Project Statement
Easy Easel

TEAM # 4
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NSF Sponsored Project

Client Contact: Brook Hallowell, Ohio University, (740) 593-1356
Statement of Need

This project will be to create a drawing easel for people with special disabilities. In a previous project a client was designed a version of an easel which did not completely fulfill his needs. The movement of the easel that was created was more restricted than desired by the client. The mechanics of the original easel allowed for lateral motion as well as vertical motion, however the vertical component failed. Other problems with the original easel were that the base support was too bulky and the unit was difficult to store when not in use. The client also wishes to have the easel powered by a wall outlet instead of batteries to eliminate the need for recharging. In addition the unit also needs to have overall slower movement so that the user has greater control over the device.

The easel had no mechanism for restricting movement of the drawing surface beyond its maximum range of motion. Due to the limited cognitive abilities of the users this was highly unsafe. Wires are also exposed, and posed another safety concern for the user. The supervisory staff also requests a master shut-off switch to prevent the accidental injury of other artists in proximity.

Basic Preliminary Requirements

The client for whom the project is proposed suffers from cerebral palsy, limited dexterity, visual acuity trouble, and moderate cognitive impairment. He is also confined to a wheelchair. However he has a passion for art and wishes to continue to paint despite his disability. Current products on the market are costly and do not adequately meet the client’s needs or are too complicated to operate. For example, one product found already on the market, is designed cater to the needs of someone with only limited mobility, but not for a person with additional handicaps. The needs of our client require an easel that is simple and efficient to use as well as one that caters to those lacking fine motor skills. In order to accomplish this, the client requests the use of joysticks to control the movement of the easel.

Basic Limitations

The unit to be designed must be fairly lightweight so that it can easily maneuvered, it must be large enough to accommodate a wheelchair but small enough to be readily stored. In addition it must be inexpensive, durable, and made of light materials.

Other Data

Harry Grim is a member of the Passionworks community in Athens, Ohio. He is a 44-year-old man suffering from cerebral palsy, dysarthria, visual acuity trouble, moderate cognitive impairment (MR), limited dexterity and limited arm movement. To Harry, painting is a passion limited by his physical ailments. The need for a motorized movable easel is important for Harry to continue producing beautiful works of art. Like other adults with developmental disabilities, Harry worked at a sheltered workshop called ATCO, where he averaged about $5 per week assembling ballpoint pens. The limitations of his dexterity and movement have affected the productivity of his job. His love for art includes writing poetry and sculpting, but Harry’s specialty lies in painting large canvases with acrylic. Recently, Harry’s artwork has been selling for high prices and his passion for painting is becoming a great source of income.
In 2002, he received a movable easel developed by former UCONN students that was not perfectly suited for Harry. Slower moving features, side to side and in/out motions are a few of Harry’s specific requests already mentioned. Other specifications that can be made for his easel include compartments built in for storage of art supplies. Overhanging lights, and arms to hold brushes, paint cups, etc. can also be attached to the easel for convenient and accessible uses.

Questions

More specific requirements of the project are needed in order to fabricate the best easel for Harry. The dimensions of Harry’s wheelchair must be known in order to properly build an easel that will not interfere with Harry’s legs, arms, or parts of his chair. One of the “other features” requested on the project list include room for his feet. It suggests a tabletop arrangement for the easel. Can the easel be constructed to clamp onto a table already available? If so, the dimensions, weight, and other information about the table or bench must be known. The size of Harry’s canvas is another important thing to know. It would be terrible if the canvas Harry painted on didn’t fit on his specially made easel. The size to which the easel must compact for storage is another question to be answered. The limits to its size and weight must be reasonable enough for easy transportation of the device.

The boundaries the easel can move depend on the limits of his arm movement. How far should the easel move in/out, side to side, up and down, or tilt? These limits along with a proper speed for these motions are important to quantify. Harry requests to use joysticks to move the canvas. Can Harry operate two joysticks at the same time? Should they be built sensitive to touch or less responsive so they won’t be set off by a simple bump? Is Harry right handed or left handed? How should the joysticks be arranged to coordinate their operations? Should they be attached to the easel or be detachable and connected by cords? All these questions are important simply for the design of the controls.

Federal rules and regulations for assisting devices pertaining to certain disabilities may restrict aspects of our project as well. Any laws forbidding certain types of materials, the placement of the controls and electronics, and other safety features must be found before any fabrication of the project begins.

Communication with the client is the most important part to any job. Emails have been sent to Brooke Hallowell and Patty Mitchell at Passionworks regarding initial specifications and questions pertaining to the project. Contact with the clients will continue through the design and completion of the device.
Technical Areas

Areas important to the design of the project include: control, digital electronics, computer programming, instrumentation, and analog logic