
Team Fantasia P3

System Prototype and Evaluation Plan

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Introduction

After the completion of P2, we analyzed the feedback we received at the poster session. After carefully evaluating the pros and cons of each system, we decided to implement “Whale Tale.”

“Whale Tale” is an interactive narrative presented through a wearable computing device and the user’s personal mobile device or home computer. The user can interact with the narrative in two ways: online or offline. Online interactions will take place when the user interacts with the narrative on their home computer or their personal mobile device. A typical online interaction will involve the user completing several in-game missions, with the help of recycled materials, to save aquatic creatures from peril.

Whale Tale *An Orson the Orca Adventure Game*



Orson is a backpack connected to a mobile device, who is the child’s guide through the game



The child scans recyclables which are used as in-game items after the real-life items are recycled



As the story progresses, the child learns the habits of recycling while helping Orson through the levels

Offline interactions will incorporate the wearable device into the narrative flow. The user will wear the wearable device, either as a backpack or wristband, to help them complete collection missions. A typical offline mission will have the user search the environment for a specified recyclable item and scan that item into the wearable device’s memory. Once the system knows the item has been recycled, the item will be transformed into an in-game power up.

We reviewed the requirements for the prototype and we realized that we needed to develop the narrative further. The “Whale Tale” system we had chosen to implement was largely narrative based. We decided to think of similar story arcs to incorporate in the game.

While brainstorming for P2, we generated several alternate narrative arcs. One we liked was the story of an alien who needed recycled materials to rebuild his mothership. We decided to develop this particular story further and create a game level system for it.



Another common theme that our reviewers wanted to see expanded was a social element to the game. Our reviewers felt “Whale Tale” was engaging but lacked a competitive social element to keep users involved. Taking this advice to heart, we incorporated a competitive social element into the “Galactic Voyage.”

While researching for P3 we found that reusing items is more effective than recycling. The feedback we received from “Design Cycle” indicated that creating items out of recyclable materials was something that potential users would want to see. We incorporated this feature of creating an item into our on-screen narrative so crafting became an important game element.

Usability Specifications

After we had finalized the design for our system, we needed to specify how exactly the users would interact with the system. For this, we needed to specify some constraints and parameters to define the ease of use of the system.

Below are the usability standards of our system:

1. Low Learning Curve:

1. Since the system is meant to be a game for user, the learning curve should not be too difficult.
2. The user should be able to easily understand how to use the scanner feature of the game since that is what drives the story forward.
3. There should be a small task/level at the start of gameplay to help the user understand this feature, and to test their knowledge about the same.

2. Predictability and consistency:

1. Once the user learn how to use the scanner and navigation, the system should be consistent, so that the user can navigate.
2. The tasks should be clear, logical and understandable, so that the user don't spend too much time understanding the navigation.

3. Engaging Narrative:

1. The narrative is what immerses the user in the game. This requires striking a fine balance between entertainment and education.

2. The game should be interesting and not too complicated. At the same time, it should not be so easy that it becomes boring.
 3. The user should easily be able to understand the game and the rules involved.
4. Reduce Human Memory Requirements:
1. The narrative should be seamlessly tied to the tasks given to the user in such a way that the user does not need to remember how to navigate through the game.
 2. Scanning a recyclable item should lead the user directly to the next level efficiently.
5. Positive Feedback:
1. Upon error made by the user, such as scanning the wrong item, feedback should be prompt. The feedback should not demotivate user from playing further.
 2. The user should be able to recover from these errors easily and these errors should not hamper the user's interest in the game.
6. Incorporate teaching:
1. The system should teach the user various details about recycling and reusing.
 2. While doing so, the feel of the game should not be lost and the system should not become preachy.
 3. The user should be encouraged to actually recycle and reuse through the gameplay itself.

7. Multimodality:

1. The game involves a multi-modal gameplay: using the videos to drive the narrative forward and dissemination of tasks, and using the scanner to get user responses and record completion of tasks.
2. The two modes of interaction in the system should be clearly defined and their purpose understandable.
3. The videos, the audio and the annotations used in the videos for navigation should amalgamate properly.
4. The multimodality of the system should enhance task performance and increase user's involvement in the system.

