Engaging Children in Environmental Activities
Phase 4: *Experimental Analysis*

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CS 6750 – Prof. Bruce Walker
December 3rd, 2008

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1. Introduction

Triple R for Now has gone through several phases of research. The first involved researching the current state of Recycling, Reducing, and Reusing (from here-in, 3R) in America. The following two phases related to researching several design alternatives, and developing a prototypical system for evaluation. For this fourth phase of the research, children of the middle childhood age range (9-11) were invited to play in a game environment which was designed to be both fun and educational. The system was intended to be used at home and in classrooms; however, it was tested in a controlled lab environment. The results from this experimental phase confirm the efficiency of the system, and inform how design can be improved to better suit the intended audience.

2. Design Process Review

Phase 1: Understanding the Problem

Over recent decades, the world started seriously recognizing the necessity of Reducing, Reusing, and Recycling. With this understanding came the realization that humanity is responsible for what it consumes and throws away on this planet.(J1)

As awareness of conservation needs for the planet rise domestically and internationally, it is time to inform children about these issues and involve them in related activities. This needs to be done in a fashion that will effectively develop long term and informed behaviors. Educating children about 3R will build this habit through emotional, social, and cognitive development. This learning experience will be a milestone for them: building solid concepts and understanding about sustaining the planet responsibly. (J2) Therefore, the primary goal for the project is creating a system for children to modify a long term behavior and attitudes towards 3R activities. The activities should encourage children to have fun and inspire them to engage the topic.

The focus for this project is children from nine to eleven years old. This range is defined as "Middle Childhood" by the Center for Disease Control and Prevention (J2). This particular age group begins to develop strong relationship with friends; children become more independent. They understand the concepts of cause and effect. On the other hand, positive parenting is strongly encouraged, e.g., helping them to construct a sense of right and wrong, responsibility,

or setting goals (J2) Children are typically involved in a variety of activities: creating, remixing (applying one's own creativity to another's creation), sharing, participating, and communicating. In a healthy environment they are encouraged to learn, teach, and exchange feedback with other children. The final medium for this project would synthesize these activities with Reduce, Reuse, and Recycle concepts.

Kids face a variety of influences in making these choices. They are at the age when they are making a fair number of their own decisions and have well-formed preferences and interests, but restrictions imposed by parents can still be a huge factor. Friends also have a large influence on choices at this age, both by introducing them to new options and by the pressures of whatever happens to be popular at the time. (J2)

Engaging Children in Environmental Activities implies a complex relationship between the middle childhood age group, their parents, peers, and formal education. To create a system and interface that is truly beneficial; it must be fun and interesting enough to cause the child to voluntarily seek out its use. It must be easy to use, and have long term effects. This can be accomplished by creating a system similar to those that currently exist. However, it would take all the relevant virtues and compile them into one entity. The feeling of participation involved in a political social network, the fun of playing a game and discovering something new, as well as the education similar but more dynamic than to what is found in the modern classroom. A system that can perform effectively in those fashions that achieves the tasks of helping children develop Reduce, Reuse, and Recycle behavior and engage them in environmental activities would be a success.

Phase 2: Design Alternatives

Alternative 1: Space Earth Tube

Three alternative designs were developed within four disciplines: easy to use, fun, easy to integrate, and effective.

The first design alternative is Space Earth Tube. It provides children with visible feedback for recycling activities in a public space such as a school, public library, or public garden. The main physical design parts of the tube consist of Plexiglas box and a touch screen monitor. Tubes serve for storing recyclable materials. Each tube is made from clear Plexiglas and the transparent feature allows kids to look at what items are inside. Therefore, children can see the accumulation of recyclable materials and each tube has its own categorized label. The shape of the tube of can be produced in a variety of forms. The tube is formed in the shape of a school mascot, such as a spaceship, lion, eagle, cougar, chunk of cheese, or Spartan. The artistic design

invites children to develop an emotional attachment. The Spaceship Earth Tube displays a touch screen monitor which offers various quantitative data and reports about the recycled materials. This way, children recycle materials and are informed about what the effects are on the environment.

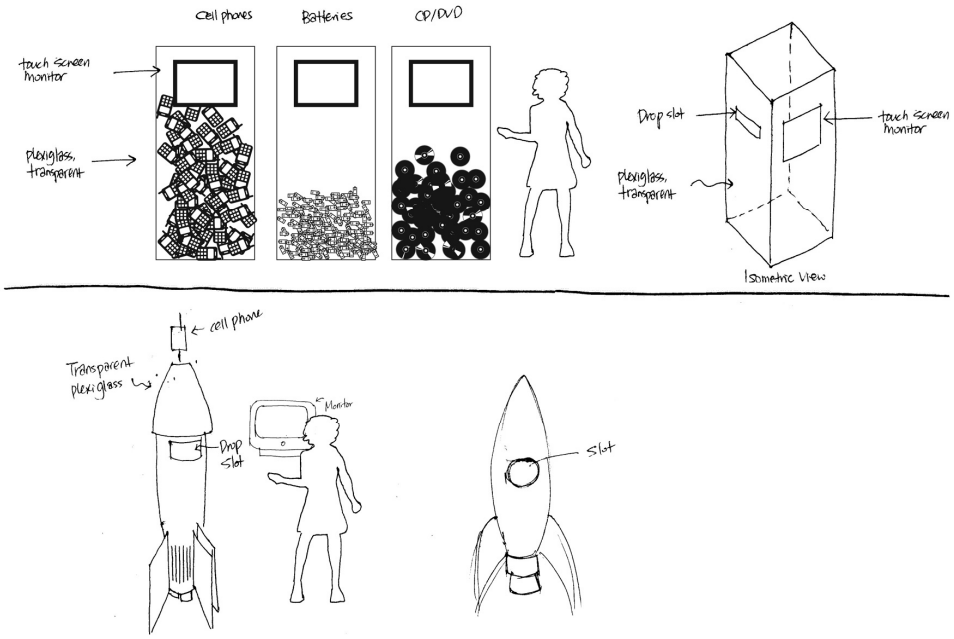


Figure 1. Space Earth Tube Alternative

Alternative 2: Virtual Game Environmentalism

The Virtual Game Environmentalism is a multi-layer gaming system which promotes environmentalism through entertainment activities. Users inhabit a virtual world affected by each other's recycling activities. Each user owns a home and is able to engage in various games, receiving points and prizes.

