

A Review of 25 Years of Human-Computer Interaction Research on Reading Support Technologies for People with Disabilities

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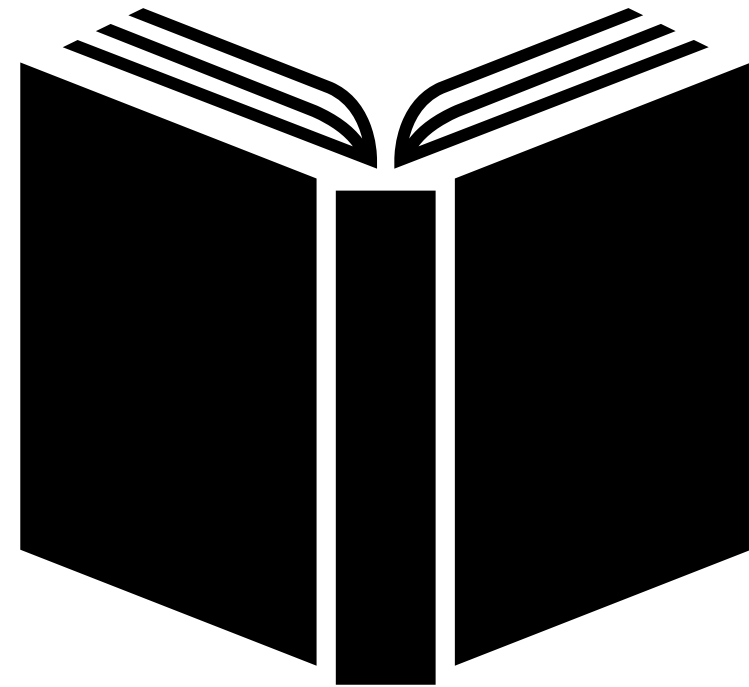
Oliver Alonzo



