

Exploring accessible modalities for inclusive conversational interactions

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Design Participation Lab

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ACKNOWLEDGEMENT OF TRADITIONAL OWNERS

QUT acknowledges the Turrbal and Yugara, as the First Nations owners of the lands where QUT now stands. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning.

QUT acknowledges the important role Aboriginal and Torres Strait Islander people play within the QUT community.

About Me



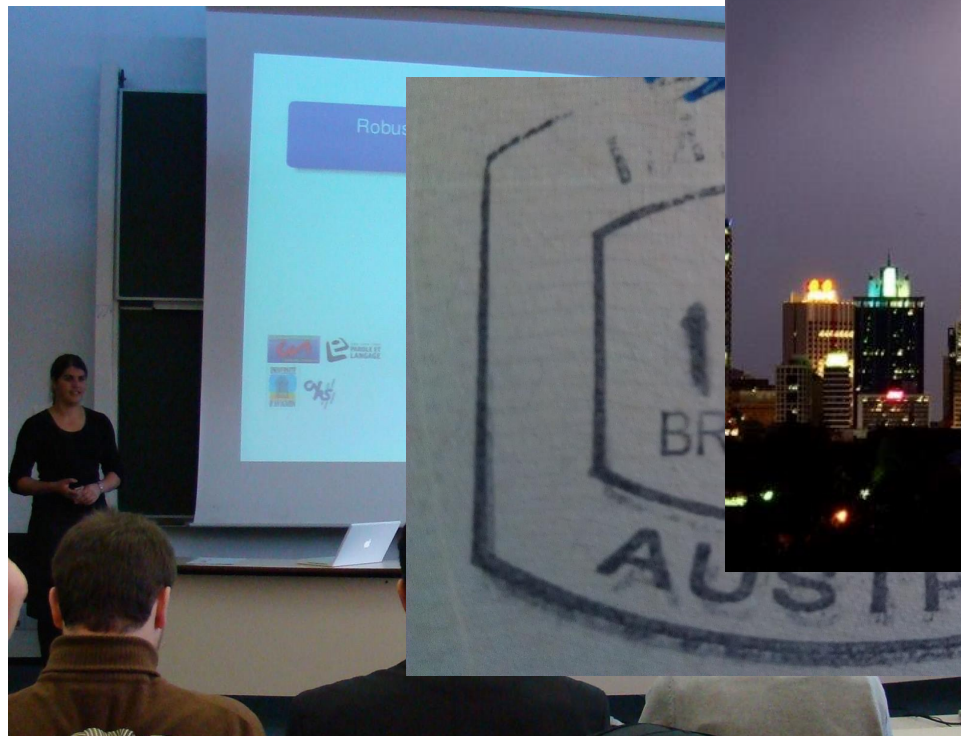
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About Me



