



**Loop: An educational and interactive gaming
experience for children to learn about intricate balance
between human and nature**

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Introduction

Our Ecosystem as a Loop

Oftentimes, people carry on with their lives without thinking how their actions impact the environment and other species that coexist with us. It's easy to see what's readily in front of us and forget about how everything is interconnected behind the scenes. Healthy ecosystems depend on plant and animal species as their foundations. When a species becomes endangered, it is a sign that the ecosystem is slowly falling apart. Each species that is lost triggers the loss of other species within its ecosystem. Without healthy forests, grasslands, rivers, oceans and other ecosystems, we will not have clean air, water, or land.

In both the worlds of animals and plants, there are now 41,415 species on the IUCN Red List (endangered species list), and 16,306 of them are endangered species threatened with extinction. This number is up from 16,118 last year. From our motivation leading towards a nature-centered design culture, we sense the urgency to raise awareness around this issue by engaging children in environmental topics and wildlife conversation at a young age, because they will be making decisions for the future soon.

Projection Mapping as main technology

Projection mapping is an emerging technology commonly used in the entertainment industry for outdoor events, cinema, and concerts to augment experiences. This technology, usually combined with audio to create an audio-visual narrative, uses video-on-surface mapping to augment the audience's spatial experiences by adding extra dimensions and optical illusions.

Our project takes the technology into our main design consideration because projection mapping allows us to be freed from the limitations of the size of screens, and to create a virtual world that is combined with reality from the projected environment.

Design

Goal

We believe it is equally important for young children to learn about the interconnectedness of the ecosystem we live in and how our actions impact animals, as other subjects currently included in their school curriculum. For 5-8 years old children, they learn about different species of animals and their habitats in school, but they are not exposed to the broader implications of how the two worlds, animals' and humans', connect and influence one another until much later on.

We hope our game can inspire children to start thinking about what living in harmony with nature means at a young age, and carry the same conscientiousness about how their daily actions impact the environment as they grow up. Thus, **the goal of our project is to design an educational interactive game experience for children about the balance between humans and nature.**

Target audience

Children aged 5-8 visiting a public educational institution, or in a classroom setting.

Concept

The whole game experience of Loop is built upon the concept of “balance”. The decisions and actions we make every day may have an impact in the future. To have a healthy ecosystem, the most important thing is to maintain the ecological balance. Children learn through interacting with the projection mapping contents about the consequences of their actions.

Discovery and Exploration

Our core game concept went through multiple iterations. When we first started the project, we wanted to look into how we can raise public awareness around environmental issues like food waste and endangered species, to bring these topics front and center in the public's mind. A majority of us often carry on with our daily routines without considering how our actions impact other species that coexist with us in the same ecosystem. It's easy to see what's readily in front of us and forget about how everything is connected behind the scenes. For example, when we get takeouts from restaurants, we don't think about where the containers might end up if we don't correctly clean and sort them. With this realization, we want to design a game that nudges people to look beyond what's readily available and be more conscientious about how their actions can impact the environment. That is, we hope to instill a sense of responsibility in the plays of our game, starting at a young age.

We conducted many rounds of research on both food waste and endangered species and eventually decided to scope down our project to focus on illustrating the relationships between human and animals, due to time constraint. We presented a few potential game concepts to our faculty advisor, Kimiko Ryokai:

- 1) Have children role play as an endangered animal, such as a polar bear, an orangutan, or an amur leopard, in a simulated habitat, to learn firsthand of how their day-to-day looks like and the challenges they face, hoping to inspire empathy (appendix 1).
- 2) Have children roleplay as a caretaker of the endangered animals and protect them from poachers and other predators through taking actions like creating distractions and providing hiding places in the wild, to inspire a sense of responsibility (appendix 2).
- 3) Have children explore how human developments affect animals living in the wild, and vice versa. Children will get to experiment and observe how the animals' and humans' living spaces change with the human development blocks and nature blocks they add or remove to the environment (figure 2).

Kimiko's advice of taking into consideration what learnings we'd like 5-8 year olds to take away from the game as well as if they're able to comprehend the embedded concept prompted us to further research into how age-appropriate each of the above game concepts is, in addition to what would promote most interests and learnings. We ultimately decided to proceed with idea 3, since both of its physical and digital components seem evidently captivating to the targeted age group, through other well-known exhibits we found like teamlab's future worlds. It also allows multiple children to play at once, which we thought could provoke more engagement in a public setting than a single-player game. We started refining the details of how the game will look like.

The physical game space will be separated into three main areas: creation, interaction, reflection (figure 1). Our initial idea was that in the creation area, children can create their own animal through sketching and coloring, and the animal will appear in the interaction area. In the main interaction area, an animated environment will be projected onto the floor and the walls to create an immersive experience for children to interact with the animal they created as well as other animals that already are in the space. There will also be physical objects, such as human development blocks: houses, factories and nature blocks: trees, waterfalls, that the children can move around and observe how the environment changes accordingly. Depending on children's choices of adding human developments or natural elements to an area, they will see the area turning brown with animals running away or turning green with animals running towards, respectively. Children can play the game individually or collaboratively with others to understand the concept of balance between human and nature. Lastly, in the reflection area, children will be able to download a complementary app on which they can take their animal home, share what they learned from the game, and access additional learning materials (figure 2).

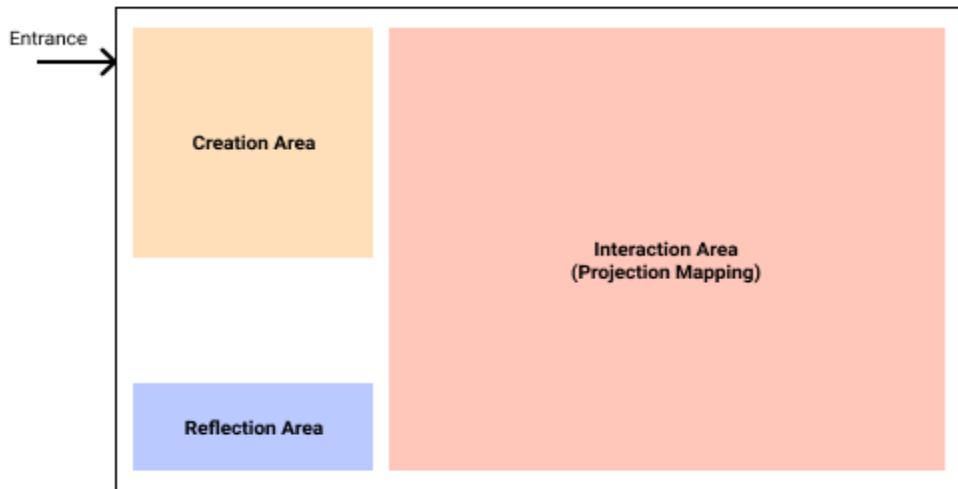


Figure 1: Initial spatial plan of our physical game spaces: creation, interaction, and reflection



Figure 2: Initial game flow of our physical game spaces: creation, interaction, and reflection

Research

Interviews

In order to evaluate how well children age 5-8 would comprehend the visualizations, interactions and reflections that make up the Loop experience, we interviewed two teachers who specialize in early childhood education. Both participants are current 2nd to 3rd grade teachers in New York public school districts that have diverse student populations. Some of our primary research questions included:

- To what extent are the topics of endangered species and environmental conservation taught in the elementary school curriculum?
- On what level are children of different ages able to understand the topic of endangered species?
- Do our three user scenarios offer enough freedom for children who may have differing learning styles?
- How well will children age 5-8 be able to interpret the seesaw visualization that we have created that represents balance?
- Does the design of our drawing screens offer the children enough creative freedom?
- How might children feel a sense of attachment to the creature that they created?
- Do the reflection questions that we developed seem engaging and understandable for children age 5-8.
- What types of exhibits are typically the most engaging for children at museums?

Each interview was an hour long and participants were first asked questions about their background in teaching, experience visiting museums with their students and curriculum surrounding endangered species and conservation. After being shown the three user scenarios and accompanying storyboards, participants were then asked questions about the general flow of the design, the tangible manipulatives and the visualization representing balance. Participants were then shown the creature creation screens and were asked questions about how the levels of engagement and creative freedom that

this design offered. Finally, participants were shown the reflection interface and were asked about the types of questions that might be included in a typical classroom reflection and how to best ask questions that would be appropriate and engaging for children as young as 5 and as old as 8 years old.

