

# ‘Gathering user views for the design of rehabilitation technology devices.’

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# Introduction

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*This presentation aims to:*

- Illustrate different interpretation and applications of ‘user involvement’ in research
- Describe two case studies that demonstrate engagement of users
- Discuss techniques used to gain user views on design decisions
- Highlight examples of user-informed design decisions

# Background

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- Providing adequate rehabilitation services is challenging (RCP, 2004)
- Technology such as FES offers promise but historically adoption is poor.
- Evidence for user involvement is growing (DH, 2001; Healthcare Industries Task Force, 2004; Smith et al., 2005)
- In spite of its benefits user involvement has been under valued by academics and professionals (Hanley et al., 2003; Beresford, 2003).
- Describe 2 case studies involving professional and end users.

# Case study 1

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## *Study overview*

- Study to develop a device with a multi-channel, electrode array Functional Electrical Stimulation (FES) system with an orthotic garment to assist foot drop following stroke
- In particular, issues such as ‘donning’ and ‘doffing’ and electrode positioning have been addressed

# Case study 1 (cont)

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## *User involvement*

- Users are the public – actual, previous and potential users of FES in an adviser role
- Many drivers for involvement/engagement
  - *A note about terms*
- Drivers include policy, public expectation, recognition of potential improved quality of research/product, moral reasons, funding
- Recognition in this study that FES device could be more fit for purpose with user involvement

# Case study 1

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## *User Advisory Group composition*

- Dedicated user involvement facilitator
- 10 advisors sourced via the Stroke Research Network and Salisbury FES user group
- Maximum diversity representation
- 4 male 6 female
- Age range approx 41 to 78 years
- Mixed use of FES and mixed levels of success
- Have met 6 times to date, 8 total likely
- Reward and recognition measures in place
- Comprehensive activity around identifying support needs, orientation, general and increasingly focused design discussion
- User involvement being evaluated

# Case study 1

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## *User Advisory Group processes*

- Our approach is to agree focus of design discussions with team and build into User Advisory Group agenda
- Research team members have been prepared for public involvement
- Excellent attendance from research team to inform and hear discussions first hand
- Technical input regarding equipment e.g. footswitch samples, elasticated garment demonstrations
- Users have signed confidentiality agreements
- Agreement to tape and video record meetings to capture information
- Comprehensive notes of meetings with design-related text highlighted

# Case study 1

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## *User impact on design*

- Informed 10m lab test for device:
  - Very small rises or drops for
  - example  $\frac{1}{4}$  or  $\frac{1}{2}$  inch
  - Side to side tilt
  - Ramps: *'like walking on scree'*
  - Pebbles
  - Lawns
  - Textured/knobbly paving stones (for example at crossings)
  - Cracked paving stones
  - People coming towards you - less concerned re speed more stability and balance

# Case study 1

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## *User impact on design....*

- Views concerning control box positioning (inside/outside leg), size, weight, knobs vs buttons, visual vs audible alarm and error messages
- Electrode array positioning, size, shape (flat box/curved flask), preference for hydrogel
- Clinical trial design: length, logistics of travel to university, time of year, frequency of visits to lab, advisers as participants

## Case study 2: *Study overview*

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- Study to develop an FES Rehab Tool for upper limb therapy following stroke
- In particular
  - easy to set up
  - suited to wide range of patients
  - task oriented voluntary initiation of movement (motor re-learning theory)

## Case study 2: *User Advisory Group composition*

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- Users are 6 PT's & 5 OT's working across acute and community settings.
- All senior specialised therapist in stroke care.
- 2 male and 9 female.
- Mixed level of experience with FES (expert to no experience)
- Drivers for their involvement include desire to maximise device usage and familiarise with benefits of the technology.
- Engaged via a Therapist Advisory Group
  - 4 meetings held so far

## Case study 2: *Meeting aims*

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1. Explore current rehabilitation practice for the upper limb in order to identify patients who might benefit from the FES Rehab Tool.
2. Identify relevant FES tasks, FES parameters and practice schedules.
3. Gain feedback on a mock up of the first prototype of the software user interface.
4. Capture therapists views on bio-feedback and useful patient performance management data

## Case Study 2: *Methods*

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- Semi- structured group discussion (focus groups)
- Real life case studies
- Aspects of participatory design
- Pre-designed group and individual question and answer template on bio-feedback.

# Case study 2:

## *User Impact on design*

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### **Setup and user interface**

- 30 mins max, automation of process, settings saved for next session or similar patient presentations
- Balance of complexity versus ease of set up
- Portable
- Able to adjust settings to facilitate 'efficient movement patterns'

### **Extrinsic Feedback and Performance Evaluation**

- Biofeedback for the patient – visual & auditory
- Performance measures for therapist

# Conclusions

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- Benefits to engaging the ‘gate keepers’ for new device adoption in clinical practice
- Development of devices that meet user needs.... and will be used!
- Need skilled facilitation for involvement – not to automatically fall to most junior member of the team!
- Cost and build into research proposals
- Build in evaluation of user involvement to enhance evidence base



# Acknowledgements & Contacts

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