SOLUTIONS TO
ACCESSIBILITY IN ART & DESIGN
A MULTI-SENSORY ART INSTALLATION

OLIVE ROBERTSON | SENIOR PROJECT | GRC SPRING 2022
TABLE OF CONTENTS

About Me 2
Abstract 3
Problem Statement 4-5
Project Objectives 6
Success Criteria 7
Timeline 8
Research 10
Mood board 12
Ideation 13
Painting Process 14
Textures 15
Conductive Paint 16
Wiring & Set-Up 17
Code 18
Audio 20
Links 22
I’m Olive Robertson, a graduating Graphic Communication student concentrating in Design and Reproduction Technology.

I’m inspired by creatives such as Jim Carrey, Wes Anderson, and Kermit the Frog. I love everything creative and am extremely passionate about all things Art & Design.
For my Senior Project, I wanted to explore possible solutions to accessibility in Art & Design while narrowing my focus specifically towards visual impairments by applying techniques commonly used in printed electronics methodology. I wanted to further showcase the impact of how designers enhance the overall user experience when they choose to center their focus on designing for accessibility.

To tackle accessibility challenges in Art & Design when it comes to visual impairments, I would have to extend Art’s visual impairments to include senses other than sight—tactile and auditory. The final product would then be an interactive art piece that not only is visually appealing to the user, but functions as a sensory board and musical instrument.
When we fail to consider accessibility in Art and Design in addition to it's visual-centric foundation, the experience of enjoying art becomes completely exclusionary to an entire group of individuals with visual impairments and forms of blindness. In order to allow everyone to have the opportunity to experience art, we must expand our preconceptions of the typical artwork to include senses other than sight.

This project will tackle these accessibility challenges in Art and Design by creating an interactive art piece that appeals to multiple senses—visual, tactile, and auditory. In addition to aiding a more narrow subgroup of individuals with visual impairments and forms of blindness, it presents an opportunity for an enhanced user experience and aesthetic value to the general user.

This will be achieved by first creating what we consider to be a typical visual-centric art piece and then adding textiles, textures, capacitive touch sensors, and a partnering auditory element that will play when triggered by the sensor.
1 billion people globally live with a moderate or severe form of visual impairment or form of blindness.

Art & Design communicates through Visual Language, therefore, groups who can’t rely on sight become excluded.

In order to allow everyone to have the opportunity to experience art we must expand our preconceptions of art’s visual foundation and appeal to senses other than sight – such as tactile & auditory.

In addition to aiding a more narrow subgroup of individuals with visual impairments and forms of blindness, it presents an opportunity for an enhanced user experience and aesthetic value to the general user.
PROJECT OBJECTIVES

Find Solutions to Accessibility in Art & Design

Create a Visually Appealing and Technically Executed Large Scale Painting

Expand Preconceptions of a Typical Art Piece to appeal to senses other than sight such as Tactile & Auditory

Use Printed Electronics Applications to Create a Painting that Functions as an Fully Interactive, User Friendly Musical Instrument
SUCCESS CRITERIA

Find Solutions to Accessibility in Art & Design

Does the project apply inclusive practices and accessibility for groups that classify with visual impairments and forms of blindness? Do the interactive elements enhance the experience of the art piece for the general user?

Create a Visually Appealing and Technically Executed Large Scale Painting

Is the piece aesthetically pleasing and offer deeper introspection for the viewer? Is the artistic quality and electronics component neat and technically executed?

Expand Preconceptions of a Typical Art Piece to appeal to senses other than sight

Does the piece challenge preconceptions of what users consider to be a typical art piece? Does the piece appeal to multiple senses?

Use Printed Electronics Applications to Create a Painting that Functions as a Musical Instrument

Would the viewer consider the piece to meet the criteria of both an art piece and an instrument? Does the audioprinted electronics element of the piece function fluidly, consistently, and without flaws?
**TIMELINE**

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My research was broken down into four parts; Visual Impairments & Forms of Blindness, Accessibility Techniques in Design Related to Visual Impairments, Printed Electronics Applications, and Electrical Paint & Bare Conductive.

I needed to start my research by exploring the different types of visual impairments, statistics on the population effected, and then I could begin to research best practices and other solutions for how Museums, Artist, and others apply multi-sensory applications for accessibility.

1
Visual Impairments


2
Accessibility in Design Related to Visual Impairments


I could then take my findings and find intersections between accessibility as it relates to previous printed electronics applications.

Taking inspiration from previous printed electronics techniques, I then had to learn about electrical paint and the company Bare Conductive whom specializes in this material in order to start creating my project.
My mood board takes inspiration from the intersection of the modern day house music scene and the 1970's club scene. I aspired to celebrate themes, cultures, and figures from music while including elements that would work to include various textures.
Using Photoshop, I collaged various pictures from my mood board in addition to playing with various color themes which I could use as a reference for my final painting.
PAINTING PROCESS

"Boiler Room"
Mixed Media on Canvas
36x48 in.
Adding textures allows it to function as a sensory board and users are encouraged to touch all parts of the painting. The added textures make the painting look more realistic, give it a 3D quality, and enhance the overall sensory elements.
CONDUCTIVE PAINT

In order to create sensors, I used Electric Paint, a black water-based, non-toxic paint that conducts electricity when it has dried from Bare Conductive. I painted 20 sensors in total, to make 20 different sounds when triggered by touch.

The buttons on the bottom of the painting use electrical paint. When touched, it triggers a signal to the soundboard and plays the audio.
WIRING & SET UP

Front of Painting: Conductive paint recolored with nails through the center.

Back of painting: Alligator Clips Attached to nails and copper tape

Connected to soundboards and speaker
The blue and pink sensors are connected to a soundboard programmed with a **HID keyboard** Arduino code, connected to **Soundplant 50** application.

This allows live loops to be played **Polyphonic**, or multiple buttons to be pressed and played at the same time. I uploaded 12 tracks to parallel different keys on my keyboard.
The 8 red and orange sensors are connected to a soundboard programmed with a **MIDI Piano** Arduino code. I then changed the code to play a **drum kit** instead of piano sounds.

To hear the audio, the blue and pink sensors require a computer connection. The red and orange sensors can work connected only to a power source as long as a speaker or headphones are attached.
Full Beat made on Logic Pro application

Beat modified to be individual stems for the user
Stems exported to twelve individual .wav files to be uploaded to Soundplant 50 application.

Because the blue and pink sensor’s audio functions without a Midi code, I made a full beat using Logic for reference of what music can be played using the painting.

I then changed the tracks to be individual stems, making sure to trim the time-frames to work in sync with all stems.

The tracks were the exported individually as 12 separate stems and renamed TRACK000 – 011 to be read by the soundboard.

Using Soundplant 50, each stem was programmed to be triggered by W, E, T, Y, U, A, S, D, F, G, and H on my keyboard.
WATCH A VIDEO OF THE PAINTING IN ACTION HERE
LISTEN TO THE
FULL SONG ON
SOUNDCLOUD
HERE