All interviews were transcribed and the transcriptions were added to an Airtable repository, where they were analyzed using the method of atomic research. After observations were written for both interviews, these observations were uploaded to a [Mural board](#), where they were affinity grouped based on topic. These affinity groups were then synthesized into insights as can be shown in Figure . Over 50 insights were found from these interviews, but some of the most significant ones that were found include:

Insights

- The concept of extinction does not come up in the normal curriculum, but is not too complicated for elementary school students to understand.
- Children are taught about animals but are not taught about the environmental balance between humans and animals.
- It can place a lot of pressure on children when they are told that it is their responsibility to protect the environment.
- Children should not be directly told the purpose of the blocks, but should discover this through their interactions.
- Children are very attracted to technology and will generally have a pretty intuitive understanding of how it works.
- The balance visualization on the wall is effective but children may need more of a cue to look at the wall or be told briefly what Loop is all about.
- Allowing children to type, draw or speak their reflection makes it possible for a wide age range to respond to the questions. These three options should be clearly stated in addition to the icons.
- Ideal time for Loop experience would be 30 minutes

- Parents might want a few talking points and dinner time conversation starters so that they can ask their child about their time playing with Loop.
- Giving the children options of where they would like to play (drawing vs. blocks) makes Loop accommodating to children with a variety of learning styles.

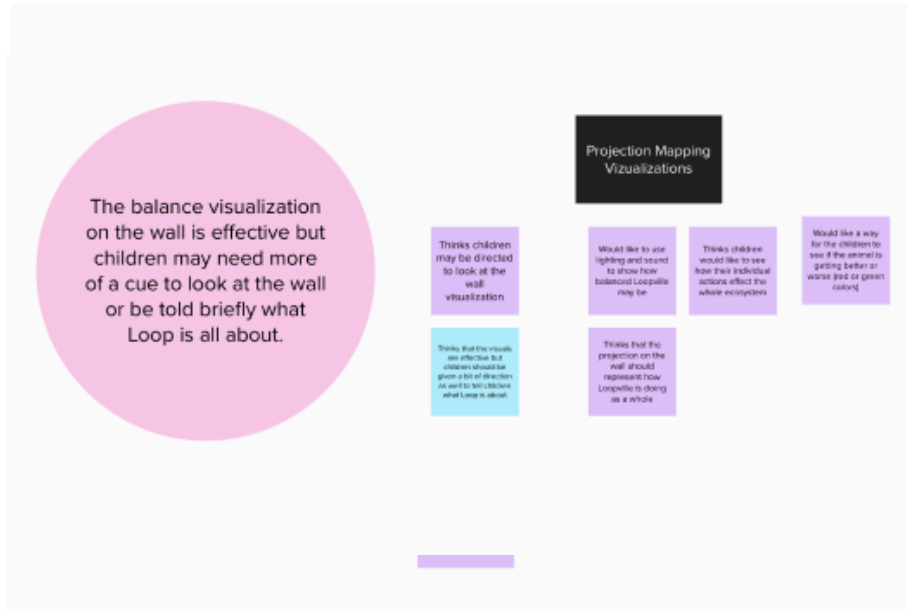


Figure 3: Interview insights on using projection mapping visualizations

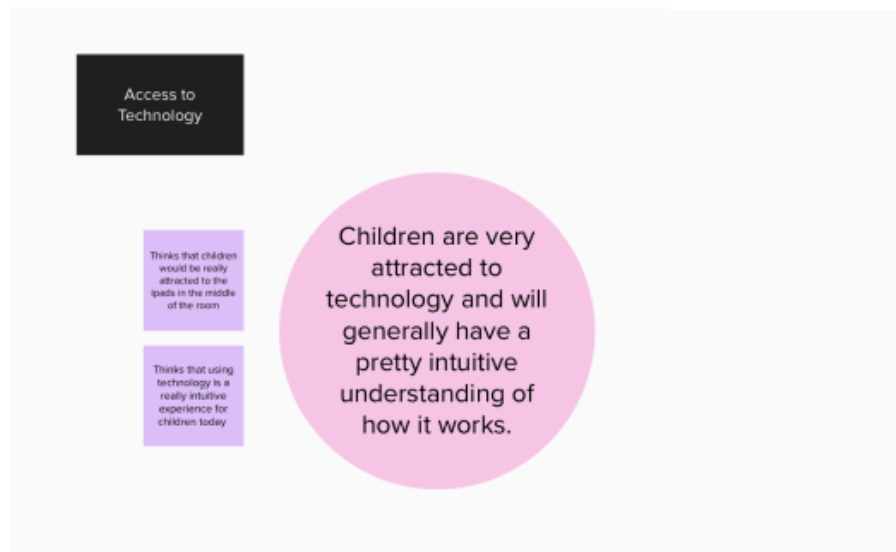


Figure 4: Interview insights on children's access to technology

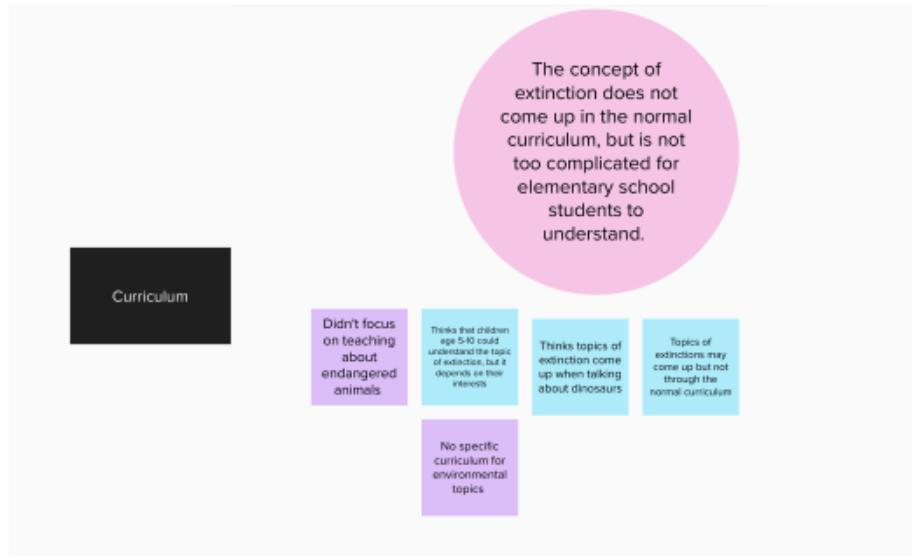


Figure 5: Interview Insights on the current curriculum related to animal extinction and wildlife preservation

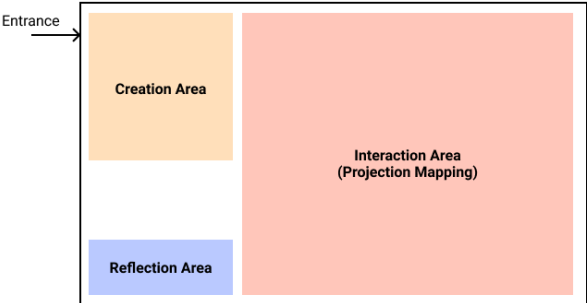
Overall, participants found the Loop experience to be very age appropriate, fun and engaging, but offered several suggestions that were ultimately implemented to improve the user experience of Loop. One of these changes included providing more options and freedom to choose the color when designing creatures in order to increase the children’s attachment to their design. The reflection experience was also moved from the Loop app, to an iPad interface at the end of the experience, being that children won’t necessarily have a device of their own with them at the time. Several other changes were also made to projection mapping visualizations and the questions asked in the reflection. These interviews also provided insight into ways that Loop can be improved upon in the future such as including multiple habitats and building out the app experience.

Design Iteration

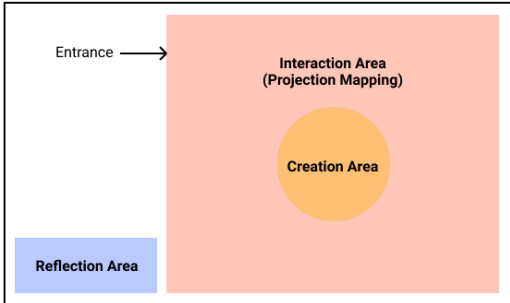
We iterated on the design concepts based on the interview insights obtained, to better align with kids' behavior and our design goals. Below are four examples of our design iterations.

