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# Personalising hearing healthcare education delivered by mHealth technologies

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# Delivery and retention of information in new hearing aids users is poor



*“You get a lot of information ...by the time you get home, you’ve forgotten most of it.”*

51% found difficulties using aid at first

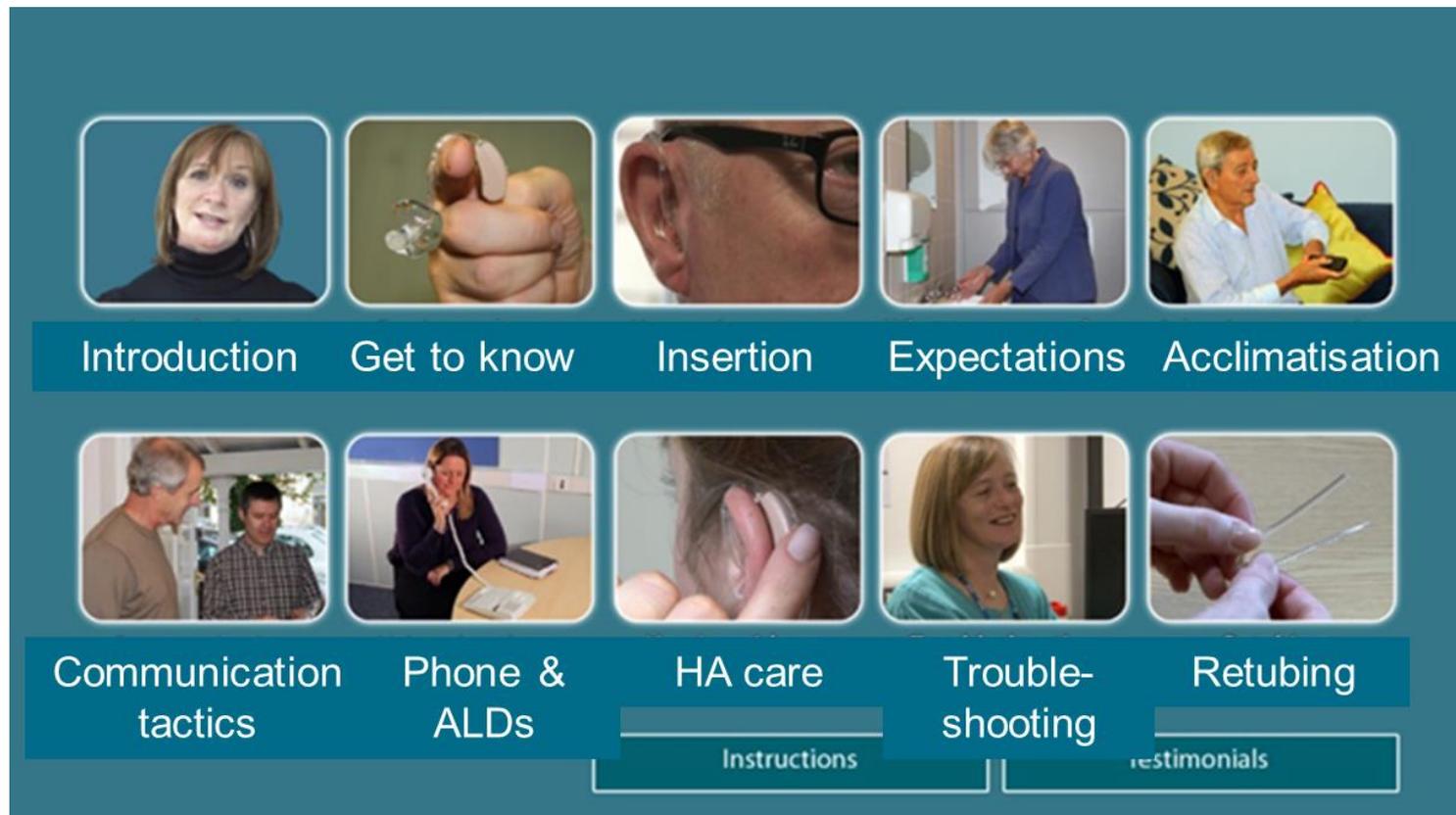
*(AoHL Hear Me Out, 2011)*

- Retention of information in first-time hearing aid users after 6 weeks, free recall

Overall = 49.6%: practical = 62.9%, psychosocial = 34.3%

*(El-Molla et al, BAA, 2012)*

# C2Hear: reusable learning objects (RLOs) → multimedia programme for hearing aid users



Home-delivered 51%



33%

(Ferguson et al, Int J Audiol, 2018)

