COCHLEAR IMPLANT INTERVENTION DEVELOPMENT

GDP Group 19
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THE PROBLEM

Cochlear Implant Users

- As of a 2011 UK study by Action On Hearing Loss:
  - 10m people with hearing loss
  - 150k with severe or profound hearing loss eligible for a cochlear implant
  - Only 6k fitted
  - Limited by only having 23 centres capable of testing & maintaining them
- One test centre on campus – the Institute of Sound and Vibration Research (ISVR)
- Patient travel expensive (time and money)
- Appointments are currently allocated over set timescales
- Remote testing could allow booking of appointments based on patient need
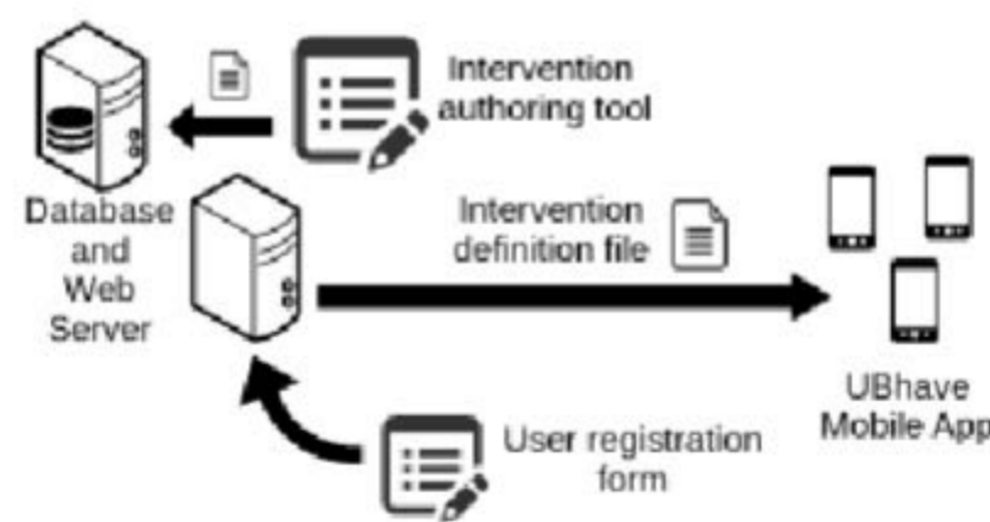
Behaviour Change Interventions

- Behaviour Change Interventions (BCIs): psychologist collects/analyses participant data and sets goals.
- *UBhave* implements digital interventions (dBCIs) on mobile devices,
  - Allows remote data analysis, simplified distribution and mobile device notifications.
- Proposed intervention models the "triple digit hearing test"
  - Finds the signal/noise ratio where 50% of the user's responses are correct.
- *UBhave* architecture: central server holds and distributes .JSON intervention definition files, which are then interpreted by a mobile Android client app.
- Intervention is constructed with a Web-based authoring tool, which required extension to support the necessary functionality to represent the test.

