CommuniCATE

Assistive technology approaches to facilitate reading and writing in aphasia

The CommuniCATE project

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Outline

14.15- 14.25	Introduction
14.25- 15.10	Practical workshop: Reading and writing technologies
15.10- 15.30	Presentation: CommuniCATE Project reading and writing therapy approaches and case studies
15.30- 15.45	Conclusion & discussion

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Thanks to our generous funders
The Barts Charity

The CommuniCATE Research Team

Speech & Language Therapy Researchers

Joint Project Leads

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Technology in aphasia therapy

Offers many potential solutions:

- ➢ compensatory strategies

- ➢ improving access to therapy

- ➢ increasing intensity of therapy

Technology may also present barriers for people with aphasia

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Aims

1. Provide **technology-enhanced therapy** services to people with aphasia

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Aims

2. **Enhance social participation** and **reduce isolation**

Aims

3. Provide **training in the use of technologies** in aphasia rehabilitation

  ➢ NHS Speech & Language Therapists
  ➢ Rehabilitation Support Workers
  ➢ SLT students
  ➢ Stroke Association volunteers

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Aims

4. **Research the benefits** of technology-based treatment for aphasia

- Language
- Communication
- Social Participation
- Quality of Life

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Aims

5. Explore accessibility of the technologies and **participants' views** about the packages

OR

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Participants

- 85 people took part in therapy

- Screening assessments pre therapy for cognition and language

- Jointly decide on most appropriate therapy strand

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Speaking

Supported conversation
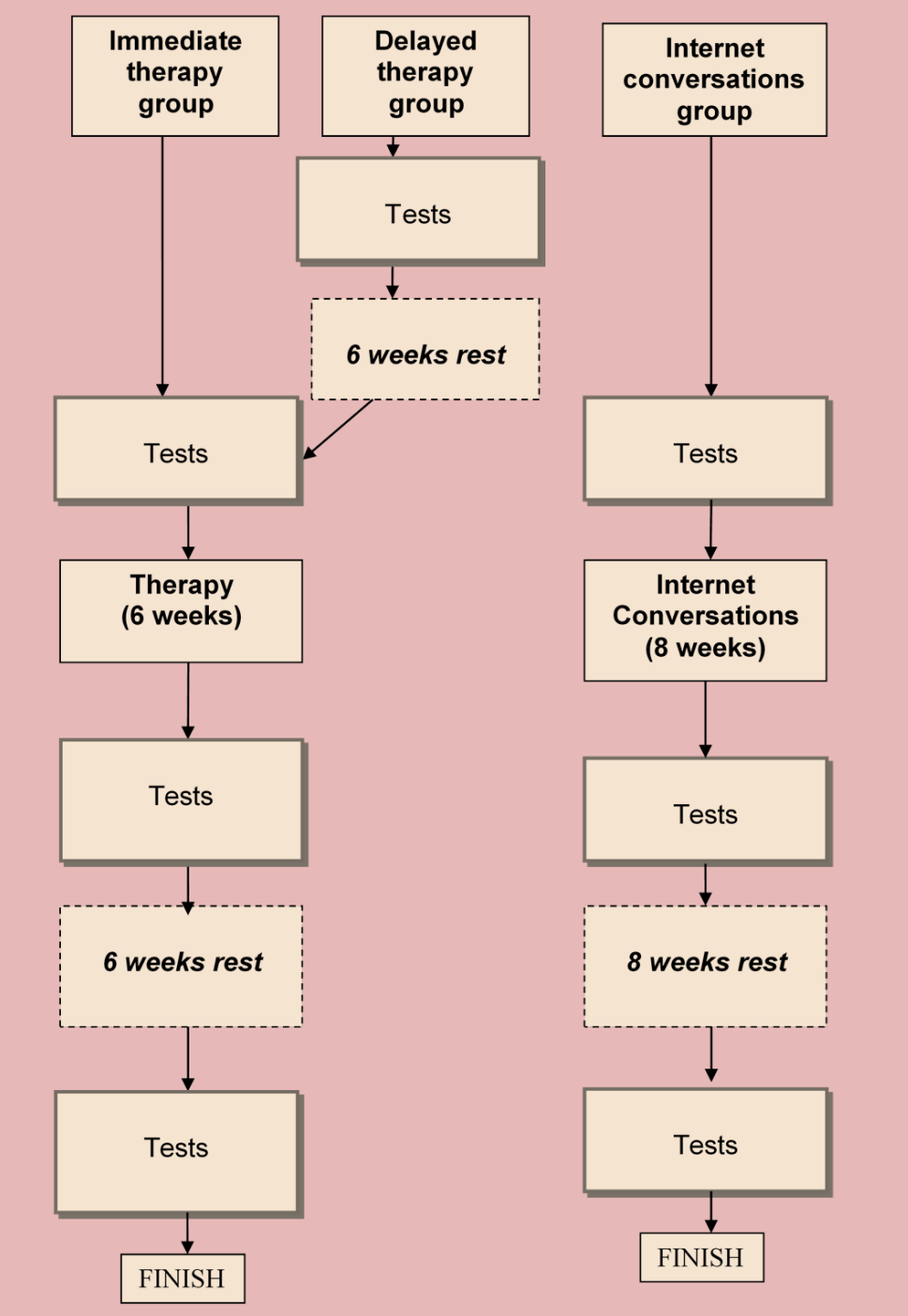
Reading

Writing

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Background

- Reading and writing in the 21st Century: written communication increasing technology-based (Dietz et al., 2011)

- Increasing importance of reading and writing

- Risk of digital exclusion (Menger, Morris & Salis, 2015)

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Study Design

Tech training pre-therapy 2 x hours

Therapy 2 x weekly, 1 hour sessions

Immediate therapy group → Tests → Therapy (6 weeks) → Tests → 6 weeks rest → Tests → FINISH

Delayed therapy group → Tests → 6 weeks rest → Tests

