Accessibility and Aging

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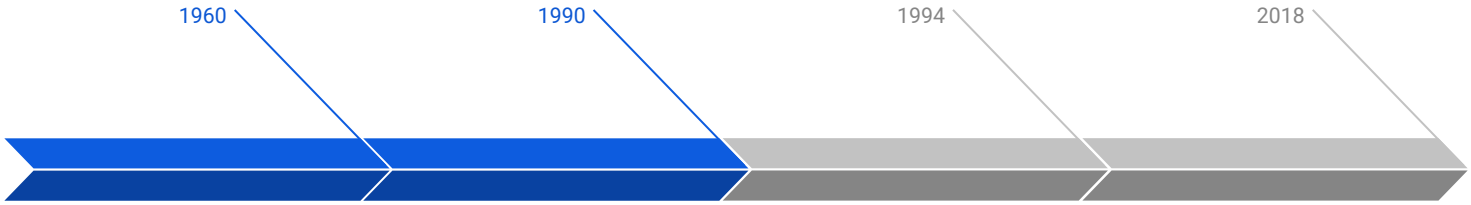
Agenda

- History
- Core Research Principles
- Framing Papers

Timeline of accessibility research



Critical Disability Studies

Two Conflicting Models of disabilities(1960s/1970s):

Medical Model:

- Viewed disability as a medical condition to be “cured”.

Social Model:

- Frames disability “as a socially and culturally constructed form of societal oppression”

Discussion

- In what ways can both the medical model and social model of accessibility be balanced for areas like building assistive technologies, that rely heavily on medical diagnosis.

Americans with Disabilities Act

- A Civil rights law in the United States that prohibits discrimination against people with disabilities
  - Claims to ensure equitable access in areas like employment, public transportation and accommodations.
  - Laws in place that mandates both federal and private regulation

Supporting Disciplines

- Critical Disability Studies
- Science and Technology Studies
- Health
- Computer Science
- Gerontechnology

Research Questions

- How can technology be designed to accommodate challenges faced by those during aging and for people with disabilities?

- How do broader social, cultural, and policy factors interact with technology design for aging and accessibility?

ASSETs 2025

“Submissions should present significant contributions to **design, systems, tools, scientific understanding, methodology, or social issues**. Relevant topics include (but are not limited to) new enabling technologies, studies of how technologies are used by people with disabilities, explorations of **barriers to access**, and evaluations of accessibility education methods”

CHI Accessibility and Aging 2025

"Accessibility papers are those that deal with **technology designed for or used by people with disabilities** including sensory, motor, mobility, psychosocial or cognitive, intellectual or learning disabilities, or people who identify as neurodivergent. Aging papers are broadly categorized as those dealing with technology designed for or used by people in the later stages of life"

PollEv.com/dwaynemorgan263

What Do We Mean by “Accessibility Research”?

- Literature survey of CHI & ASSETs
- Research Questions
  - Who does accessibility research focus on?
  - What are the stated goals?

Accessibility Literature

Community of Focus	Papers w/ Code	This Code Only	Issue Addressed	Papers w/ Code	This Code Only	Contribution Type	Papers w/ Code	This Code Only
BLV	220 (43.5%)	208 (41.1%)	Digital Access	186 (36.8%)	122 (24.1%)	Empirical	305 (60.3%)	171 (33.8%)
Motor/Physical	72 (14.2%)	59 (11.7%)	Understanding Users	139 (27.5%)	89 (17.6%)	Artifact	281 (55.5%)	182 (36.0%)
DHH	57 (11.3%)	43 (8.5%)	Physical Access	105 (20.8%)	26 (5.1%)	Theoretical	44 (8.7%)	6 (1.2%)
Cognitive	46 (9.1%)	29 (5.7%)	Independence	93 (18.4%)	14 (2.8%)	Methodological	16 (3.2%)	2 (0.4%)
General Disability	46 (9.1%)	31 (6.1%)	Communication	81 (16.0%)	45 (8.9%)	Dataset	7 (1.4%)	2 (0.4%)
Older Adult	45 (8.9%)	29 (5.7%)	Behavior Change	39 (7.7%)	19 (3.8%)	Survey	3 (0.6%)	0 (0.0%)
Autism	31 (6.1%)	21 (4.2%)	*Other*	59 (11.7%)	25 (4.9%)			
IDD	14 (2.8%)	8 (1.6%)						
Other	46 (9.1%)	20 (4.0%)						

Discussion

- What reasons are accessibility and aging distinct from health? What features do you think lead aging to be grouped with accessibility?

