How Can Disability Studies Inform Rehabilitation Engineering Practice and Education?

Concepts, Outcomes, & Lessons Learned

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About Us

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Welcome

Agenda

• Disclosures & Learning Objectives
• Husky ADAPT- Background
• VIP Design Course
  • Course Goals & Logistics
  • Disability Studies Principles
  • Design Philosophies
  • Practical Engagement Strategies
• Outcomes- Student Learning and Projects
• Lessons Learned and Next Steps
Disclosures

> The presenters have no disclosures or conflicts of interest to report.
Learning Objectives

> Participants will be able to contrast two major differences between the medical and social models of disability.
> Participants will be able to describe three ways in which disability studies may inform rehabilitation technology service delivery.
> Participants will be able to identify one way that disability studies may be infused into rehabilitation engineering design courses.
> Participants will be able to explain two ways in which rehabilitation engineers can be better allies for people with disabilities.
HuskyADAPT: Accessible Design & Play Technology

A community of UW students, faculty, and staff committed to fostering inclusivity in design, and innovation in play and technology
# Husky ADAPT Organization

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<th>Design</th>
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<td>Toy Adaptation</td>
<td>Participatory Design</td>
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<td>Taskar Holiday Toy Hack</td>
<td>design challenges from need experts</td>
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<td>GoBabyGo</td>
<td>VIP Design Course</td>
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*play and mobility are crucial for development*
VIP Design Course ENG 497 & 297

> Vertically Integrated Project course
  – Engineering students across subspecialties and academic levels
    > Human Centered Design & Engineering
    > Electrical Engineering
    > Mechanical Engineering
    > Computer Science & Engineering
    > Industrial Design
    > Bioengineering

– About half the class was comprised of underrepresented students in engineering
Course Goals

> To bring accessibility & inclusivity to the forefront of design

> Introduce engineering students to concepts of disability studies, the history of disability discrimination, and the disability rights movement

> Engage in a design challenge directed by needs experts in the disability community
Course Logistics

> Multidisciplinary course instructors:
  - Community members with disabilities
  - Rehabilitation
  - Disability Studies
  - Mechanical, Computer Science, & Bioengineering

> Course content across 2 quarters:
  - Lecture & Discussion
  - Media
  - Team-Based/Project-Based Learning
  - Design prototype showcases
Example Activities: Intro to Disability Studies

HOW AND WHY DO WE THINK ABOUT DISABILITY?

• Dominant models of disability
  • Medical Model
  • Social Model
  • Political Relational Model/Complex Embodiment Model

• What are the messages that people with disabilities receive about their lives/needs?

• How does disability and accessibility figure into engineering and design?
Disability Studies Scholarship & Activism

Alison Kafer

Colin Barnes

Simi Linton

Donna Haraway

Nirmala Erevelles

Stella Young
The Disability Rights Movement

- Access as an ongoing civil rights issue
- Civil Disobedience
- Passage of the ADA
- Assistive Technology Act
- Ongoing policy change
Disability and Design

WHO DO WE DESIGN FOR?

• The ‘average’
• Male
• White
• Able-Bodied
Where Does Innovation Happen?

Innovation happens here!
Disability & Technological Innovation

The controversies surrounding technology & ‘human enhancement’
Ability Based Design (Wobbrock et al. 2011)

• Focusing on abilities to leverage the full range of human potential

• Exploring how systems and technology can be designed around existing abilities

• Measuring, sensing, and adapting to user’s abilities inherent in system, and not as an add-on or afterthought
Design for User Empowerment (Ladner 2015)

- Disability is a valued form of diversity

- End goal of design should be empowerment, not just accommodation

- Disabled people co-design along every aspect of the engineering design process
Equality, Equity, and Liberation
Design Fail (An Attempt at Equality?)
Design for Accommodation (Equity)
Design for User Empowerment (Liberation)
HuskyADAPT

PRACTICAL ENGAGEMENT STRATEGIES AND TIPS

• **Need Experts are not ‘needy’**
• It’s not always about what someone can’t do, but designing to harness what someone can do
• Be explicit in involving need experts in each aspect of the design process- Document how this unfolds
Practical Engagement Strategies & Challenges

• Person-first language vs. Identity-first language

• Technology Positive Language

• Our designs are not about overcoming disability, but about overcoming barriers in access/participation
HuskyADAPT Teams

Documenting the process

• Design Notebooks
• Team Websites to track ideas and progress
• Weekly presentation of AOI’s
  • Accomplishments
  • Objectives
  • Issues
• Weekly Reflections
• Fall and Winter Design Showcases
Teams and Outcomes 1

> **SafeWheels**: Affordable, DIY solutions to assist with steering in ride-on cars for early powered mobility

> **Lend-a-Hand**: Providing shoulder support and low-cost, at-home gaming and rehabilitation options after stroke
Teams and Outcomes 2

> **Team Transfer:** Tools that support safe transfers from standing to sitting positions that encourage independence in daily living.

> **Imagineers:** Mobile mental health application to help support networks stay connected with daily activities and emotional well-being.
Teams and Outcomes 3

> **DISplay**: A laser space game on a flexible platform that encourages collaborative play among children of all abilities.