This system is a web-based environment composed of various layers. At the lowest level is a set of mini-games, designed to provide the system's immediate appeal and lasting fun. The middle level of this system is the so-called "Home Space". This is a small persistent world, personalized by each user, in the form of a house or other small physical space. In this space, the user gets persistent and immediate feedback from their progress in the games.

At the highest level, the game includes various features for encouraging a sense of community and collaboration. At this level, the system can track global progress and show users how much they can accomplish when their efforts are combined.

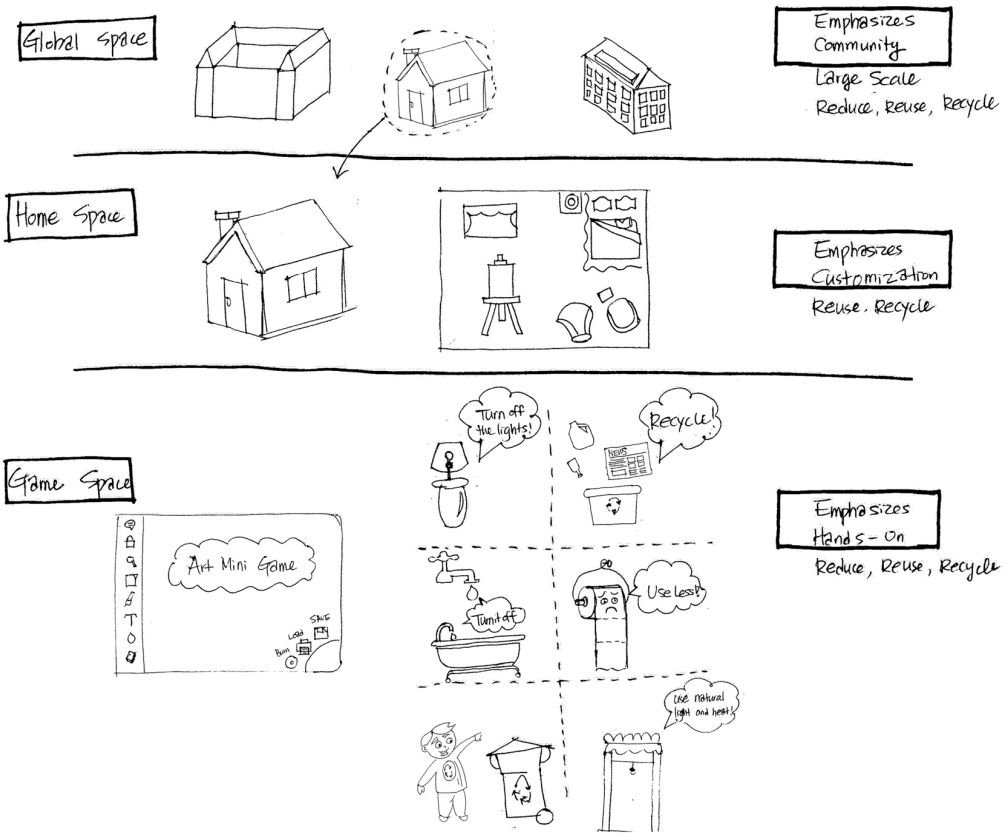


Figure 2. Virtual Environmentalism Alternative

Alternative 3: Recycling Rangers

Recycling Rangers is a socio-technical system designed to increase children's involvement in 3R activities. The physical components of the system are Recycling Ranger Stations and Recycling Ranger Badges. The physical components of the system are Recycling Ranger Stations and Recycling Ranger Badges.

The Recycling Ranger Stations reside in public spaces typically accessible by children, such as school cafeterias. The station allows children to deposit recyclable materials in exchange for points which can later be redeemed. The interface also allows children to see how they compare to others in their recycling activity. Finally, children can receive feedback on how much "green" impact was caused by themselves and their school. The station is implemented as a kiosk designed to be accessible by children, which contains a touchscreen, slots for inserting materials, and activity indicators for each type of material. Internally, the station contains an RFID tag detector for identifying badges, which is called, a Bluetooth chip for communicating with the detected badges, and a wireless network card for communicating over

the Internet with other kiosks. The system will also be remotely accessible through the Internet, such that children can gain points for recycling activities outside of school.