# Involvement of patients and public is at the heart of our research



*(Ferguson et al, Int J Audiol, 2018)*

# C2Hear RLOs are clinically effective

- Evidence-based, randomised controlled trial (n=203)



knowledge



handling  
skills



self-  
management



hearing  
aid use



self-efficacy

C2Hear



valued by users

*(Ferguson et al, Ear Hear, 2016)*

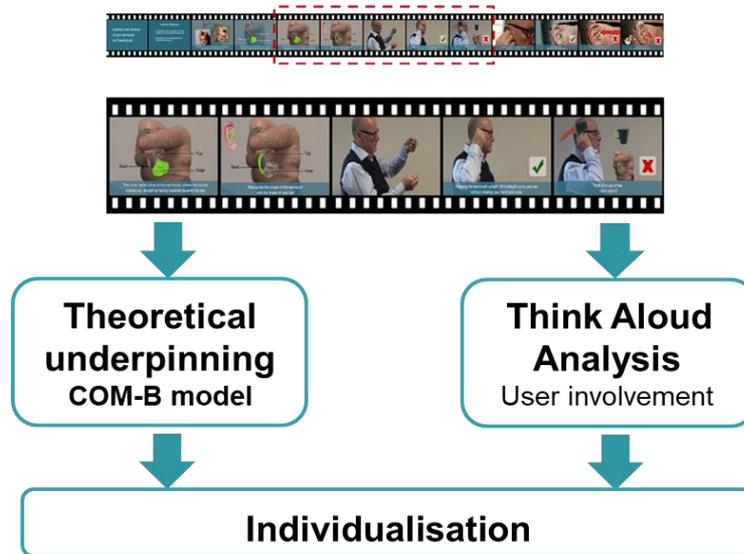
## ➤ C2Hear Online: freely available multimedia RLOs on YouTube

- Lots of positives but....
  - RLOs 5-8 minutes, too long
  - One size fits all
  - Limited interactivity
- To future-proof
  - Shorter
  - Individualise
  - Interactive
  - (Inclusive)

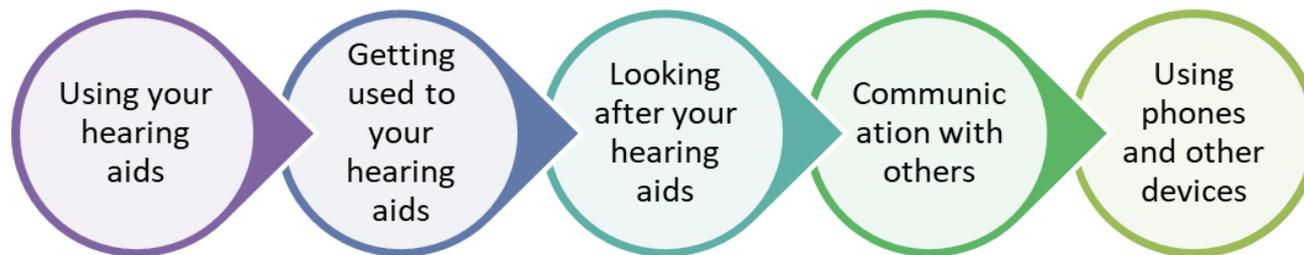


To view C2Hear Online: just google C2Hear YouTube

# Individualised: tailored to meet user's specific needs (m2Hear)



- 42 mRLOs, designed for smartphone technologies
- Greater interactivity
- Additional activities



(Ferguson, ENT and Audiology News, 2017)

# Individualised information to meet user's needs

How do I know which hearing aid is for my left/right ears?

The image illustrates a user interface for 'm2Hear' on a tablet, with several overlapping screenshots of interactive quiz questions and a labelling activity. The tablet screen shows a user named David with selected information on 'How to use your hearing aids'. The quiz questions include:

- How do I know which hearing aid is for my left/right ears?
- How do I turn my hearing aids on and off?
- How do I change programmes on my hearing aids?
- How do I change the volume on my hearing aids?
- How do I keep my hearing aids safe?
- How do I change my hearing aid battery?
- When should I change my hearing aid battery?
- How do I get more hearing aid batteries?
- How do I put my hearing aids in?

The labelling activity screenshot shows a hearing aid with arrows pointing to different parts, and a text box explaining left/right ear markers:

**Labelling activity**  
Drag the matching label into the box for each arrow?

**Left/right ear markers**  
A blue marker is for the left aid. A red marker is for the right aid – it may be helpful to think of 'R' for red and 'L' for left. It is important you don't swap the hearing aids as they have been programmed specifically for each individual ear.

**Left/right ear markers**

**Battery compartment & Programme switch & volume**

At the bottom, a bar chart shows the distribution of device usage:

Device	Percentage
Smartphone	5.1%
Tablet	40.7%
Laptop	35.6%
Desktop Monitor	18.6%

# Additional interactivity

How do I work with other to help me take part in conversations?

How do I work with others to help me take part in conversations?

## Hearing problems and solutions activity

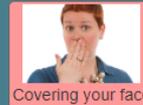
Here are some situations you might recognise with suggested solutions.

Activity: Drag which solution you think would be best to each problem.