Internet conversations group → Tests → Internet Conversations (8 weeks) → Tests → 8 weeks rest → Tests → FINISH

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What participants chose

Reading

21 participants

9 used Claro

12 used Kindle

Writing

25 participants

12 used Write Online

13 used Dragon

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Workshop

In groups, you will rotate between four work stations:

A	Writing: Dragon on iPad
B	Writing: WriteOnline
C	Reading: ClaroRead
D	Reading: Kindle Fire

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Background

- PWA's reading supported by:

  - Text size adjustment and key word highlighting
    (Rose et al., 2003)

  - Manipulating white space and text layout (Worrall et
    al., 2005)

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ClaroRead

- Changes font size and spacing

- Screenruler

- iPad or PC

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E-reader: Kindle Fire

Kindle Fire HD

- Synch to audiobook

- "Reading View"

- "Word wise"

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Choosing technology

Reading material

Technology experience

Ability to learn to use technology

Reading interview

What do they already use?

Dynamic assessment of computer learning

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Early sessions

- Setting up technology

- Setting broad goals: what do they want to read?

- Trialling assistive features of technology

- Negotiating/modifying goals

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Technology training: Challenges

- **PC**

- Selecting text to read aloud in webpages

- Operating touchpad/mouse

- **iPad**

- Sequencing steps (e.g. copy & paste)

- Switching between apps

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Technology training: Challenges

- Understanding zones on touchscreen

- Tapping v swiping

- Searching for books (typing)

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CASE STUDY

Case study- Kindle Fire

"Linda"

- 48 years old

- 3 years post-stroke

- Moderate Broca's aphasia

- Reading impaired at single word, sentence and paragraph level

Background

- Previously worked as youth worker

- Not reading at all since stroke, except TV subtitles

- Before stroke read ++ since childhood, particularly biographies and true stories

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Goals

Technology goals:
- To independently operate text to speech/audiobooks
- To independently use VoiceAloud app to listen to webpages
- To independently search for and purchase books/audiobooks in Amazon store