8. Accommodate disabilities:

1. The system is largely based on the narrative, which includes videos that move the story forward.
2. These videos should be subtitled so that they are accessible for people with hearing impairments.
3. These videos should be descriptive, incorporate audio cues, and be accessible to blind individuals.

JUSTIFICATION

1. **Low Learning Curve:** Since this system is primarily dealing with children, we needed to make sure that every aspect of it was simple to pick up and play. Characters in the narrative tell them when they need to use the Recyclo-scanner (QR Reader). At the end of each video, there is also a mission briefing listing the tasks they are assigned to do before progressing to the next level. Furthermore, our menu system was reiterated multiple times in order to display all the important informa-

tion in a simplified way. We let them know when they're logged in through the information displayed at the top, and have grayed-out buttons to let them know that they're not currently able to select that menu item.

2. Predictability and Consistency: We stayed with a restricted color system and utilized it to highlight specific items. Items that are either headers or important information glow orange, whereas regular information glows blue. If an item is touchable, there is always a rectangle around it to show that it is a button and can be interacted with. Furthermore, if a button can't be currently selected, the button is grayed out so it is clear the items isn't currently able to be interacted with. Since our narrative is a Sci-Fi adventure, menu items were created with a distinct style that felt appropriate and consistent with a futuristic tone.

3. Engaging Narrative: Since children don't always have the longest attention span, we wanted to make sure we created a fun story with interesting characters. With this in mind, we believed that a Sci-Fi story with special effects could catch a child's eye and keep them interested in continuing the story. Furthermore, we did not want to make it serious, so humor was another aspect that was important for our prototype. The main character, Eten, is a lighthearted character who is serious about his mission, but is a somewhat clumsy character and enjoys light things like piggy banks (see Scene 3 of the prototype for further elaboration). The supporting characters, including Dryad (the hologram) and Orson the Orca flesh out the story with their own personalities as well.

4. Reduce Human Memory Requirements: Our system is designed in a way that when a child scans in an item, they are automatically taken to the next part of the story. In addition, they are not required to remember their task, for there is a mission briefing at the end of each video. Once an item is scanned in, not only is a recycling fact provided, but they are also reminded by Dryad (the hologram) what their current task is. He will say something along the lines of "Good Job, did you

know that [recycling fact]. Also, don't forget that you need to also scan in cardboard and an aluminum can to continue." Again, we wanted to provide this information to the children through the narrative rather than text overload on our interface. This helps further develop the child's relationship with the characters.

5. Positive Error Feedback: We wanted to make sure that if a non-recyclable material was scanned in, the child was told so and asked to try again. We make sure that they don't feel like they've made a terrible mistake that puts the characters in danger, so Dryad (the hologram) says "Whoops! The item you just scanned in isn't actually recyclable. No worries though! Please try again." Also, there is a "Main Menu" button that overlays the top left of the videos. When a child presses the button, it takes them to a confirmation screen asking if they are sure they want to go to the main menu. The screen also informs them that their progress will be saved if they return to the menu. That way, if a child accidentally hits the Menu button, they can return to the video if it was an unintended action.

6. Incorporate Teaching: One of our initial design criteria was teach but not preach. This was very much an "easier said than done" task, however we tried to incorporate themes in a more subtle way that made sense in the context of the narrative. The closest we get to preaching is providing a recycling fact that is provided when the child scans in an item. Other than that, we don't explicitly say "Recyclable items are put into individualized bins." Rather, we designed it to justify what happens in the game. For example, sorting items into the appropriate bins "boost the signal strength" so the child can work with Dryad to find Eten when he is lost.

7. Multimodality: Utilizing both the videos and the scanner was important for us when designing this system. Our system explicitly tells children when they will be using the scanner so as to not make them guess when they should be using the scanning function. Not only is this to encourage children to actually pay attention to recyclable materials, but also to make them feel like they are making an ac-

tual difference and helping out the characters in the game. Anybody can watch a movie, but if the viewer helps drive the journey and provide characters with the resources necessary to carry on, the immersion factor grows.