Saad Hassan

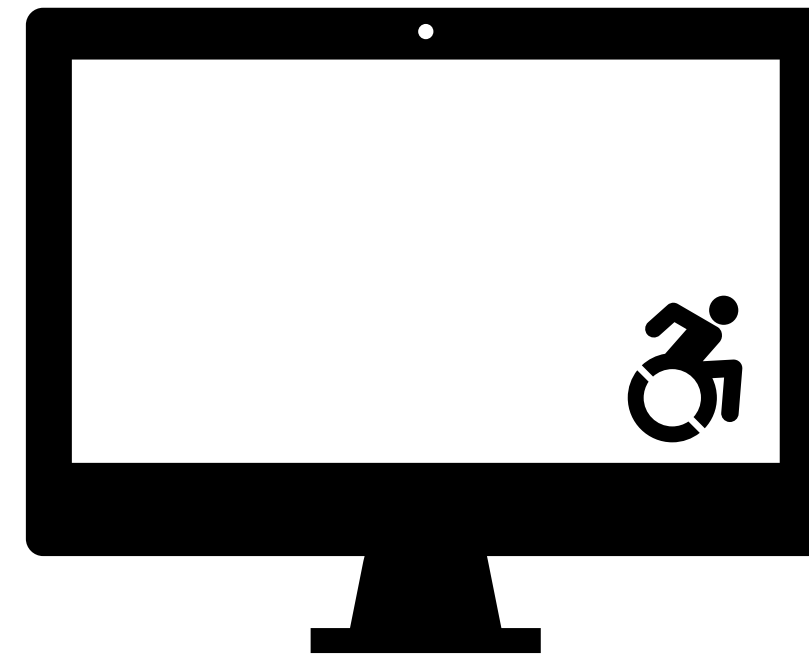


Motivation



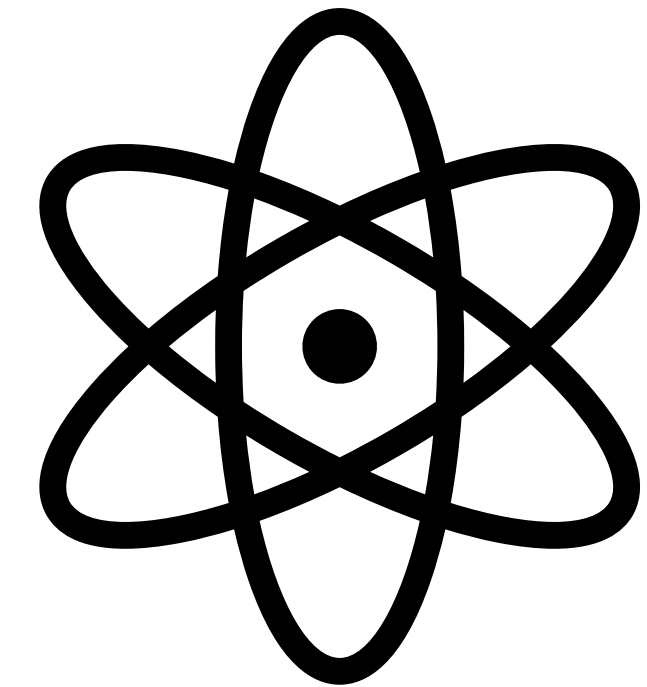
Reading is an important skill

but it's not always accessible to people
with disabilities



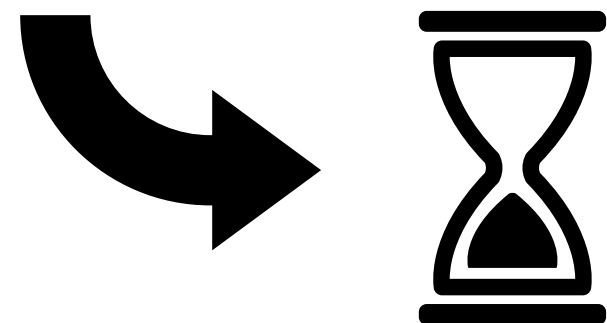
HCI and Accessibility Research

has explored reading support
technologies for >25 years



Novel Language Technologies

(e.g. LLMs) may enable new opportunities
for reading support



Good time to take stock of this existing research

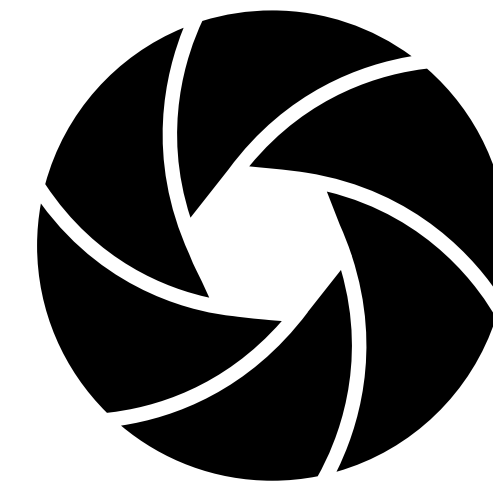
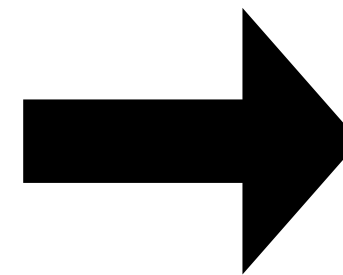
Background and Scope

$$RC = D \times L$$

Simple View of Reading

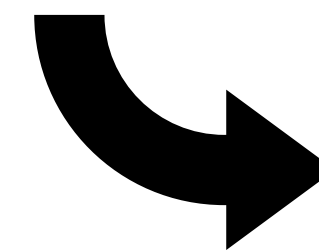
reading comprehension is the product of **decoding** and **language comprehension**

Gough and Tunmer, 1986



Our focus

tools that aim to address **cognitive** or **linguistic** barriers for diverse disabilities



excludes tools only focused on sensory access
(e.g. screen readers)

Guiding Questions

- GQ1** Which **disability communities** have researchers primarily focused on?
- GQ2** Which **research methods** and **contribution** types dominate?
- GQ3** What **technologies** and **interface approaches** appear, and which reading aspects do they target?
- GQ4** What **unanswered questions** and **opportunities** can we identify from the literature?

