



Inclusive Design

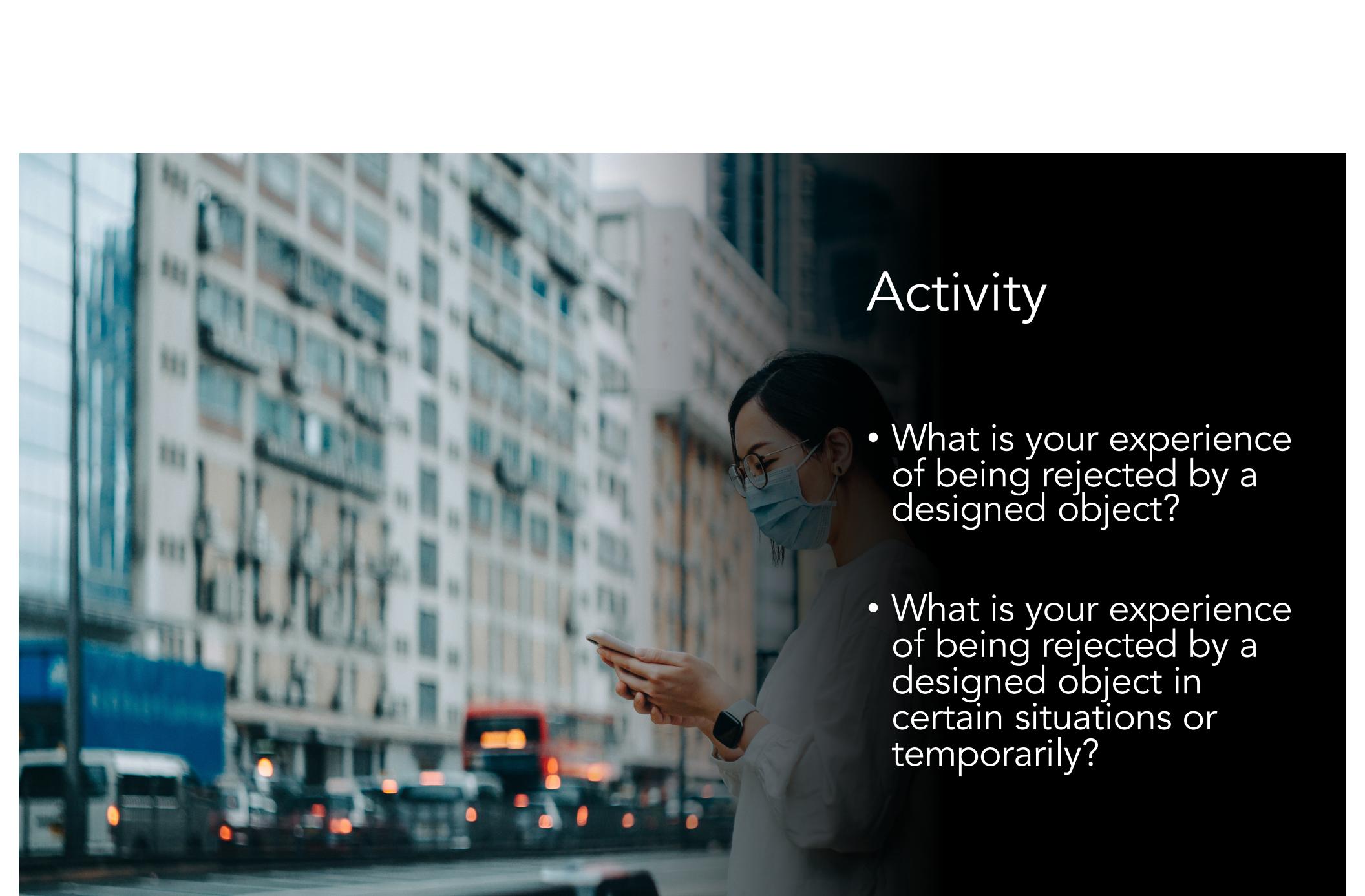
Jin L.C. Guo

SOCS McGill University

What is inclusive Design?

Why inclusive design?

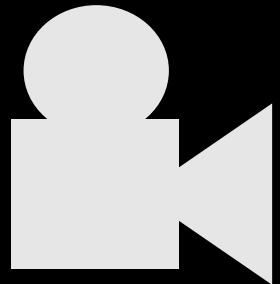
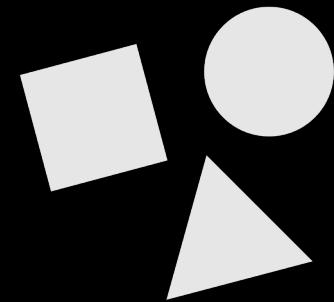
Inclusive design is design that is inclusive of the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference.

A photograph of a woman with dark hair, wearing a white long-sleeved shirt, a blue surgical mask, and glasses. She is looking down at her smartphone. She is walking on a city street with blurred buildings and traffic in the background.

Activity

- What is your experience of being rejected by a designed object?
- What is your experience of being rejected by a designed object in certain situations or temporarily?