Reading goals:
- To read and understand at least one full-length biography/ true-life story
- To read and understand news articles on BBC news app

Participation goals:
- To read a children's book with her 6-year old granddaughter, using text-to-speech/ audiobook
- To visit local library and ask librarian for book recommendations

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Therapy

Features used:

- Large font and spacing
- Listened using text-to-speech or audiobook where available
- VoiceAloud app
- Dictionary/Wikipedia

Therapy activities

- Answering comprehension questions
- Discussing and expressing her opinions about a book/ article
- Re-reading passages if misunderstood
- Finding suitable books

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Challenges

- Some difficulties navigating around Kindle and operating menus

- Finding suitable books to read

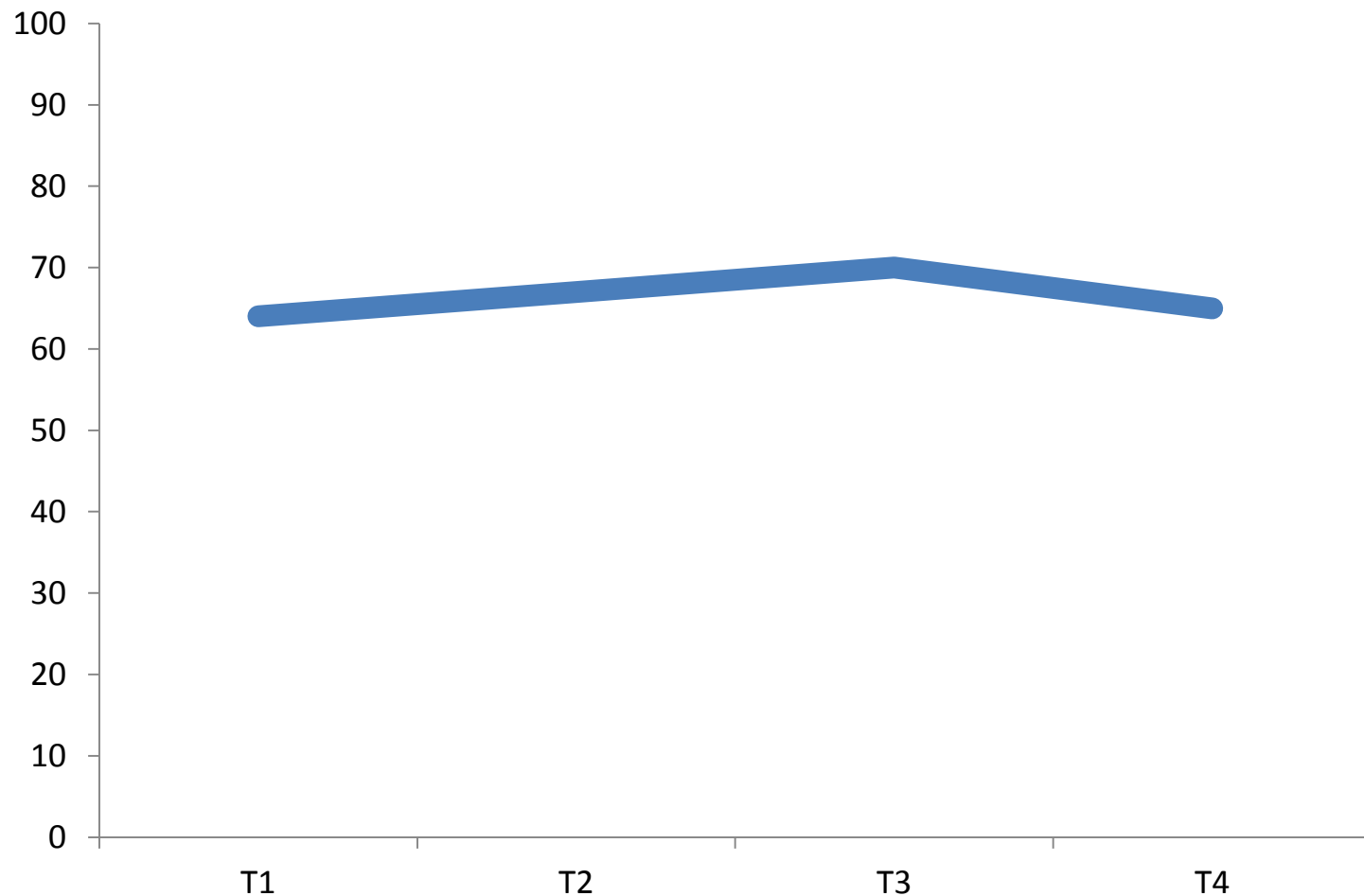- Difficulties using Store, particularly typing to search for authors/titles