Method

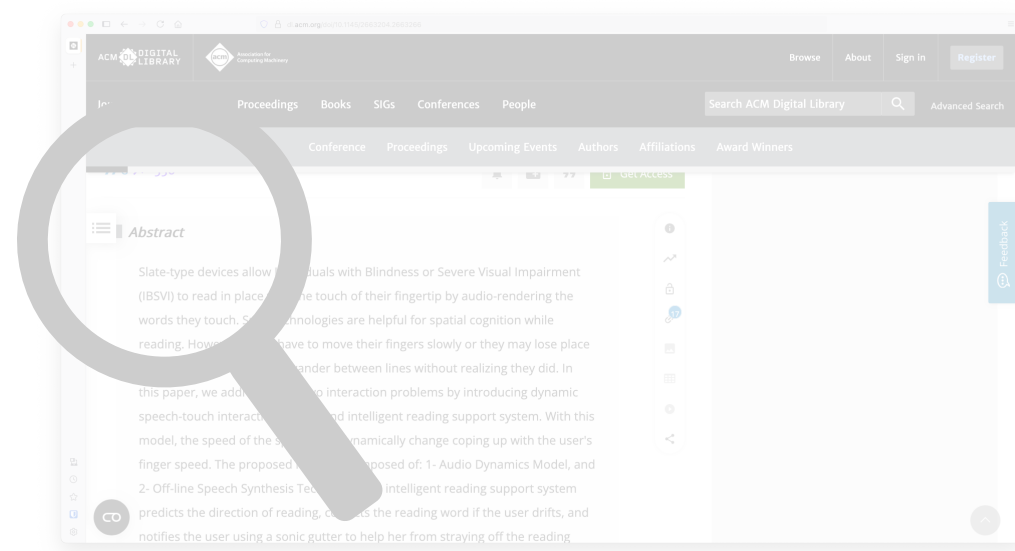
1



ACM Digital Library

keyword search using domain expertise and existing literature

2



Identify

reviewed all **abstracts** in search results for **HCI work** with people with disabilities

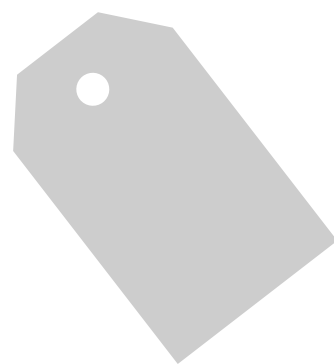
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Filter

identified 141 publications, but only **101** had **research contributions**

4



Code

each author independently coded half of the papers for classification

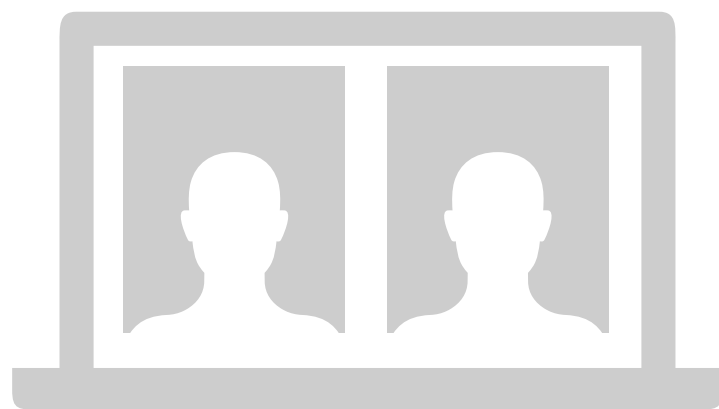
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Review