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About Me



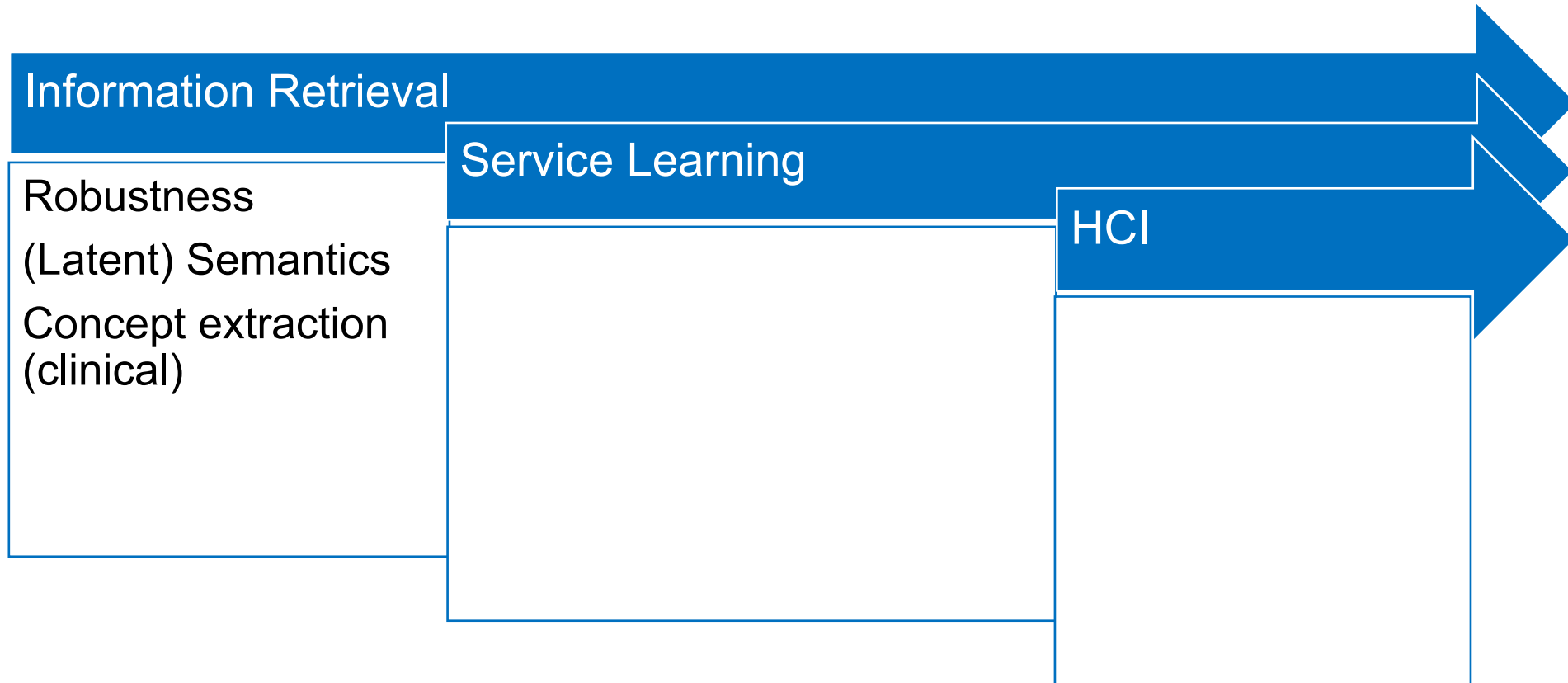
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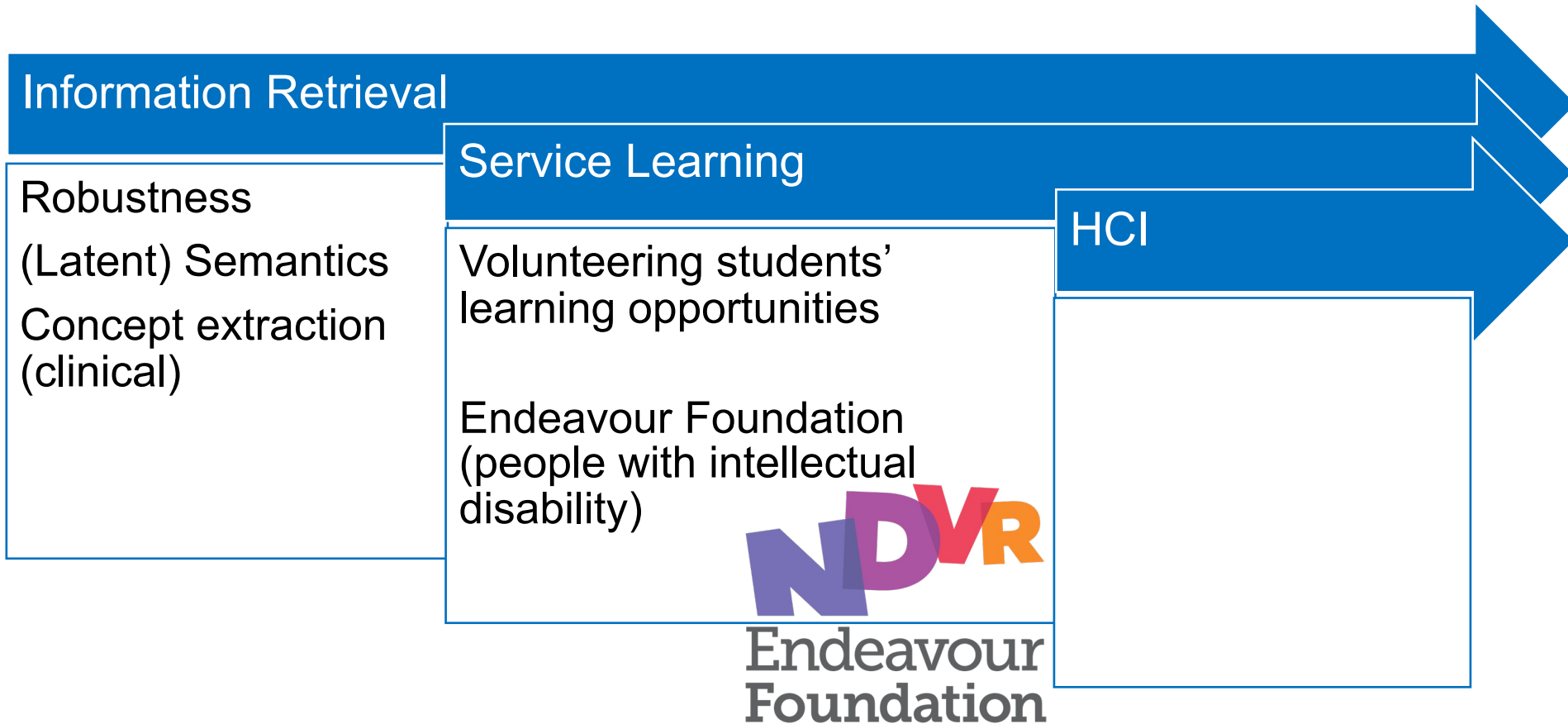