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Progress in therapy

- Operated all key features of Kindle independently
- Completed four books (two "Quick Read" books, two full length books)
- Independently downloaded a sequel (full length book for teens)
- Read and listened to BBC News
- Read on the Kindle every day and bought one of her own
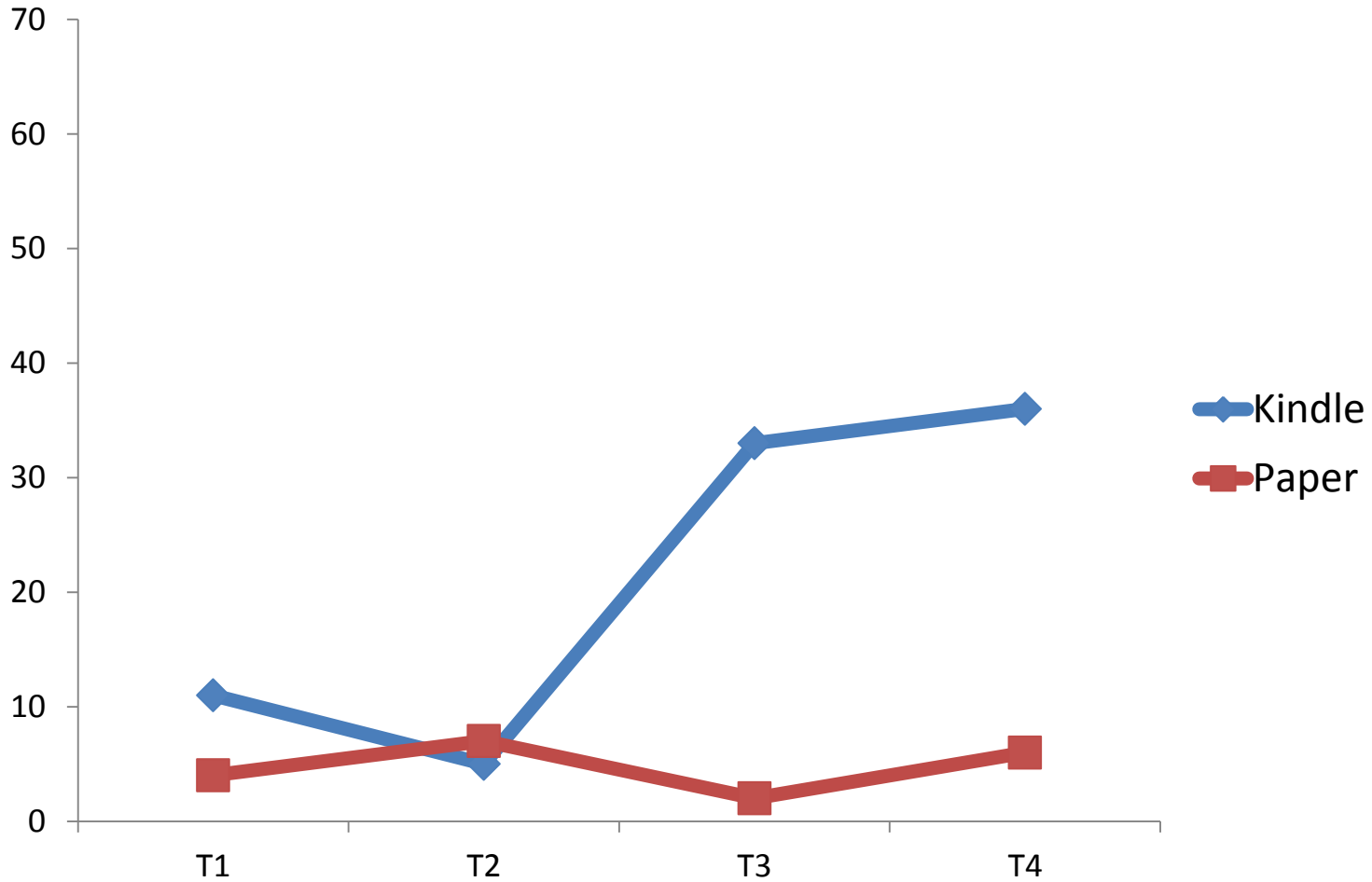- Also started reading newspapers and magazines (on paper)