Design is a source of the
mismatched interactions



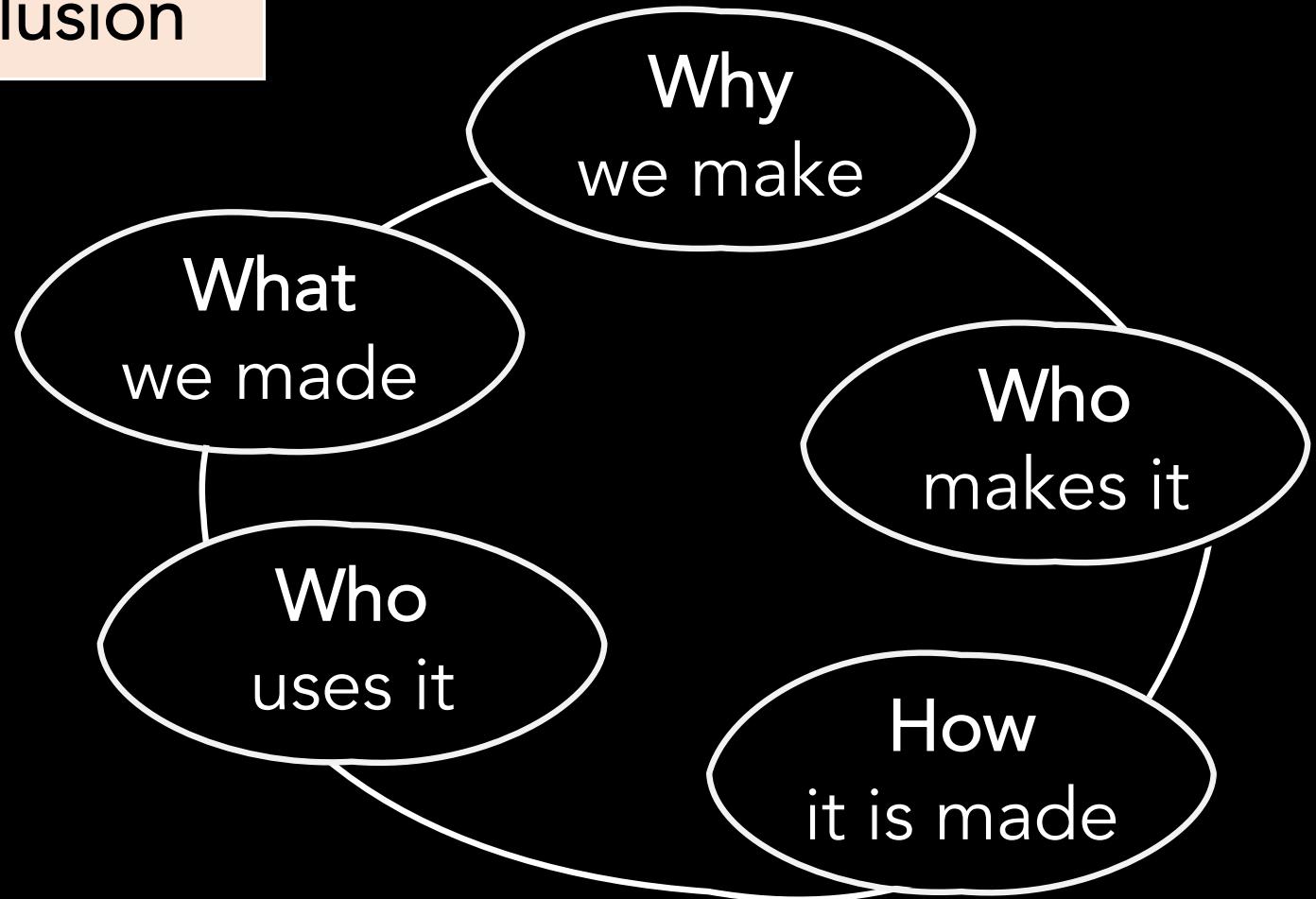
but can also be a remedy.