1. Flexible Game Flow

Our initial design of the physical gamespace (figure 6) separates the creature creation area from the interaction area, because at first we wanted the kids to create their own creatures before entering the main projection mapping area, where they can start interacting with the game. However, we received feedback from our interviewees that it's important to consider different kids may have different preferences on how they want to play the game and that each stage of our Loop experience should captivate as many children's interests as possible based on that understanding. As a result, we ended up combining the creature creation area and the main interaction area to better support flexible playing styles (figure 6). We want kids to have a choice on how they want to begin exploring Loopville, whether it's creating their own creatures, exploring the Loopville environment, or watching others play in the main interaction area. We believe this new setup will encourage children to enjoy and experiment Loopville in their own preferred ways, rather than following a specific script or game flow.



Original Spatial Plan



Iterated Spatial Plan

Figure 6: Updated spatial plan with creation area integrated into the main interaction area

2. Creative Creature Creation Flow

Our initial idea was to provide kids with several options to create their own Loopville creatures: 1) draw their own creatures from scratch, 2) put a creature together by selecting pre-created body parts, 3) select pre-created Loopville creatures. During the user interviews, we learned that kids enjoy drawing and coloring at age 5-8, but may need some sort of parameters to guide their creations. Therefore, we ended up deciding our creation flow should allow kids to express their creativity, within a reasonable design system, where they can still create a creature that's unique to them. That is, they will be able to assemble a creature through selecting pre-created body parts, coloring, and adding accessories like hats or necklaces.

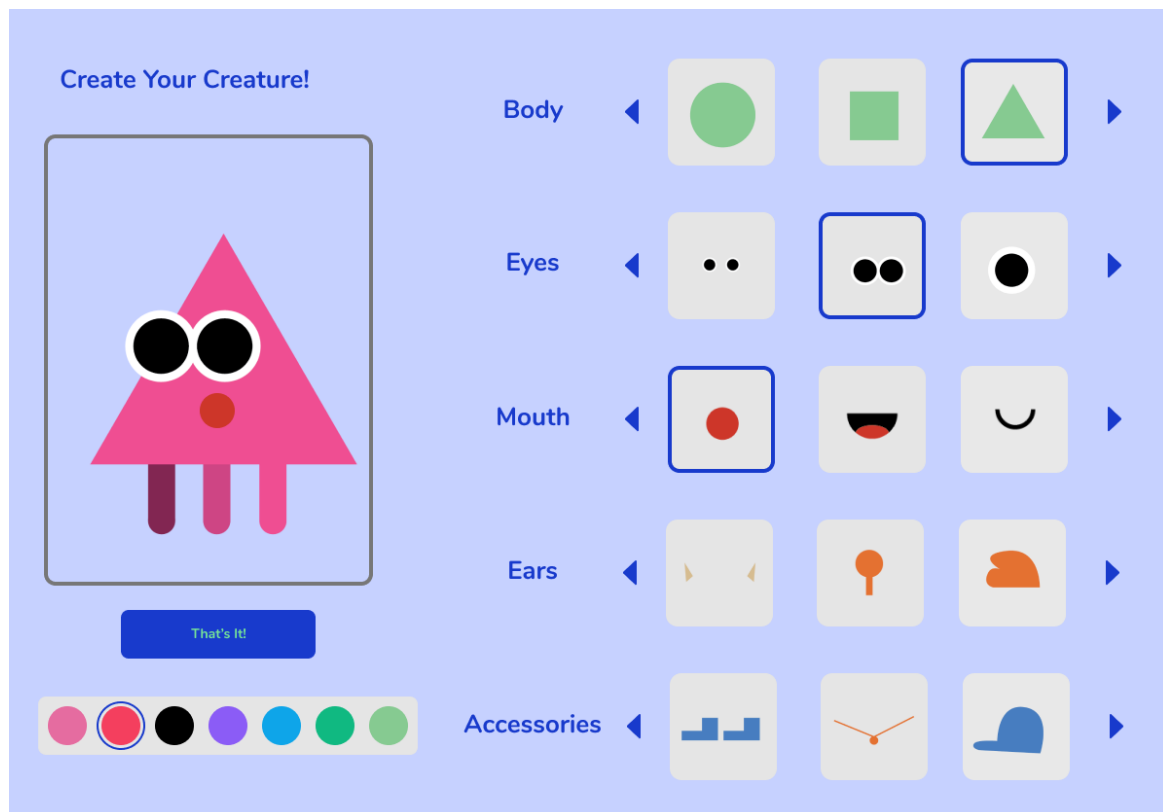
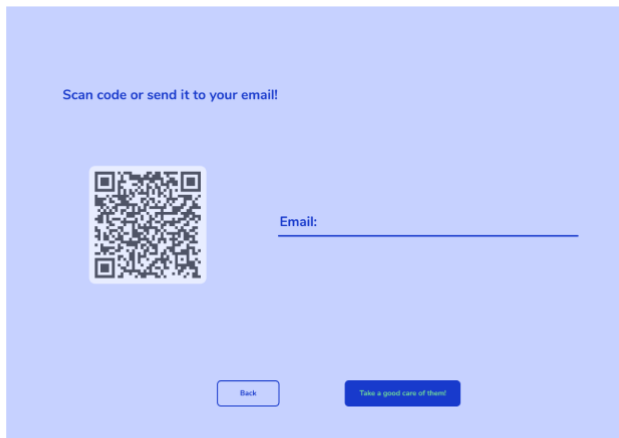


Figure 7: Creature Creation - Provide customization for the children to create their own monster

3. Game Reflection Flow

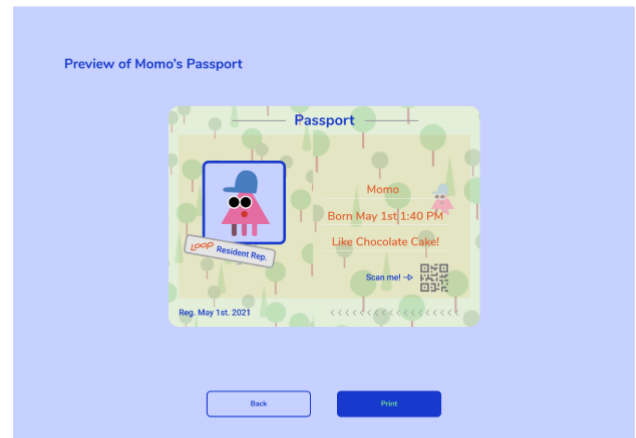
At the end of the game, we hope kids can reflect on what they learned from the game experience, download the creatures they created, and visit our website to learn more about endangered animals. In our initial design, we thought about 1) having kids scan the QR code using their phones (or parents' phones) to access all this information, if they are visiting the exhibit with their parents, or 2) email all this information to their teacher, if they are visiting the exhibit with their school.

From the user interviews, we learned that most kids don't own or have access to a mobile phone at home, but enjoy tangible souvenirs they can bring home, which inspired us to design the creature passport they can print out and take home as souvenirs after the game.



Original Design

For Children to Download Creatures



Iterated Design

A printed passport for children to take home

Figure 8: Creature Download - Design a customized passport for children to take home



Figure 9: Cover Image of Loop - an interactive game for young children

Final Design

Story: A visit to Loopville

Loopville is an utopia, existing in the deep forest. with thriving vegetation and pleasant weather. Brightly colored little creatures lived freely in this land, until one day humans discovered this world....

What will happen to the creatures? How can humans coexist with nature-loving monsters?

Designed as a part of an exhibition under the theme of environmental conservation and wildlife preservation, our projection mapping game is meant to be a stand-alone installation that invites children to the world of Loopville. Loopville is an ideal environment for children to imagine and experiment with the possibility of a new society. As visitors of Loopville, children can create a new identity for themselves (a resident creature), and interact with the environment by moving physical objects (house blocks, tree blocks, etc) around. As objects are planted or removed, the environment changes. Children will be able to observe how their actions impact the development of Loopville.

The entire game experience is divided into three sections:

- 1) Creature Creation
- 2) Exploring Loopville
- 3) Reflection

In the below section, we will discuss a few user scenarios we considered in the three sections of the game experience.

User Scenarios

The entire Loop experience is designed to be part of a permanent or pop-up exhibition in public educational institutions like museums. Our plan is for it to become a half-day field trip destination where children can learn through play.