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Research journey

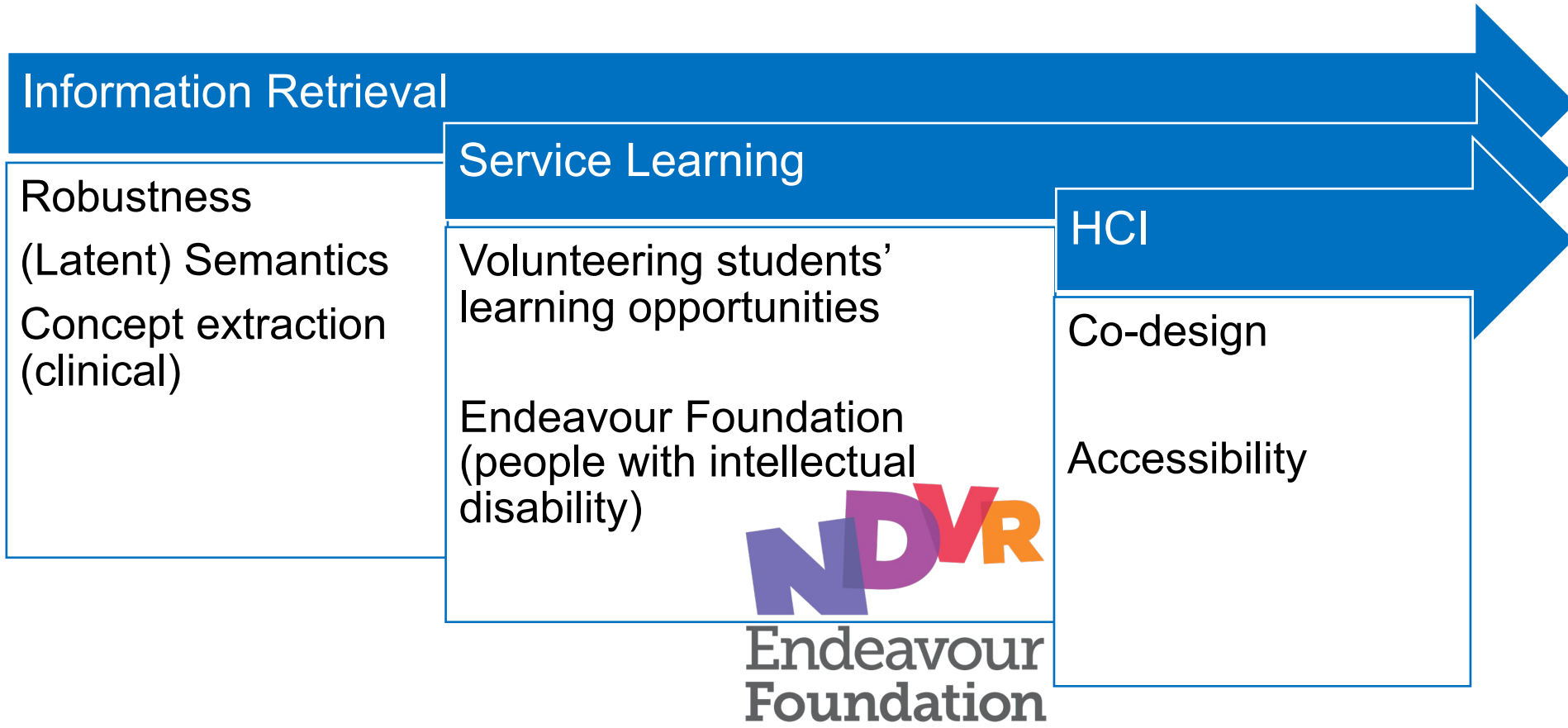


Research journey



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Research journey



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Roadmap

Aim: present an overview of my team's research on inclusive conversational interfaces.

Co-design with people with intellectual disability

From Making Information Retrieval Accessible

To Accessing Information Inclusion

Intellectual Disability

- “*Intellectual disability* is a disability characterized by significant limitations in both **intellectual functioning** and in **adaptive behavior**, which covers many everyday social and practical skills. This disability originates **before the age of 22**”
 - “assessments must also assume that limitations in individuals often coexist with strengths, and that a person’s level of life functioning will improve if appropriate personalized supports are provided over a sustained period.”

<https://www.aaid.org/intellectual-disability/definition>

Source: endeavour.com.au



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Intellectual Disability

<u>Do you need support to...</u>	<u>Cognitive skills / executive function required to plan, organize and complete task</u>
A3. Choose the Grocery items you need to buy?	<ul style="list-style-type: none">· Sustaining attention· Setting priorities & starting tasks
B1. Hand over the right amount of money for the items you choose?	<ul style="list-style-type: none">· Using working memory & recalling information
B2. Pay for things by EFTPOS / card?	<ul style="list-style-type: none">· Starting tasks· Focusing, staying on task
C2. Keep your home safe when you leave by locking all doors and windows?	<ul style="list-style-type: none">· Organising,· Using working memory

