

## FROM SLUMS AND SHELTERS TO A NORMAL LIFE

UN Sustainable Development Goal 11: Sustainable Cities and Communities

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### ABSTRACT

Around the world, numerous regions are burdened by the presence of sprawling slum areas, where impoverished communities contend with substandard living conditions, inadequate infrastructure, and environmental contamination. These densely populated areas are characterized by substandard housing, the absence of basic services, and one most important thing is limited access to clean water and sanitation. This problem is caused by environmental pollution which intensifies the already challenging living conditions, jeopardizing the health and well-being of their residents.

This abstract draws attention to the critical issue of slums and their associated issues, emphasizing the need for individuals intervention and transformation. Tackling this complex challenge demands a multi-faceted approach that includes improved housing, sanitation, and environmental remediation. By addressing these issues, we can not only enhance the living conditions of slum residents but also work towards creating sustainable, healthier, and more equitable urban environments, thus fostering social and economic development on a global scale. This project is a virtual reality experience developed for the CAVE2™ Virtual Environment which places the user in the slum area and leads them through the difficulties this poor community faces and how they can support these people to improve their living conditions.



Figure 1

## **KEYWORDS**

Virtual Reality (VR), Unity 3D, Slums, Communities, Pollution, Recycle, Sustainable

## **ACM Reference Format**

Vi Nguyen and Irbi Haxhillari. 2023. From Slums and Shelters to a Normal Life, UN Sustainable Development Goal 11: Sustainable Cities and Communities

## **INTRODUCTION**

The United Nations (UN) Sustainable Development Goal 11: Sustainable Cities and Communities specifies many targets to make cities and human settlements inclusive, safe, resilient and sustainable [1]. The goal of target 11.1 is to “ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums” by 2030 [1].

Therefore the project “From Slums and Shelters to a Normal Life” is to create a stark contrast between the unsanitary living conditions of impoverished communities and the lush, green urban environments. The ultimate aim is to advocate for and facilitate initiatives that support struggling impoverished communities in these slums in transitioning to cleaner, healthier, and more sustainable living environments. By doing so, it seeks to contribute to poverty alleviation and improve the overall well-being of these communities.

## **RESEARCH**

### **Problem**

At the capital of Madagascar, there is a unique community in which it is one of the poorest slum areas in Antananarivo, named Manaritsoa. The area is so poor that the people living there don't have jobs, no healthcare, and no education. To make matters worse, the government does not give any help to the community at all so these people need to recycle trash in order to survive. Families between three to fifteen individuals live in small, cramped shacks [2]. Another way they survive is by going to the garbage dumpsters to collect various recyclable trash such as cans and plastic bottles, so that they can put it in front of their homes in order to sell them, and make only about 5000 ariary per day, which is 1.10 euros [3].

### **Concept**

Many individuals know about the hazards of poor living conditions, which details poorly built houses, barely enough food to eat, and trash being found all over the many floors, whether it be outside or inside the houses. The tons of dirty trash also brings CO<sub>2</sub>, and smoke from individuals burning the

trash in order to get rid of it, which brings pollution to the air and makes it difficult for individuals to breath dirty polluted air. In this project, we will see an example of a slum that is not only covered by many garbage in their living area, but also smoke and CO2 causing air pollution with the lack of green which leads to several health conditions. As we cross the slum area, we will find solutions to help this community.

### Solution

In order to solve these problems, we need to identify the various problems and the harm that it brings to the individuals and the environment. The solutions that can be caused to solve these problems are more housing materials being brought to the community which the people can use to build better houses, or reinforce the poor, broken houses that they are currently living in.

One of the solutions is by Eco-Design that individuals can collect objects which are recyclable and non-toxic, and re-use the materials to create various furniture such as chairs, tables, benches, and stools [4]. The objects can be from various materials such as plastic, glass, metal, and wood [5]. Another solution is the use of photo-synthesis, in which plants take CO2 and smoke and turn it into clean O2, making the environment cleaner than before [6]. On the other hand, people can grow various fruits and vegetables in the community to eat and drink, or they could sell them to various other communities in order to trade them for other objects of need.

