



DESIGN THINKING TO CREATE SOLUTIONS FOR PEOPLE WITH HEARING LOSS

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Learning Outcomes

After this course, participants will be able to:

3. Name the five main components of design thinking and why they are important when creating impactful solutions.

Design Thinking for Innovation

- A human-centred approach to innovation which focuses on the needs of people
- Hands-on and solution-based
- Bring ideas to life quickly
- Test with real users to identify promising solutions (or not!)



Design Thinking stages

Q4

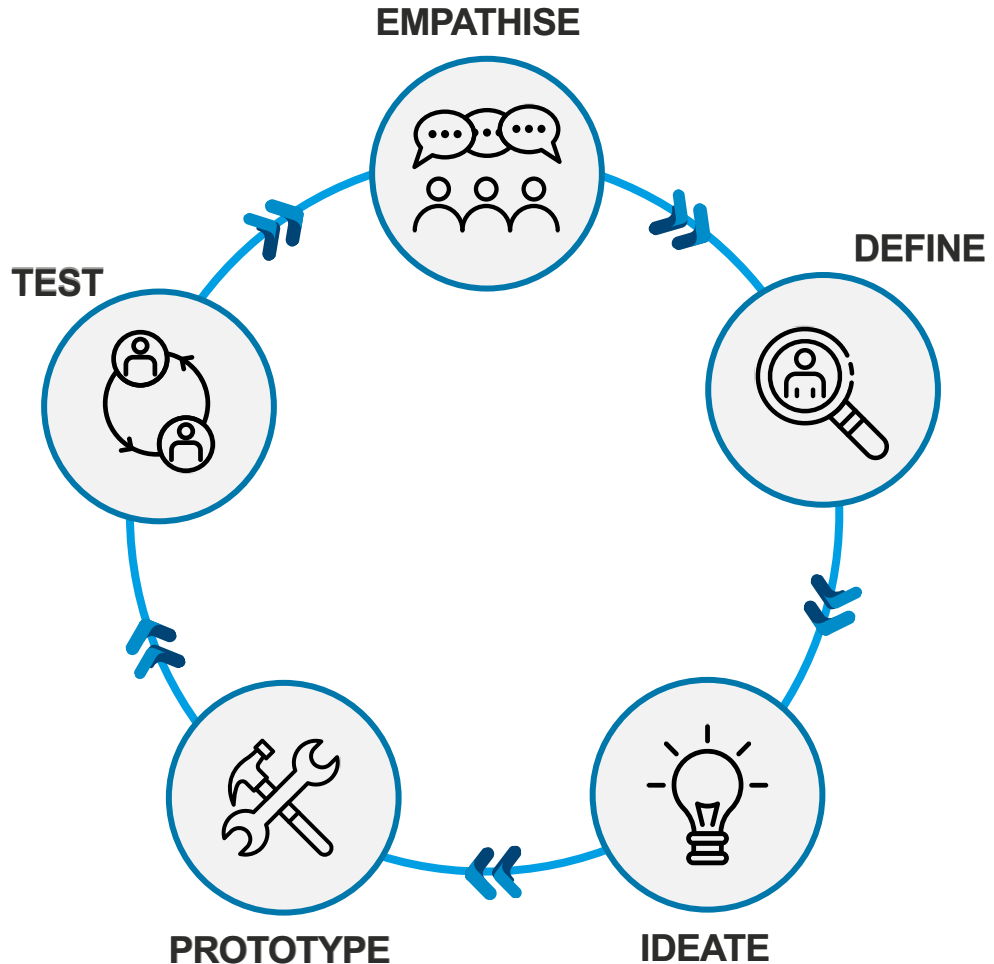
EMPATHISE: Understand the experiences and needs of users

DEFINE: Identify and define the ideal users and their unmet needs

IDEATE: Brainstorm solutions

PROTOTYPE: Create something to let users experience the solution.

TEST: Verify the idea in real life to gather feedback, iterate and improve



Case Study: Facemasks make communication challenging

J Am Acad Audiol 19:686-695 (2008)

Speech Understanding Using Surgical Masks: A Problem in Health Care?

