Project Statement
A Different Adjustable Easel

Easel 5000
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Project Statement

Statement of Need:

This project is meant to benefit an artist having a number of motor function disorders affecting strength, dexterity and range of motion. Previously, an adjustable easel was designed in 2003, but did not completely fulfill the needs of the artist. The first design did not have the adjustability needed by the artist. It also had a motor that the artist had difficulty using, and was a tripping hazard at the location where it was used. The ultimate goal of the current project, Easel 5000, is to create a new design better suited to meet the needs of the current artist and address the design flaws of the first easel.

The artist is in need of an easel that can be easily adjusted. Since the artist has a very limited range of motion, painting with a static easel is incredibly difficult. The artist also cannot use a standard easel with legs due to the fact that he is in a wheelchair. An easel would need to account for wheelchair dimensions in order for the artist to use it. In addition, the artist is unable to paint unless the easel is closer to him.

Preliminary Requirements:

The easel has several requirements to consider in the initial designs. The surface where the canvas will be placed must be able to project forward. This is essential due to the extreme lack of the artist’s range of motion. If he is unable to get close enough to the easel, it will be extremely difficult for him to use. The artist’s moving capabilities require the easel to be dynamic. Movement of the easel includes tilting along the horizontal axis so that the canvas bottom and top are able to tilted closer or father away from the user by use of a ball joint. After the canvas is tilted, in order for the user to paint on it, the canvas must be able to mechanically lock in place without use of any electronic parts.

In addition, the canvas’s surface must be illuminated by a light source that draws power from a cordless power supply and have a user friendly designed on/off switch. The easel must temporarily mount on a table and be an appropriate size for the artist. Both the necessity of a cordless power supply and mountable design of the easel are to eliminate safety hazards at the location of painting. The past design for this easel had legs and a power cord that was considered a tripping hazard for the handicapped artists and aids. The design for the easel must consider a lighter-weight easel, since the easel shall be attached and removed from an art table frequently. Finally, the easel’s range of motion should allow the user full control of the painting surface in order to allow him to paint while still having the limited range of motion.

- Canvas surface needs to project forward
- Canvas surface must tilt at the horizontal axis
- Mechanical locking capability
- Light source
  - Easy on and off switch
  - Cordless power supply
- Ball joints used to position easel.
- Attachable base (must be able to attach to an art table)
- Appropriate size for client
Limitations:

Several design limitations must also be observed. Any electrical energy required for any part of the design must come from a cordless power source. As a result, it is doubtful that motors can be utilized due to power requirements. This means that any adjustable movement of the easel will most probably be purely mechanical. The size and weight of the easel are also limitations. The easel cannot be too large or else it will not fit on a generic art table, but also not too small in order to accommodate for a variety of canvas sizes up to 20”x20”. Since the easel must be fastened onto this art table and easily removed, the easel must not weigh too much or else an aid will not be able to put it into storage after use. The easel project is also limited by the financial cap of $750 for materials and parts.

- No motors can be used
- No wires can lead away from the easel
- Budget of $750
- Canvas size
- Size, weight

Other Data:

The Easel 5000 project is to be designed specifically for Tom Depugh and is meant for use in a large art room located at the Passion Works Studio for people with impairments. Tom has the limited ability to tilt his head and grasp things due to an automobile accident. He is a 46-year-old man with cerebral palsy, dysarthria, moderate cognitive impairment (MR), visual acuity trouble, limited dexterity, and limited upper body movement. His mobility is controlled by his wheelchair, which also limits the height at which he can paint. Although this client has lost much of his ability to move his upper body, he is extremely talented painter and it is a hobby that defines him. He specializes in painting on large canvases with acrylic paint, though now has trouble covering the entire surface of the canvas.

Questions:

How is the canvas to be fastened to the backboard?
What are the joints going to look like?
How is the light going to be powered?
What types of materials is the easel going to be made of?
How is the easel to be fastened onto the table top?
What type of lighting source is to be used?
How will the easel be stabilized?
How will the locking mechanism work?
How will the light source be attached?
What is an ideal weight for the easel to strive toward in the design process?
Technical Areas:

Areas that are used in this project consist of:
  • Communications
  • Control
  • Computer programming
  • Instrumentation and analog electronics