rE-COLLECT

PROJECT GOAL

Our goal is to enable participants to shift perspective on the value of electronics, and the decisions they can make regarding their acquisition and disposal towards reducing the negative impacts of e-waste on climate change.

Project Video: https://youtu.be/xj1lj1eQFMI

/01
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MOTIVATION

From research, we found large factors of how e-waste affects climate change. **Improper disposal of e-waste causes chemicals to be released in the air** (Climate Institute, 2018) **and valuable materials to be lost.** According to a 2017 UN report, "...80% [of global e-waste likely] made its way to a... **landfill**." Also, **manufacturing new electronics** has large greenhouse gas emissions. According to Apple's 2018 environmental responsibility report , "77% of [their electronics] carbon footprint comes from their manufacture, versus the 17% that comes from actual use." This informed our goal, environment, and dynamics of reuse/repair, replace, and recycle.

USER EXPERIENCE

The UX is intended to be engaging and approachable while allowing participants to **feel comfortable, in-control, and curious about their objective**. This is done through the narrative of visiting an otherwise hard-to-experience landfill site as a robot and communicating what is normally facts and figures through interaction. This includes the toxicity of new vs old devices, collecting materials that can still be recycled by mining devices, and allowing participants to make the decision to repair or replace their mining tool when it breaks.

These features **tie participants actions to effects on the virtual environment. This is intended to help participants remember these actions to enable stronger reflection** post-VR when asked about how they treat electronics.

METHODOLOGY

Design approach: we applied design activities from Google's Design Sprint process to translate research into ideas that were brought together to form our concept. It was developed through the application of weekly meetings using Slack and Google Hangouts along with tasks using Asana. These tasks included creating rough specifications for features using Figma which were then loosely implemented for weekly prototypes/user tests.

Technical implementation: we used Unity, Unity Collab and the SteamVR SDK. This included teleporting, UI, and pickupable interactions, along with delegating handling of custom behaviors that interface with SteamVR. Multiple systems were developed to keep track of participants' actions and dynamically change the scene. This included enabling and disabling teleport zones, particle effects, fog, and objects. Audio and animation components were also implemented as feedback for participants' actions.

IMMERSION FRAMEWORKS

Although we referred to concepts of Game Immersion and Flow, the **Media Immersion Framework** acted as our foundation.

Sensory Immersion is used to increase sense of presence and reduce external distractions. Visuals coupled with ambient sounds create a sense of atmosphere and the environment allows participants agency to move in different directions. Sound is used to provide immediate feedback for interactions to align with participants' expectations of how objects react. **Challenge-based Immersion** is used to provide motivation through an objective and set-backs. **Imaginative Immersion** is used by allowing the participant to use the narrative and environment we present as a foundation for their subjective experience.

CONCLUSION

From what was tested/showcased remotely with few participants, interactions and dynamics of cause-and-effect were understood. Through iteration it was found they usually needed to be improved through further exaggerating the effects, not only to ensure they are seen, but so they are remembered for post-VR reflection. Our hypotheses for task completion were confirmed in that the number of the number of activities the participants completed and the few actions they took to do so were appropriate for the intended duration of the experience and the meaning for effect we wanted to imply in relation to our goal.

Next steps: test newly implemented fog effect that intends to better exaggerates the effects of choosing to print a new device, along with changing the appearance of a newly printed tool versus a repaired tool versus to be more appealing in order to make the difference more obvious, and provide another variable that influences the participants decision.