

Use of Class Projects to Support AgrAbility AND Disability Related Accommodations at the UW-Madison

By

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Presentation Objectives

- Identifying clients and groups to work with
- Types of courses used
- Resources for projects and furthering AgrAbility program

Teaching Objectives

- Help AgrAbility clients or others with disabilities or physical limitations
- Provide students with an awareness of physical limitations in design
- Provide students with appreciation of how small design changes can enhance usability
- Provide meaningful real life design experience

Identification of Clients and Groups to Interact

- AgrAbility and EasterSeals Farm Program staff and contacts
- College of Agricultural and Life Sciences and Extension faculty and staff
- Mortgridge Center for Public Service
- Other interested stakeholders

Courses

InterEngr 160, Introduction to Design, a freshman course intended to teach the design process and introduce engineers to issues in engineering, 3 cr

- 425-450 students per semesters
- Sections of 30 students per faculty advisor
- Sub divided into design team of 10-15 students
- All engineering disciplines

InterEng 160/Trace Center

- Approximately 850-900 freshman engineers get Trace Center training each year
- Exposed to designs that are not user friendly to those with disabilities and alternatives that more accessible for those with disabilities

InterEng 160/Trace Center

Types of disabilities addressed

- Manual dexterity
- Skeletal/Muscular
- Visual
- Auditory

Trace Research & Development Center

- Founded in 1971 in UW-Madison College of Engineering
- A pioneer in the field of technology and disability
- Address the communication needs of people who are nonspeaking and have severe disabilities
- Significant contributor to the development of numerous industry and government standards and guidelines related to accessibility

Trace Center Mission Statement:

To prevent the barriers and capitalize on the opportunities presented by current and emerging information and telecommunication technologies, in order to create a world that is as accessible and usable as possible for as many people as possible.

Project Examples

AgrAbility related:

- Calf feeding system for milk replacer/milk
- ATV/Gator based tank/pump system for milk replacer
- Operator could distribute from seat of Gator, hose held on pivotable arm to minimize stress on operator
- Eliminated lugging of buckets to hutches

Project Examples

Picking carts
for Raspberries:





Garden Benches for Disabled Gardeners

- Client; West Madison Agricultural Research Station
- Urban Gardens
- Accessible elevated planting beds





Project Examples

AgrAbility related:

- Cart for strawberry picking
- Seat lowers for better ground interaction
- Fit between rows
- Provided to U-pick berry grower
- Design success--?? Example of something that was not totally successful
- Take away: some are successful/some not, these are student projects and the objective is the process, and the student experience



Project Examples

Non- AgrAbility related project: A mounting system for a hockey stick on a wheel chair for a disabled youth with limited upper body strength.

- For use in wheel chair hockey program in Madison supported by UW Womens Hockey team
- Developed mounting system that accommodated the hockey stick mounting as well as other accessories such as a table/computer bench, etc.
- Copied for other players and written up in Wisconsin State Journal
- Student client attending UW- Madison COE

Courses

BSE 309/509, Design Practicum I/II, 2/3 cr

- Biological Systems Engineering students
- Junior/Senior level engineering students
- Over two semesters
- Small design teams of 3-5 students
- More independent student work

Calf Cart

AgrAbility client William

- Small dairy farm (approx. 60 cows)
- Towable with utility vehicle
- Usable manually in barn
- Minimizes lifting
- Humane calf treatment

Calf Cart





Biomedical Engineering Courses

BME 200/300/301/400/402, Biomedical Engineering Design

- Sophomore thru Seniors in BME
- Semester design projects
- Small teams similar to BSE
- Staff with joint BSE/BME ties
- Collaborating staff from InterEng 160

Piano Pedal Project

- Client: Mary, former AgrAbility Client
- Passionate piano player
- Lower extremity issues limited her ability to work foot pedals

Piano Pedal Project



Standing Paraplegic Omni-directional Transport (SPOT)

The client is an orthopedic surgeon who has been without work ever since an accident left him paralyzed (T12 paraplegia). In order to return to orthopedic surgery he will need to be able to perform surgeries in a standing position, as well as be able to move about the operating room. Our goal is to create a device which will allow him to meet those requirements.

Weblink for project coverage on TV:

Chicago's WGN News

<http://wgntv.com/2012/12/19/standing-wheelchair-update/>

ABC news

<http://www.wkow.com/story/17214453/students-aim-to-change-life-with-student-project>

Big Ten Network

<http://www.youtube.com/watch?v=tUDYAmTDv5A&feature=youtu.be>



UW-CREATE

Center for Rehabilitation Engineering and Assistive Technology

Engages in a variety of research and design projects aimed at providing additional independence to individuals with disabilities

UW-CREATE

Center for Rehabilitation Engineering and Assistive Technology

This center was developed by Professor Jay Martin, an engine researcher, whose son was injured in a diving accident. Jay completely redirected his research program and focused on assistive technology. Jay has since retired and formed Martin Product Engineering.



Electra Lift will design a seat tilt mechanism while maintaining the current functionality and minimum standards of the chair. The seat will tilt forward 40 – 45 degrees to assist the rider in standing once he or she is ready to dismount and will have a weight capacity ranging from 80 pounds to 420 pounds. Electra Lift will design a seat tilt mechanism while maintaining the current functionality and minimum standards of the chair. The seat will tilt forward 40 – 45 degrees to assist the rider in standing once he or she is ready to dismount and will have a weight capacity ranging from 80 pounds to 420 pounds.

The logo for Electra Lift features the word "Electra" in a cursive font, with a lightning bolt symbol integrated into the letter "E", and the word "Lift" in a smaller cursive font below it.



BOTTOMS & UP↑

This semester, Bottoms Up! plans to create an assistive chair that has the ability to raise and lower its seat to the ground to enable clients to reenter the chair from the floor and to raise themselves to the desired height. Pictures of the wheelchair from different angles can be seen to the left. below.



Questions

Thank you

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