✓ Helps communication



✗ Doesn't help communication



# m2Hear rated higher than C2Hear

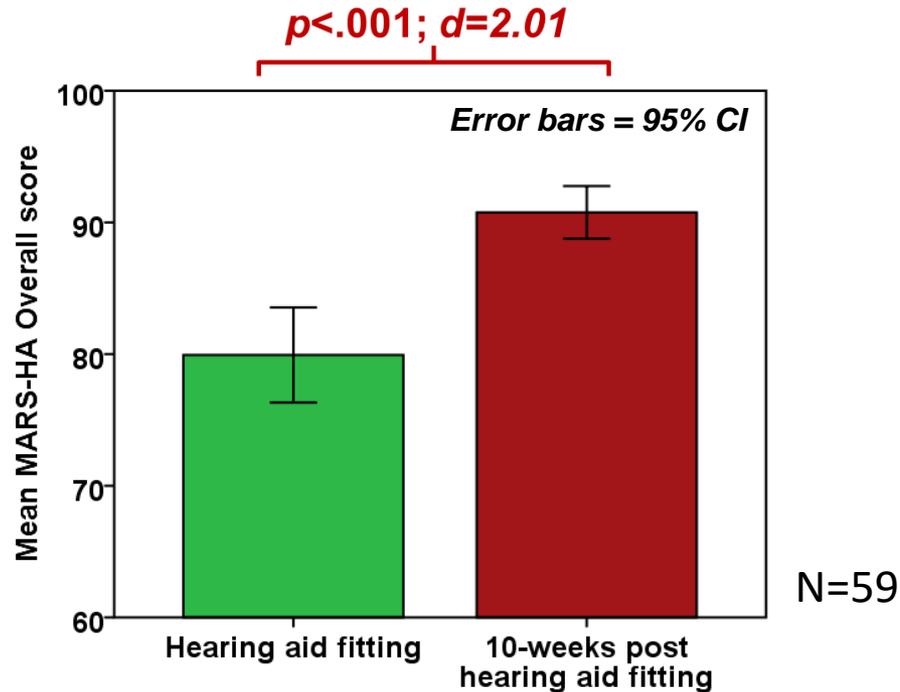
uMARS = user version Mobile Application Rating Scale

<b>Average uMARS score</b> (0=poor, 5=excellent)	<b>C2Hear</b>	<b>m2Hear</b>
<b>Overall App Quality</b>	<b>3.6</b>	<b>4.2</b>
Engagement	3.1	3.6
Functionality	3.8	4.4
Aesthetics	3.0	4.2
Information	4.5	4.6
<b>Subjective App Quality</b>	<b>3.3</b>	<b>4.1</b>
Star Rating	3.7	4.0
<b>Perceived Impact (Behaviour Change)</b>	<b>3.6</b>	<b>4.3</b>



# Self-efficacy for hearing aids was significantly improved

Measure of Audiological Rehabilitation for Self-efficacy for Hearing Aids (MARS-HA)



# What the patients said

- Provides reminders

“[m2Hear] started to change my life. I had... a prop basically... something to fall back onto if there was a problem.”

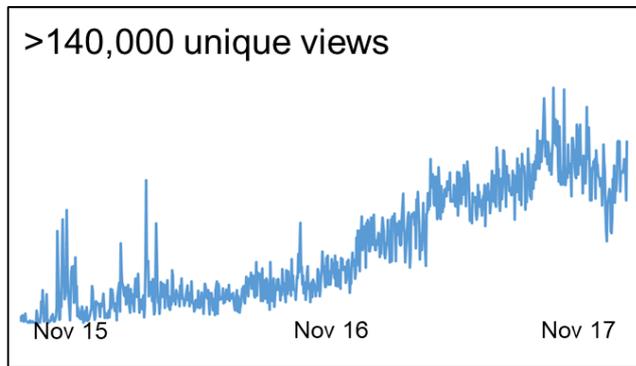
- Convenient to re-visit

It's more convenient to use, wherever you are. You just get your phone out.

- Comprehensive content

“I knew which section to go to and there were details in there that would give me what I needed.”

# Summary of ehealth and mhealth developments



UK	45%
N America	46%
India	6.6%
Australia	1.1%

November 2015



Freely available  
online

2016/17



mRLOs for  
communication  
partners

2017/18



mRLOs tailored  
for hearing aid  
users

➤ **Multiple patient benefits**

# Thanks to .....



Patient panels



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Nottingham University Hospitals  
NHS Trust

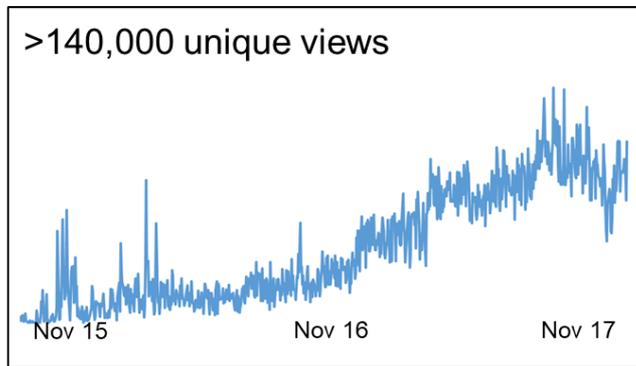


## Clinical and academic colleagues



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