reviewed the papers in details to identify findings

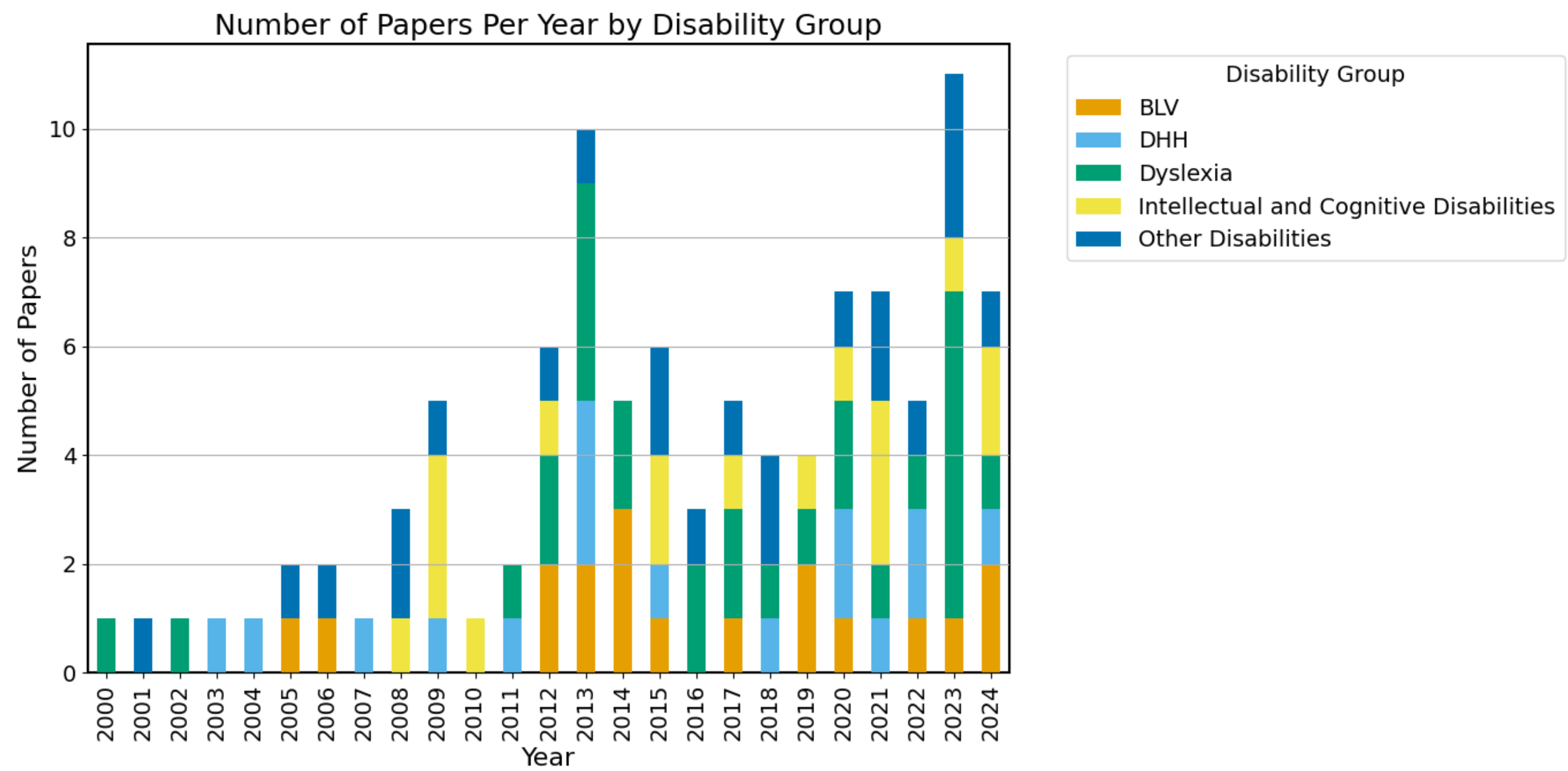
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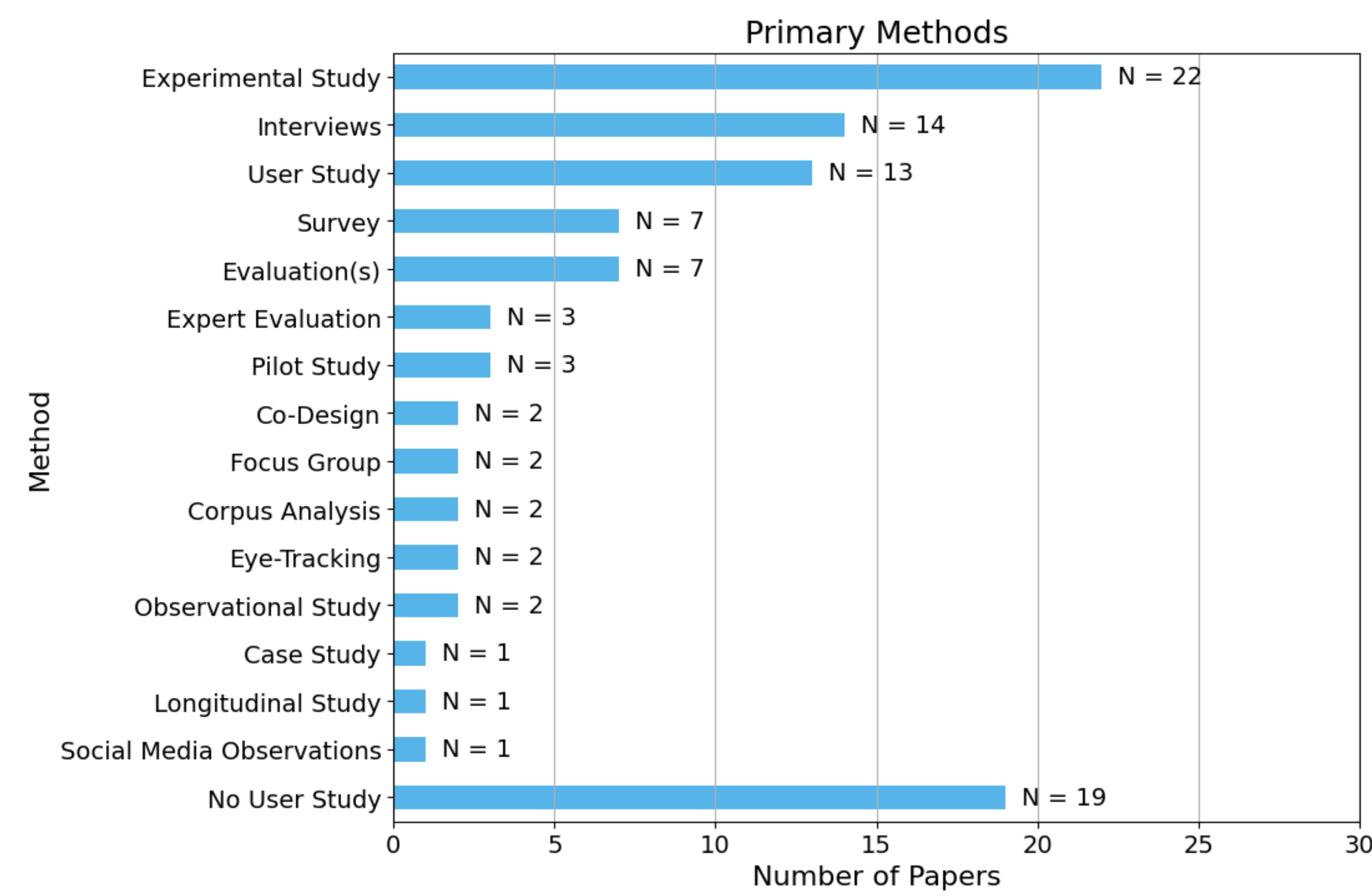
Discuss