- How have you seen implications from this subcommittee within your particular field (e.g. methods, literature, language)?

Disability Studies as a Source of Critical Inquiry for the Field of Assistive Technology

- Literature Review & Cases Studies
- How does disability study connect to assistive technology research?

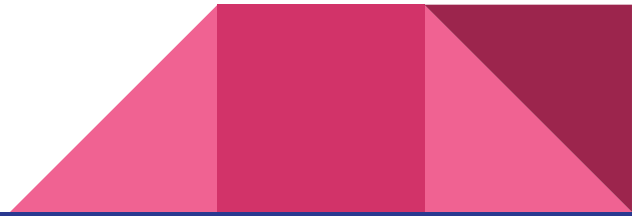
Background

(critical) Disability Studies

- “a field of critical inquiry focused on the lived experience of disability, and the societal, medical, and intellectual policies and rhetoric concerned with disability”
- Critic & inspiration to assistive technology research

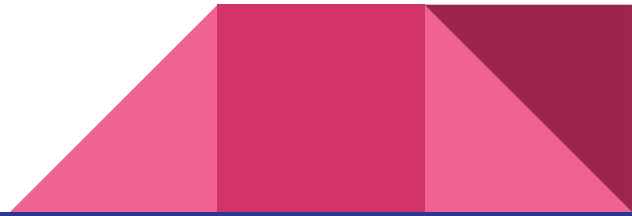
Case Studies

- Autism and Educational Technology
  - Empower the caregiver -> empower the children
- Designing for Accessibility
  - Universal usability



Connecting Disability Studies with Assistive Technology Research

- Rethinking assistive technology research with the perspective of disability studies
- Involving disability studies in teaching



Discussion

What do you think is the relationship between disability studies and assistive technology research?

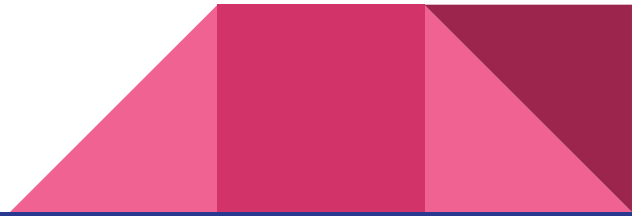
Can you think of any others two fields of study that share the similar relationship with that between disability and assistive technology?

Ability-Based Design: Concept, Principles and Examples

- Review of Prior Research Approaches
- Clarify the principles with examples

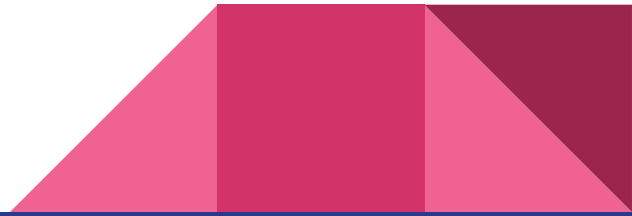
Prior Approaches to Accessible Computing

- Assistive Technology
- Rehabilitation Engineering
- Universal Design
- Universal Usability
- Design for All
- User Interfaces for All
- Inclusive Design
- Extra-Ordinary Human-Computer Interaction
- Other Ability-Based Approaches



Ability-Based Design

- A refocusing of accessible computing from disabilities to abilities
- “What disability does a person have?” -> “What can a person do?”



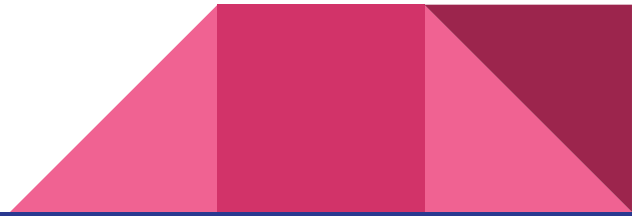
Principle for Ability-based Design

STANCE	**1. Ability.**	Designers will focus on ability not *dis*-ability, striving to leverage all that users *can* do.	*Required*
	2. Accountability.	Designers will respond to poor performance by changing systems, not users, leaving users as they are.	*Required*
INTERFACE	**3. Adaptation.**	Interfaces may be self-adaptive or user-adaptable to provide the best possible match to users' abilities.	*Recommended*
	4. Transparency.	Interfaces may give users awareness of adaptations and the means to inspect, override, discard, revert, store, retrieve, preview, and test those adaptations.	*Recommended*
SYSTEM	**5. Performance.**	Systems may regard users' performance, and may monitor, measure, model, or predict that performance.	*Recommended*
	6. Context.	Systems may proactively sense context and anticipate its effects on users' abilities.	*Recommended*
	7. Commodity.	Systems may comprise low-cost, inexpensive, readily available commodity hardware and software.	*Encouraged*

Discussion

What are the difference/similarities between ability-based design and the focus of studies for CHI's accessibility & aging subsection?