Recognize exclusion

Learn from human diversity

Solve for one, extend to many

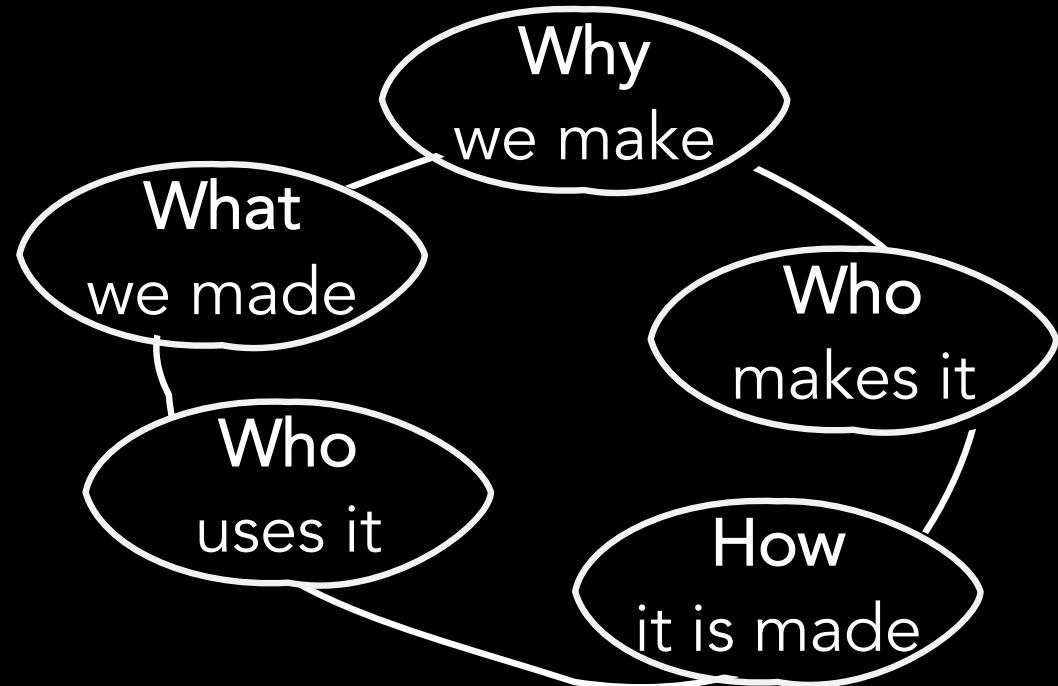
Recognize exclusion



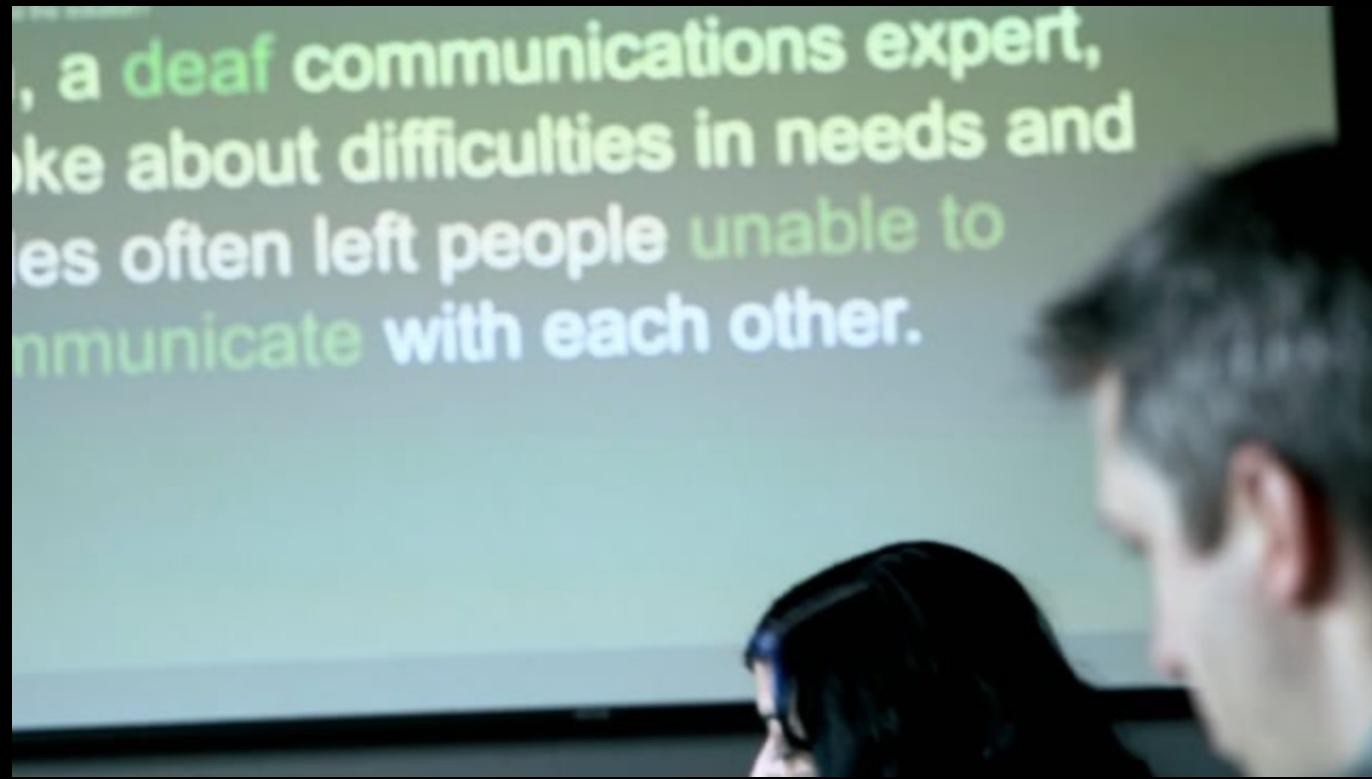
Where can exclusion happen?

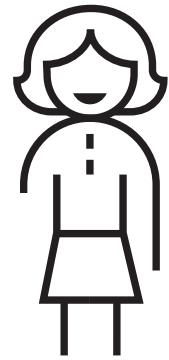
Activity

- For your case study from Assignment 1, answer as many questions as you can from the diagram.
- Identify who are excluded from the design. Consider from (but not limited to) the aspects of gender, age, language ability, tech literacy, physical ability, and specific access to money, time, and a social network.

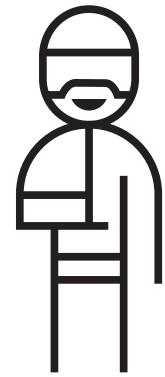


Learn from human diversity

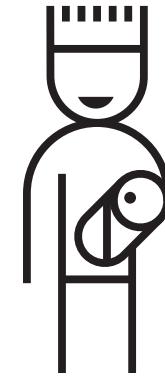




One arm



Arm injury



New parent

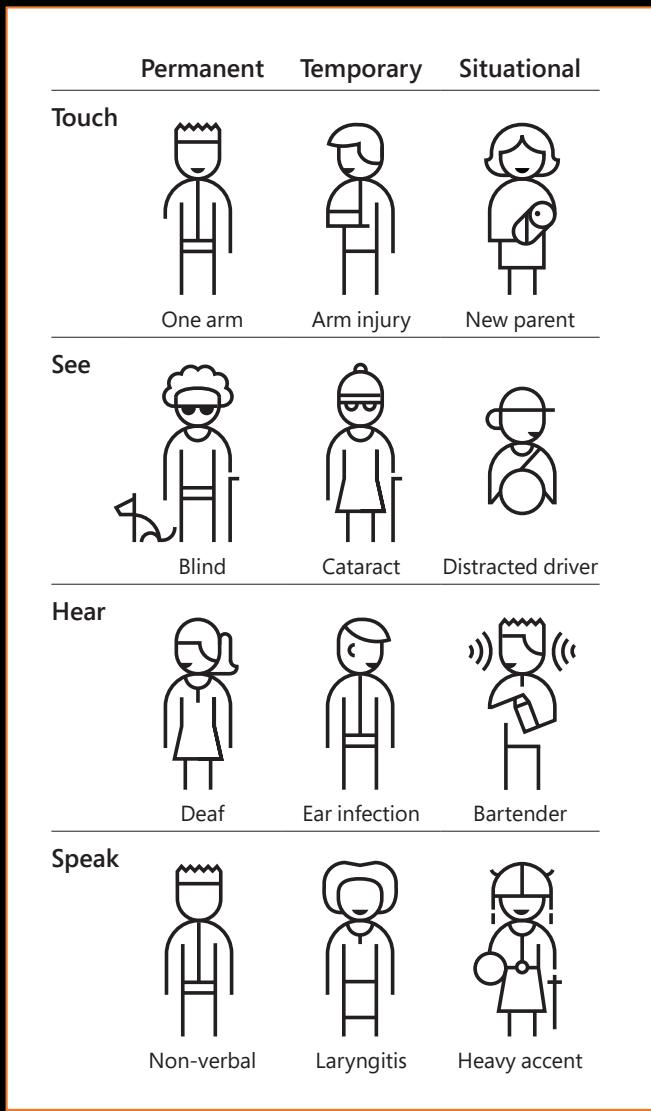
Permanent 26k

Temporary 13M

Situational 8M

Solve for one, extend to many

Microsoft Inclusive Design Toolkits
<https://www.microsoft.com/design/inclusive/>