The Washington Post
Democracy Dies in Darkness

Opinions

Masks are a barrier against the coronavirus. They also pose a major hurdle for deaf people.



Jessica Monaghan

Face masks present challenge to hearing, communication

By Jean Bonchak For The News-Herald Jun 15, 2020 Comments

The challenges of facemasks for people with hearing loss

By Kevin Munro and Michael Stone



THE HearingReview

How Do Medical Masks Degrade Speech Reception?

Apr 1, 2020 | Assistive Technologies, Counseling & Education, Health & Wellness, Industry News | ★★★★★

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James Galloway

THE WALL STREET JOURNAL.

The Pandemic Has Made My Hearing Problem Even More of a Problem

Masks and social distancing are now essential, but they make life and work more difficult for those with serious hearing loss

Exploring how people who experience the problem feel



Frustration



IT'S AWFUL!!!",
"Frustrating when I may
totally mess up doctors'
orders"

Guilt



ultimately they have to
remove the mask and
then we feel guilty bc that
person might get sick bc I
can't hear

Anxious



I pray nobody will talk to
me unless absolutely
necessary because it's a
struggle

Stressed



I have panic attacks
because my hearing
issues make every single
conversation more
stressful

Upset



when I ask people to talk
louder they end up yelling
and talk very
condescending

Scared



Terrified to return to work
because customer-facing

Lonely



I avoid going out or
having to talk to people

Embarrassing



It's so awkward to
have to say "what" again
or to just nod and hope
I'm not agreeing to
anything bad

Helpless



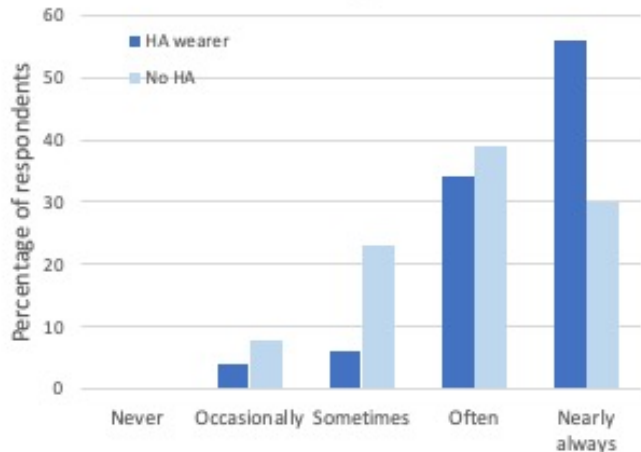
Nearly impossible to
figure out what customers
are wanting 90% of the
time

Source: Reddit, Sept 2020, "Hearing impaired or lip reading people, how have Corona mask policies affected your daily life? 53.4k upvotes, 3.7k comments



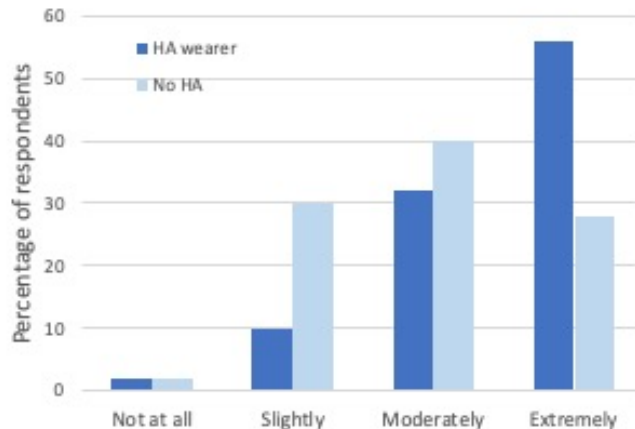
Our own survey (N=133)

When you are talking to someone who is wearing a mask, do you have trouble understanding them?



Mask wearing affects understanding for people with and without hearing aids, but more often for HA wearers (**90%** rated Often or Nearly Always)

How frustrating are your mask communication difficulties?