> **Cajun**: Designing a modular system of manipulation to assist with dexterity during tasks like brushing teeth.
Teams & Outcomes-4

> **Easytype:** A one-handed keyboard that maximizes input with minimal effort to enable communication and play with peers.
Student Reflections

What have you learned about accessibility in our society?

“I have learned that much of our world is truly not built for people with disabilities... What still needs to change is the actual integration, not isolation of these technologies and mechanisms that help all abilities. [People] need access to something that makes [them] feel independent and able to interact with the world in a way that doesn’t make them stand out in a crowd, but blend in like every other person”

“I am shocked by just how many barriers to accessibility exist within our campus. Just today for instance, the elevator was broken in Lowe and my classmate, who uses a power chair, couldn’t attend class.”
In your introduction to different models and ways of thinking about disability, what surprised you or resonated with you?

“Not necessarily surprised but more impressed to see **design presented with a bit of a driving philosophy** rather than typical drivers like ‘can we make it’ or ‘is it profitable’”

“The view from people with disabilities really shocked me...I never thought the cares/attention I pay for them would be inappropriate for them to hear (Stella Young’s Ted Talk)”

“The black and whiteness of the **medical model**. Overcoming environmental barriers versus disability. **Changing the way we look at this whole area of thought.**”

“I strongly resonate with the **social model** of disability and its seeing barriers as something to be broken down.”
In your introduction to different models and ways of thinking about disability, what surprised you or resonated with you?

“I personally thought disability was something that needed to be fixed...[this course] changed my thoughts about disability that it's just a difference.”
Student Experiences and Prototype

Team Cajun- Daily Dexterity & Manipulation Need Expert- Carolee
Carolee

- Retired teacher passionate about education, family, yoga, and cooking
- Diagnosed with Inclusion Body Mitosis
- Very sweet and willing to work with us in any way she can to design some awesome products
- Used to have large dogs in their home and loved Cajun’s presence!
- Kept in touch through email with visits to her home and to campus once a quarter
First Steps

- Discussions with faculty
- Focus on toothbrush, then go modular
- New Ideas
  - Velcro and Grommet
    > George and Tom
  - Gears
  - Gymnastics Twisting Belt
    > Dr. Hendricks
  - Phone Case Holder/Wrap
    > Dr. Steele
Current Design

- Cradled in the palm
- Larger size for easier grip
- Adjustable to any hand
- Stable base
- Hand attachment half of what we designed last quarter
Next Steps

> How to make modular with multiple objects
  - Focus more on zip ties
> Shorter/flatter hand base
> Two Options:
  - Horizontal twisting piece
  - Knob and track
Our Poster

Innovation Challenge
Individuals with varying dexterity need a modular system of manipulation to assist with dexterity and to foster greater independence in their daily life, specifically to manipulate a toothbrush.

Core Functions
- Ease of grip strength and dexterity
- Enhance independence
- Effectively manipulating a variety of objects.

Design Inspiration
- Iteration #1
  - Centripetal rotation at 360 degrees
  - Arrows for rotation by degree
  - Toothbrush specific

- Iteration #2
  - Circular rotation at 360 degrees
  - Centripetal rotation at 90 degrees
  - Toothbrush specific

Design Evolution
Using the stability, durability, and variety of our design inspirations:

Final Design
- Lateral rotation at 360 degrees
- Centripetal rotation at ±90 degrees
- Foam insert for modularity
- One piece and easy to assemble

Core Objectives
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<tr>
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<th>Secondary Objectives</th>
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<tr>
<td>Ease of Use</td>
<td>Independence</td>
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<td>Lightweight</td>
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<td>Reasonable in Size</td>
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<td>Durability</td>
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Additional Feedback
- Needs work...
- Add your post it here
- Almost there
- Perfect

Next Steps
- User testing
- Work with a large population of users to get feedback
- Design iteration
- Continue to refine designs and improve on materials used

Acknowledgments
We would like to thank our main sponsors, Corbena and Toro, for their support and feedback throughout our design process. We would also like to thank the faculty, leadership, and members of the HuskyADAPT organization for their encouragement and for providing us with the opportunity to expand our knowledge in the world of assistive design. We are also grateful for the Makers Fund to Empower and Improve Human Ability for their ongoing support of HuskyADAPT.
Husky ADAPT - Personal Experience

> Educating
  – Able to learn from a large diversity of background

> Team Work
  – Able to get the experience of working on a team for an extended period of time

> Empowering
  – Designing for User Empowerment
Lessons Learned for Next Year...

> Provide Need Experts with improved connection with course/instructors/students
  – Solution: Created an online design idea Google Form and a master spreadsheet of community contacts and ideas

> Provide greater continuity of disability studies/accessibility course content
  – Solution: Shift VIP course to Winter/Spring quarters following Intro to Accessible Design Seminar in Fall quarter
More Lessons...

> Provide students with greater detail regarding specific accessible design needs
  - Solution: Working in advance with need experts to provide more specific design constraints

> Introduce the Disability Studies framework to Need Experts before course begins
  - Solution: Provide introductory education regarding disability studies and the idea of disability as a positive form of diversity
Acknowledgements & Questions

Funding Support:

> Harlan Hahn Endowment Fund
  – University of Washington Disability Studies Program
> Mather Empowerment Fund
  – Ability & Innovation Lab, Mechanical Engineering
> NIH NCATS KL2 TR002317