

Senior Design Project Data Sheet

Project #	Project Name	Project Track	
21068	Robotic Art Assistant	Biomedical and Assistive Devices	
Start Term	Team Guide	Project Sponsor	Doc. Revision
2205	Art North	Kids Making Miracles, Inc.	Rev. 1

Project Description

Project Background:

Students with varying physical capabilities have trouble actively participating alongside the teacher and their peers throughout art class. Modifications currently include hand-over-hand drawing with an aid which gives the student little to no independence. Also, there are implementations, such as tennis balls or special handles, to increase the width of art tools and allow for easier gripping. These implementations do not provide the students with a fully successful experience. The Robotic Art Assist aims to change this, by creating a device that responds to user input through a variety of adaptable interfaces and produces a physical creation at the end of the process. The goal of this project is to increase inclusivity in art education, like how P20068 Robotic Drum Assist aimed to increase inclusivity in music education.

Problem Statement:

The main goal of the project is to design and test a device that allows students with varying abilities to participate in art education alongside their peers. The Robotic Art Drawing Assist device should allow students to control a variety of sizes, colors, and mediums to create collage paintings with some independence in a 30-minute art class.

Objectives/Scope:

1. Adaptable controls for easy use with limited movements and standard wheelchairs.
2. Optimized device and control interfaces to allow for the inclusion on students with varying physical and mental abilities.
3. Varying tool holder design that is compatible with many different tools, including pens, pencils, paint, and markers.
4. Design of device to produce physical artwork the students can bring home with them after class.

Deliverables:

- Functional device that produces a physical end drawing/painting based on student input.
- Training and maintenance documentation.
- Finalized paper, poster, and Confluence page.

Expected Project Benefits:

- More independence for students of varying abilities in art class
- Successful drawing/painting completion by the device

Core Team Members:

- Andrew Pasek – Project Manager
- John Owens – System Engineer
- Kaitlyn Pohler – Facilitator
- Allison Morgan – Purchasing
- Dylan Lebedin – Communication
- David Nwokolo – Documentation
- Josh Kolosick – Team Member
- George Heltz – Team Member

Strategy & Approach

Assumptions & Constraints:

1. The device needs to be portable and easily taken down and set up due to the customer's mobile classroom. This brings up stability and reliability concerns with the design.
2. The team needs to understand the students' ranges of motion and abilities to design a suitable set of control interfaces.
3. It is assumed the device should fit on a table and have movable controls to allow them to be placed within reach of the student.
4. The proposed budget for the device is \$1,000.

Issues & Risks:

- The project and design process are new to many team members.
- Due to COVID-19, there is the risk that some/all the team will need to quarantine at some point. This could lead to delays in progress and falling behind schedule.
- The team needs to investigate designing a drawing interface, such as an x-y plotter, or purchasing one. The lead times, cost, and compatibility could be risks with purchasing one, and increase complexity and integration could be issues with making one.