Research through design

Emerging knowledge

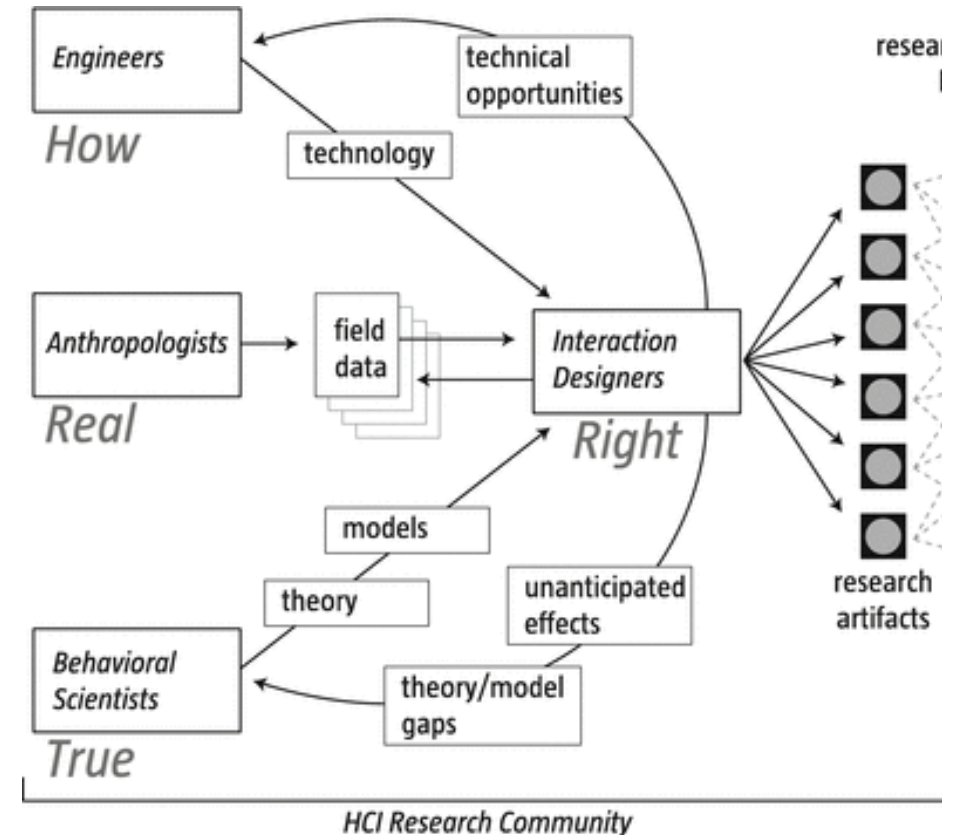
- Design process
- Artefacts
- Frames

Iterative process

- Explore, build, reflect, repeat

Exploration of possible speculative futures

- Informs Engineers



Research through co-design

- Co-design is a form of participatory design
- Provides rich context for socio-technical interferences
- Enables communities to drive the research agenda as they participate in co-design activities at different stages (pre-design, ideation, iterative prototyping, evaluation)
- Rapid Prototyping helps people best express their views when interacting

Making Information Retrieval Accessible

New Information Access Technologies for People with Intellectual Disability

ARC Linkage Project - LP160100800 – Endeavour Foundation – 2016-2020

Margot Brereton, Laurianne Sitbon, Peta Wyeth, Shlomo Geva, Jinglan Zhang, Stewart Koplick

The team



Choice, control and access to information

- As of 31 December 2019, there were 78,992 participants with a primary intellectual disability in the NDIS, making up 23.3 per cent of all Scheme participants with an approved plan.

<https://data.ndis.gov.au>

Universal Design for Information Access

Need to re-think search engines

- Interfaces: presentation, prompts, query suggestion, collaboration
- Rankings: readability, understandability, relevance to context
- Personalisation: interests, competencies, sharing

Re-thinking can be

- Based on assumptions (people with disability **cannot** do X or Y and **need Z...**)
- Based on observations (people with disability **can** do X and Y and **try to achieve Z**) – Ability Based Design
- Based on co-design (people with disability **showed me how they can take advantage** of Y and said they **would like** more Z) – Competency Based Design