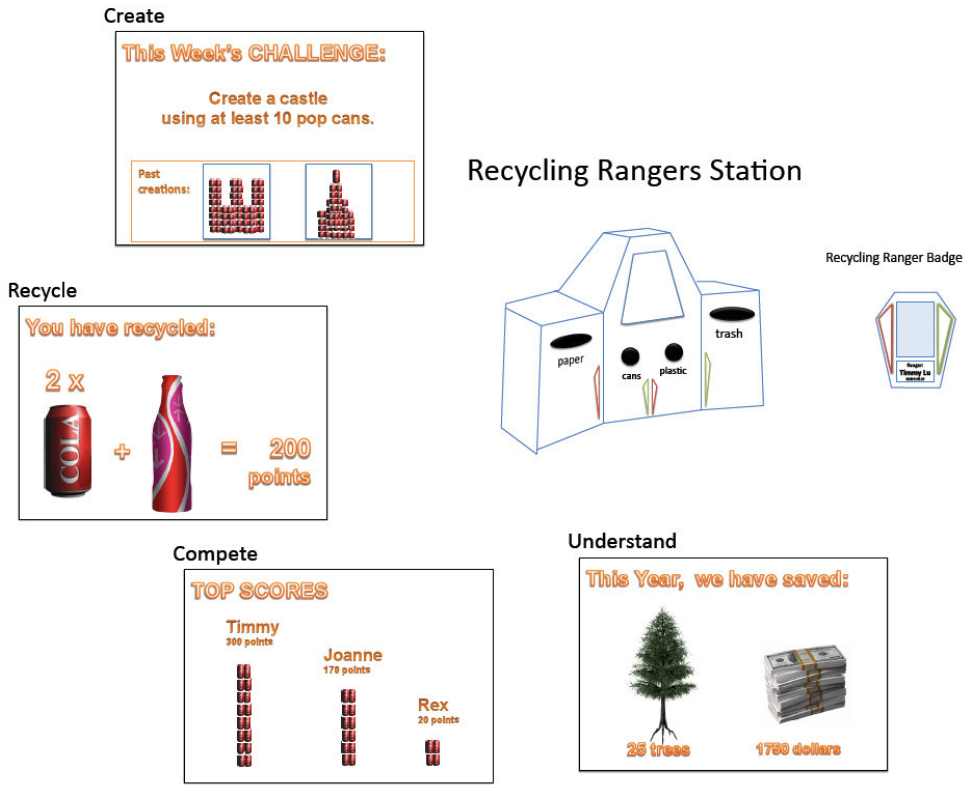


Figure 3. Recycling Rangers Alternative

Review of Design Alternatives

From the poster session, Triple 3 for Now received copious feedback and two of these alternatives were found to be potentially successful. Alternative 1: Space Earth Tube was considered easy to implement, but its cost to create could have been high. Also, Space Earth Tube is more of a industrial design problem than a human computer interaction. Alternative 2: Virtual Game Environmentalism was thought to have potential value for keeping children captivated in an entertaining environment; however, it was unclear whether it would have any real-life effects. Alternative 3: Recycling Rangers was thought to be potentially valuable for engaging children in reallife activities; however, it was unclear whether it would be captivating or entertaining enough, and whether local schools and businesses would be willing to participate in this system.

As a result, we have decided to pursue a system which is a combination of two alternatives: Virtual Game Environmentalism and Recycling Rangers. The system has both virtual and real-

world components; the virtual component is a video game designed to entertain and captivate children, while the real-world component consists of recycling activities intended to engage children in real-life behaviors.

Phase 3: System prototype

The virtual component of the system is a web-based Flash application, designed to be accessible from any internet-enabled computer. The purpose of this portion of the system is to provide users with a personalized space in which to track their online and offline activities, keep their rewards, access online activities, and collaborate or compete with friends. The virtual system architecture (Figure 4) and flow diagram (Figure 5) are described below.