Video: Street Cat Bob

Video: Street Cat Bob

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Results: Reading Comprehension Battery for Aphasia (Paper)

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Results: Gray Oral Reading Tests-4

Results: Reading Confidence and Emotions Questionnaire

Interview feedback

- Linda described Kindle Fire as a *"miracle"* and *"beautiful"* and how she can *"lay down"* and read a book and *"laugh"*

- *"Well it's just nice you know cos you can follow on the, on these Kindles... you can hear the words and also hear it as well"*

- *"Using the Kindle was an absolute joy"*

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Conclusions

- People with aphasia were able to learn to use ClaroRead and Kindle Fire ✓

- Many read books again for the first time since stroke ✓

- Technology compensated for reading difficulties ✓

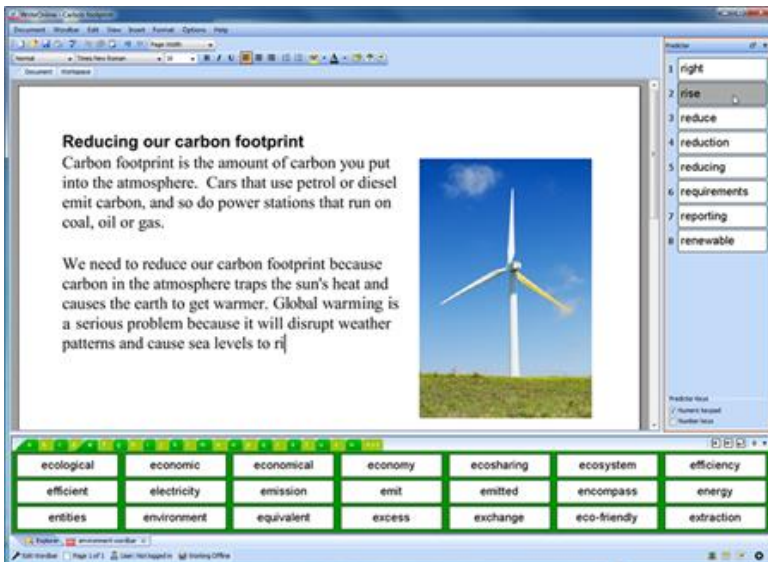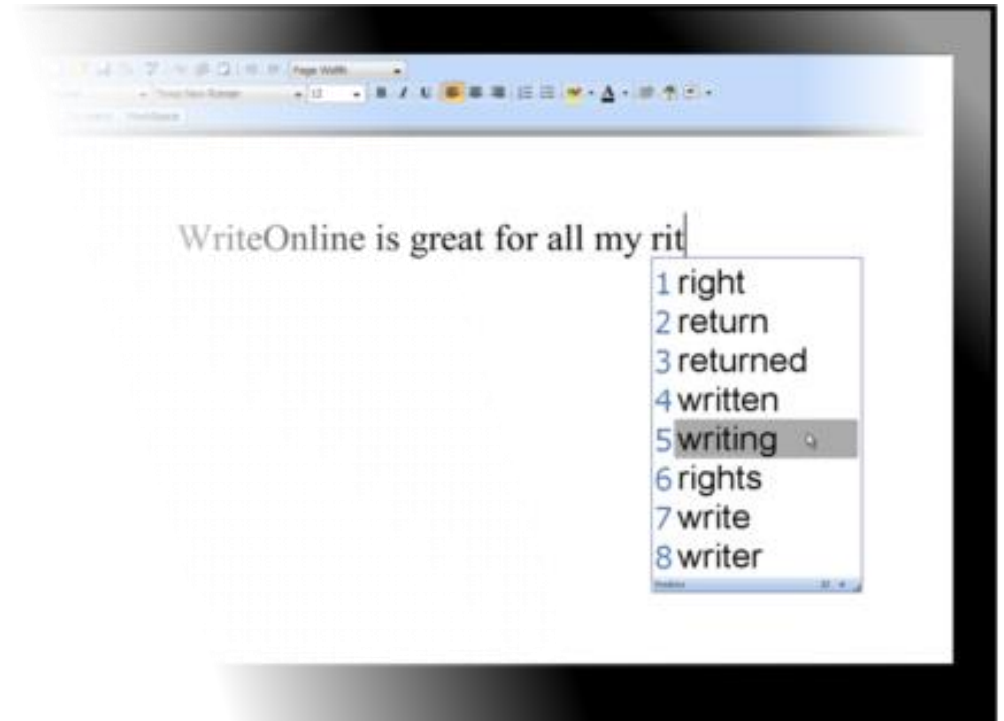- Feedback from participants was overwhelmingly positive ✓