Mask communication difficulties cause frequent, high levels of frustration for HA wearers

- **88%** rate frustration as Moderate or Extreme
- **72%** are frustrated at least once per day

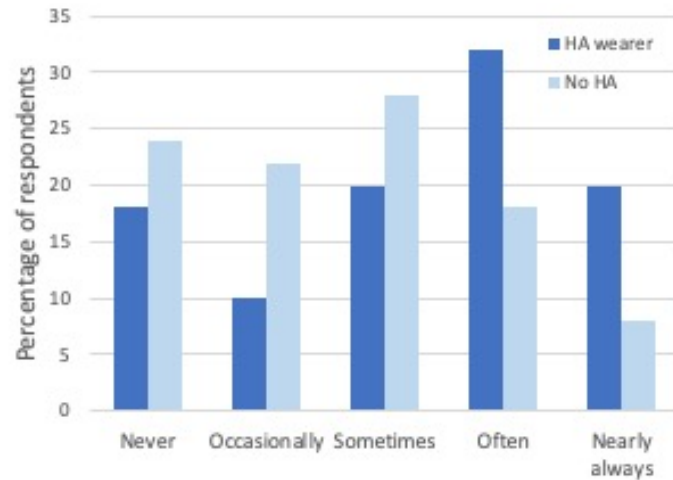


In what situations do you have mask communication difficulties?

restaurant	retail store	grocery store
80%	78%	76%
hospital / healthcare	bank, govt agency	office / school
66%	42%	60%

Mask communication difficulties occur in many everyday situations

How frequently do you avoid interacting with people because of masks?



Mask communication issues affect social interaction

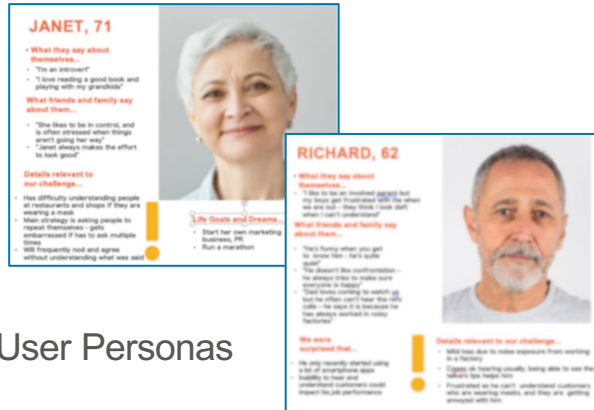
- **52%** of HA wearers avoid interactions Often or Nearly always

Defining the problem



- Understanding the data

- Analysis of existing solutions



User Personas

What do you do to improve communication?

ask person to speak louder	ask someone to help	write things down	use captioning app
74%	36%	30%	10%
more body language	ask them to remove mask	wear a badge	use transparent mask
34%	20%	10%	10%

Effectiveness of current strategies [0: not at all, 99: completely]

51% (median, stdev 20)

Generating ideas



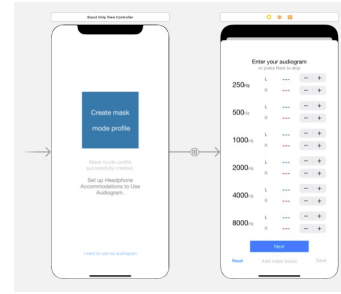
How might we help people with hearing loss have easier conversations and improve understanding during the pandemic and beyond?



Building prototypes to test ideas



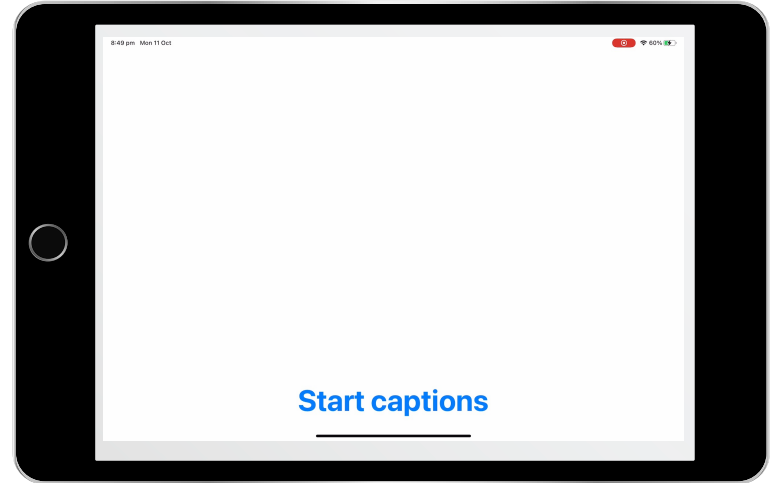
- Build to think
- Make something quickly to put in front of users so they understand the idea.
- Early prototypes involved hearables, sound amplification, compensating for muffled sound, and captioning on an individual's phone.