Learn from what people already do

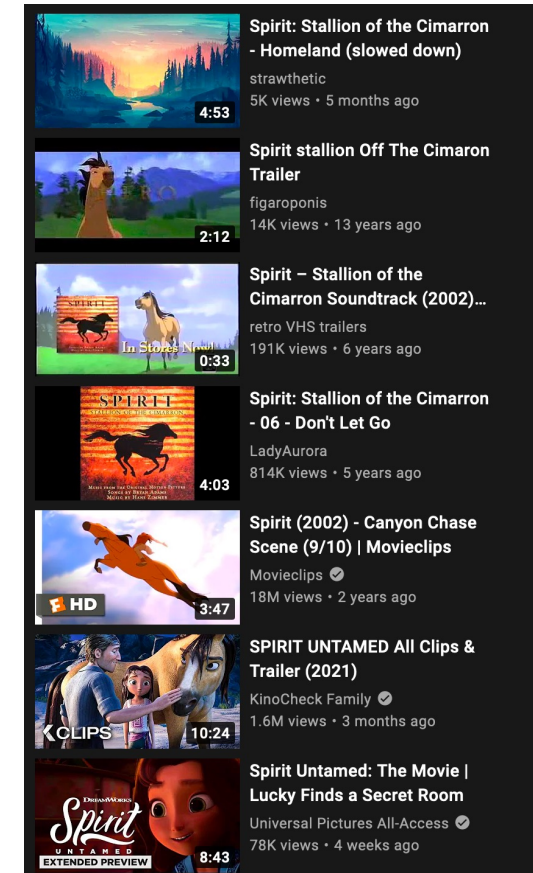
- Observations
- Interviews



- Strategies

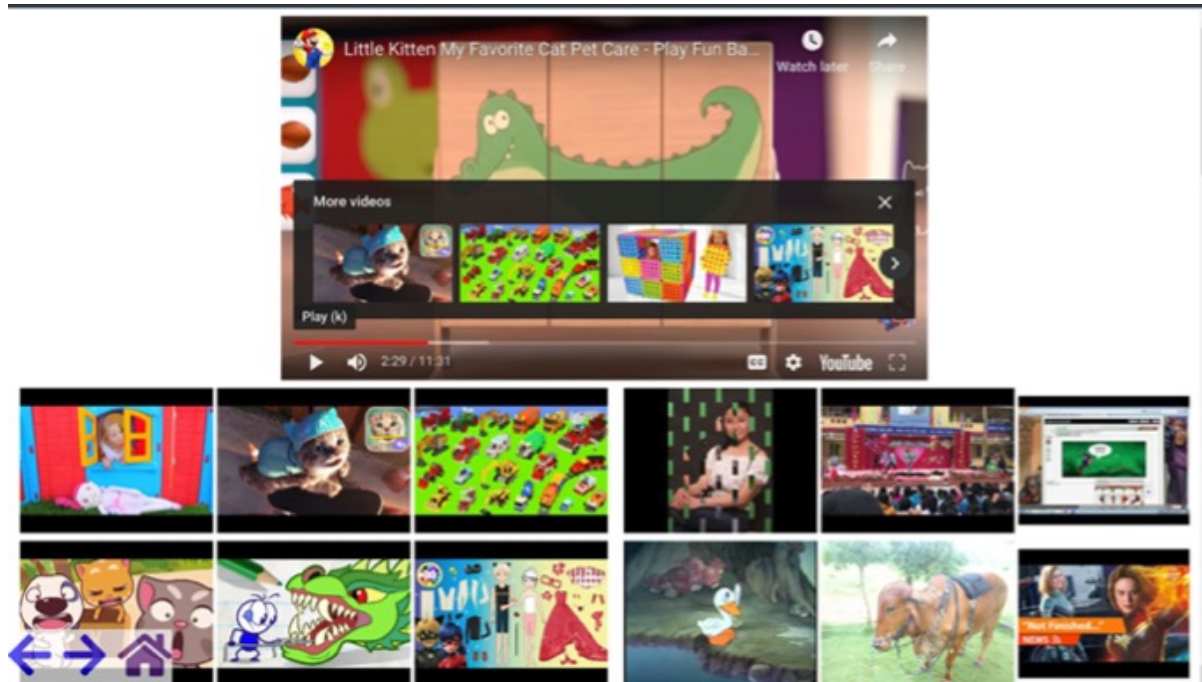
- Interests

- TechShops
 - Reciprocity
 - Participation



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Identify opportunities through interaction



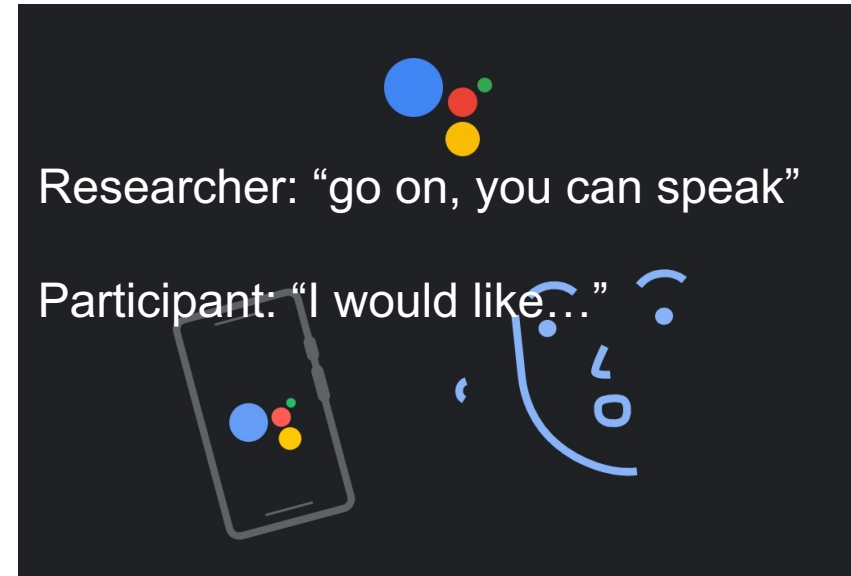
- Accessible protocols
 - Motivating
 - Appropriate to known competencies

Voice Assistants



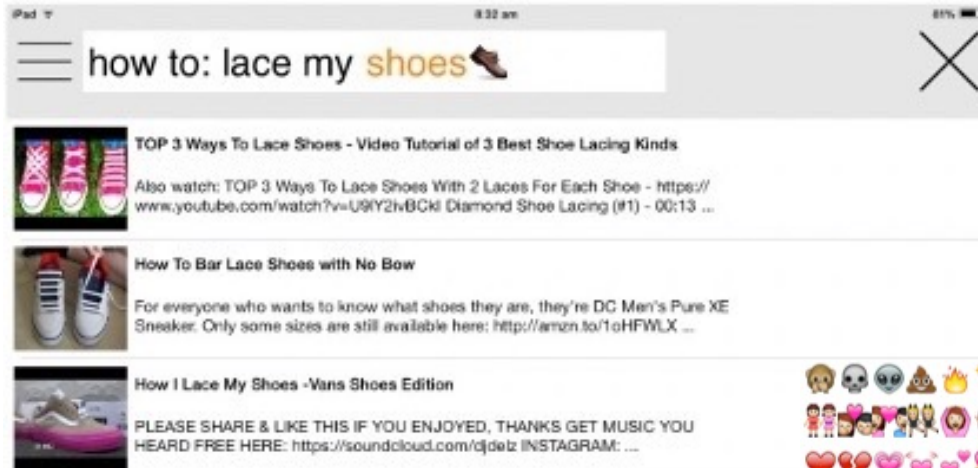
- Don't understand all people
- Are impatient

Recording...