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Writing

- WriteOnline

- Dragon voice recognition software

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Software for dyslexia: WriteOnline

- Word prediction

- Word bars

- Highlighting

WriteOnline is great for all my rit

1 right
2 return
3 returned
4 written
5 writing
6 rights
7 write
8 writer

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Laptop

- Software learns to recognise voice

- Can train it to recognise names

iPad

- Voice transcribed by server

- Copy text into other apps

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Recruitment criteria

- Spoken output markedly better than written output

- No significant motor speech disorder

- ≥ 9/15 spoken **OR** written word to picture matching (CAT, Swinburn et al., 2004)

Learning to use Dragon

Challenges

- Editing longer passages

- "Thinking for writing"?

Strategies

- Writing sentences (chunking)

- Narrative planning

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Learning to use Write Online

Challenges

- Some participants had more impaired language overall and need more language support

Strategies

- Strategic construction of word bars and repetitive tasks using them (e.g. sentence construction)

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CASE STUDY

Case study- WriteOnline on iPad

"KB"
Aged 60

- 2.5 years post stroke

- Mild mixed aphasia

- Severe writing impairment- often word initial letter only

- Cognitive issues- severe memory impairment and executive functioning difficulties

Background

- Originally from India

- High level accountant dealing with international companies

- Pre-stroke proficient technology user

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Goals

Technology goals:
- To learn how to use the WriteOnline app alongside news apps to send emails

Writing goals:
- To learn how to structure simple sentences to write about recent events
- To be able to write emails including content about his interests (news, economy, business)

Participation goals:
- To re-connect with friends and family living overseas via email

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Technology features and challenges

Write Online features used:

- Predictive text
- Word bars
- Text to Speech

Therapy Activities

- Developing new word bars with target vocabulary

- Practice emailing therapist

- Sequencing & structuring activities

- Identifying suitable contacts to email

- Downloading apps of interest

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Video: Editing an email

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Pre therapy

Write an email to a friend sharing some news...