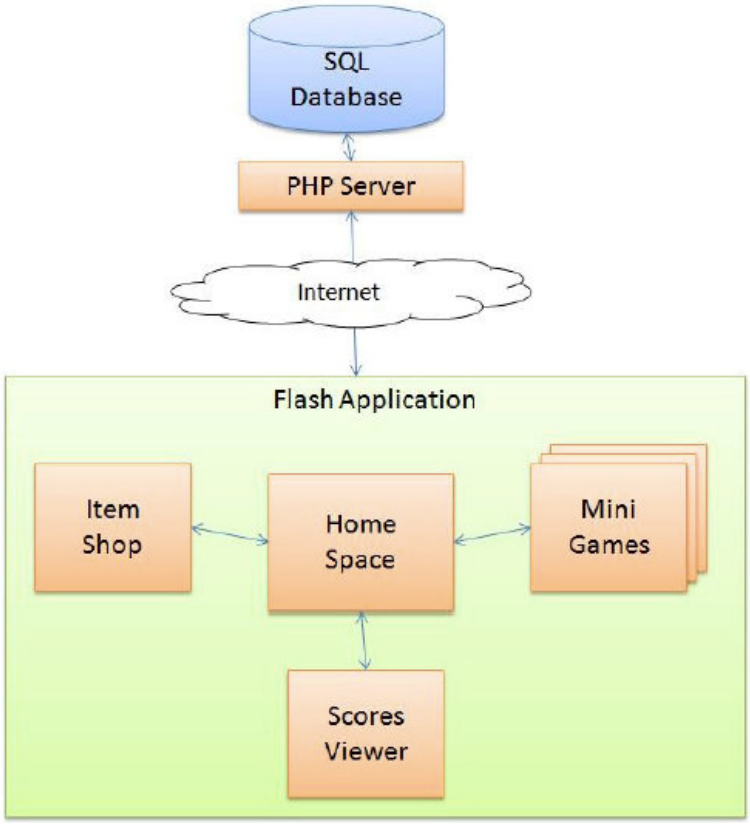


Figure 4. System Architecture

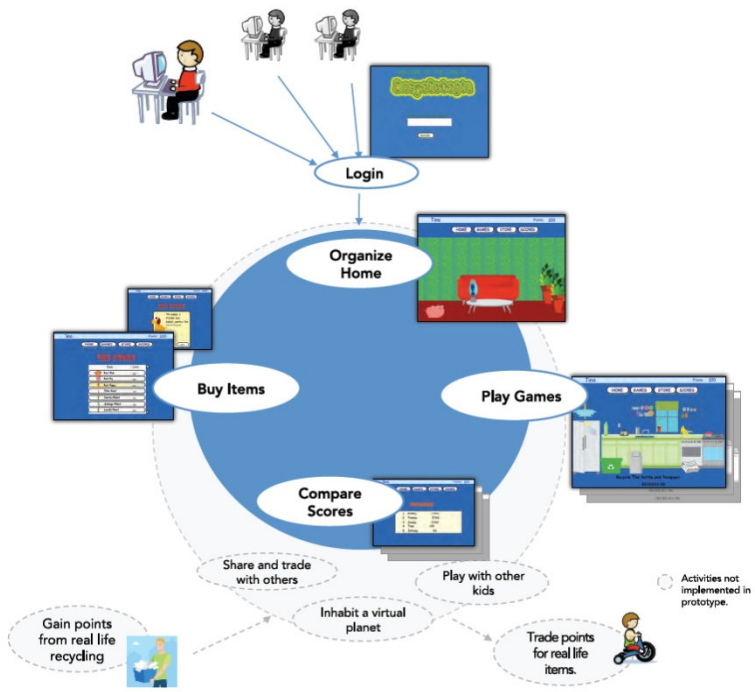


Figure 5. Flow Diagram

After a user logs in the site (Figure 6), they are transported to the "home space". The system is centered around the user's home space (Figure 7), which is a virtual home which they can personalize by decorating with purchased items. Items can be moved around and reorganized according to the user's wishes. From this space, the user can access the other virtual areas, which include a store area where new household items can be purchased, an area for playing simple games, and an area for viewing other people's scores.

Figure 6. Login Screen

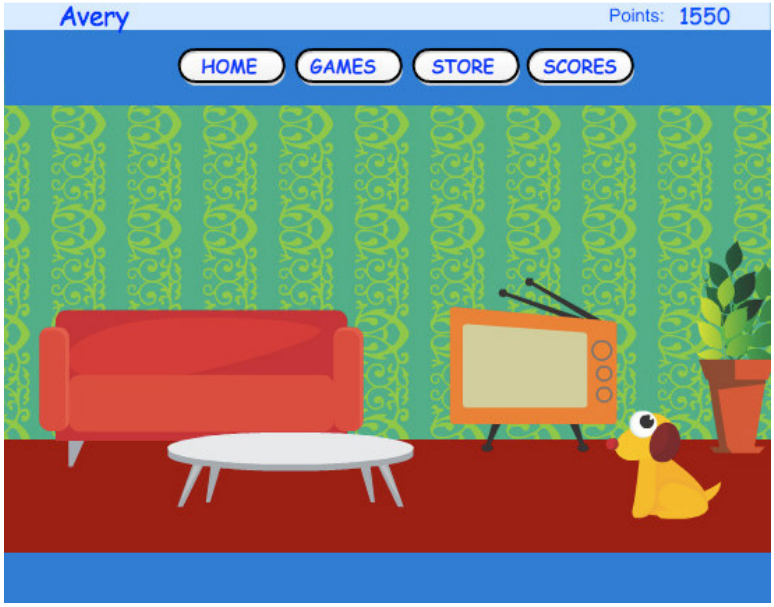


Figure 7. Home Space

In the “store” (Figure 8 a,b,c), users can purchase items by spending points they have earned (through virtual or real-life activities). If they have the points, they can choose what to buy from a menu. Information about an item is shown in a separate window with item details (Figure 8c). After confirming their purchase, they are returned to their home space (Figure 8d), where they can then place their new item.

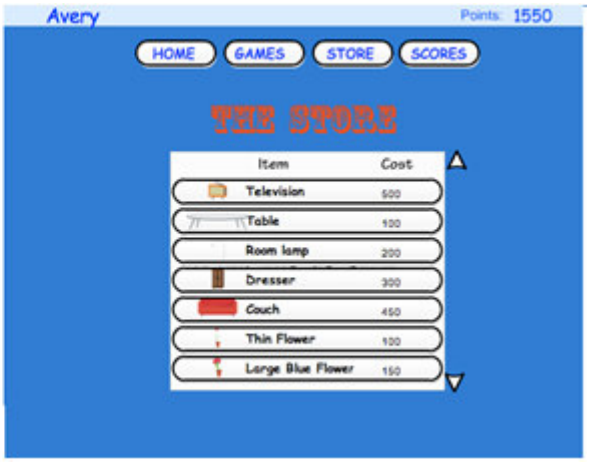


Figure 8. (a) Store Introduction (b) Store item listing

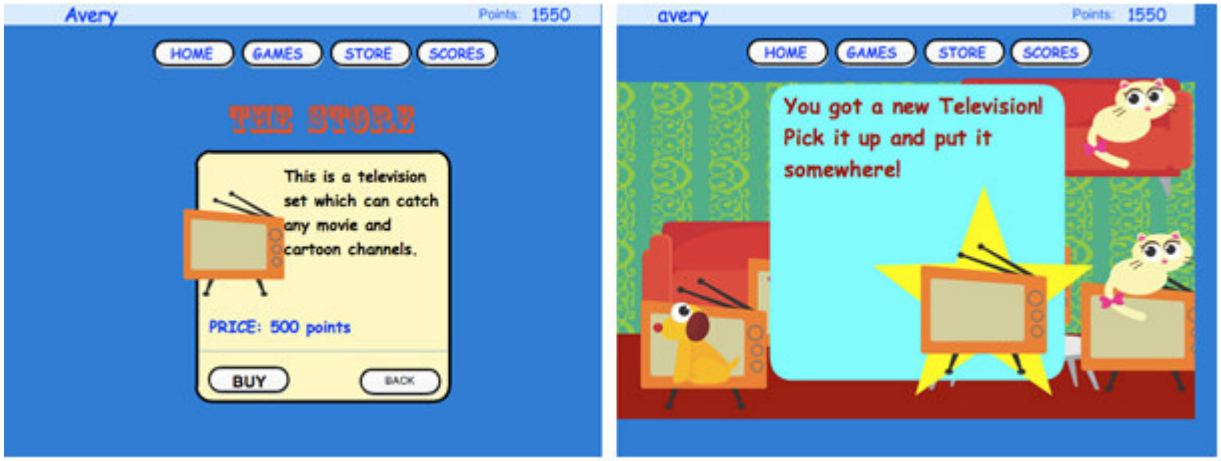


Figure 8. (c) Item details (d) New Item in home

Users have access to a "scores" visualization screen where they can see scores of other people. (Figure 9)

Figure 9. Score Visualization

Users gain points and perform recycling activities through the "mini-games" (Figure 10). These are a set of simple games designed to provide quick entertainment and reward the user with points which can be traded for home-space items. These games usually include quick and simple interactions, such as throwing as many items as possible into a recycling bin, in a limited time period.