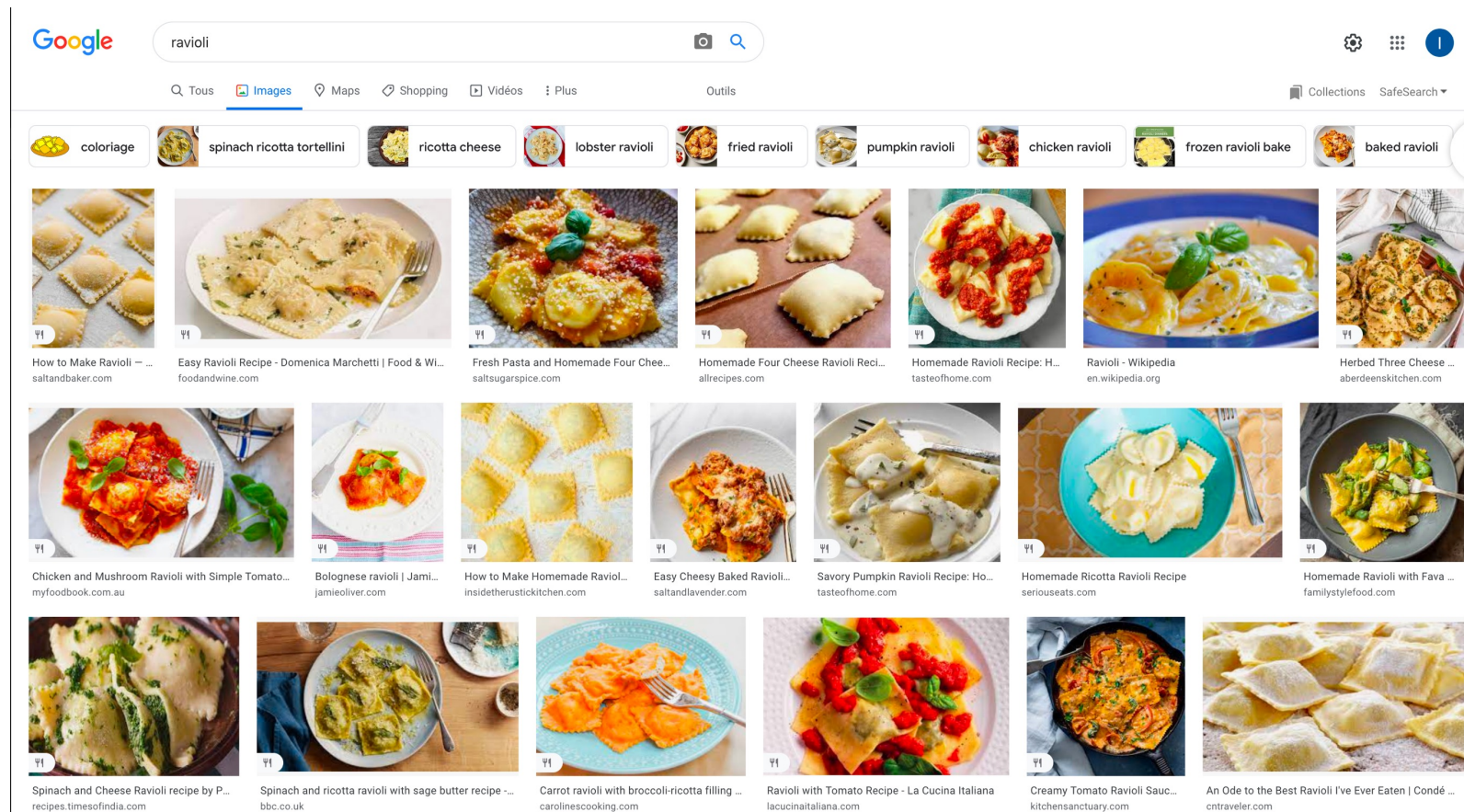


Here is what I found for "Speak"

Reframing how queries are defined



Key Finding: Information is for sharing



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Reframing Information Use

Initial assumption/frame

- Information seeking is either transactional or informational
- Image search intent studies have added the categories: Explore/Learn, Entertain, and Locate/Acquire.

Observations

- People seek documents to share with the researchers (their interests, their story, their knowledge)
- Images are used in communication devices (AAC).

New Frame

- How can co-design search algorithms support access to images in communication settings?