### PROJECT DEVELOPMENT

Unity is a game development platform used to create interactive 2D, 3D and virtual reality experiences. The version we use in this project is Unity Version 2019.2.11.

### Storyboard

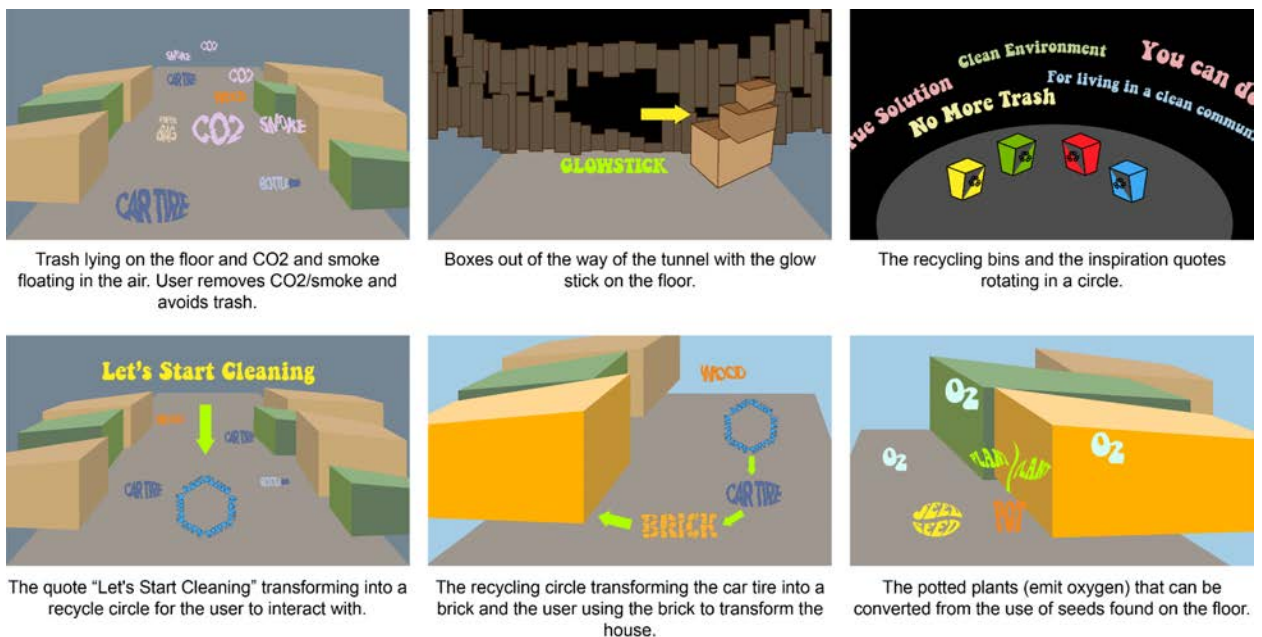


Figure 2

## Model

To create a filthy slum area, the 3D models used were broken houses, metal or wooden shelter. Different materials and types of shelters in 3D models were utilized to represent the sprawling slum area with substandard living conditions and housing.