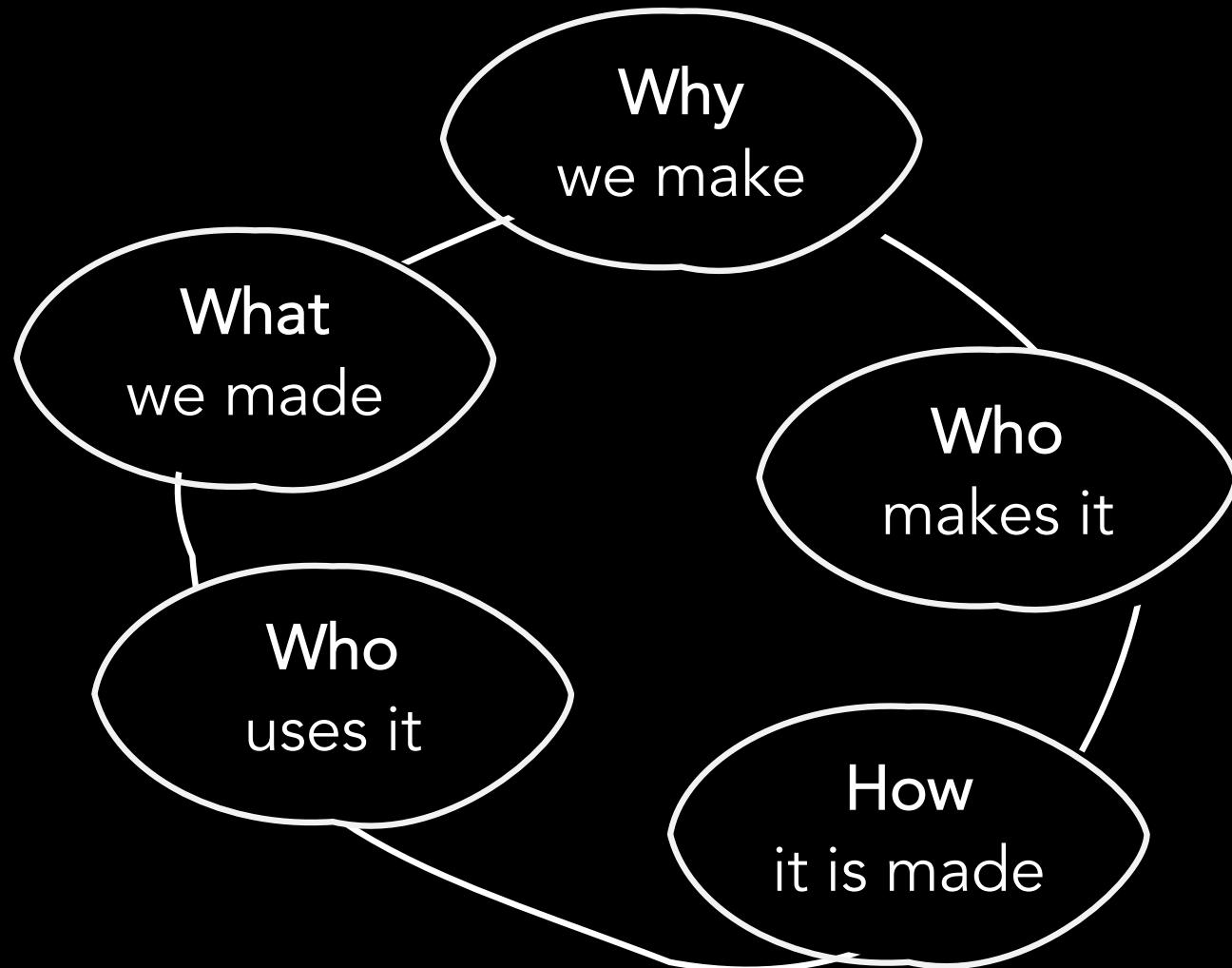


From Persona To Persona Spectrum

Microsoft Inclusive Design Toolkits
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Inclusive Design and AI

Where are the mismatches and remedies?





What is the quality of this data instance for training machine learning models (text recognition task)?

Jump to page

Search

Within visual question

Within answers to visual question

Within captions

Image by filename

Filter

Reasons why answers differ:

- LQI - Low quality image
- IVE - Insufficient visual evidence - answer not present in the image
- INV - Invalid question
- DFF - Difficult question
- AMB - Ambiguous question
- SBJ - Subjective question
- SYN - Synonymous answers
- GRN - Answers present same idea in different levels of detail / granularity
- SPM - Answers are spam
- OTH - Any other reason

Skills needed by an AI system to automatically answer the visual question

- TXT - Text recognition
- OBJ - Object recognition

Image 6: VizWiz_train_00001601.jpg



Visual question: *What's in this can?*

Answers:

1. chicken noodle soup
2. soup
3. chicken noodle soup
4. chicken noodle soup weve discussed this before
5. homestyle chicken noodle
6. chicken noodle soup
7. homestyle chicken noodle soup
8. chicken noodle soup
9. soup
10. homestyle chicken noodle soup

Reasons why answers differ:

1	0	0	0	2	0	2	4	0
LQI – Low quality image	IVE – Insufficient visual	INV – Invalid question	DFF – Difficult question	AMB – Ambiguous question	SBJ – Subjective question	SYN – Synonymous answers	GRN – Granular answers	SPM – Spam

Image captions:

1. A can of Campbell chicken noodle soup that is being held by the person.
2. A hand holds a can of chicken noodle soup.
3. I see a can of chicken noodles homestyle
4. I see an arm in a green shirt holding a can of home style chicken soup.
5. Quality issues are too severe to recognize visual content.

Skills needed by an AI system to automatically answer the visual question:

5	5	1	0	0
TXT – Text recognition	OBJ – Object Recognition	COL – Color Recognition	CNT – Counting	OTH – Other

Quality issues in the image:

4	0	0	0	3	0	0	0
BLR – Blur	BRT – Too bright	DRK – Too dark	OBS – Obstruction	FRM – Framing	ROT – Rotation	OTH – Other	NONE – No issue