What is the significance of refocusing from disability to ability in accessibility design?



BAGEL: An Approach to Automatically Detect Navigation-Based Web Accessibility Barriers for Keyboard Users

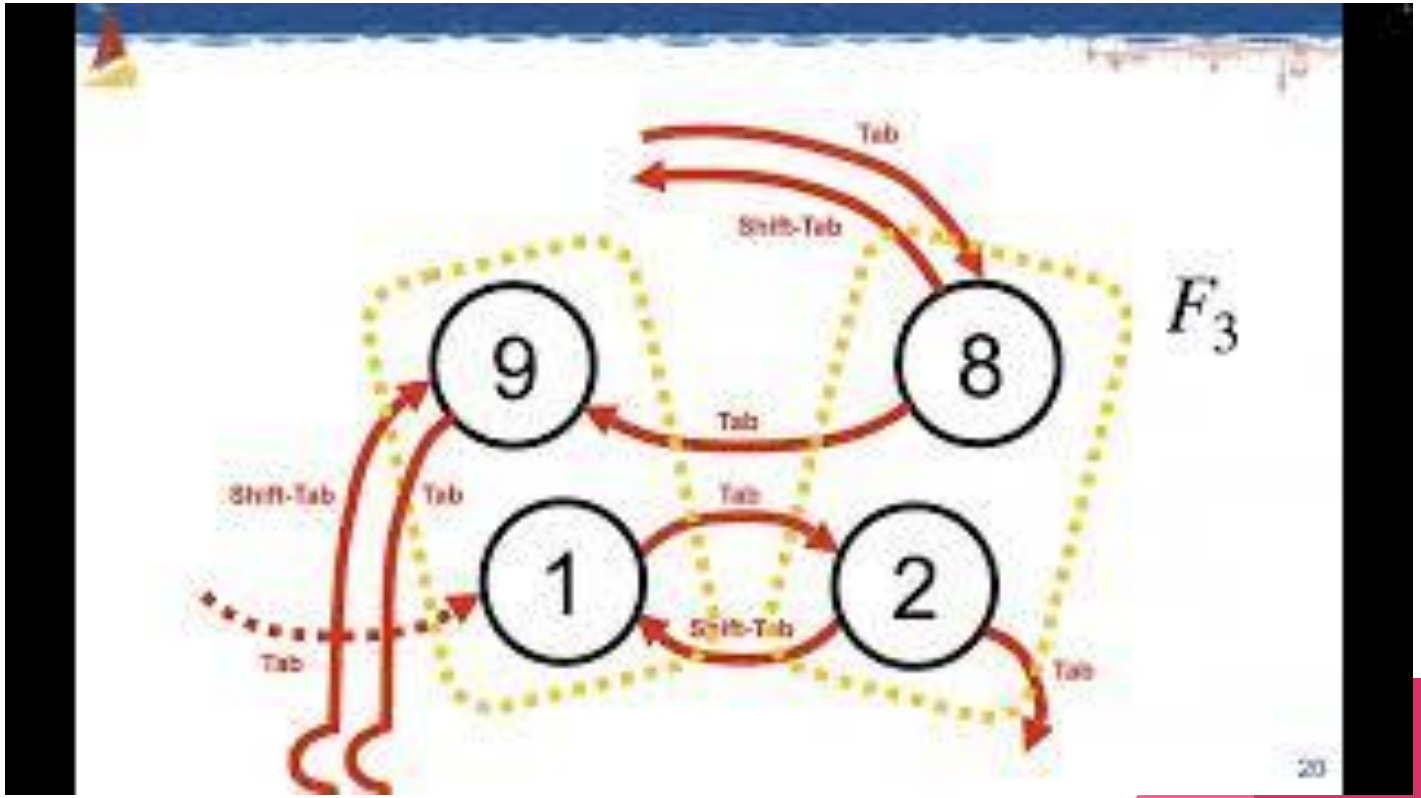
- Artifact Contribution(System)
- Research Questions
  - (1) The first formalization and modeling of Keyboard Navigation Failures (KNFs) as defined by the W3C.
  - (2) A fully automated KNF detection technique that outperforms state-of-the-art on real-world web applications.
  - (3) A study on a set of 20 real-world web pages that shows our approach is accurate in detecting KNFs.