BBC

England's housing market is "broken", ministers have admitted, as they unveil plans to build more affordable homes.
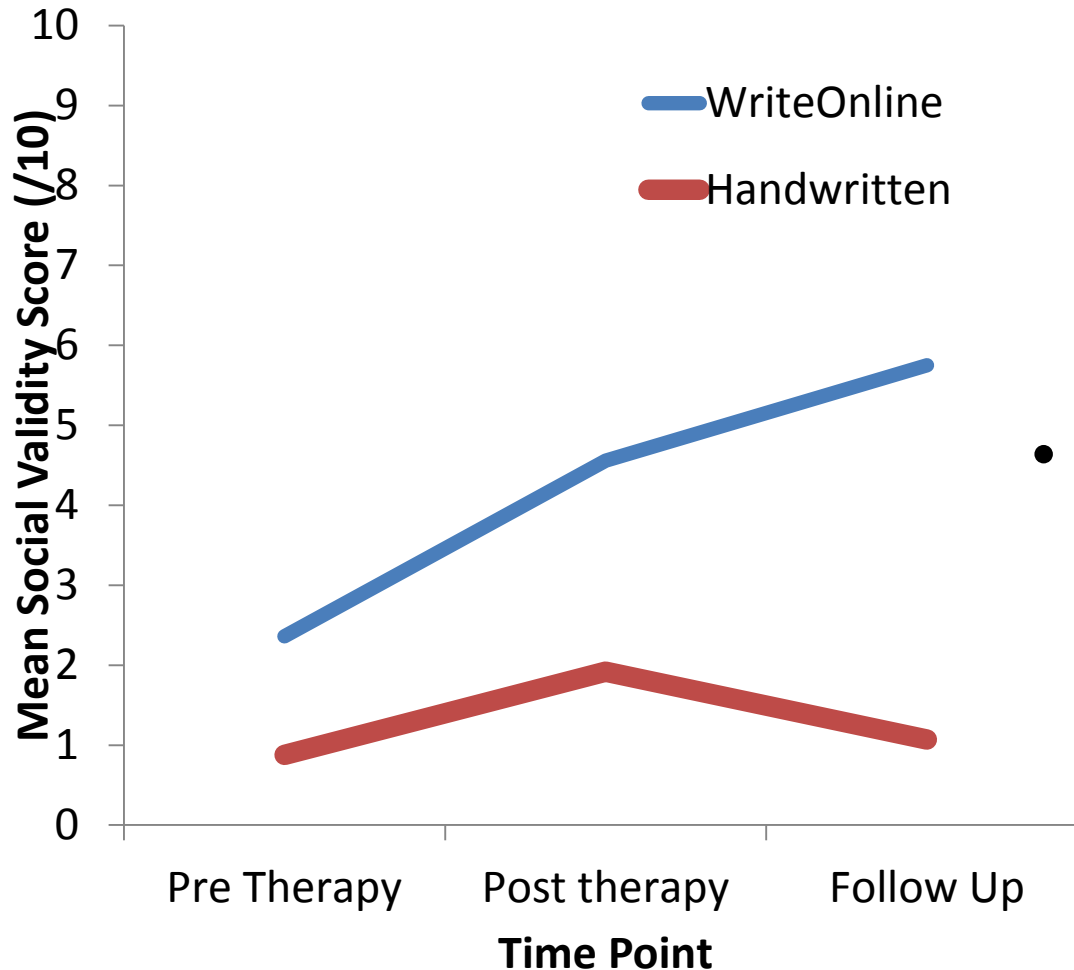
This is challenging.

What should be done?