8. **Accommodate Disabilities:** We have provided subtitles for each video with dialog in it. We wanted our system to be accessible by a large audience of children, so adding subtitles supports those with hearing impairments. Not only does including subtitles allow the hearing impaired to use our system, but it also permits our system to be used even in loud environments when the user can't hear the videos.

Description of the Prototype

HISTORY OF THE PROTOTYPE

The history of our current prototype is paralleled by the adventures of Orson the Orca. The feedback we received from the reviewers in P2 was strongly positive towards Orson as a character and a peripheral. Reviewers found that he was a cute, relatable character that contributed an air of Pixar like charm to the narrative. While we appreciated the feedback about Orson, we found that he represented an oceanographic theme that was too limiting.



The narrative of “Whale Tale” was given critical review. We found the oceanographic theme interesting, but ultimately limited which creative directions we could take. Essentially, we could only go down into the depths of the ocean with this theme. After watching movies, titillated by sports playing animal films, we decided that having a whale as main character was also limiting. Simply put, Orson was not strong enough to carry the plot as he could not leave the ocean.

Seeking inspiration elsewhere, we decided that a science fiction theme would provide more opportunities for a diverse, coherent narrative. We could create a scanning device that seamlessly merged with the interactive narrative we were writing. The science fiction genre allows us to teach recycling without being obtuse.



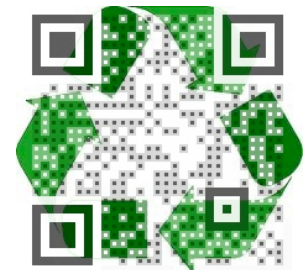
Thus “Galactic Voyage” was born. The science fiction narrative allowed us to teach user about recycling without coming off as cutesy or userish. Orson the Orca was placed in a supporting role, allowing us to incorporate oceanographic or other environmental themes. The narrative lends itself to a diverse range of prototypes incorporated with the story.

PHYSICAL PROTOTYPE

Our physical prototype is comprised of a touch screen computer, QR codes, and various recyclable items. The user will primarily interact with the touch screen computer to interact with the in-game menus and missions. Using the touch screen,



the user will be able to access the QR scanner application. A variety of physical recyclable items will be tagged with unique printed QR codes. We divided the items into categories by mission, to prevent the user from skip-