Accessing Information for Inclusion

A Pictorial Communication Framework for Inclusion

ARC Future Fellowship - FT190100855 – 2020 - 2024

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Iterative algorithmic design

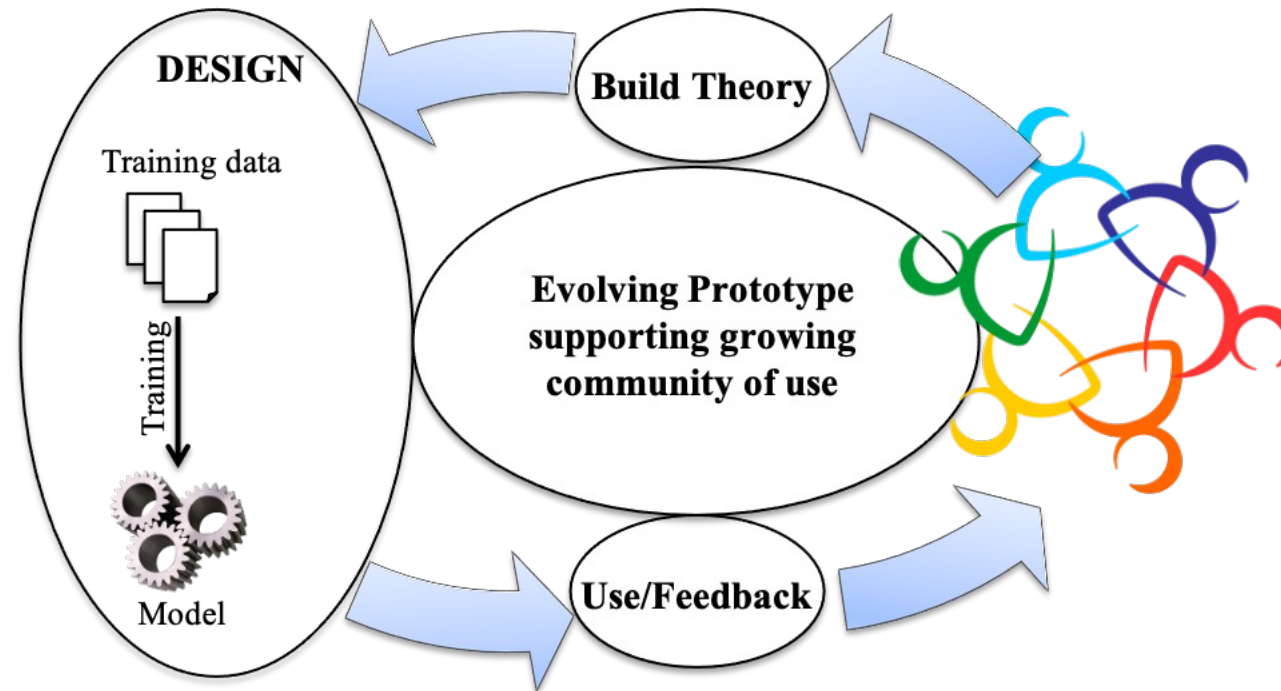
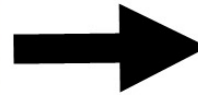
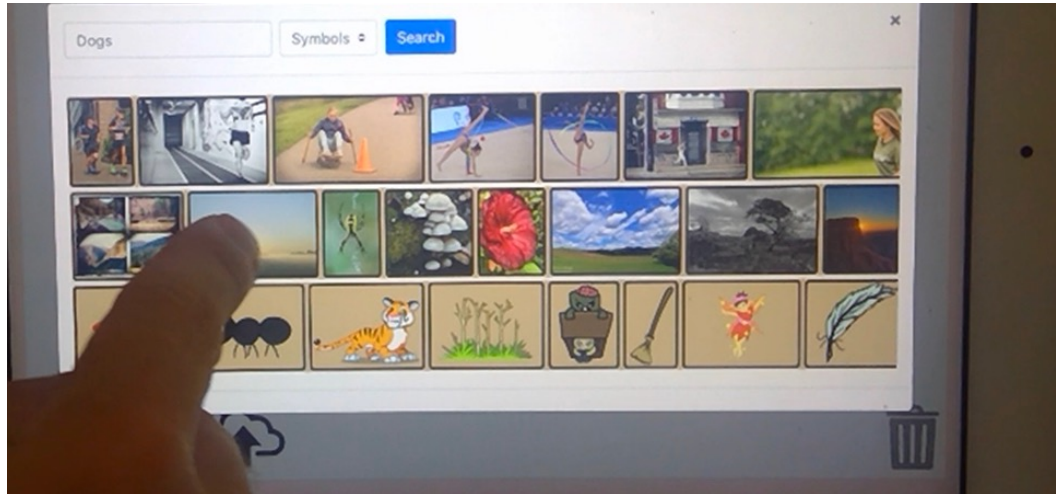


Image Search for Pictorial Communication



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Reframing Communication modalities

Initial assumption/frame

- Images arrangements could be interpreted and expressed as sentences

Observations

- Suggested by carers too.
- Images are support to other forms of communication, not a sole channel.

