases 6-7, again (Formative Evaluation #2)
7. Update Prototype based on Phases 7
8. Perform Phase 8

This is a high-level overview and there are steps within each phase that we would need to discuss. Yet I hope the document will help to convey our project plan.

Appendix B: Recruitment Process

Recruitment Plan

{The following plan was created as a guide for the recruitment process. Use the following blog address to review the final product noted below; <http://unifieddesigners.wordpress.com/>}

- Recruiting Requirements
 - Recruiting should consist of individuals that fit the characteristics of the persona group from our previous research. Great care must be made to ensure the motivation of the accepted participants include the following variables.
 - Interest in Native American Culture
 - Desire to increase their use or continue their use of their iPhone as a tool for learning
 - We may want to consider finding individuals who have used the Natural History Museum's App. Input by these individuals who have already had experiences with the use of apps in a 'museum learning context' can contribute valuable data. Using their past experience using an app in a museum can be a foundation for how they may use our app in the future. They will already know how well certain features worked and did not work as it relates to their learning style and learning experience.
 - These participants maybe located through inquiry through the internet and blog comments on websites like yelp: <http://www.yelp.com/biz/national-museum-of-natural-history-washington>
- Screening Criteria
 - Data from our persona charts will be used as the foundation for our screening. It should be within these characteristics that we will search for participants.
 - Requires foundational characteristics are individuals:
 - who own and use their iPhone as a tool for learning
 - with academic interests in Native American Culture
 - who currently engage in lifelong learning both formally and informally
 - who are first through fifth time visitors to NMAI (focusing on visitors who are familiar and unfamiliar with the museum; addressing the visitor experience enhancement for various types of visitors)
 - individuals looking to connect personal interests with Native Indian cultures
 - Characteristics that are nice, but not required (demographic data will be collected, but not the basis of our screening):
 - individuals traveling with family members; including children
 - business professionals who are live or work locally
 - college students or professors who have academic interests/requirements on the topic
- Screening Script
 - Prescreening Process:
 - Set up a blog to introduce our group, EDIT 752 Project Details, and screening requests; including a Unified Designs email address.

- If blog viewers are interested, they can answer 5 prescreening questions and 3-5 demographic questions via an online form that is automatically emailed to our Unified Designs email address. The prescreening questionnaire will be created in Articulate Quizmaker uploaded to the internet and results will be emailed to the Unified Designs via the internet.
- Prescreening questions are:
 - Demographic Focus
 - What is your name?
 - What is the best way to contact you? Email or phone? Please leave email address and/or phone number.
 - What state do you live in?
 - Do you live within one hour of the National Museum of the American Indian?
 - How old are you?
 - 18-24
 - 25-35
 - 36-50
 - 51-70
 - Motivation Focus
 - Do you own an iPhone?
 - Do you currently use apps in your everyday life? If so, how often (daily, twice a week, three times a week or more)
 - Do any of your apps used to gather content?
 - Do you use any of your apps to plan trips or events?
 - On a scale of 1 to 5, (1=no interest, 2=little interest, 3=neutral, 4=some interest, 5=high interest) how do you rate your interest in Native American Indian culture?
 - Have you ever visited the National Museum of the American Indian in Washington DC?

Appendix C: Informed Consent Form

Title of Research: National Museum of the American Indian (NMAI) Mobile App

Investigators: Gloria Barron, Tangier Bates, Heath Huff, Katherine Phillips, Ying Wu (GMU Instructional Technology Graduate Students)

Before agreeing to participate in the usability test, it is important that you read the following explanation of below. This statement describes the purpose, procedures, benefits, and precautions of the program.

Explanation of Procedures

You are being asked to participate in a usability test to investigate a newly developed mobile app design for users to be able to navigate and create their own tours within the Smithsonian's National Museum of the American Indian. This app could be potentially used to help visitors successfully navigate the museum to enhance their enjoyment of the experience and create an ideal learning situation for all.

You will be asked to complete certain tasks within the mobile app prototype and answer some questions about your experience using the app, plus what you think could be improved in the app.

Video/Audio Recording

You will be recorded via audio and/or video during the usability test. These images are not for public view and will be used for research purposes only.

Risks

You will not be at physical or psychological risk and should experience no discomfort resulting from the usability test.

Benefits

There are no direct benefits by participating in this usability test. However, this test is expected to yield knowledge about the designed app and will be used to develop a better product based on your suggestions.

Confidentiality

All information gathered from the study will remain confidential. Your identity as a participant will not be disclosed to any unauthorized persons; only the researchers and those involved with the NMAI Mobile App project at GMU in EDIT 752 (the class this study is being conducted for) will have access to the research materials. Any references to your identity that would compromise your anonymity will be removed or disguised prior to the preparation of the research reports and publications.

Participation

Participation in this study is voluntary; refusal to participate will involve no penalty. Each participant is free to withdraw consent and discontinue participation in this project at any time without prejudice from this institution.

Questions

Any questions concerning the usability test, please contact by email: unified_designs@hotmail.com

Agreement

Your signature below indicates that you agree to participate in this study.