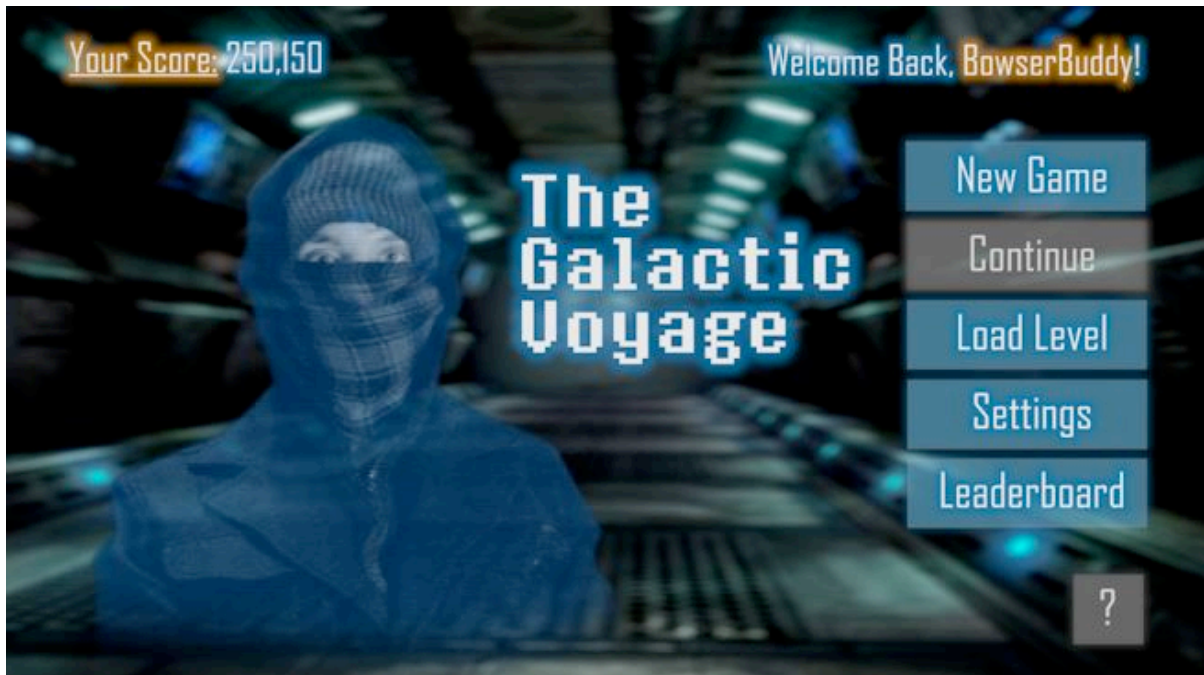


ping ahead or repeating part of the narrative. Each sub-mission will have a designated box of recyclable items used during the course of the sub-mission. Colorized QR codes are used as auxiliary means of distinguishing items by level.

“THE GALACTIC VOYAGE”

The user will interact with “The Galactic Voyage” game using the provided touch screen computer. The game is comprised of two primary interactions; a video narrative and on-screen instructions. The video narrative is used to keep the user interested in recycling by providing exciting visuals and relatable characters. From a narrative perspective, the user is the main character’s sidekick. This provides us with a convincing means of explaining the importance of recycling without coming off as preachy.

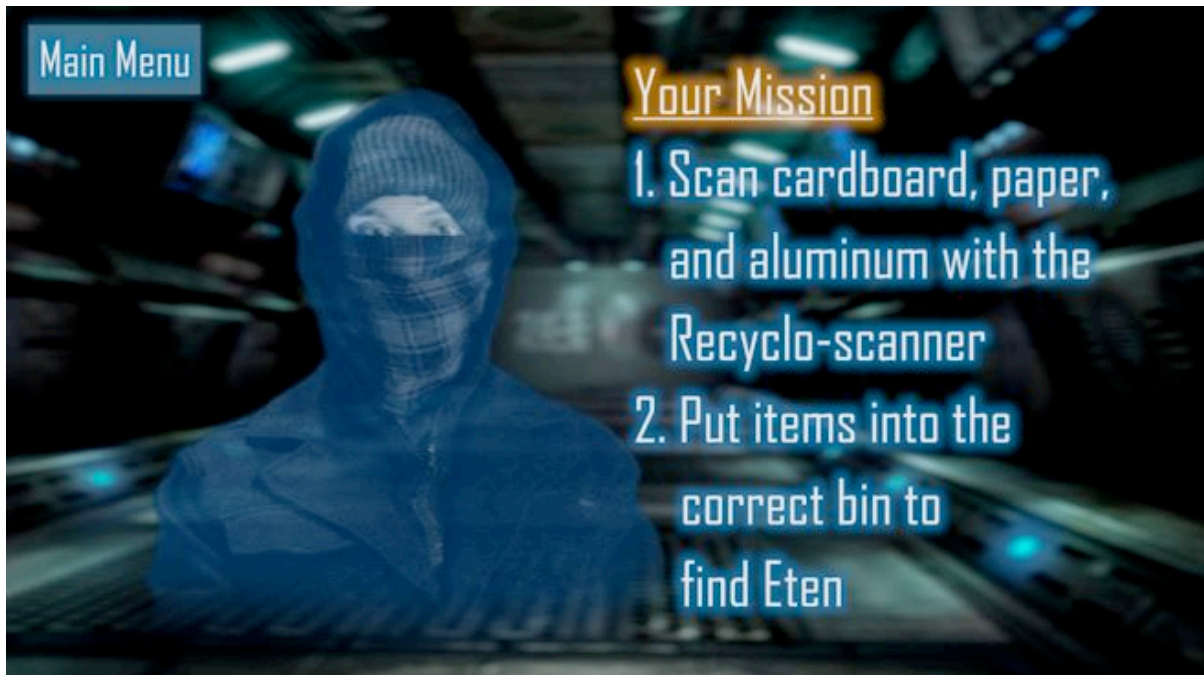
Due to technical limitations, we rendered the menu system using Adobe Premiere and overlaid those menus using the Youtube annotation systems. This combination of tools keeps the menu icons in scalable fixed positions on the screen.