Figure 10. The Mini-Games screens.

3. Evaluation Method

System Usability Criteria

In the previous phases of the project detailing the usability criteria, it was determined that the system must be fun, easy to use, effective in changing behaviors, and easy to integrate into the household. The current evaluation method attempts to validate the system with respect to these criteria.

It is believed that a sense of fun can be created through an entertaining interface which provides challenges and rewards. Additionally, if an interface is fun, it will also be captivating to the users. The satisfaction of this criteria is dependent on the user's experience of this system, as different users have different ideas of what makes an experience "fun". Although it is a subjective interpretation, the criteria can be validated through users' reports of increased entertainment while interacting with the system, and observed captivation with the software (that is, willingness to play multiple times, and enthusiasm for continuing to play after the benchmark task was completed).

To create an interface which is easy to use, the set of interactions which our system provides, are simple and intuitive. Children are expected to not have difficulty determining how the system is operated. In order to ensure that the system is presented at a level simple enough for its users, we can observe users interacting with the system and determine the number of errors they run into, as well as the number of times they attempt to do something that is not possible in the system. During the evaluation we will also request users to subjectively report on the ease of use of the system, and expect users to not report difficulty using the system.

In order for our system to be successful, it must also be effective in changing user recycling behavior and attitudes. The system is designed to teach users recycling habits and entice the user to recycle in real life. Through post-game discussions with the users, it will be determined whether users think the game required them to perform recycling behaviors. In the initial study plan, users were to be monitored for a prolonged period of time and changes in their recycling habits monitored throughout. The original study plan intended to study two groups – one group whose participants would be rewarded game points for performing real-life recycling activities, and one group where these rewards were not offered; the hypothesis was that we would see an increase in recycling activities in the first group, proving that the game combined with real-life incentives could lead to changes in behavior. However, due to the small number of users, the limited time for this study, and some users' inability to remember their recycling habits, it

was not possible to determine whether the system had a significant impact on users' real-life recycling behaviors.

Finally, the system is designed to integrate easily into the household. The system is built for the Macromedia Flash Player, which is accessible to computers with web browsers. The Flash Player requires an Intel Pentium 2 computer at 450 Mhz with 128 MB RAM (an average computer system circa 2001), thus it is expected that middle-class households with internet-enabled computers will be able to access this software as long as they meet the minimum system requirements. To validate if this is true of the population, we will assess their previous experience with playing online video games at home.

Participants

Three participants were involved in this study. Two were typical users - boys aged 10 and 11, having previous experience with computers. The third participant was an HCI Masters student role-playing as a child; she was specifically recruited since (1) her work focuses on child users and her expertise is in minor-oriented interfaces, and (2) we lacked an extensive number of child participants.

One of the younger participants was recruited by contacting a group of middle-school parents (see Appendix recruitment form); the other participants were friends or relatives of the project team members.

Procedure & Tasks

The study procedure was designed to evaluate the usability criteria of the system. Each study session consisted of one participant interacting independently with the system, while the researchers observed and documented the interactions; each session lasted approximately 30 minutes.
Participants were first introduced to the project team and told that they would be evaluating an experimental system. They were told that they are the experts and that they are there to tell us what things are good and what things are bad about the system; additionally, they were told that they can stop the study at any point if they feel discomfort. (The exact study script is included in the Appendix.)

Initially, the participants saw the Login page, and they entered their name to log into the system. Once inside the system, they were given a brief tutorial by the researchers and a walkthrough of the different spaces in the game - the Home space which was presented as the

user's house, the Store space where they can purchase items, the Game space where they can play games and earn points, and the Scores space where they can view their score. After the tutorial, all participants were given the benchmark task to "purchase a TV and a pet". Completion of this task required quite a significant amount of points, thus the participant was forced to spend a lot of time in the games area; additionally, the need for two items required the participant to explore the store section (for purchasing an item at a time) as well as the home section (for placing each item); this ensured that participants visited most areas of the system.

While participants played the game, the researchers observed their facial expressions and body language, to determine enjoyment levels; at the same time, participants were encouraged to provide comments and suggestions. When participants finished the task and indicated that they did not wish to play anymore, they were asked a series of questions about the game and their recycling habits. The questions are detailed in the Appendix B.1 section; typically, one researcher asked these questions in a structured-interview fashion. This approach was chosen over asking children to fill the questionnaire by themselves, in order to ensure that a lot of information is extracted from the participants, as researchers could ask deeper questions about issues they felt were relevant.

At the same time, the parents of the participants (with the exception of the MS-HCI student) were asked to fill out a survey questionnaire about their child's recycling habits; these questions are detailed in Appendix B.2.

After all questions were answered, the participants were thanked for their time, and the study completed.

Evaluation Lessons Learned

Several lessons were learned with regard to performing studies with children. Primarily, it was observed that child participants are intelligent in analysing the game and discovering bugs; furthermore, they provide lots of feedback when motivated and are very creative in their proposed ideas. It was also determined that children have trouble verbalizing their thoughts so questions may need to be asked multiple times in various ways. Children also tend to veer off topic, so the researcher needs to bring the conversation back to the intended question and ensure that the experimental schedule is followed. Finally, when children are confused or lacking motivation, they will not communicate much; conversely, if they are motivated, children will provide lots of useful information.