discussed the codes and findings to ensure agreement

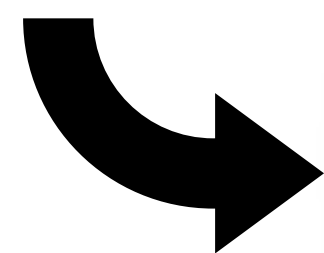
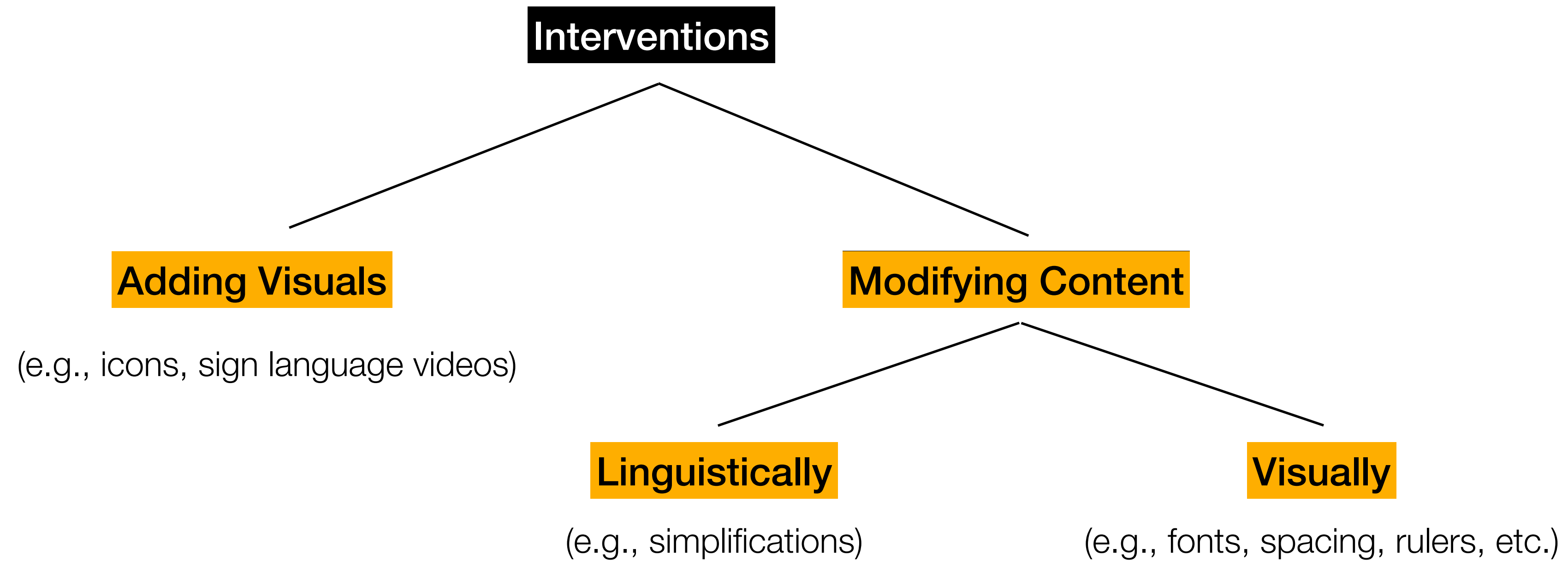
Highlighted Findings | Overall Trends