Signature of Subject: _____ Date: _____

Subject name (printed): _____

Appendix D: Usability Test Script

Introduction

Unified Design Rep (UDr):

Thank you for taking the time to participate in our usability test! Your feedback will be invaluable as we improve and streamline our prototype, which is in the early stages of development.

This evaluation should take about 40-45 minutes.

We will record our observations via audio and/or video; this is for analysis only. This will allow me to concentrate on our discussion and capture all your feedback. My entire team will view these recordings to ensure your opinions are accurately represented. This is strictly for our research, and the recordings will not be used in any way otherwise.

{Go over informed consent form...make sure you have their copy with you; soft or hard copy.}

Before we begin, it is standard procedure to go over your rights as a participant of this kind of research. As a participant in this research:

- You may stop at any time.
- You may ask questions at any time.
- You may leave at any time.
- There is no deception involved.
- Your answers are kept confidential.

Any questions before we begin?

Preliminary Questions

{5-10 minutes: Begin Audio/Video recording}

First, we'd like to know a little more about your experiences with mobile applications and museums.

Mobile Application Questions:

- How much time do you spend using mobile applications on your Smartphone or tablet?
- What are some of the mobile applications you use frequently?
- What do you like most about those mobile applications?
- What you like the least about those mobile applications?

Museum Visitation Questions:

- How often do you visit museums?
- Do you visit museums for personal, professional or academic purposes?
- Do you visit museums alone or with others? If you visit with others, please specify who.
- When visiting a museum, what types of things do you like to discover?

Mobile Applications & Museums:

- Have you ever used a mobile application while visiting a museum? If so, please describe that experience.

- While visiting a museum, have you seen others using a mobile application? If so, can you describe your thoughts on what you observed?

Participant Tasks

{15-20 Minutes: *Note to Facilitator: Ask participant to use their own personal mobile device to perform the following tasks.*}

Task 1

Before we get any further, I have to let you know that this prototype is strictly a class project, copyrighted by Unified Designs. We have not been in the employ of, under contract with, or compensated by the National Museum of the American Indian (NMAI) or the Smithsonian Institutions at anytime during this process.

This is the icon for a mobile application for the National Museum of the American Indian (NMAI.) By clicking on the icon, you access the main home page. Before we start on initial tasks, we'd like to know your initial reaction to this page.

- Please give me your initial impressions about the layout of this page and what you think of the color, graphics, photos, etc.
- Without touching/clicking on anything yet, please describe the options you see on the home page and what do you think they do.
- Without clicking on anything yet, if you were exploring this application on your own, what would you click on first?
- What do you think is the purpose of this mobile application?

As you perform the following tasks, please share your thoughts out loud so that we can learn about your reactions. These tasks have no right or wrong answers. We truly desire to know your reactions to the prototype.

Task 2

There are hundreds of objects to discover at NMAI. In an effort to discover some of the objects on display, locate five individual objects within the application.

When you feel you have completed this task, please say so.

{ When necessary, do not forget to remind participant to share their thoughts out loud as they go through the entire task. }

Task 3

You consider yourself a lover of unique cuisine. Locate a regional dish on the cafe menu and an object from the same region.

When you feel you have completed this task, please say so.

{ When necessary, do not forget to remind participant to share their thoughts out loud as they go through the entire task. }

Task 4

You are interested in the learning about objects invented by Native Indians for the Western Hemisphere. With your list of known inventions {below}, locate each object, save it to a tour and then launch the tour.

1. Lacrosse
2. Kayaks
3. Snow Shoes
4. Totem Poles
5. Tipis

When you feel you have completed this task, please say so.

{ When necessary, do not forget to remind participant to share their thoughts out loud as they go through the entire task. }

Task 5

You are planning a trip to Washington, D.C. the week of April 1-7. View the details of the events taking place during your visit.

When you feel you have completed this task, please say so.

{ When necessary, do not forget to remind participant to share their thoughts out loud as they go through the entire task. }

Task 6

You are at NMAI, and you want to let your friends know about one object you saw at the museum. Locate an item of personal interest and share it with the community.

When you feel you have completed this task, please say so.

{ When necessary, do not forget to remind participant to share their thoughts out loud as they go through the entire task. }

Post Test Interview

{10 Minutes}

- What is your overall impression of this mobile application prototype?
- If you had to give this prototype a letter grade from A to F, where A was exemplary and F was failing, what grade would you give it, and why?
- What aspects of the prototype did you like best?
- What aspects of the prototype did you like the least?
- If you could change any aspect of the mobile application, what would it be and why?
- Would you recommend this mobile application to a colleague? To a friend?
- Do you have any other questions or comments about the mobile application or your experiences with it?

These are all the questions I have for now. If you have any other thoughts or ideas on your way home or tomorrow or even next week, please feel free to send an email to unified_designs@hotmail.com {provide hard or soft copy of Unified Designs' contact information.}

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Contact Information

For additional details regarding the usability test and results, please contact Katherine Phillips, Team Lead and member of Unified Designs at unified_designs@hotmail.com.