Text detected by: 5 / 5 annotators

More than data quality

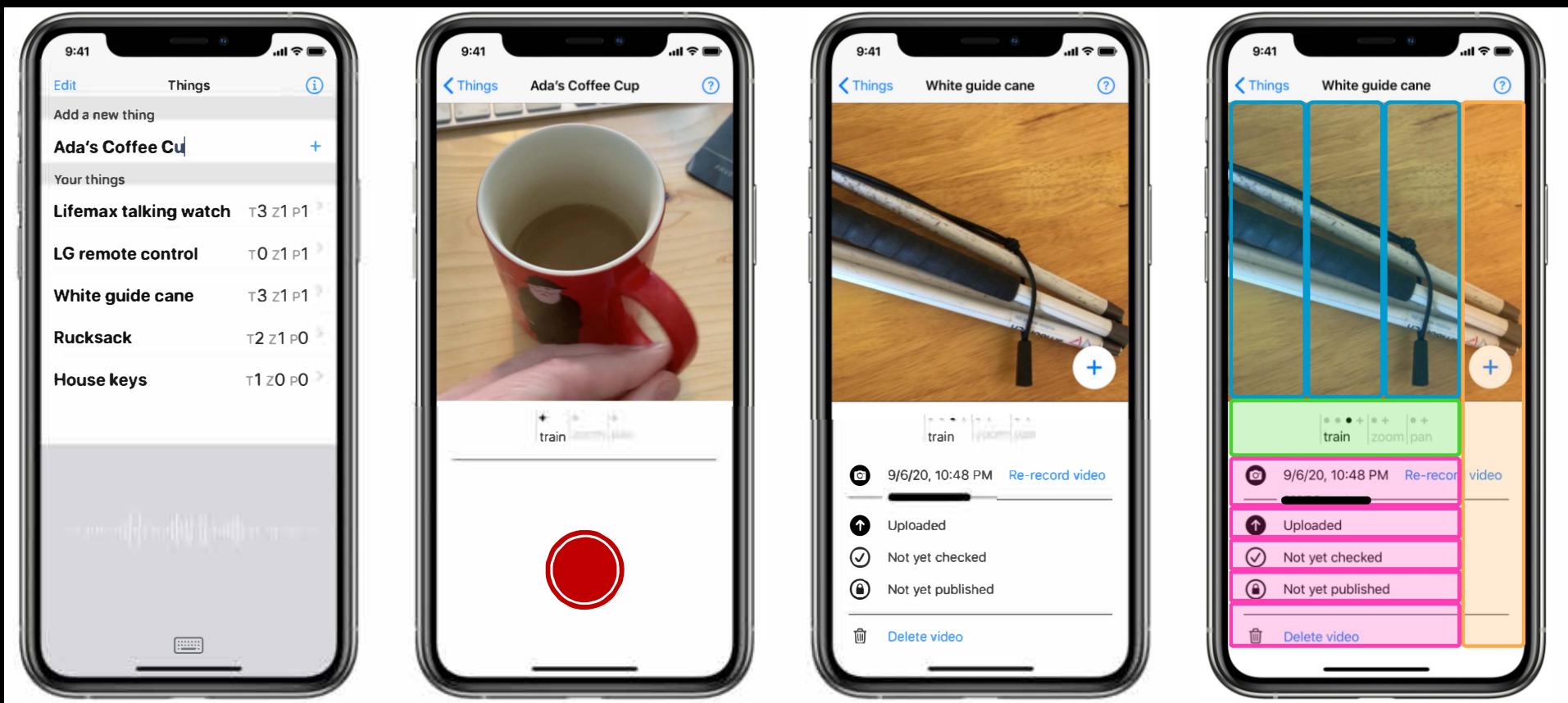


Lida Theodorou, Daniela Massiceti, Luisa Zintgraf, Simone Stumpf, Cecily Morrison, Edward Cutrell, Matthew Tobias Harris, and Katja Hofmann. 2021. Disability-first Dataset Creation: Lessons from Constructing a Dataset for Teachable Object Recognition with Blind and Low Vision Data Collectors. ASSETS '21. DOI:<https://doi.org/10.1145/3441852.3471225>

Mismatch - Data Collection

- Instructure
 - Are they accessible?
- What data to collect?
 - What objects?
 - How many objects?
 - What examples?
 - How many examples?

Lida Theodorou, Daniela Massiceti, Luisa Zintgraf, Simone Stumpf, Cecily Morrison, Edward Cutrell, Matthew Tobias Harris, and Katja Hofmann. 2021. Disability-first Dataset Creation: Lessons from Constructing a Dataset for Teachable Object Recognition with Blind and Low Vision Data Collectors. ASSETS '21. DOI:<https://doi.org/10.1145/3441852.3471225>



The data collection app for blind and low vision data collectors: (a) the main 'Things' screen, (b) a 'Thing' screen adding a recording, (c) a 'Thing' screen after some recording activity, (d) the same 'thing' screen marked up with the adapted information hierarchy and touch-targets of the accessibility interface.

Remedy - Application

- Augmentative and Alternative Communication (AAC)

Imaging facing a world that you might not able to communicate using speech.