Our game was created around three user scenarios:

1. User creates a creature, then visits Loopville for the projection mapping game
2. User plays inside Loopville, decides to create creatures, and continues to immerse in the projection mapping environment
3. User plays inside Loopville, and continues to immerse in the projection mapping environment.

The above user scenarios considers how children with different personalities may prefer to interact with Loopville in very different ways. From our research, we learned that children’s focus is to follow the people and environment around them to make changes at any time. Thus, we designed the sequence of the game experience to be free-formed. Children are allowed to pick the activity they want to participate in according to their interest at the moment, and freely explore the environment.

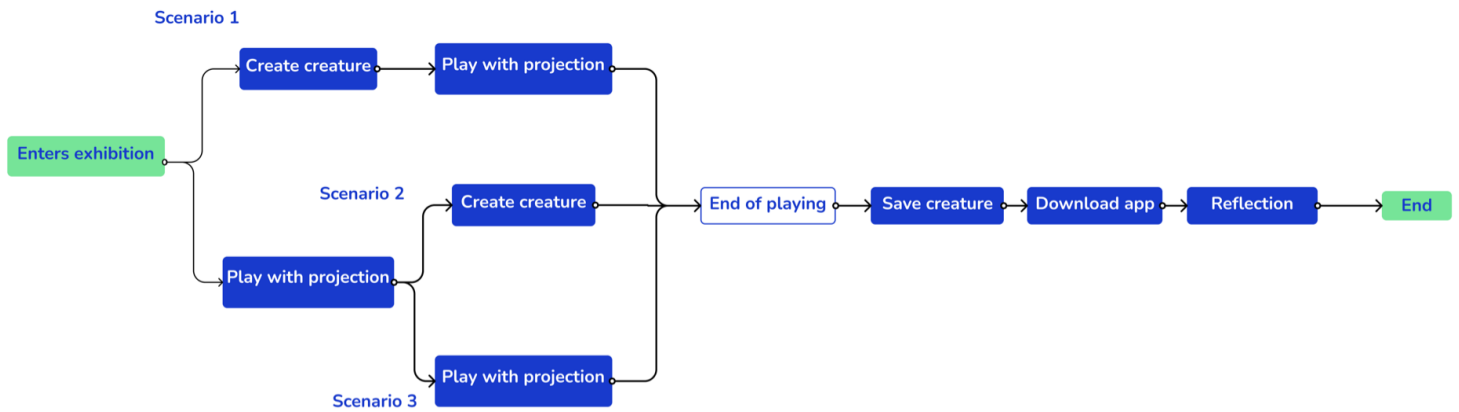
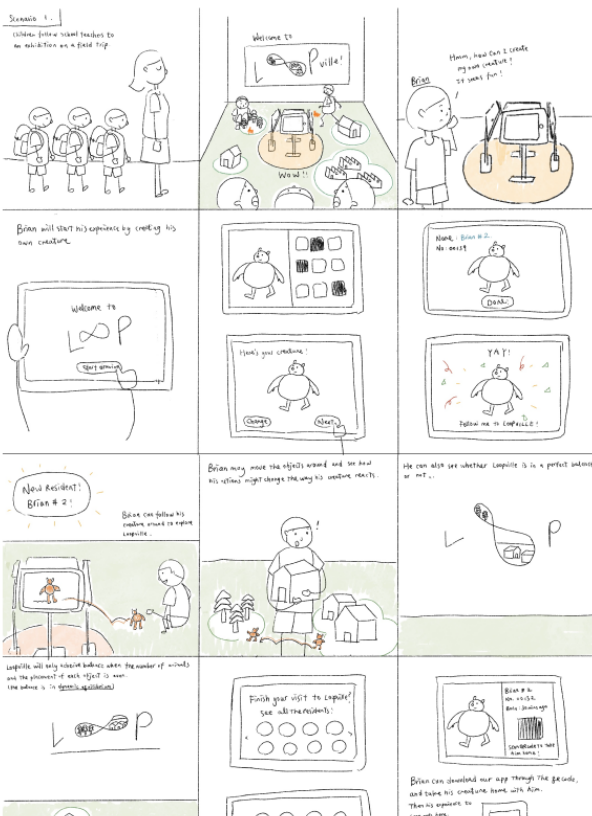


Figure 10: The three main user scenarios

Scenario 1 - Brian
Main Use Case

Children create their own creature, and follow along to the projection mapping.



Scenario 2 - April
Second Use Case

Children attracted to the projection mapping, and decided to draw afterwards

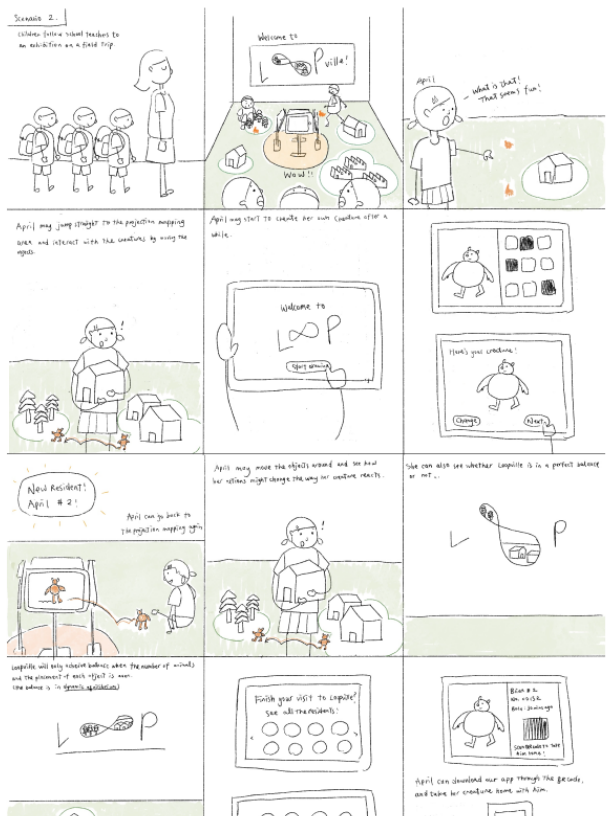


Figure 11: Storyboard of the main user scenarios

Scenario 3 - Jane
Third Use Case
Children attracted by the projection, and never draw their own creature



Figure 12: Storyboard of the three main user scenarios

End-to-end Loopville Experience

1. Creature Creation

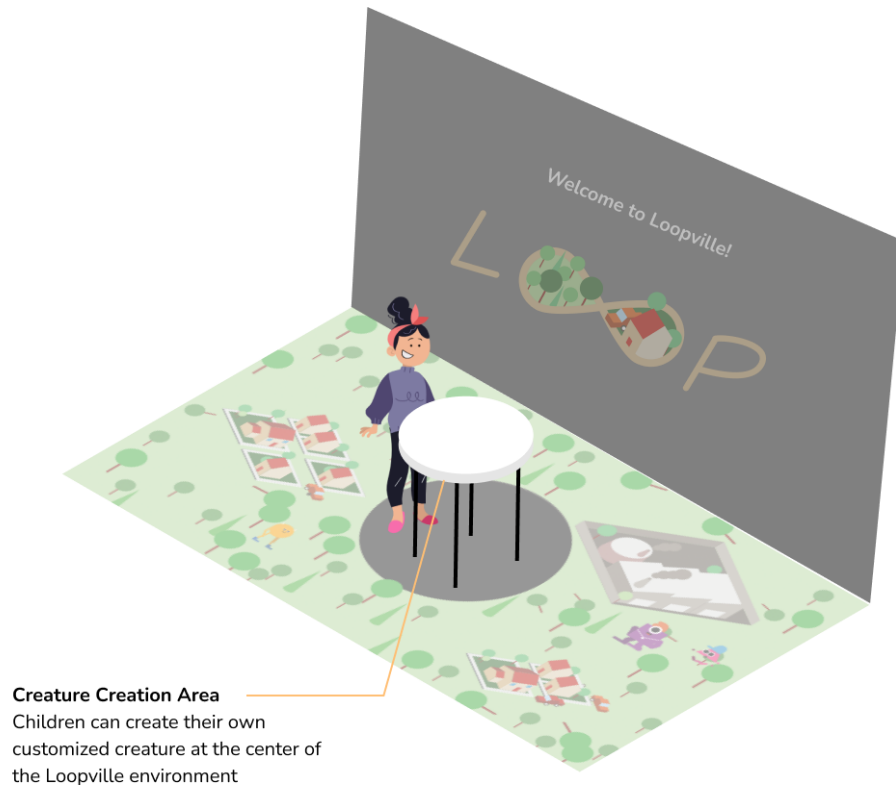


Figure 13: Creature Creation - Perspective diagram of the spatial plan

Loopville will be pre-populated with several creatures before the children enter the environment. This will allow children to engage with the game even if they don't create a creature of their own. As a visitor to Loopville, children can either choose to create their own creature when they first enter Loopville, or after they've already had a chance to play with the creatures already in the game. We set up the creature creation area in the middle of the Loopville projection mapping area, where children can design their own Loopville resident by selecting the body, head, mouth, ears and accessories on the iPad. Within each of these categories, we provided a variety of options to choose from and allow

further customization via color selections. Our initial design did not offer as large of an array of options or color choices, but the feedback from interview participants reminded us that children may feel a greater attachment to the creature when they can further customize their creature to be more unique from others’.