4. Results and Analysis

The participants found our system to be generally fun and easy to use, although they did find several bugs and minor usability issues. They generally agreed that they would use our system if it were available among the online games they play and if it were expanded beyond our small prototype. The participants varied in their assessment of the mini-game's difficulty, indicating a general issue that should be added to our usability and evaluation criteria for this system. They all indicated that they actively recycle and said they were motivated by concern for the environment, lending support to our idea of increasing the visibility of the results of 3R activities.

Observation Analysis

During the evaluation sessions, many interesting observations were made, both by the team and the evaluators themselves.

Participants varied in their tendencies when faced with instructions. Two of the users tended to ignore written instructions until they got stuck, while another user stopped to read everything. In all cases, they did not immediately notice the instructions for each stage of the mini-game, and once they saw the instructions, they were not able to read them within the time limit, much less complete the task.

Users also varied in their assessment of the time limit in the mini-game. While they agreed that the time limit provided the necessary challenge for the game, two users thought the limit we set was too short while one thought it was just right. All of the participants reported that they ignored the timer while playing the game because it was too hard to read given its small format and peripheral location. Also, given the need to read the instructions and figure out the game, no one had a chance of completing the game on the first time through.

Participants also pointed out many aspects of the system that they liked. They generally agreed that points were a good motivator and that extending the system to include real world recycling activities would be a good idea. They liked the general idea of the home space and games and enjoyed the core gameplay of the mini-game. One user specifically remarked that they enjoyed the descriptions of items in the store.

The users also had suggestions for improving the system. Participants proposed animating the objects in the home space or allowing the user to customize colors and wallpapers. These ideas would have been implemented if there had been more time for development. Both the team and the users noted that points were too easy to earn relative to the prices of the items in the store space. This had been designed into the evaluation so users could quickly earn points and fill up their home space. Other suggestions and observations were new and useful to the team, including a fishbowl for the fish. One participant suggested that the home space needed to be bigger, both to have more room for items and to make it more interesting. This user also suggested providing more opportunities for interaction in the home space, including opportunities to earn a few points.

Several bugs in the prototype were also found during evaluation, which will be accounted for in the future implementation.

Survey Analysis

At the end of the evaluation session, the users answered a series of questions about the system and their recycling habits and attitudes.

All users reported that they enjoyed playing the game to an extent. Two responded that they enjoyed the challenge, while one picked buying items and mentioned that it would be better with more mini-games. Two users complained about the time limit and the clarity of the directions, while one complained about only having one mini-game. Other than bugs and the time limit, users reported having no problems doing what they wanted to within the system. Opinions were mixed on whether they would tell friends about the game, but all agreed they would play it at home.

All users reported that they were knowledgeable about recycling and actively recycled. Each reported recycling for environmental reasons, whether concern for the environment itself or for the future.

Design Implications

The prototype for Triple R for Now's evaluation was built with certain design goals in mind. The objectives were that the system would be easy to use, fun, easy to integrate into the

household, and would yield a long term positive change in the child. Our evaluation revealed certain implications for our design and future implementation.

The current design is easy to use in most places. The drag and drop nature of the home space is intuitive, as is the interface of the store space. There were a few minor hang-ups in loading between multiple purchases and entering the home space, which can be improved by better synchronizing system modules together. This glitch did not seem to greatly diminish the user's enjoyment or overall experience, however. Another problem with the ease of use was that the faucet in the second stage was considerably difficult to click accurately; in general, attention must be paid to the clickable area associated with each interactive object in the system.

The current game design is evidently fun. The observed user experience indicated an eagerness to play. Also, while observing children, it was seen that they were very self-motivated in exploring all that the game had to offer. One was vocally eager to find out what the store had to offer for his points. This particular user was also keenly interested in the challenge of the minigame space and making adjustments to the level of challenge. Essentially, the game was fun, but he offered ideas for making the game more fun and rewarding. This validates the hypothesis that a game can be developed by the group that is fun and environmentally educational.

The system integrates easily into users' daily lives, working off of a website that can be accessed from homes and schools. The evaluation involved having a user navigate between various virtual spaces. The flow from space to space was organic with little complications. This navigation implies that the design could be replicated on a mass scale.

The long term influence of the system is questionable. The evaluation period was extremely limited and the possibility of positively affecting a child's outlook (and then, in the long term, behavior) is extremely subjective. With a longer period for evaluation and a larger-scale prototype, this aspect of the system could be tested. Of the design objectives, this item has the greatest implications.

Future Implementation

Future development of Recycletopia would include updates to the infrastructure of the system, as well as a broadening of its scope. Minor glitches and usability errors found during testing of the prototype would be corrected. To successfully achieve the goals of fun, ease of use, behavior improvement, and being easily integrated, the system would have to be updated as it relates to the results of testing. Once the problems were fixed, it would offer a solid base on

which the game would grow. Functionality such as multi-user interactions (creating a virtual global space to be inhabited) and integration of real-world recycling activities are two of the elements that would come into effect.

In the home, children could use Recycletopia to learn about Reduction, Reuse, and Recycling. Then, they could put those techniques into practice in the real world at home. One of the main goals of Recycletopia was to let it encourage children's environmentally aware behavior at home. Development of the system would focus on elements that would make it easier to integrate at home. These elements would involve playability, accessibility, and concepts that reinforce the game's positive message. Ideally, this would encourage children's employment of 3R awareness in their everyday lives.

Schools would also be an appropriate place to introduce an implementation of Recycletopia. The games could be altered to fit a classroom setting with more locally relevant material. Also, it could easily become part of a long term environmental awareness program in school. Ideally, the elements that made it useful at home would carry over to its use at school. The difference would be that at home it would be entirely voluntary while at school it may be tied to grades or other expectations. Also, the real world aspect of the Recycletopia ideal is simultaneously more and less easy to achieve in this setting. Gaining points from real world recycling could be easily measurable in a classroom. Trading points for real-world items may encourage healthy competition too far and make it unhealthy. If those real-world items directly tied into the classroom or were sanctioned by the school and local community, then that aspect of the system would be incorporated smoothly.