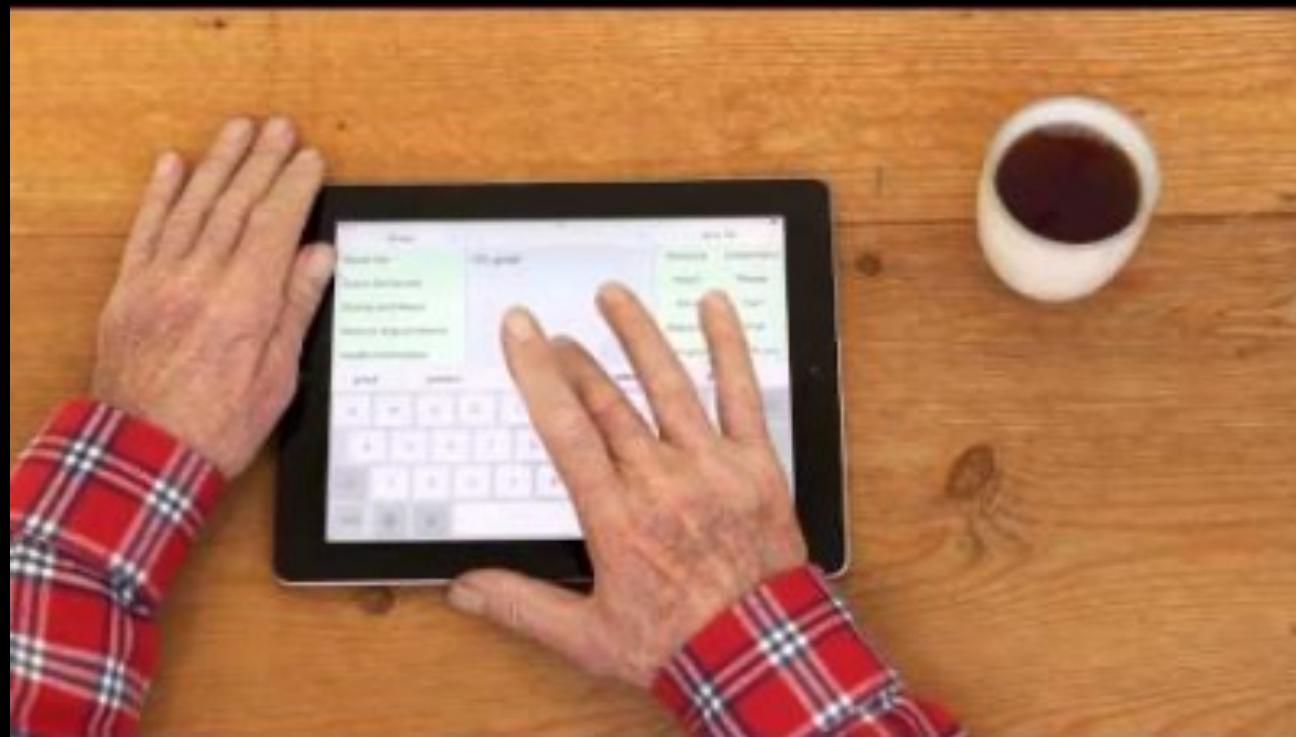




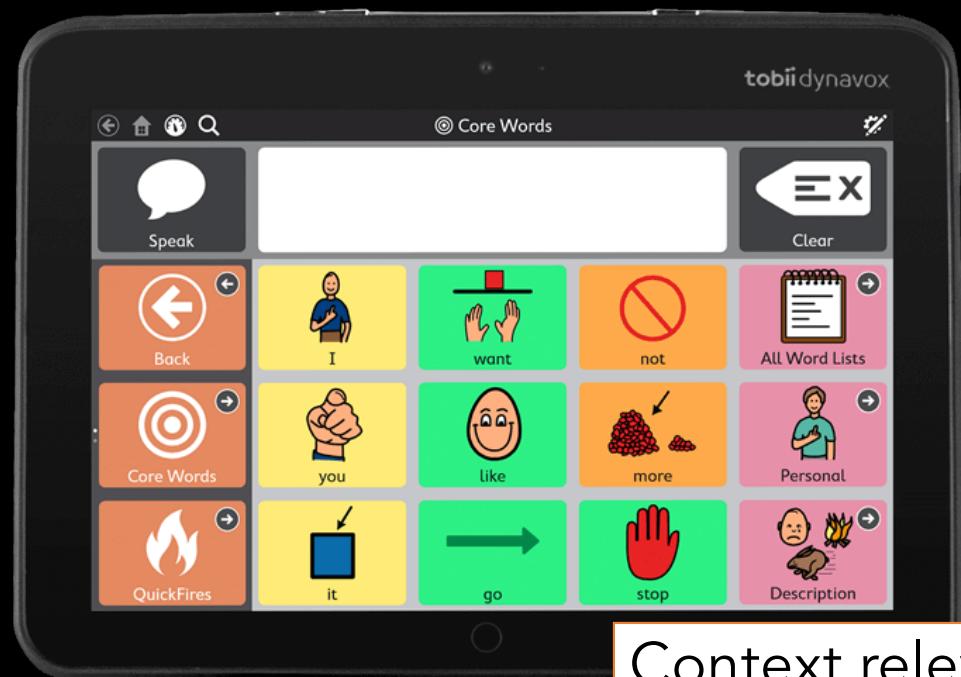
One man's set of communication aids. In the centre, is an example of a traditional custom-purpose AAC device. This individual combines multiple AAC strategies, from low- to high-tech, in his daily communication.

Moffatt, Karyn, Golnoosh Pourshahid, and Ronald M. Baecker. "Augmentative and alternative communication devices for aphasia: the emerging role of "smart" mobile devices." *Universal Access in the Information Society* 16, no. 1 (2017): 115-128.