Highlighted Findings | Overall Trends



Highlighted Findings | Overall Trends



Predominantly **web-based interfaces**

Highlighted Findings | Trends by Community

Blind &
Low Vision

Skimming, navigation and **braille literacy development**

Deaf & Hard-of-
hearing

Text augmentation (e.g. sign language) and **simplification**

Dyslexia

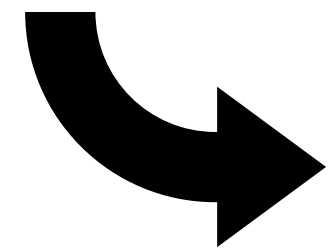
Visual modifications and **simplification**

Intellectual &
Cognitive Disabilities

Assessing difficulty and **summarization**

Takeaways

GQ1 Which **disability communities** have researchers primarily focused on?

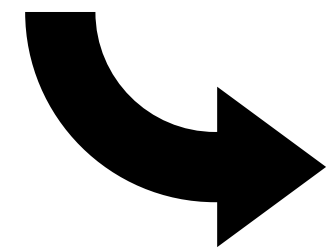


Dyslexia had the most focus, followed by people who are BLV, DHH or who have intellectual or cognitive disabilities.

Aphasia, ADHD, autism and other disabilities had less attention.

Takeaways

GQ2 Which **research methods** and **contribution** types dominate?



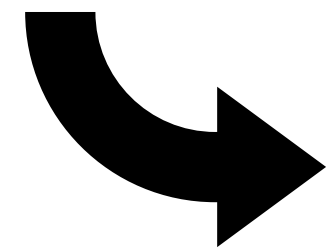
Lab-based user studies and interviews were the most common method

But other methods may present barriers, but also be valuable (e.g. participatory design, longitudinal studies)

Demographic reporting was also inconsistent, which may make it difficult to compare across studies

Takeaways

GQ3 What **technologies** and **interface approaches** appear, and which reading aspects do they target?

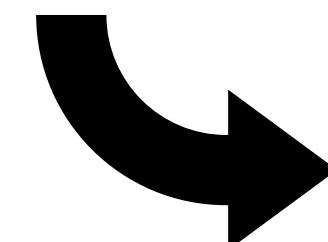


Most research focused on **the web** as the reading contexts

But people read across other contexts, and new technologies may enable or necessitate new forms of interactions (e.g. chatbots)

Takeaways

GQ4 What **unanswered questions** and **opportunities** can we identify from the literature?

- 
- 1 Centering under-represented communities, embracing **participatory approaches**?
 - 2 Capturing **long-term** ecological **impact**, **standardizing metrics** across studies?
 - 3 Extending **beyond the web** and **leveraging novel interfaces and technologies** (e.g. chatbots, AR, generative AI) while **preserving agency** and **social acceptability**?
 - 4 **Adapting cross-community insights**—e.g., navigation aids for BLV or visual changes for dyslexia—**to benefit other readers**?

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