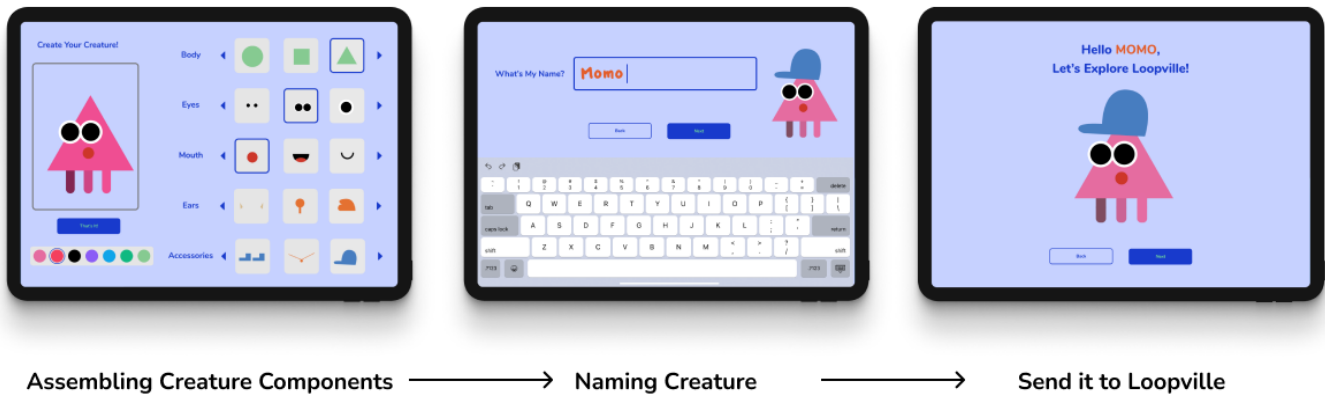


Figure 14: Creature Creation - Assembling the components to customize creature

After assembling their creature, children will need to name it in order to confirm the creation. Our system will automatically animate and pop the creature out in the projected Loopville environment. We hope to augment the child’s sense of attachment when they are able to see their creature out and about in the projected world. This creature will guide the child around in Loopville.

2. Visit Loopville

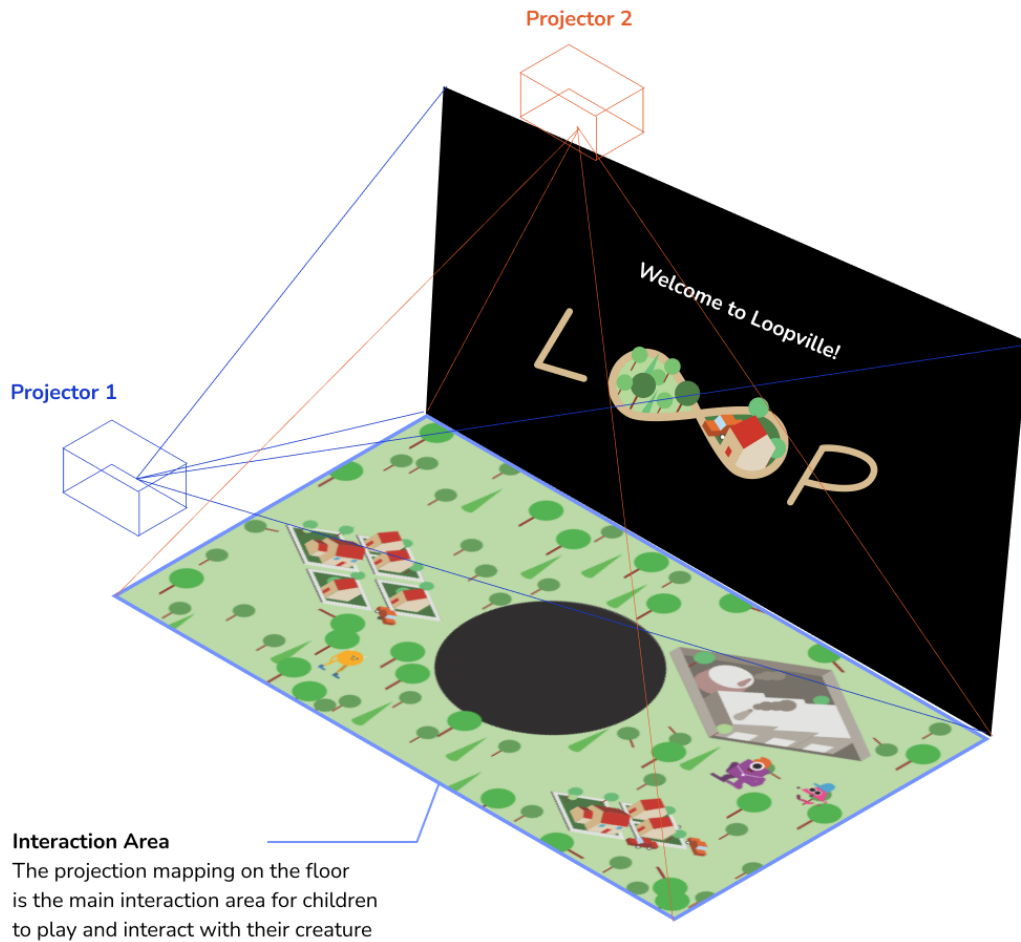


Figure 15: Visit Loopville - Perspective diagram of the projection mapping plan

a. Projection Mapping Environment

To create an environment where children can fully immerse themselves in, we used projection mapping as the main medium. The Loopville environment is created with two projectors, one on the wall, and the other on the floor. See figure 15 for the projectors setup.

The main interaction area of Loopville is projected onto the floor with monsters roaming freely in it. Our design is to allow children to move tangible objects around and see how their creature responds to the placement of the objects.

b. Tangible Blocks

The Loopville experience allows users to move various wooden blocks around the projected environment. We have designed four kinds of blocks in our prototype: House, Factory, Water Source, and Forest. Two of them represent man-made infrastructure, and two others represent elements of the natural world. These blocks are not meant to convey anything good or bad, but merely represent human vs. nature. Though we only designed four kinds of blocks for the prototype, there are some other blocks that we would like to include in future, such as Lakes/Rivers, Farms, Hunters, Roads, Playgrounds, etc, to allow more dynamics in the Loopville environment.



Figure 16: Tangible Blocks - Children playing in the prototype of Loopville

c. Constant Balance in Loopville

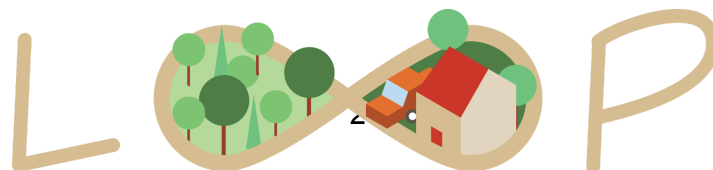


Figure 17: Visualization of the seesaw indicating constant balance

In addition to the projection on the floor, we added a visualization that is projected onto the wall to show the state of balance for Loopville at the current moment. This visualization is animated to move like a seesaw(∞), with the natural world on one side and manmade infrastructure on the other. The ways that the children move the blocks in Loopville will determine which side of the loop sign will be higher or lower. If there is an equal balance between human world and nature world, then the loop sign will be balanced. On the other hand, if the kids put many houses and factories inside Loopville and not any trees, the loop sign will tilt towards the human side, and the creatures will flee from Loopville.