The annotations (not visible in the picture) allow the user to navigate between the

video portions of the game.

The second portion of the interaction is following the on-screen instructions. The user will be promoted by on-screen video to complete a task.



Please see appendix 4 for complete video listings.

Benchmark Tasks

We identified the four following benchmark tasks necessary to produce a functional prototype. We consider these task crucial to our prototype's success as these are tasks the user will have a high likelihood of engaging in. The five categories of benchmark tasks we will be testing are: Menu Navigation, Recycling Behavior, Scanner Use, Understanding feedback.

MENU NAVIGATION

The first category of benchmark tasks is broadly termed menu navigation and is subdivided into the following subtasks: Save, Pause/Continue, Change brightness, Login, Find the Scores and leaderboard, Return to previous menu from video, and Go to main menu from game. These tasks are to be performed before the user starts playing the game

RECYCLING BEHAVIOR

The purpose of this benchmark is to test if the user will recycle and if they will place the proper item into the corresponding bin. We will observe the user during the testing to see if they recycle items into the bins provided, without verbally prompting the user to do so.

The purpose of this task is to demonstrate that the user has learned to recycle items into the proper bins.

SCANNER CALIBRATION

The use of the “Recyclo-scanner” is an essential part of the game and one of the major interactions users will have with the system.

The purpose of this task is twofold. First, we want to see if the user can use the scanner, and if the user understand the purpose of the scanner and how it fits into the game. Second, we want to test if the scanner function is working prior to testing. This stage allows us to preemptively diagnose if a user failed to complete their task because the scanner did not work.

UNDERSTANDING FEEDBACK

Our system will provide feedback throughout the game in the form of short videos. These videos provide instructions on the next tasks the user needs to complete or if they have made an error. This benchmark task is meant to show if that a user can understand if the feedback that the system is giving them.

Evaluation Plan

EXPERT REVIEW

Before any testing involving real users, we will conduct expert review on our system. We will use a hybrid approach of Heuristic Evaluation and Cognitive Walkthrough, by combining task scenarios with heuristics. We will invite 3-5 master students and professors in the Human Computer Interaction program or relevant fields and ask them to evaluate our system by using the following steps:

1. Overview of the problem we are solving and the solution: our system
2. Explain who our users are and their goals
3. Define the tasks they will be performing with our system
4. Ask the experts to walkthrough the tasks step-by-step through the lens of the users (if the language make sense to them, what are the likely path they would take)
5. Ask the experts to identify problems for each benchmark task (see Benchmark Task section) based on the set of heuristics we provided
6. Ask the experts to specify problems and rate the importance and severity of each problem, also propose possible design fixes

We combined usability guidelines and heuristics from many sources, as well as our usability specifications. Below is the list of heuristics we will be using:

- **Visibility of system status:** Do the users know the status of the system and where they are in the interaction flow at any time?

- **Match between system and the real world:** Are our users familiar with the language, concepts and metaphors in the system? Do they follow real world conventions? Do they know if the buttons are clickable?
- **User control and freedom:** Are users able to explore the system freely in a controlled environment? Does the system allow some degree of freedom, rather than forcing them on a fixed path? Are users able to undo and redo their actions?
- **Consistency and standards:** Are the interface, layout, color scheme, fonts and terminology of the system consistent?
- **Error prevention:** Does the system prevent user making mistakes, such as forgetting to save game progress?
- **Recognition rather than recall:** Are the information users need to use the system visible and easily retrievable?
- **Flexibility and efficiency of use:** Does the system support the usage both of novice and expert users?
- **Aesthetic and minimal design:** Are the information clear to see for the users? Are there distracting colors and words? Is the system stimulating and appealing for user?
- **Help users recognize, diagnose and recover from error:** Are they able to recover from mistakes? Do they know what caused the error when it happened?
- **Help and documentation:** Does the system provide adequate help on how to play the game? Does the system provide adequate help for the navigation of the system?