Motivation

- “Studies show that as much as 51% of the disabled population rely on the Web as a societal lifeline [6].”

- “As of 2022, less than 4% of the top million homepages on the Web meet the most widely used accessibility standards [37].

Demo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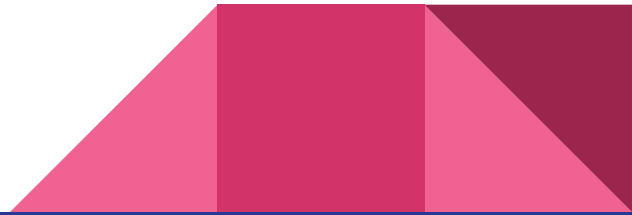
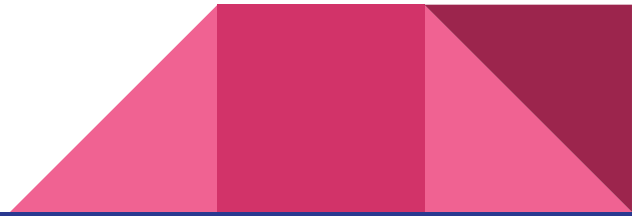
This paper contributes the potential for Web accessibility to improve, what responsibility does this place on developers for this potential to be realized?



Supporting Fields

- Software Engineering(Web Development)
- Web Accessibility
- Computer Science



Web Content Accessibility Guidelines(WCAG)

Success Criterion 2.4.3 Focus Order(Level A) :

“If a web page can be **navigated sequentially** and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves **meaning and operability**.”

“Since there may be **several possible logical reading orders** for the content, the focus order may match any of them.”

Takeaways

- More robust accessibility assessments
- System Contribution

Discussion

- Given that this study conducted no formative assessment with participants, how does this impact the studies reliability within HCI?

- What applications do you see for this system outside of HCI(if any)?

Envisioning Collective Communication Access:

A Theoretically-Grounded Review of Captioning Literature from 2013-2023

Theoretical Contribution

RQ:

- How can disability studies, Deaf studies, disability justice, and communication studies thinking inform a **theoretical framework** of communication accessibility?
- What is the state of last decade of human-centered, accessibility focused captioning research and how, if at all, does it align with that framework?

Motivations

Large amount of work has been done in communication accessibility

Accessibility research begins to integrate more interdisciplinary critique

Opportunities to reflect on prior studies and refer to perspectives from other related disciplines

Areas of Inquiry

Within HCI:

- Communication Accessibility
- Captioning Technology

Outside HCI:

- Disability Studies
- Deaf Studies
- Disability Justice

Communication Studies

Methods

- Articulate a framework for collective communication access
- Design a criteria based on the framework
- Systematically review HCI captioning papers

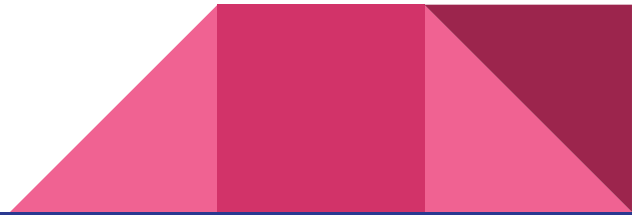
Takeaways

HCI:

- a framework and rubric for collective communication access
- critical reflections on the prior captioning research
- directions for future collective communication access research

Other Research Communities:

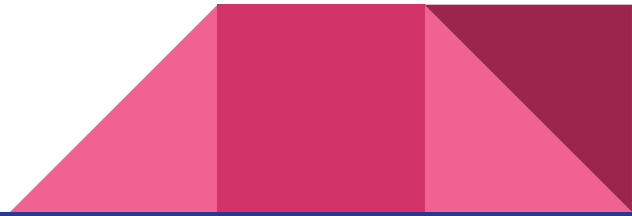
- Opportunities for applying theories in communication accessibility research



Discussion

Can you think of any theoretical shifts or emerging theories in your field or others?

How did this shift impact subsequent research?



Thank You