Project Statement

Head-Mounted and Arm-Mounted Adaptive Art Squigglers

NSF Sponsored Project

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Statement of Need:

Often times the creative potential and needs of people with special disabilities are overlooked. There should be more resources available to permit these individuals to fully showcase their creative talent. The goal of this project is to create a specialized art squiggler system that would allow people with cerebral palsy and hydrocephaly to be able to fashion works of art. With the aid of this system the client will be free to draw or paint, despite their everyday constraints of limited head and hand movements. The head and arm mounted art squiggler system will decrease the work and stress on the client while expressing their creative side.

Basic Preliminary Requirements:

The device we are proposing to make has to be specifically catered to our client Stacey, who has both cerebral palsy and hydrocephaly. Cerebral palsy is a broad term used to describe disorders with disrupted control of movement due to brain injuries. Hydrocephaly, on the other hand, is a buildup of cerebrospinal fluid in the ventricles of the brain that can compress and damage the brain. The weight of Stacey’s head complicates her head movement. Also, her arms have very little movement and motor control. This affects her ability to be able to hold simple artist tools to paint.

Some constraints must be taken into consideration to properly cater to our clientele. Stacey is our main client; however others with other motor handicaps at the Passion Works Art Studio may be using our squiggler system in the future. Since this device may be used on multiple people, the head mounted squiggler must have a comfortable and adjustable head strap or other mounting device that can cater to head sizes of all circumferences. In addition, the hand or wrist component must be lightweight and be able to fit multiple people. Both head and arm pieces have to be lightweight and be compatible for mixed media such as markers, crayons, paintbrushes, and colored pencils.

Due to a limited range of motion in the client, a contraption to amplify minimal movements is necessary to create random patterns and shapes for the artist. These arm and head devices will be useful for the artist to create patterns without motor control, but with simple brush to canvas contact. Also, the safety of the user ought to be kept in mind. Therefore, no sharp edges will be present in the system. The center of balance of the system should not cause neck pain or general discomfort to the client. Hence, most of the system’s weight will be proximal to the head.

Basic Limitations:

The units should be aesthetically pleasing, as well as durable and easy to clean so that the users and/or caretakers will not be inconvenienced. The squiggler ought to be inexpensive, but at the same time serve its purpose. The squiggler system should be easy to set-up and store. The system will be comfortable and have the appropriate materials for the type of environment it will be located in. The overall project has a maximum construction cost of $750.
Other Data:

The purpose of the Passion Works Art Studio “is to inspire and liberate the human spirit through the arts.” The artist mentioned earlier, Stacey, longs to convey her visionary talent through drawing and painting. Unfortunately, hydrocephaly and cerebral palsy have put a damper on her efforts.

Prior attempts to create a solution to her limited motor skills have lead to awkward and unsuccessful tools. For example, she has used a rudimentary device composed of a paintbrush and marker attached to goggles. She was unable to make designs, squiggles, or shapes with this set-up. Stacey requires an adaptive head-mounted and hand-mounted system to hold and properly control paintbrushes and markers in a comfortable and user-friendly manner.

Questions:

• What specific form of cerebral palsy does Stacey have and what limitations does this entail?
• Will Stacey be using this device to paint on a table mounted to her wheelchair or to paint on an easel?
  o What will be the angles to the drawing surfaces?
  o Is there a certain length that the system ought to extend out to?
• Are there any particular shapes desired for the device to “squiggle”?
• Should the unit be motorized or simply mechanical in nature?
  o If motorized, will it be best for it to run on batteries or AC power?
• Does Stacey want to use any other media besides markers, crayons, paintbrushes, and colored pencils?
• Will Stacey or any of the other artists at Passion Works want the squiggler system to be portable?
• Are any of the artists allergic to any metallic, plastic, latex materials, or any other pertinent allergens?
• What are the ranges of the head circumferences?
  o If need be, will there be a way for Dr. Hallowell to measure their head sizes?
• What are the approximate wrist sizes of the artists? Will they allow the use of Velcro?
• What are the specific motor function abilities of the clientele? What is the extent of what they can or cannot do?
• Do they want any accessories such as a button to automatically refill paint or anything along these lines?