We wanted to keep our game instructions to a minimum, to encourage children to experiment with the relationship between human and nature on their own, and avoid seeking for a right vs. wrong answer. In our initial design, we used color and projection animation to indicate environment changes as some hints for the children. However, this design was iterated after our interview participants suggested that we may want to provide a little more guidance for the children on the overall game purpose, so they don't feel completely lost during the experience.

As a result, we ended up adding a short sentence, "Let's experiment with balance!" under the loop sign projected on the wall, subtly hinting at the children on the concept we want to convey through the Loopville experience, but not defining what's good and what's bad with the idea of balance. Our goal is to leave the judgement to the children on what object they would like to place in Loopville to balance or unbalance the environment.

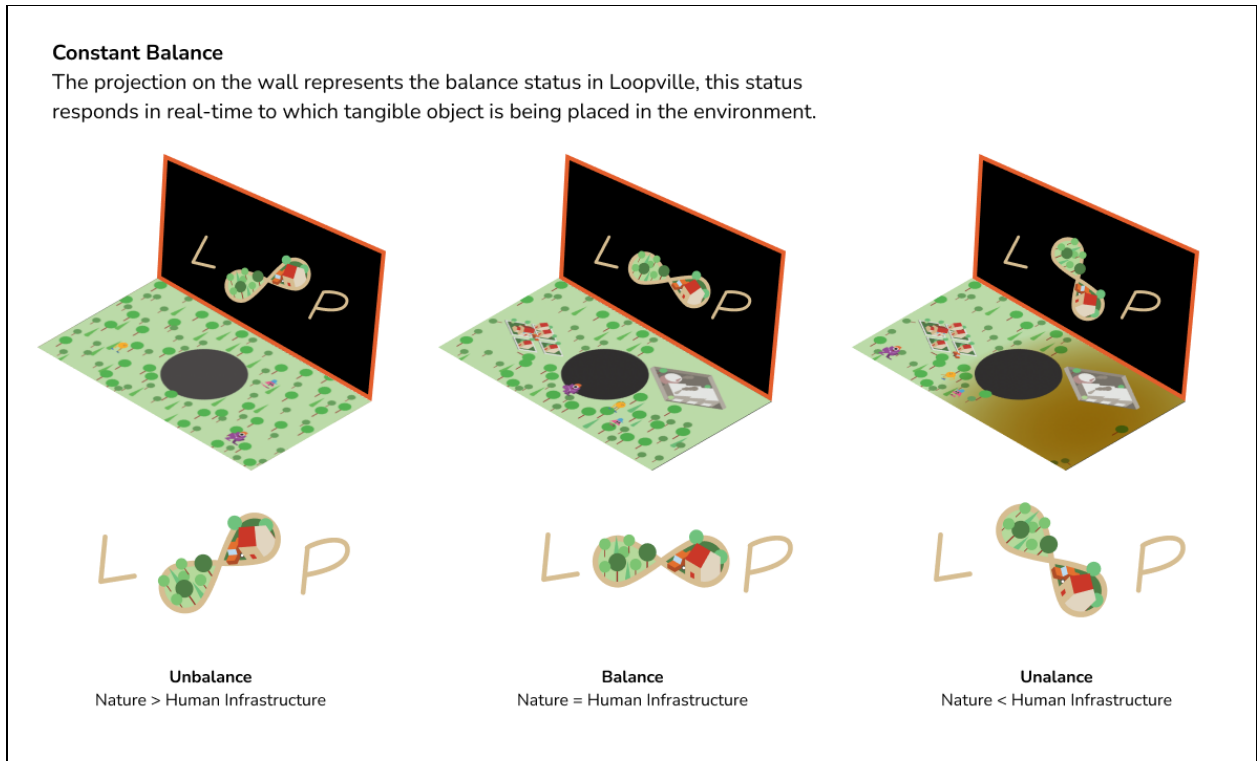


Figure 18: Constant Balance - diagram of the different states of balance in Loopville

3. Reflection

a. Prompts

When children are done playing in Loopville, they can leave the projection mapping area, and go on to the reflection area before they exit the experience. This reflection activity asks children to share how they enjoyed their time in Loopville.

Our main concern for this reflection was to make it engaging for children who are 8 year old, while still understandable to children as young as 5. This was ultimately achieved by asking very simple questions and giving children the opportunity to respond in a variety of ways: voice recording, text or drawing. Children who love typing can choose the text option, while younger children, who are still learning how to read and write, can tell a story verbally. Similarly, children

who prefer to express themselves through artistic manners can choose to draw out their experience.

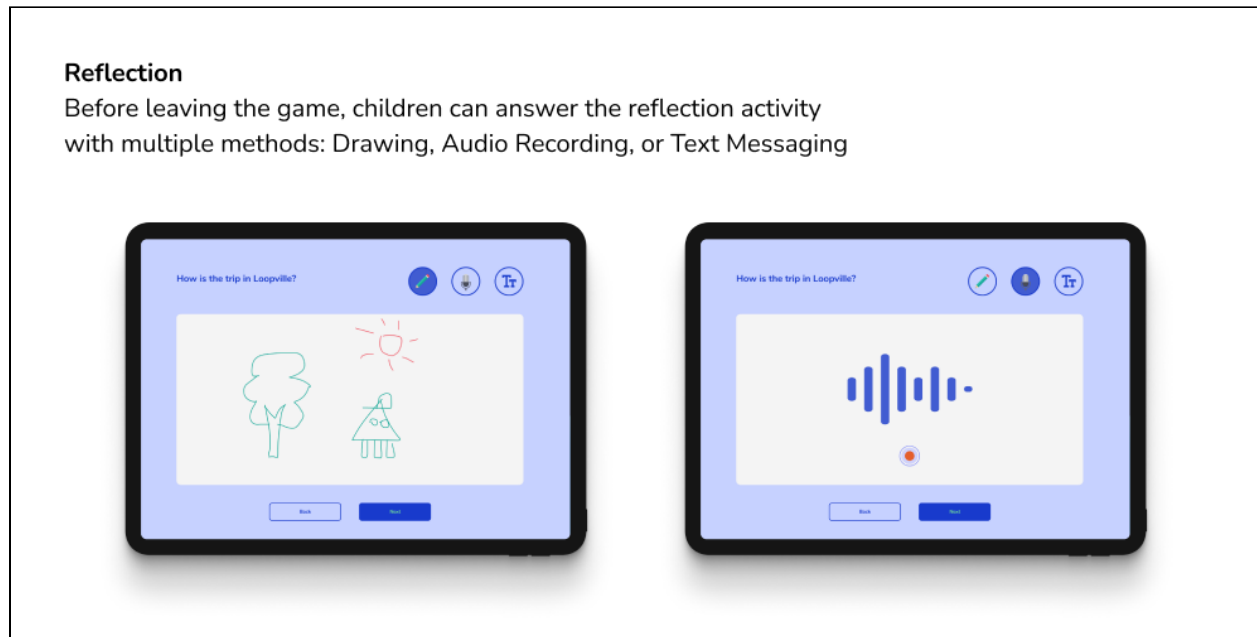


Figure 19: Multiple choices for children to answer questions in the reflection area

This reflection section brings to an end to the game experience in the installation space. However, we designed a complementary mobile application that will allow children to continue their Loopville experience when they go home.

b. Mobile Application

After the children have shared their Loopville experience in the reflection area, they can bring home the creature they created via downloading the Loop mobile app or selecting for a paper printout.

A library of the current residents in Loopville will be presented on the iPad screen in the reflection area. Children can either scroll through the creatures and decide if they want to also download/print other creatures they saw in Loopville today, or search for their own creature by name.

If they selected a paper printout, the system will print out a customized creature's "passport" for them to take home as a souvenir. This passport, shown in figure 20, contains an image of the creature, its name, date of birth and a fun fact about the creature that is randomly selected from a bank of fun facts. The passport will also contain a QR code that can be scanned by any smartphone to download a version of the app that will have the child's creature prepopulated in its bank of creatures. If the child has already downloaded the app from a past visit, they can simply scan the code to add the creature to their collection.