- **Human Limitations:** Will the interface overload the user's cognitive, visual, auditory, motor limits?
- **Learnability:** Is the system easy to use? Is it easy to learn how to play the game for the user?
- **Incorporate Teaching:** Will the system teach user recycling knowledge? Will the system reinforce the recycling behavior? Will the system encourage users' recycling behavior outside the game?
- **Engaging:** Is the game attractive and engaging enough for the user? Is there a fine balance between the education element and entertainment element?
- **Accessibility:** Is the system accessible to people with disabilities? Does the system follow principles of universal design?
- **Predictability:** Can users perceive what each button, menu, control does by looking at it?
- **Encouraging:** Does the game encourage the users to keep trying when they fail a task in the game? Is the game at the appropriate difficulty for the users to keep users interested and not get frustrated?
- **Modal Integrity:** Does the interface fit individual tasks within the modality being used

We will collect the feedback from our expert review and improve and fix any big issues with our prototype before the usability testing involving real users.

Usability Testing

STAGE 1

After giving an overview of the study to the user and parent, the first stage of our usability study is the training of the users. The purpose of this stage is to help the user become acclimated with the system and to catch any critical errors in using the scanner. In addition we will also go over the quirks of the prototype, and what the current prototype was not able to realize. So they know what to and what not to focus on when they interact and evaluate our system.

We will also explain that, because of the way our prototype is set up, they will be using a touchscreen laptop rather than a mobile device, and they will need to switch between the YouTube app and the scanner app during the game.

The users will be asked to scan a sample QR code that leads them to a website (our blog). We will be testing for their response time and accuracy.

In the real system, the training and tutorial will be integrated into the application, and will be shown when the user play the game for the first time. The help and tutorial will also be available anytime through the main menu.

The user will then be asked to perform a series of tasks with the menu structure.

How would you log into the system?

How would you check your score?

How would you check your friends' scores and ranking?

How do you adjust the music settings?

How do you look for help on how to play the game?

How do you load a particular level?

How do you change the video settings?

How do you start a new game?

How do you continue with a saved game?

How do you save the game and exit the system anytime you are in the game?

We are measuring the number of errors made by the user when navigating the menus and their response time.

The user will be tested on the following tasks in this stage. They will be asked to login to the system and change the screen brightness to a setting they feel comfortable with. Once the user has navigated the menu system, they will be asked to scan a sample QR code. We will call this a scanner calibration task. Calibration tasks are common in gaming systems, so we predict that the user will not be distracted by this task. Additionally, this task allow us to know if the scanner is working, preemptively ruling out user incompetence.

STAGE 2

The second stage of our evaluation plan is to let the users play the game. We chose 3 different recycling tasks for the users to perform with our prototype: identify recycling items, sorting recycling items, and reusing recycling items by doing crafts. We will set up our controlled testing environment into 3 stations, each representing a level of the game. Our prototype will have instructions to guide the user through each level.

Level 1

The first level intends to teach students about what materials are recyclable. When doing the usability testing, we will lead the users to our first station. The first station will contain a recycle bin and several recyclable items and several non-recyclable items including: plastic bottle, glass bottle, paper, aluminum cans, styro-foam, coffee mugs, etc. Each item will have a QR code attach to it for the users to scan. Our prototype will ask the users to scan 3 recyclable items using the “Recyclo-scanner” to help the character in the game. If the users scan a non-recyclable item, the system will tell the users so, and encourage them to try again. If the users scan a recyclable item, the system will give an interesting fact about the recyclable item.

First, we will be testing the time users need to complete the task and the number of errors they made. Second, we will test the reinforceability of the recycling behavior using our system. We will observe if the user will complete the recycling task by putting the recyclable material inside the recycle bin as instructed by the system. Third, we will also observe if the users understand the feedback provided by our system, such as “please recycle 3 items to advance to the next level” and “this item is not recyclable, please try another item.”

Level 2

At the second level, we aim to teach the users about sorting the recyclable. The set up for station 2 is similar to station 1 but with 3 different recycle bins representing plastic, paper and cardboard. Our system will ask the users to scan in recyclable items and sort the them by put them in the correct bin.

Like Level 1, we will be evaluating the following aspects of their performance: First, we will record the time they used to complete the level and the number of errors they made. Second, we will observe whether they will follow the instructions and out the recyclable materials into corresponding recycle bins. Third, we will

also evaluate if the users understand the system feedback when they succeed or fail at a task.