5. Conclusion

The design implications of Triple R for Now's Engaging Children in Environmental Activities research project has met with mixed success. While the results indicate that the design goals of entertainment, simplicity and portability were met, it is unclear how effective the system is in affecting recycling behaviors. Certain aspects of the evaluation and prototype indicate that a future implementation could be created that would provide more user challenge, and be stronger in terms of behavioral impact. Other aspects that would further need to be developed would be making the game readily accessible from one's home, and integrating it with real-life activities, as well as into school curriculums. This would allow Recycletopia to be more widely accessible, as well as integrated into schools in order to bring the 3R values learned in game to life.

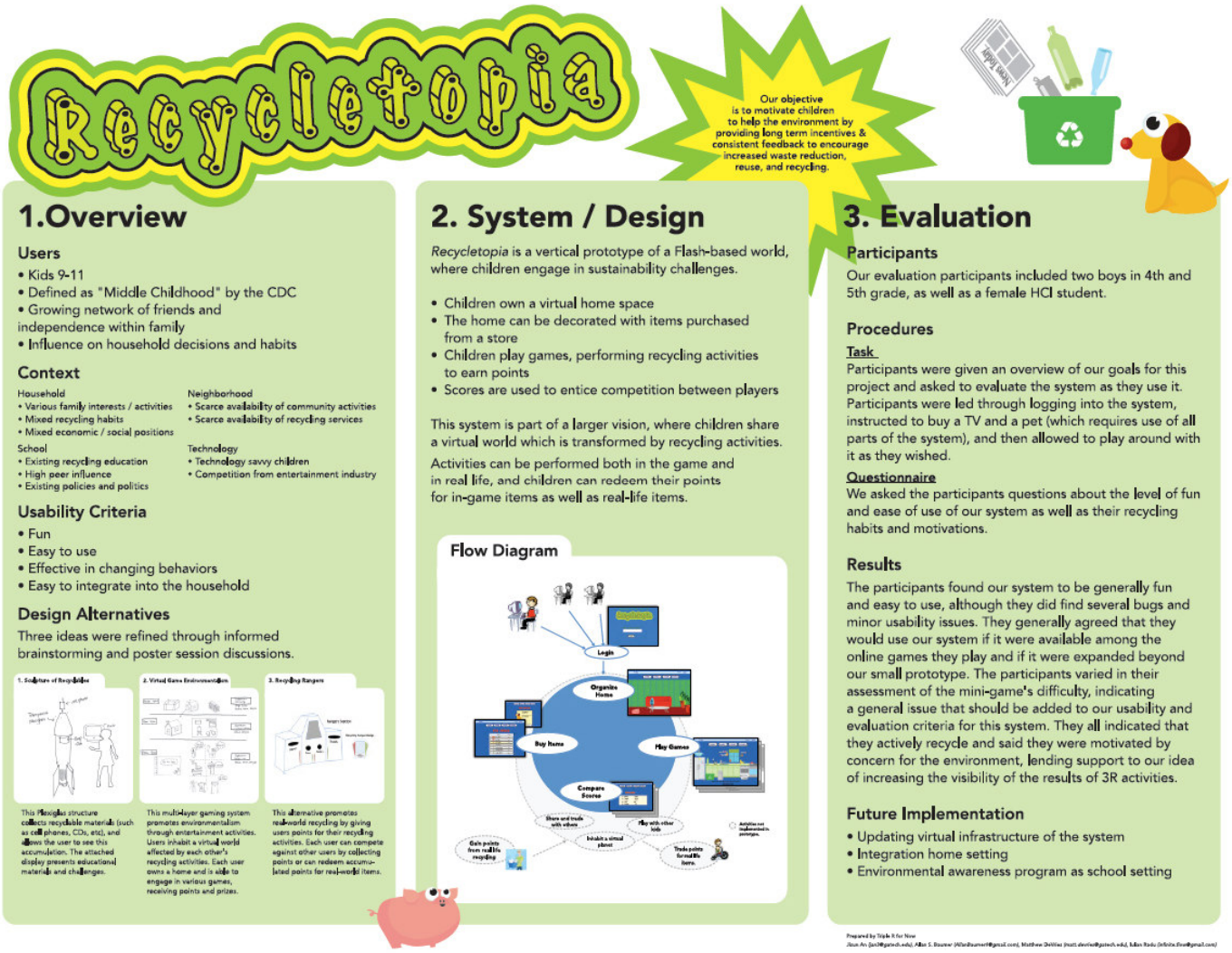
In conclusion, the system works well as developed, as it achieves sufficiently to be viewed as a successful research project. The system has been empirically validated to offer a fun interaction that appropriate for children ages 9-11, and has the potential to affect behaviors in a positive fashion.

References

(J1) Bureau of International Recycling (Last Updated September 16th, 2008) About Recycling. Retrieved September 16th, 2008, from http://www.bir.org/aboutrecycling/index.asp

(J2) Child Development (Last Updated September 20th, 2005) Accessed September 7th, 2008 from: http://www.cdc.gov/ncbddd/child/middlechildhood9-11.htm

Appendix A. Poster



Recycletopia

Our objective is to motivate children to help the environment by providing long term incentives & consistent feedback to encourage increased waste reduction, reuse, and recycling.

1.Overview

Users

- Kids 9-11
- Defined as "Middle Childhood" by the CDC
- Growing network of friends and independence within family
- Influence on household decisions and habits

Context

Household
- Various family interests / activities
- Mixed recycling habits
- Mixed economic / social positions

School
- Existing recycling education
- High peer influence
- Existing policies and politics

Neighborhood
- Scarce availability of community activities
- Scarce availability of recycling services

Technology
- Technology savvy children
- Competition from entertainment industry

Usability Criteria

- Fun
- Easy to use
- Effective in changing behaviors
- Easy to integrate into the household

Design Alternatives

Three ideas were refined through informed brainstorming and poster session discussions.