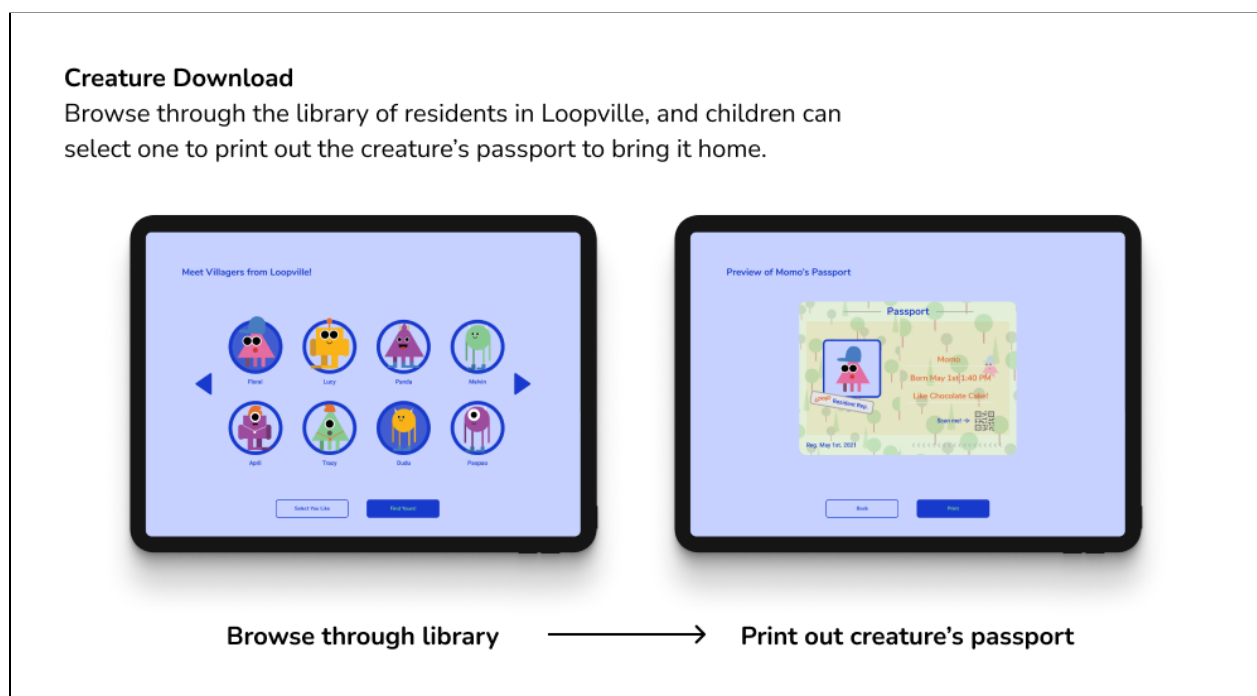


Figure 20: The UI Design of Creature Download

Website

The Loop website is an online resource that was developed specifically with parents and teachers in mind. The goal of this website is to provide a deeper level of detail about issues that inspired the creation of Loop as well more information about the projection mapping game overall. Parents and teachers can navigate to our "explore" section to learn more about different endangered species and their main threats. They

can also navigate to the “game” section to learn about the projection mapping experience and the Loopville environment.

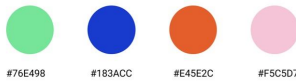
Key Design Elements

- Design system



Colors

Primary



Secondary



Grey Tones (For text or backgrounds)



Fonts

All from Google Font

Nunito

for headlines

Spectral

for highlights or quotes

Roboto

for contents

Typography

Hierarchy	Font	Size
H1 Headline	Nunito Black	56
H2 Headline	Nunito Extra Bold	40
H3 Headline	Nunito Bold	28
H4 Headline	Nunito Bold	26
H5 Headline	Nunito Semi Bold	22
H6 Headline	Nunito Regular	20
Body Large	Roboto Medium	16
Body Medium	Roboto Regular	14
Body Small	Roboto Regular	12
Button	Nunito Bold	14

Example of use



Button

Primary Buttons



Secondary Buttons

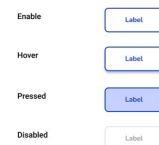


Figure 21: Official design system for our Loop project

Targeting young children, we chose rounder fonts and bright colors to captivate children's attention. Quite often, children's games on the market can use excessive decorative effects and illustrations, which can become a distraction. While building out our design system for Loop, we deliberately removed

unnecessary decorations and utilized simple geometric shapes to keep things simple and to the point.

- Character Design

Three characters were designed for the prototype of the Loop game. These are the pre-populated residents that children will see when they enter Loopville.

Sketch



Illustration

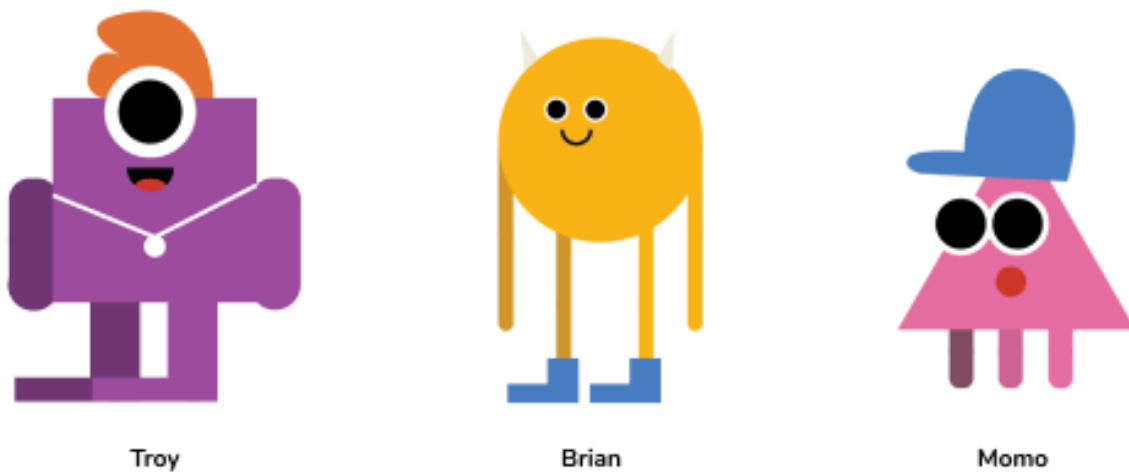
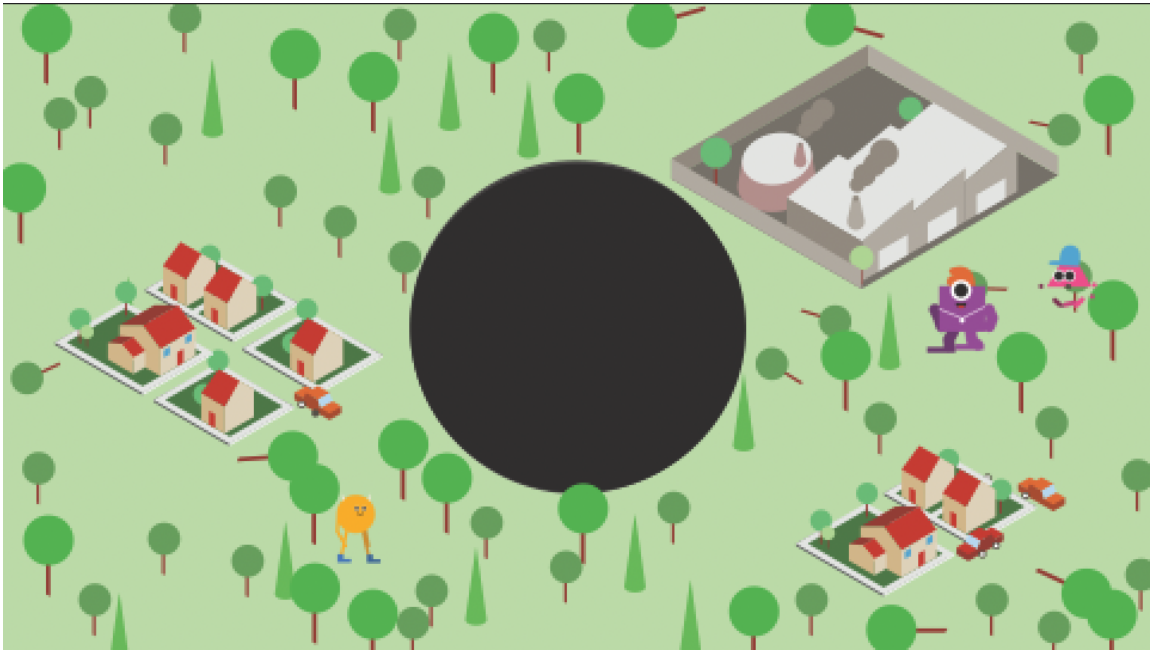


Figure 22: Character design for the pre-populated Loopville environment



- Environment Design

Figure 23: Environment of Loopville

Illustrations responding to physical blocks

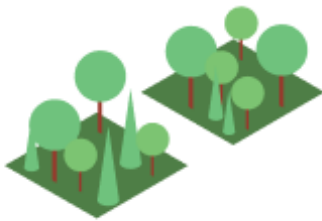
House Block



Factory Block



Forest Block



Watersource Block



Figure 24: Environment elements for Loopville

Prototype

User Testing

To test out our prototype design with real users, we invited three kids, Hana, Mia, and Jasmine, a 2-year old, a 4-year old, and a 7-year old respectively, to play and test out our game across 2 days.