Text based AAC Tools

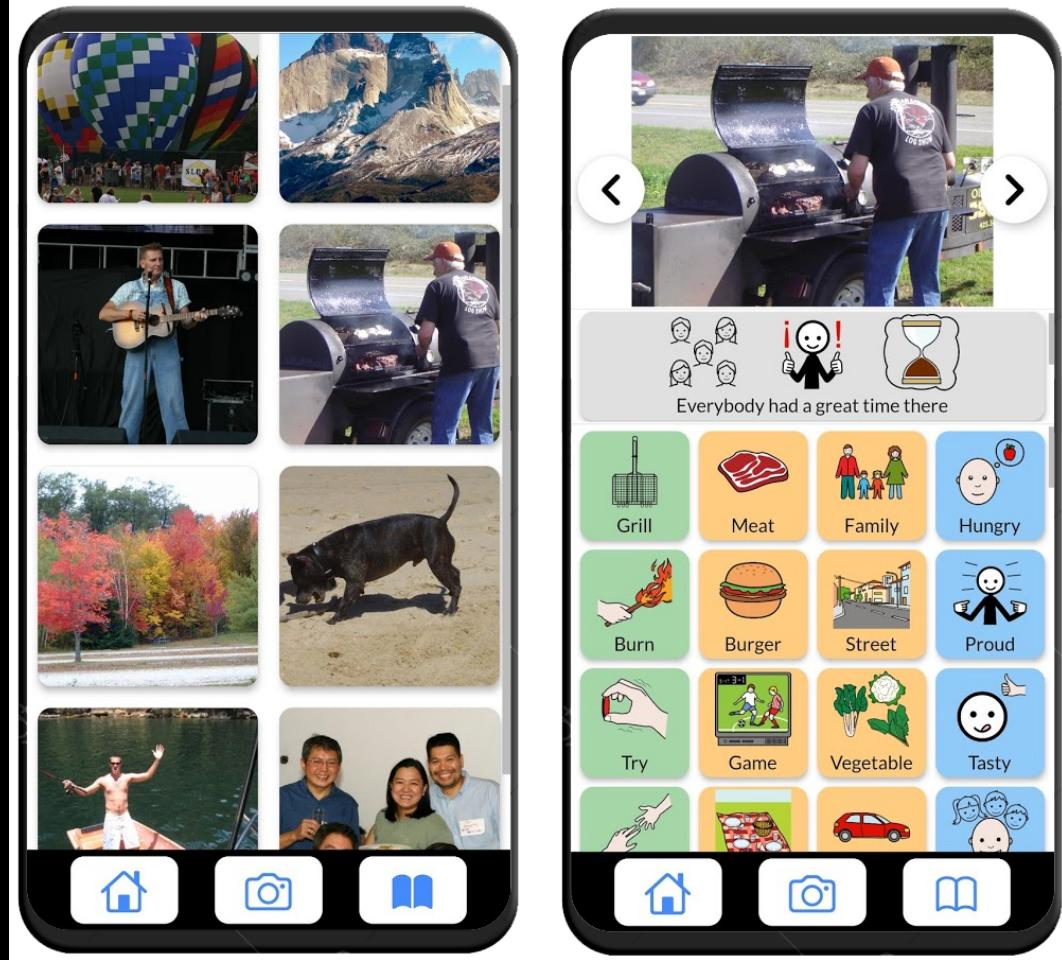


Symbolic based AAC Tools



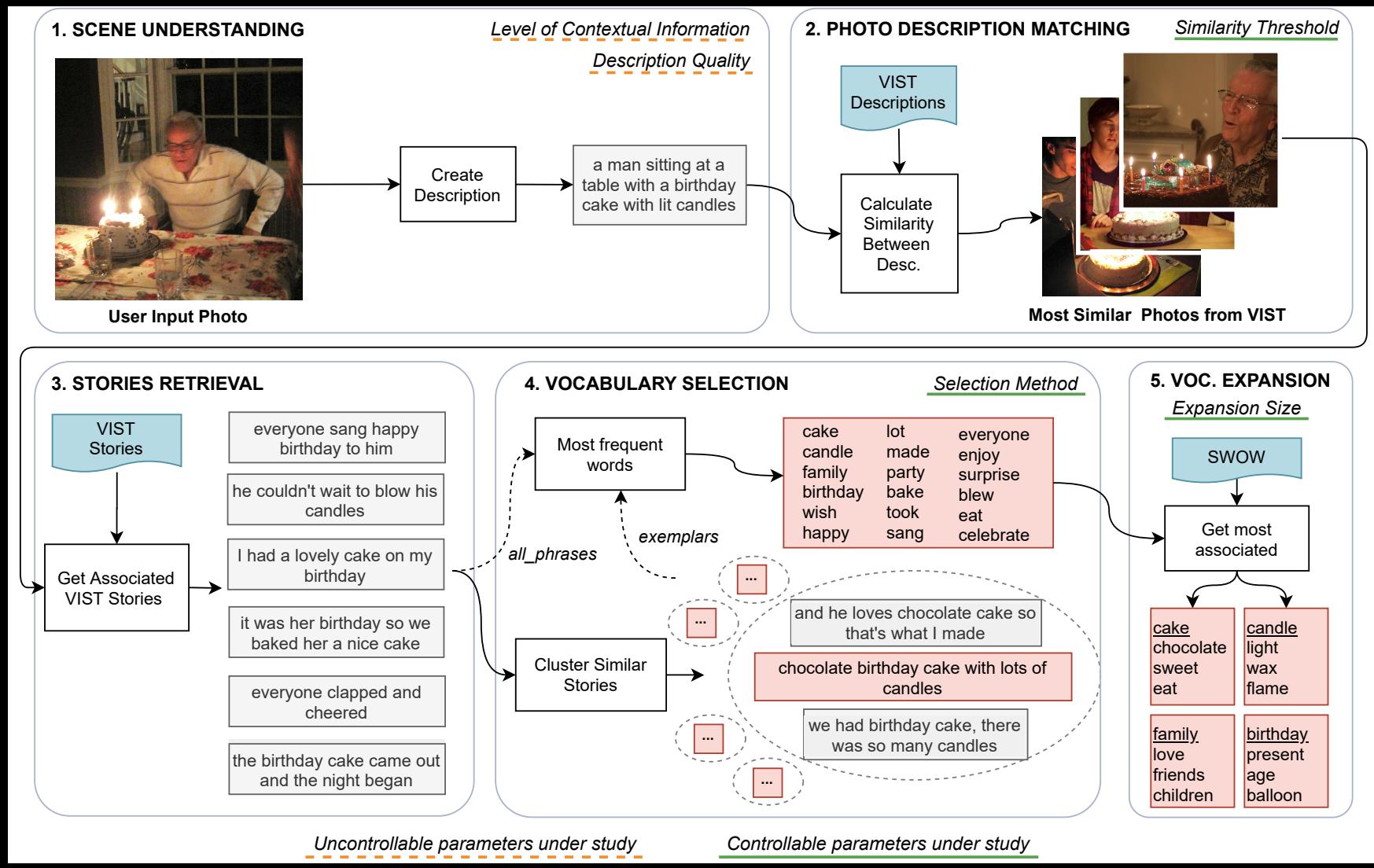
Context relevant vocabulary generation?

<https://www.tobiidynavox.com/collections/devices>



An AAC app design demonstrating how context-related vocabulary generated by our method might be presented for use in subsequent conversations. As in many non-orthographic AACs, vocabulary is represented by images that reproduce computer generated speech when selected; however, unlike the status quo, this design eliminates navigation across complicated hierarchies and the need for pre-programming.

Fontana de Vargas, M. and Moffatt, K. (2021). Automated generation of storytelling vocabulary from photographs for use in AAC. Proceedings of the Joint Conference of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing, 11 pages.