Prototype: Speech to text iPad app



- Converts speech to text as a person is talking
- Very large text for ease of reading by the elderly or people with reduced vision
- Simple, minimum version
- Developed for hearing clinics to have at reception counters and in appointments



Testing in hearing clinics



Test locations

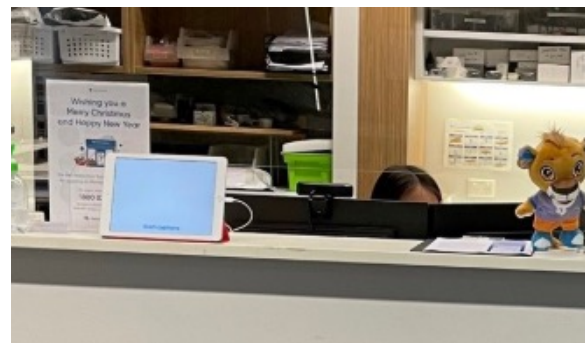
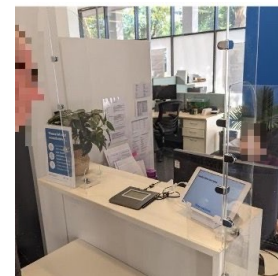
- 10+ hearing centres in metro and regional areas

Objectives:

1. To evaluate how well the solution improves communication for people with hearing loss
2. To identify situations where it was most beneficial and for whom
3. To learn how it could be improved

Feedback methods:

Surveys, observation, casual conversations, semi-structured interviews



Clinician feedback



Clients with severe/profound loss love it. Even though they lipread, they think it's good as a backup to confirm what they are hearing.

Some clients were excited to use it even before they saw how it worked. Through the app, they found reassurance by being able to confirm what they think they heard, and it eliminated any miscommunication.

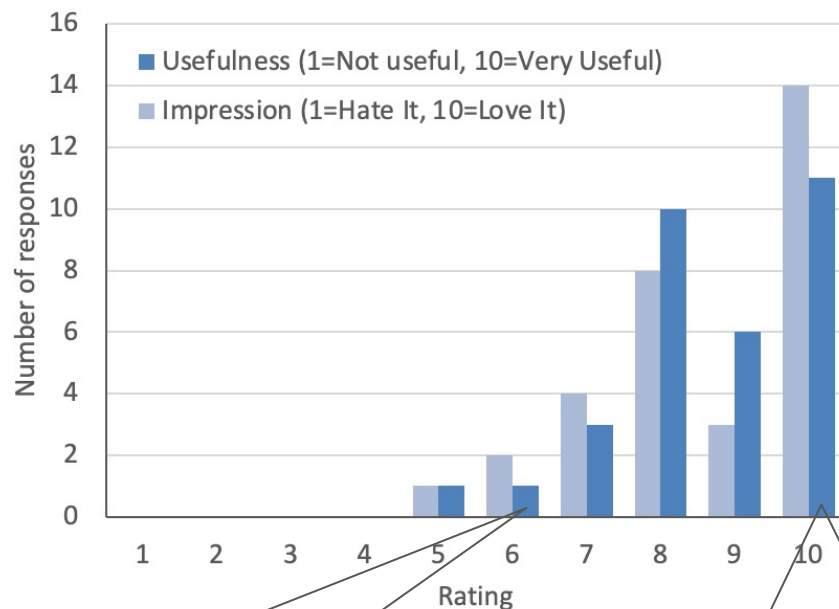
It's fantastic to see that we have real-time captioning available for our clients now! With the increasing use of face masks and shields, having a speech-to-text app breaks down the barriers to communication, and gives our clients that boost in confidence communicating with us.