Level 3

In level 3, the system aim to teach the users about the reusing and repurposing of recycled items. According to the storyline of our prototype, the main character will ask the user to make an piggy bank using recyclable items. Our set up for station 3 will have all the materials to make the piggy bank, including plastic bottle, paper, glue etc; In addition we will provide the instruction to make the piggy bank. But in our final system, the instructions will be included as part of the game.

We will be testing the time they used to complete the level and the number of errors they made. We will also be evaluating if the users understand the instructions: making a piggy bank and scanning the piggy bank to continue the game.

SURVEY

For our Usability Testing, we will conduct surveys to understand the effectiveness and usability of the system. Please see Appendix for the complete survey questions.

Pre-test Survey: We will distribute the survey prior to letting users interact with the system. The survey includes questions about the demographic information of the user and their recycling habit, as well as several questions to test their recycling knowledge. The answer to these questions will be embedded in the game.

Post-test Survey: After the user have completed the game, we will conduct the post-test survey. This survey includes subject questions (Likert scale) to see how much they enjoy the game and the likeliness that they will use the system again in the future. The survey will also include the same recycling knowledge questions to test if they have learned any recycling knowledge from playing the game by comparing

their performance on the recycling knowledge questions before and after they use the system.

Parents Survey: After the user complete the game, we will also conduct a survey on the parents since they have been observing their user during the study. Since they know their user the best, we hope to get more insight from them.

Conclusions

Our design, called “The Galactic Voyage ,” teaches user ages 8 to 11 about the importance of recycling. This system includes a QR scanner, Youtube videos and various recyclable materials. The user must identify various recyclable materials in the environment by scanning them with a QR reader and disposing of them into the proper bins. Since we did not have time or resources to develop a high fidelity prototype version of our system, we focused on specific tasks that were platform independent. Future iterations of prototypes will allow us to focus on platform specific benchmark tasks.

For the purpose of this evaluation, the user will interact with “The Galactic Voyage” on a touchscreen computer. This interaction modality allows the user to complete the benchmark tasks consistent across our target platforms. Future versions of the prototype on mobile platforms will address interactions on smaller touch-screens.

The design process is one of constant iteration, implementation and evaluation. During this phase of the project we learned there is no such thing as an ‘average user’ and that our testing methods could be limited by the testing platform. While we can find educational measures that say what our users should know, we

cannot assume this is always the case. It is unwise for us to assume all our users are on the upper end of the age range or the lower end of the range. Furthermore, a user could be on the lower end of our age range but the upper end of the knowledge range.

We also learned that testing on mobile platforms presents limitations about the features we could test in a low fidelity prototype. Youtube does not support annotations on mobile platforms, which rendered our video menu work irrelevant. This forced us to make a choice if we wanted to test mobile capabilities or the menu navigation. At this stage of the iteration, we felt that knowing how users interacted with our menus was more critical.

APPENDIX 1: PRE-TEST SURVEY

How old are you? *

What's your gender? * (Radio Button)

Male

Female

What grade are you in? * (Radio Button)

3rd grade

4th grade

5th grade

6th grade

Other:

How often do you recycle? * (Radio Button)

Everyday

Once a week

Once a month

Never

I don't know

Other:

Recycling one ton of paper saves? (Radio Button)

10 trees

17 trees

13 trees

3 trees

Other:

Which of the following items are recyclable (Check Box)

Plastic bottles

Paper

Glass

Cans

Cardboard

Coffee Mugs

Styrofoam

Aluminum Cans

Which of the following material is 100% recyclable? (Radio Button)

Paper

Plastic

Aluminum

Glass

Which of the following statement is false? (Radio Button)

Americans make enough plastic every year to shrink-wrap New York

We should separate glass into different colors when recycling

Every Sunday, United States wastes 90% of recyclable newspapers

Every month, Americans throw away enough aluminum to rebuild all of our airplanes

What makes up 1/3 of all the garbage that most people throw away?

(Radio Button)

Plastic

Glass

Paper and cardboard

Styrofoam

APPENDIX 2: POST TEST SURVEY

How much did you enjoy the game?

Likert scale (1 Not Important--5 Extremely Important)

Did you learn about recycling from the game?