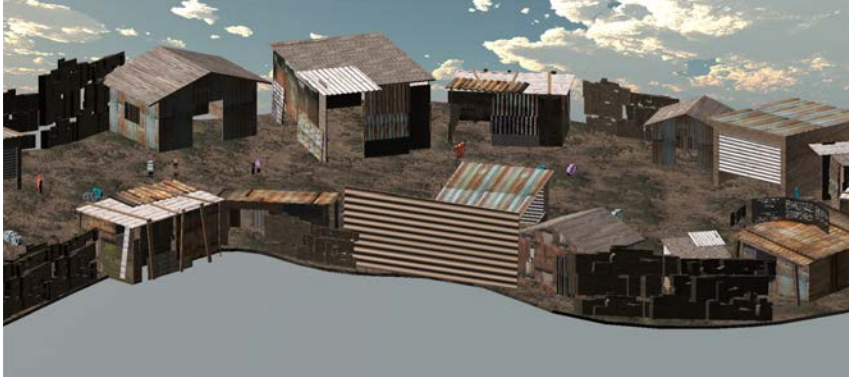


Figure 3

## Typography

The focal point of this project was the use of 3D typography for interaction throughout the project. The typography was designed to adapt the basic shape of the actual object and the choice of typography focuses on certain things that possibly appear in the slums. Such as trash that can be found on the streets, everyday objects that some people use, inspirational quotes that inspire people to become productive and willing to make a change, and different types of furniture that can be made from recycled materials, as well as recycled materials.



Figure 4



## PROJECT INTERACTION

At the very beginning, the user finds themselves in the slums with garbage in the floor at the path in front of them as well as CO<sub>2</sub> and Smoke floating in the air, with broken homes at the boundaries of their path. The user will press the right button to turn on sounds, which are the sounds of traffic noise and people speaking. The user will have to move forward through the path, avoiding the trash on the floor and walking up to the CO<sub>2</sub> and Smoke and interacting with it in order for the CO<sub>2</sub> and Smoke to disappear. The interaction will be grabbing the CO<sub>2</sub> and Smoke and in a second, the Smoke and CO<sub>2</sub> will disappear.

When the user has gone through the path, the sounds will fade and the light will become dim, and the user will find some boxes blocking a hole on a fence that the user will need to move them away in order to cross the hole on the fence. While the user is moving the boxes, the user will find a glowstick on the ground, which the user will need in order to go through the hole on the fence. When the user crosses the fence, the user finds themselves in a dark room which they would need to turn on the glow stick with the up button in order to see what's inside the room. Here, the user will see many inspirational quotes, such as “No More Trash”, “Clean Environment”, “For Living in a Clean Community”, on the wall spinning around and the user will learn what to do to help the slums. The user will find recycling bins and a trash bag, in which the user will need to interact with in order to progress. The user will pick up the trash bag and then the user will find themselves at the beginning.

The user will find the quote “Let's Start Cleaning” in front of them, in which they will need to interact by grabbing it, in which it shall disappear after a second and a new object will appear which is a recycling circle. The user will pick up the recycling circle and use it in order to interact with the garbage on the floor such as the car tires and bottles, which will turn into various objects such as bricks and seeds. The user will take the bricks and use them on the broken walls found on the broken homes in order to make a brand new wall. The user will take the seeds and use it to interact with the top of the pots found in various places in order to grow a plant which will bring O<sub>2</sub>. Various car tires and wood will be recycled into wooden furniture such as tables and chairs. When the user has finished using the recycling circle on all the trash, the user will reach the end of the project.



Figure 5

## PROJECT EXHIBITION

The exhibition of our project took place at the University of Illinois Chicago Electronic Visualization Laboratory (EVL) on November 8, 2023. Rather than being launched through Unity's Game View through a laptop, the project was configured to be displayed at the CAVE2 Hybrid Reality Environment, a virtual reality room-scale display where all 40 audience members could watch and learn about each classmate's various projects. The project has successfully presented with the collaboration of the global IBM Design+Technology+Theater Group.



Figure 6



Figure 7

## **CONCLUSION**

In conclusion, we believe that our project shows best on how to apply various solutions to the many problems found in the Slums, and how they make the problems from hurting the environment and the community, to helping the community and environment. These solutions will bring a stronger and cleaner community to the slums than before. This project brings the importance of community as well as advocating for a change to the community through various actions. Throughout the story, the audience is lectured about the challenges and problems that people living in the slums face on a daily basis. The interactions in the story help to bring to the audience the idea of change in the slum community for the better and how to do it.

## **ACKNOWLEDGEMENTS**

Thank you CS 427/DES 350 for bringing us this opportunity to collectively think about a global problem and how to think about the creative solution for it. As well as the CS 427 Discord that helps us get in touch with the teachers and TA's so that we can ask for help on the project whenever we were in trouble and needed help, whether it be for coding in Unity engine script, and Unity engine objects and components.

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