THE SOLUTION
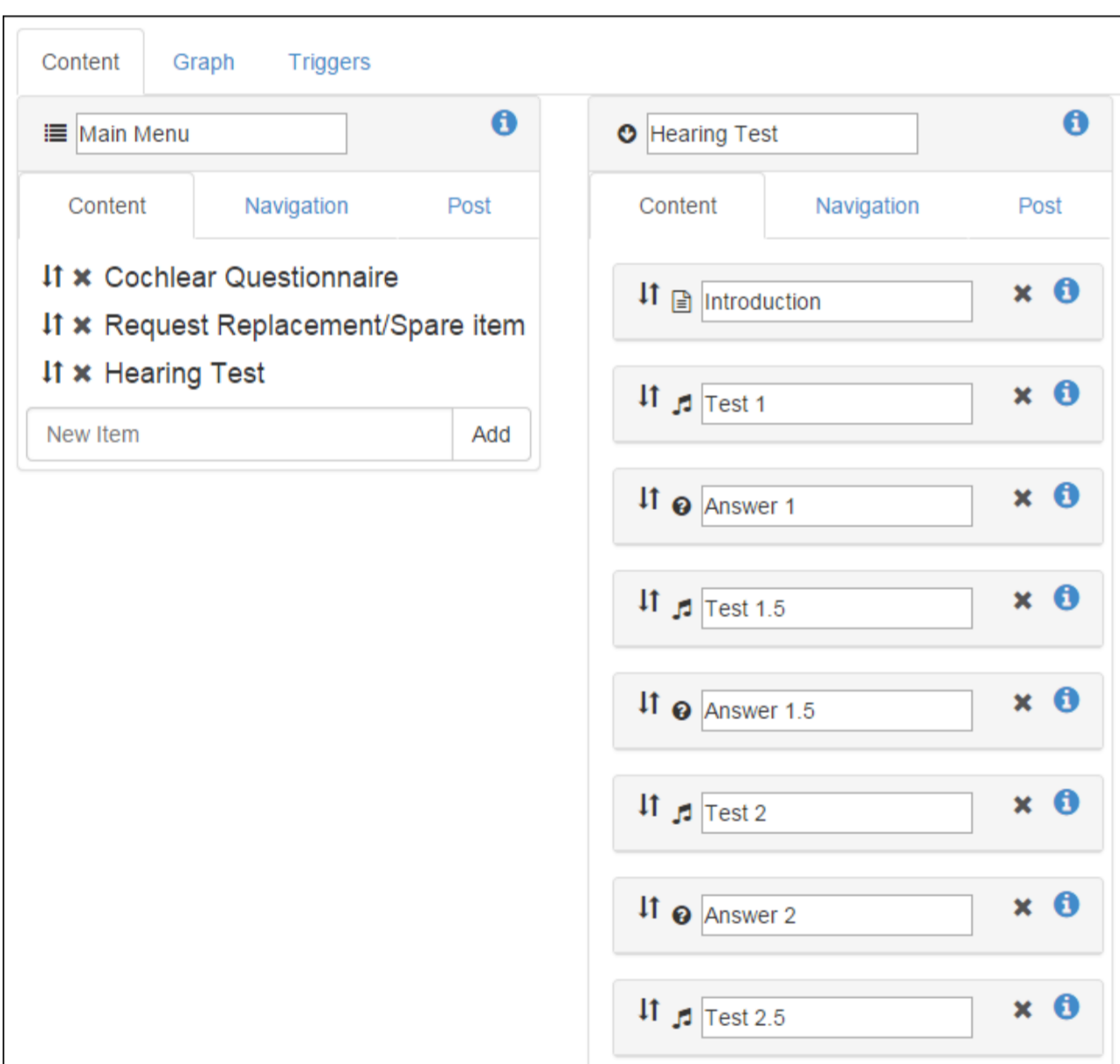
- New features added to framework
  - 'Media' activity allows for simultaneous playback of audio files at different volumes
- Three-part cochlear implant intervention
  - Questionnaire
  - Spare / new item request
  - Hearing test
- Hearing test (triple digit test) implemented using new media activity
  - 10 noise levels, 2 questions each
  - Correct answer: up a level
  - Two incorrect answers: end of test
  - Advice given based on noise level
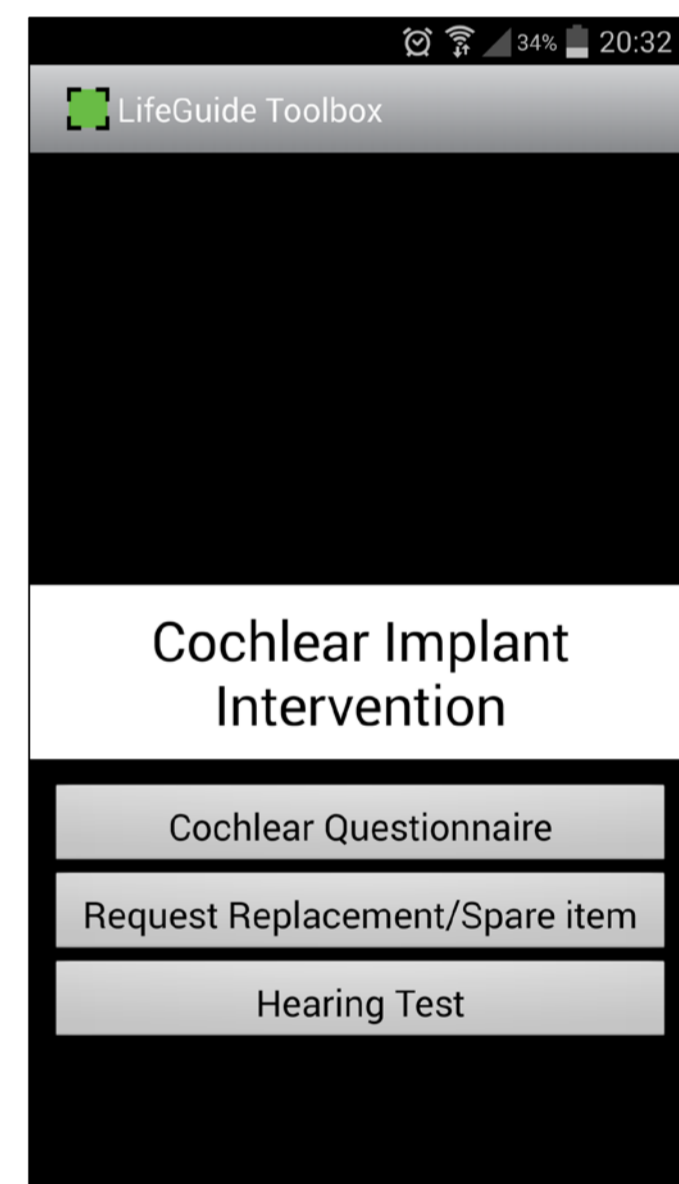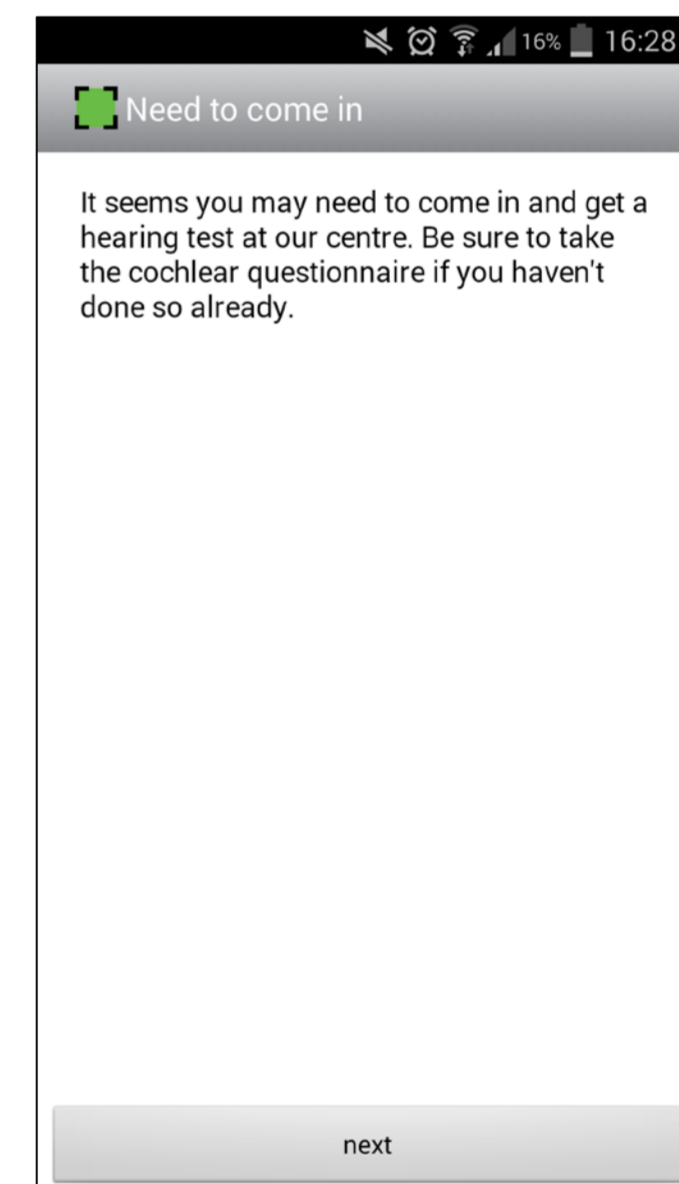
THE RESULT

- A User Acceptance Test consisting of 17 volunteers running our intervention on their device
- 94% of respondents thought the information was accessible, 100% thought the instructions were accessible
- 76% of respondents rated the intervention very good or excellent

- We assessed the effectiveness of our intervention with our client and a cochlear implant user
- The user took the hearing test, which declared their hearing as fine and not in need of a check-up
- The client was extremely pleased with the project and plans to take it forward and make it available to cochlear implant users soon

Q1. How accessible was the information displayed on screen?
41.2% 52.9% 5.9% 0.0% 0.0%
Simple to understand — Difficult to understand

Q3. How natural was it to use the user interface of the questionnaire?
23.5% 35.3% 35.3% 5.9% 0.0%
Very natural — Very difficult

Q7. Overall, how would you rate your experience of using the intervention application?
0.0% 5.9% 17.6% 58.8% 17.6%
Poor — Excellent