The captioning improved the flow of conversations and, as a result, the overall appointment experience was better for clients.

Customer feedback



Usefulness and Overall Impression Ratings



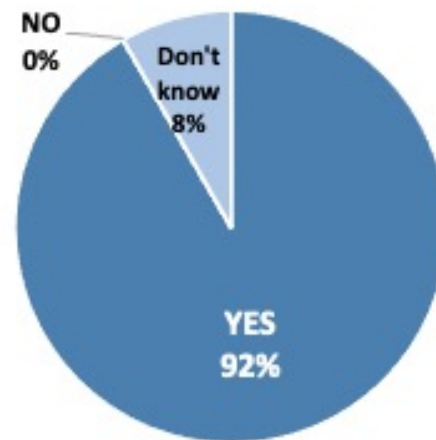
"I personally don't need it but can see the benefit to helping others with worse hearing."

Age 70, Better ear 3FAHL 28

"If [the audiologist] had said anything I didn't hear then I picked it up on the screen."

Age 76, Better ear 3FAHL 40

Would you like to see this technology continue to be available in hearing clinics?





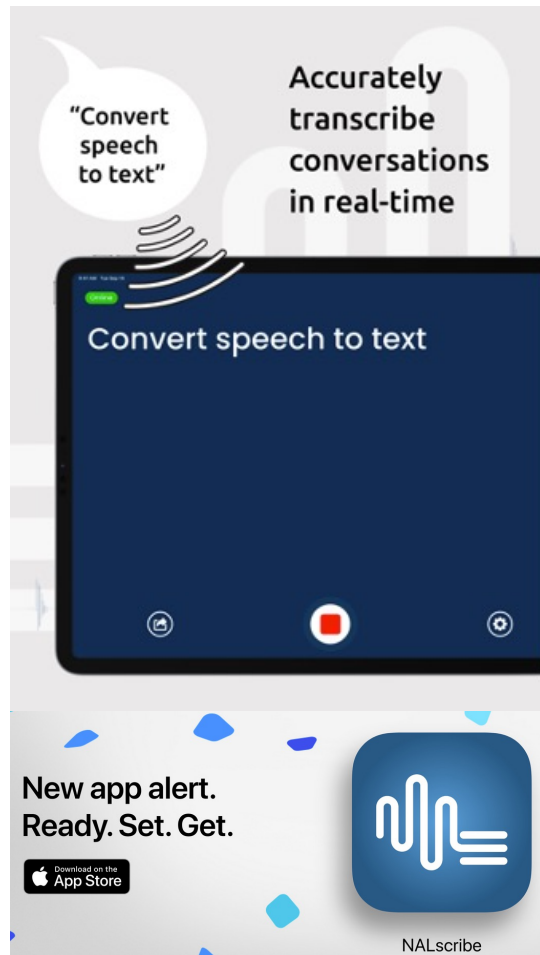
Use feedback to continuously iterate and improve

Feedback	Added feature improvement
Want continuous captioning	No timeout of speech recognition
Privacy concerns if voice data sent over internet	Offline speech recognition only mode.
Privacy concerns if captions remain on screen in reception area	Automatic clearing of screen after speech inactivity. Mic button function to manually clear screen.
Some clients find text too small	Adjustable font size, accessibility large fonts
Difficult to read text all bunched together	Automatic paragraph spacing
Translation would be awesome!	Translation of captions into 10 languages

Final solution & impact

The *NALscribe* real-time speech captioning app makes conversations easier and improves speech understanding in hearing clinics, especially

- for clients with severe or profound hearing loss
- in noisy reception areas
- when the client is not wearing hearing aids
- when the client is not fluent in English
- when staff are wearing masks or behind perspex screens



Summary

1. Design thinking is a human-centred approach to innovation which focuses on the needs of people
2. The stages include Empathising with users, Defining the problem, Ideating, Creating prototypes, and Testing them with real users
3. The process helped us to gain a better understanding of the problem of communication challenges for people with hearing loss and create a useful and well-received solution.



Q&A

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