1. Sculpture of Recyclables

This Plexiglas structure collects recyclable materials (such as cell phones, CDs, etc), and allows the user to see this accumulation. The attached display presents educational materials and challenges.

2. Virtual Game Environmentalism

This multi-player gaming system promotes environmentalism through entertainment activities. Users inhabit a virtual world affected by each other's recycling activities. Each user owns a home and is able to engage in various games, receiving points and prizes.

3. Recycling Rangers

This alternative promotes real-world recycling by giving users points for their recycling activities. Each user can compete against other users by collecting points or can redeem accumulated points for real-world items.

2. System / Design

Recycletopia is a vertical prototype of a Flash-based world, where children engage in sustainability challenges.

- Children own a virtual home space
- The home can be decorated with items purchased from a store
- Children play games, performing recycling activities to earn points
- Scores are used to entice competition between players

This system is part of a larger vision, where children share a virtual world which is transformed by recycling activities.

Activities can be performed both in the game and in real life, and children can redeem their points for in-game items as well as real-life items.

Flow Diagram

3. Evaluation

Participants

Our evaluation participants included two boys in 4th and 5th grade, as well as a female HCI student.

Procedures

Task

Participants were given an overview of our goals for this project and asked to evaluate the system as they use it. Participants were led through logging into the system, instructed to buy a TV and a pet (which requires use of all parts of the system), and then allowed to play around with it as they wished.

Questionnaire

We asked the participants questions about the level of fun and ease of use of our system as well as their recycling habits and motivations.

Results

The participants found our system to be generally fun and easy to use, although they did find several bugs and minor usability issues. They generally agreed that they would use our system if it were available among the online games they play and if it were expanded beyond our small prototype. The participants varied in their assessment of the mini-game's difficulty, indicating a general issue that should be added to our usability and evaluation criteria for this system. They all indicated that they actively recycle and said they were motivated by concern for the environment, lending support to our idea of increasing the visibility of the results of 3R activities.

Future Implementation

- Updating virtual infrastructure of the system
- Integration home setting
- Environmental awareness program as school setting

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Appendix B.1. Child Questionnaires

GAME SURVEY

1. Did you enjoy playing this game ? (circle one)

No, I didn't like it at all.	I liked it, but not much.	Yes, I sort-of liked it.	I really liked it a lot.

2. What did you think was fun about the game ?

   _____

   _____

3. What did you feel was not fun ?

   _____

   _____

4. Was it easy to do the things you wanted in the game ? (circle one)

No, the game was confusing all the time.	Sometimes I knew how to play, but a lot of the time it was confusing.	I usually knew how to play, but sometimes it was confusing.	I knew how to play the game all the time.

5. What did you want to do, but had trouble doing?

   _____

   _____

6. Are you going to tell your friends about this game ?
   (circle one): Yes No

7. Would you play this game if you had it at home? (circle one)

No, not at all.	Sometimes, but not much.	Yes, often.	All the time.

RECYCLING SURVEY

1. Do you know what Recycling is ?
   (circle one): Yes No

2. Do you recycle things ?
   (circle one and follow the arrow): YES NO

3. How much did you recycle last week ? (If zero, you can leave blanks). Cans __ Bottles __ Papers __ Others _____ 4. Why do you recycle ? What would make you recycle even more ? _____ _____	3. Do you use some things that could be recycled ? (circle one): Yes No 4. If yes, why don't you recycle things? _____ _____

Appendix B.2. Parent Questionnaires

PARENT - RECYCLING SURVEY

1. Does your child know about recycling ?

Yes. [ ]	No. [ ]	I'm not sure. [ ]

2. If yes, how often did your child talk about recycling in the last 2 weeks?

Never mentioned it. [ ]	Mentioned it a few times. [ ]	Mentioned it very often. [ ]

3. How many items did your child recycle in the last 2 weeks ? (rough estimate)

Cans __ Bottles __ Papers __
Others _____

4. What do you think would improve children's recycling habits ?

_____
_____
_____
_____

Appendix C. Recruitment Script

Hello,

I am a friend of XXXX, we are taking the same class together at Georgia Tech, on Human-Computer Interaction (CS6750 taught by Dr Bruce Walker).

For the class project, my team is building a video game system which may help children become more involved in recycling activities. I am wondering if your child would like to serve as a subject for our study.

The study will run for a 2-week time period during November 2008, and will require your child to be exposed to our video game. We would like your child to play the game two times during this period, for roughly 10 minutes of gameplay in each session. During each session, we would like your child to fill out a questionnaire; the total time for each session is not expected to exceed 20 minutes. More information about the experiment can be found in the attached parental consent form.

Some of our team members need to be present during each gameplay session, so we would like this to occur in our lab at Georgia Tech, or in a location that is convenient to both you and ourselves. You and your child are free to choose the times for these two experiment sessions.

The risks involved in this study are no greater than typical use of computers for casual playing of video games. No audio or video recording will occur during this experiment. Although there are no direct benefits, this may subject children to the importance of recycling. There is no compensation offered for participating in this study.

The following procedures will be followed to keep your personal information confidential in this study:

- The data that is collected about you and your child will be kept private to the extent allowed by law.
- To protect your and your child's privacy, records will be kept under a code number rather than by name.
- Your and your child's records will be kept in locked files and only study staff will be allowed to look at them.
- Your and your child's name and any other fact that might point to you or your child will not appear when results of this study are presented or published.
- To make sure that this research is being carried out in the proper way, the Georgia Institute of Technology IRB will review study records. The Office of Human Research Protections may also look at study records.

Please let us know if your child would like to be a participant in this study.

Sincerely,

XXXXX