We tested out our creature creation and reflection flow with Jasmine, the 7-year old (see figure 25), and tested out the main interactions flow with all three kids.



Figure 25: Testing out creature creation flow with Jasmine, the 7-year old

Learnings

Overall, the three children really enjoyed the main interactions of the game. We noticed that children at different ages had different focuses with their approach to playing the game. Younger children (Hana, age 2, and Mia, age 4) were excited about the projected creatures running around on the floor and spent lots of time playing with the physical objects: house, factory and tree blocks, while older children (Jasmine, age 7) asked questions about what the game is for and what she is supposed to accomplish in the game before started exploring around the space.

Jasmine found the creature creation flow pretty easy to follow and was amazed when the creature she created, Momo, hopped off of the iPad screen and into Loopville. From testing the reflection flow, we discovered that Jasmine really liked the resident passport

printout that has a picture of the creature she created (figure 26). She (and her sister, Mia too!) not only wanted to bring her own creature home but also wanted a passport with her own picture and name on it.



Figure 26: Jasmine holding the passport of the Loopville resident she created, Momo

Future Considerations

There are several different ways in which we would like to further develop Loop in future iterations, when it comes to the projection mapping, website and mobile application experiences.

Implementation

Although we were able to develop a working prototype for the game experience, the development of Loopville is still in its infancy. A CPHS protocol has been submitted and is currently under review for approval to perform usability tests with children on both the

Loop user interfaces and projection mapping interactions. Through our usability tests with the prototype, we hope we could partner with software engineers to develop a scaled up version of Loop that could potentially be placed in an educational institution in the future.

We also hope that the current design concept can be expanded in the future. The current goal of Loop is to teach children about the broader balance between human and nature, but our design concept interview elicited feedback that it would be intriguing to expand this goal to educate children about how human actions are affecting various habitats of various endangered animals.

We can see that Loopville can be evolved into an intricate world with various types of habitats (such as arctic, desert and rainforest) and creatures with different attributes for children to choose from. This interactive virtual environment has a lot of potential to further evoke children's interests in environmental conservation and wildlife preservation topics.

Projection Mapping Feasibility

We also researched into the technical feasibility of implementing our ideas through object tracking, which led us to 3 possible directions:

1. Kinect Action Tracking ([Link](#))

Kinect is able to track kids' movement which can trigger different animation in the projection to elaborate the loop concept.

2. Lidar Sensor and Accelerometer ([Link](#))

Lidar sensors are able to identify objects' shape, together with the accelerometer which can detect users' movement of picking up and putting down the physical objects on the floor, it can trigger different animations.

3. Force Sensitive Resistor ([Link](#))

Force Sensitive Resistor is able to trigger different animations based on different weights of the objects. In our design we want to include different weights for different objects which can trigger different animations.

Website and Mobile application

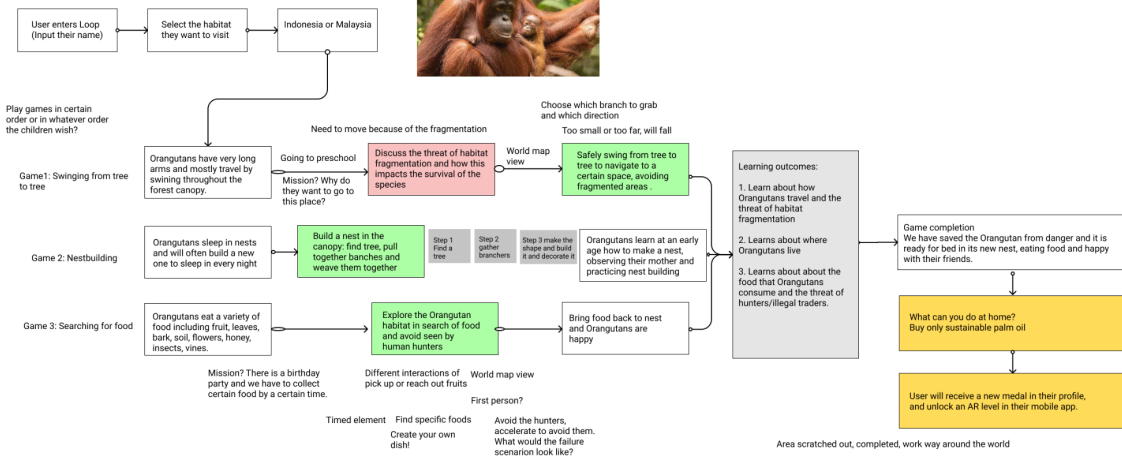
The Loop website currently contains informational content about Loop that is aimed at the parents of elementary school age children. In the future, we would like to incorporate both the website and the mobile application into a part of the whole game experience. Children can seamlessly transition from their physical visit of Loopville to their digital account on our website and mobile application.

We are considering expanding the website to include resources about crafts, activities and educational games that parents can engage in at home with their children. The aim of these resources are for children to be able to continue learning at home about the topics of extinction and balance that they were introduced to in Loopville. We could also include resources aimed specifically at elementary school teachers, which would contain lesson plan ideas that focus on these topics as well. These resources would fill a void that currently exists when it comes to teaching about conservation and extinction.

References

- Appendix 1: Orangutan Game Concept

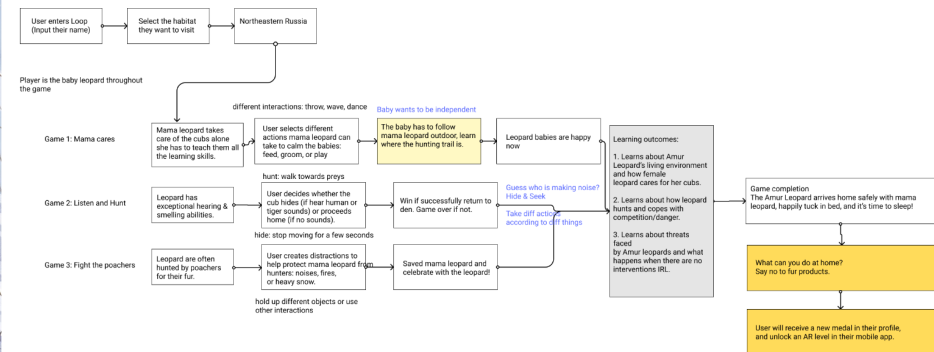
Orangutan Storyline



- Appendix 2: Amur Leopard Game Concept



Amur Leopard Storyline



- Appendix 3: Mural Board of Interview Notes

<https://app.mural.co/t/kimberlysworkspace5615/m/kimberlysworkspace5615/1618787216370/aa6d7df04ce2d22f7201c2cbcb61351ce7180c9a>

- Appendix 4: Figma Prototype of Creature Creation and Reflection

[https://www.figma.com/proto/NPNsMjk4etlkQdKyvtPHuE/Drawing-UI?page-id=0%3A1&nnode-id=79%3A0&viewport=238%2C297%2C0.022082554176449776&scaling=scale-down](https://www.figma.com/proto/NPNsMjk4etlkQdKyvtPHuE/Drawing-UI?page-id=0%3A1&node-id=79%3A0&viewport=238%2C297%2C0.022082554176449776&scaling=scale-down)

- Appendix 5: Animation for our prototype

<https://drive.google.com/drive/folders/1cKNXFvq0rL-Vi8K4v3RQt2zikYJ3jDB3?usp=sharing>

- Appendix 6: Photos of prototype and user testing

https://drive.google.com/drive/folders/1XAG8YQmj1yX1U_OrP0GrcoNt-yuEJAf?usp=sharing