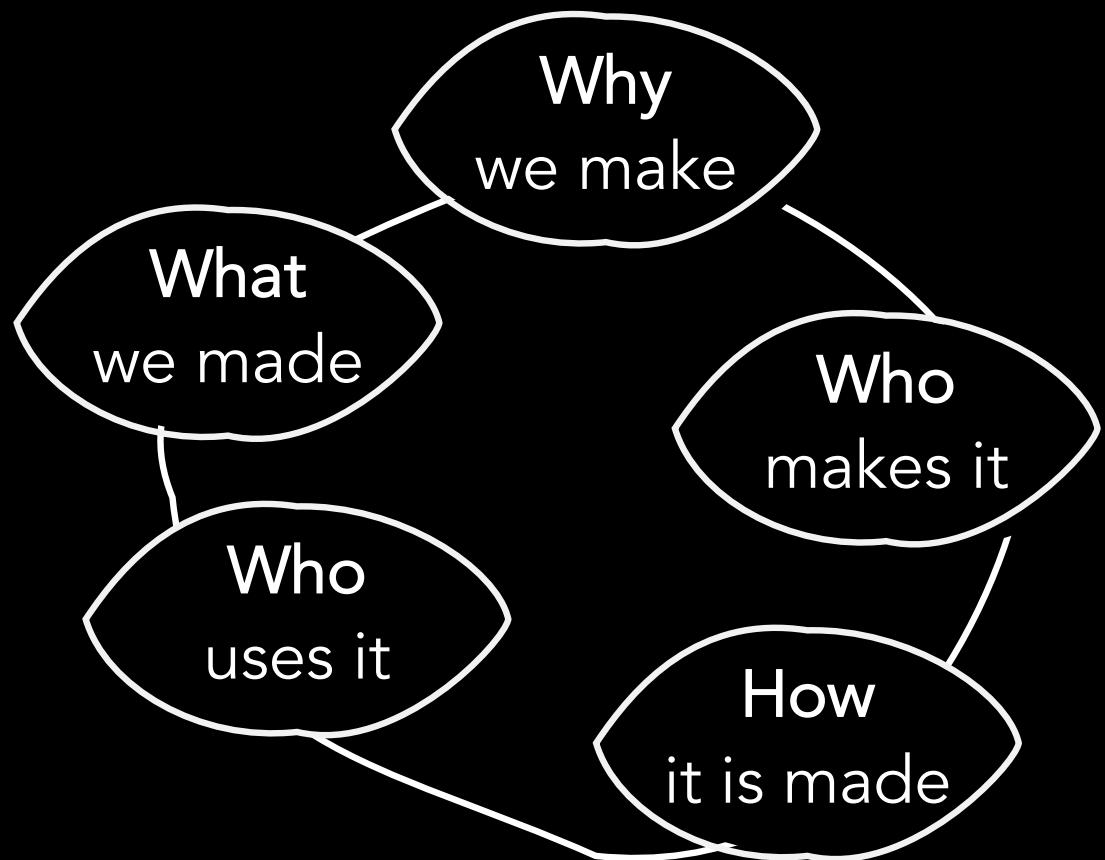
			
DII	A black frisbee is sitting on top of a roof.	A man playing soccer outside of a white house with a red door.	(1) Pick at least 5 photos that best describe the story. Skip (Only if this album is not telling any stories.)
DIS	A roof top with a black frisbee laying on the top of the edge of it.	A man is standing in the grass in front of the house kicking a soccer ball.	(2) Write a sentence or a phrase for each photo to form a story. (Please at least pick 5 photos.)
SIS	A discuss got stuck up on the roof.	Why not try getting it down with a soccer ball?	 <p>Today is my big day. I'm glad my parents and Mary are all here with me. Mary is</p>

Figure 4: Example descriptions (DII); descriptions of images in sequences of images in sequence

Figure 3: Interface for the *Storytelling* task, which contains: 1) the photo album, and 2) the storyboard.

Huang, Ting-Hao, Francis Ferraro, Nasrin Mostafazadeh, Ishan Misra, Aishwarya Agrawal, Jacob Devlin, Ross Girshick et al. "Visual storytelling." In *Proceedings of the 2016 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, pp. 1233-1239. 2016.

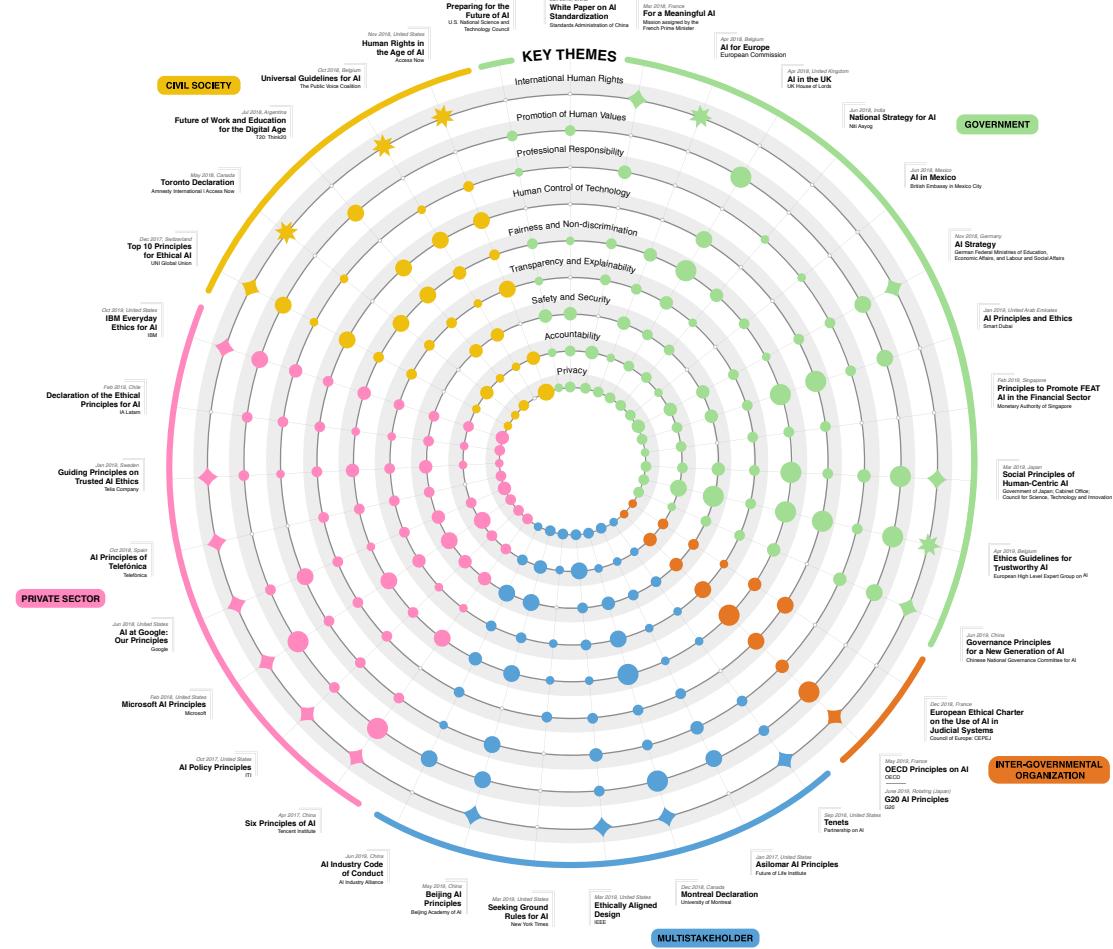
Conclusion



Next

AI principles Overview

Fjeld, Jessica, Nele Achten, Hannah Hilligoss, Adam Nagy, and Madhulika Srikumar. "Principled artificial intelligence: Mapping consensus in ethical and rights-based approaches to principles for AI." *Berkman Klein Center Research Publication* 2020-1 (2020).



Activity

- Task1: Read the content of your assigned principal group(s) in the "Principled AI" paper, assign one or more emojis for at least three principles to reflect your understanding of each of the principle.
- Task2: Think about the following two questions (10mins), share your answer to your teammate, and later share within the class:
 - Q.1: in your opinion, which principle can be reasonably addressed by the content we discussed in the class so far? How and by whom?
 - Q.2: which principle do you feel the most muffled and you don't know the connections with your role or knowledge about AI.

When you discuss with your teammate, record the most and least agreed points.