New Frame

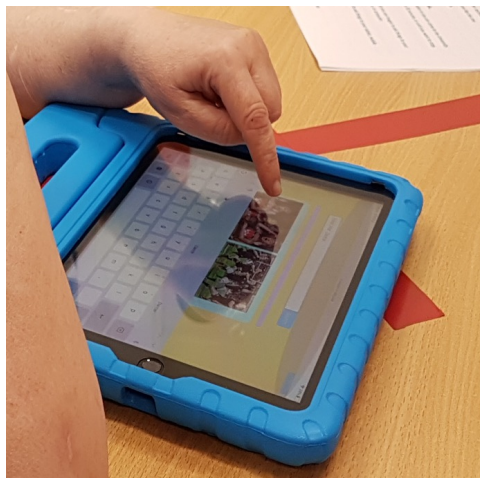
- An inclusive approach will reflect people's unique communication preferences



Multimodal Conversations

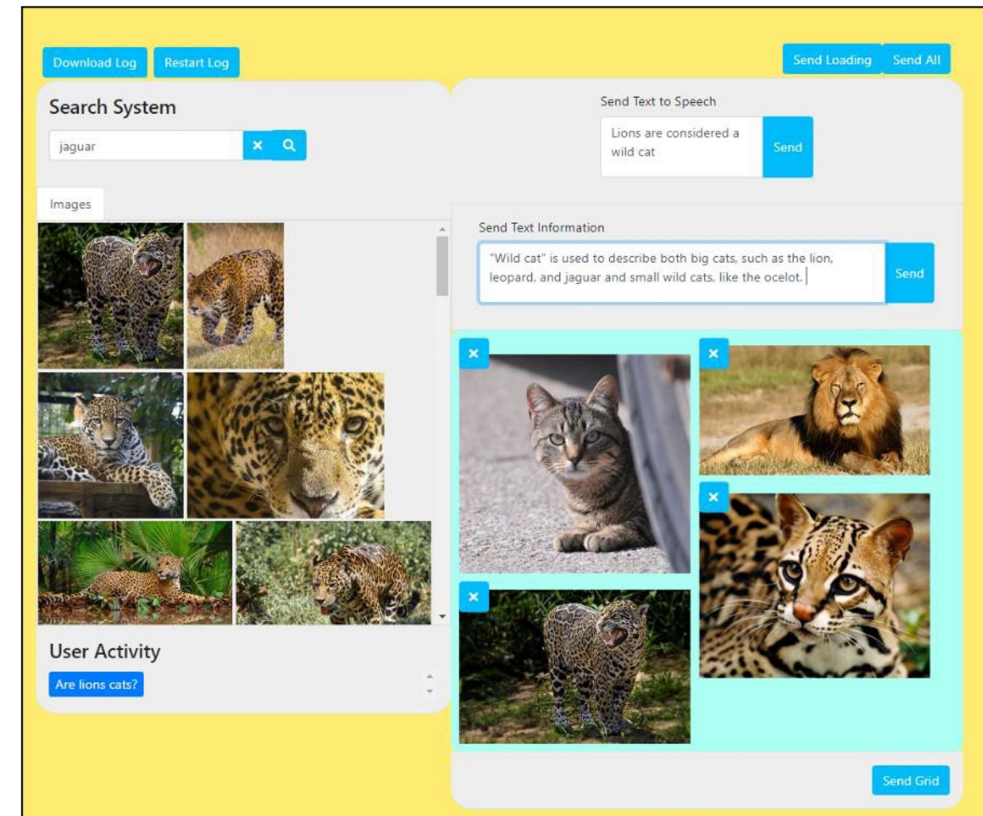
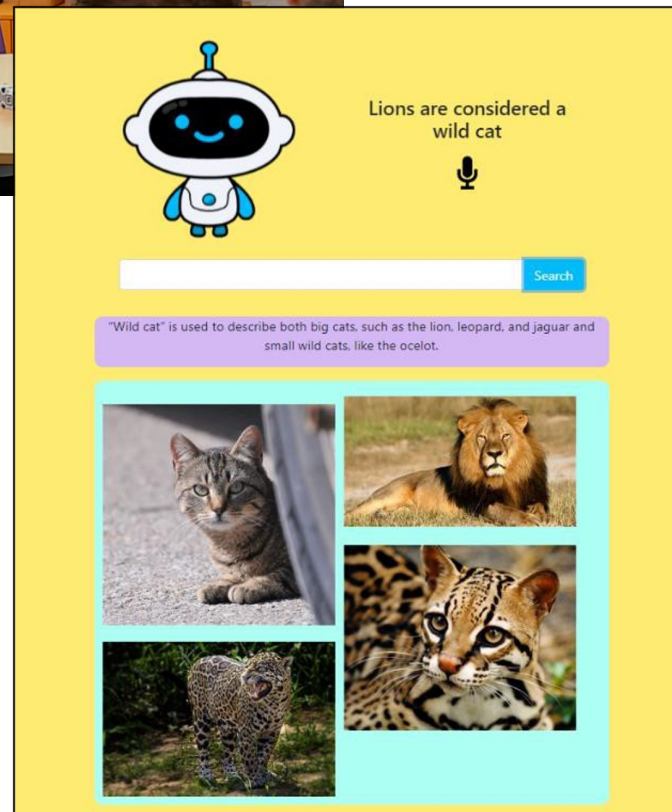


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Multimodal Conversational Search



Closing Reflections

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Rapid Prototyping for Conversational Interactions

Early Prototypes

- Constrained use cases
- Simulation, Wizard-of-Oz

Outcomes

- Discovering new use cases for existing algorithms/systems
- Imagine future tasks add their parameters: new research frames

Investigating consequences of system errors

- Understanding acceptable error types and error rates
- Designing coping mechanisms (transparency, recovery, etc.)

From assistive to inclusive technologies

Design for everyone/every place to become inclusive, rather than assistive technology.

Automating cognitive inclusion/personalization with generation of images in context.



Thank you!

Come Visit 😊