Likert scale (1 Not Important--5 Extremely Important)

Did you have trouble figuring out how to play the game?

Likert scale (1 Not Important--5 Extremely Important)

Did you understand the story?

Likert scale (1 Not Important--5 Extremely Important)

How likely are you going to use recycled items to make arts and crafts?

Likert scale (1 Not Important--5 Extremely Important)

How likely are you going to play this game again?

Likert scale (1 Not Important--5 Extremely Important)

Was the game difficult or easy to complete?

Likert scale (1 Not Important--5 Extremely Important)

How likely are you going to play this game again?

Likert scale (1 Not Important--5 Extremely Important)

Was there anything in the game that was confusing to you?

Check Box

If you answered Yes in the last questions, what was confusing to you?

Text Box

Which of the following statement is false? (Radio Button)

- Americans make enough plastic every year to shrink-wrap New York
- We should separate glass into different colors when recycling
- Every sunday, United States wastes 90% of recyclable newspapers
- Every ton of paper that is recycled saves 17 trees

Recycling one ton of paper saves? (Radio Button)

- 10 trees
- 17 trees
- 13 trees
- 3 trees
- Other:

Which of the following items are recyclable (Check Box)

- Plastic bottles
- Paper
- Glass
- Cans
- Cardboard
- Coffee Mugs
- Styrofoam
- Aluminum Cans

Which of the following material is 100% recyclable? (Radio Button)

- Paper
- Plastic
- Aluminum
- Glass

Which of the following statement is false? (Radio Button)

- Americans make enough plastic every year to shrink-wrap New York
- We should separate glass into different colors when recycling
- Every sunday, United States wastes 90% of recyclable newspapers
- Every month, Americans throw away enough aluminum to rebuild all of our airplanes

What makes up 1/3 of all the garbage that most people throw away?

(Radio Button)

Plastic

Glass

Paper and cardboard

Stryofoam

APPENDIX 3: PARENT'S SURVEY

How important is it to let your user learn about recycling?

Likert scale (1 Not Important--5 Extremely Important)

From your observation, did your user enjoyed the game?

Likert scale (1 Not Important--5 Extremely Important)

Do you think your user had any difficulty understanding how to play the game?

Likert scale (1 Not Important--5 Extremely Important)

Will your user improve recycling knowledge and develop recycling habit from playing the game?

Likert scale (1 Not Important--5 Extremely Important)

Do you have any suggestions for us to improve our system?

Text Box

APPENDIX 4: VIDEO LINKS

Main Menu Not Logged In: <http://www.youtube.com/watch?v=IXVkf2nLIGw>

Main Menu Logged In: <http://www.youtube.com/watch?v=qGPzfN4AX-A>

Main Menu Confirmation: <http://www.youtube.com/watch?v=5pLw-VKDXgQ>

Settings: http://www.youtube.com/watch?v=fPX9UtxE_Us

Leader Board: <http://www.youtube.com/watch?v=B2Wx2k1IUzE>

Load Level: <http://www.youtube.com/watch?v=XLafE2n7ffY>

Scene 1: <http://www.youtube.com/watch?v=HugUiVLWhYE>

Scene 2: <http://www.youtube.com/watch?v=AFdn3vQ3DI4>

Scene 3: <http://www.youtube.com/watch?v=q0Kyr3OwZOM>

Scene 4: <http://www.youtube.com/watch?v=9-kiqPrH3T0>

Glass fact 1: <http://www.youtube.com/watch?v=3vPM7rzYC9I>

Cardboard fact 1: http://www.youtube.com/watch?v=Oux_sJQOZCI

Cardboard fact 2: <http://www.youtube.com/watch?v=uTxPB5cEaQM>

Paper fact 1: <http://www.youtube.com/watch?v=LOJND06SzHI>

Paper fact 2: <http://www.youtube.com/watch?v=WdbfPUCwY54>

Aluminum fact 1: <http://www.youtube.com/watch?v=Ozdd-SHqQG8>

Aluminum fact 2: <http://www.youtube.com/watch?v=IMLhFtienH8>

Not Recyclable: <http://www.youtube.com/watch?v=dqaMb6yDOQo>