The government which however. She

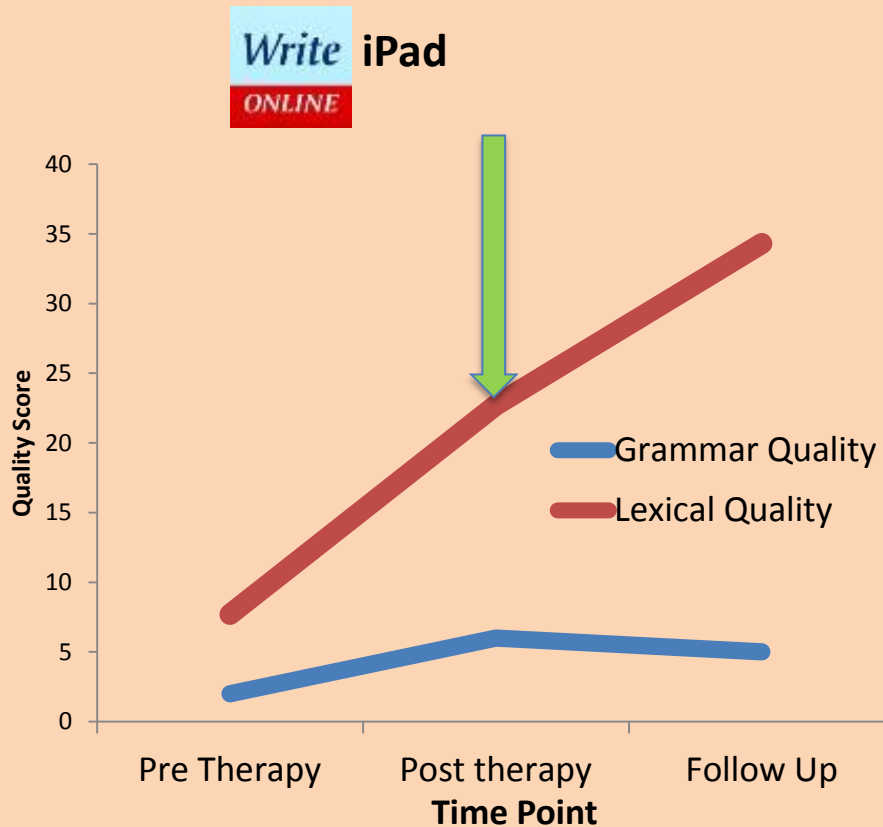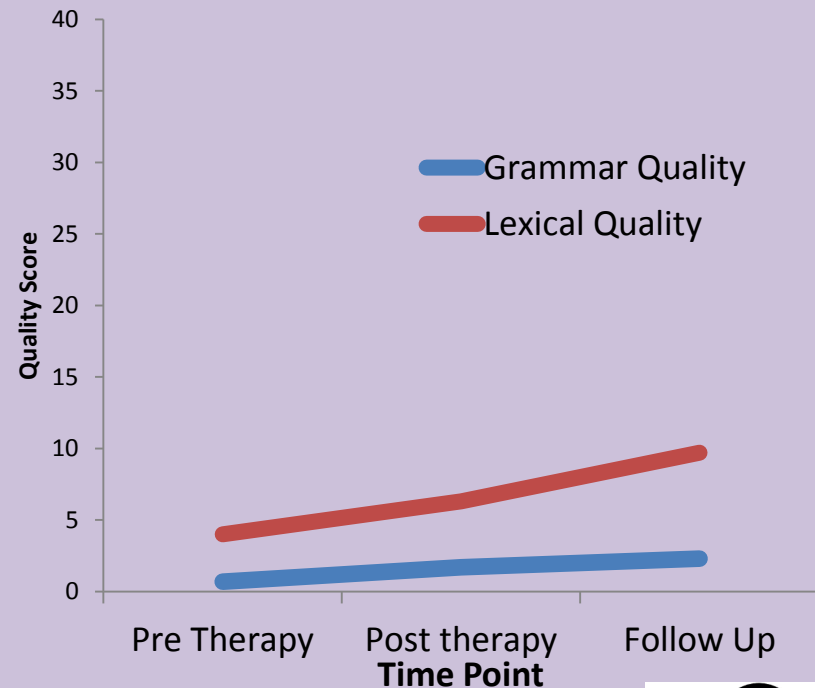Sent from my iPad

Post therapy (using **Write Online**)

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Outcomes

- More socially valid (i.e. acceptable to reader) emails when written using iPad

- Handwritten emails did not improve

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Outcomes

Large increase in **lexical quality after therapy** using **WriteOnline** on iPad

Write **iPad**
ONLINE

Grammar Quality
Lexical Quality

Handwriting

Grammar Quality
Lexical Quality

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Progress in therapy

- KB was able to consistently send emails with range of content:

  - News information

  - Recent events

  - Questions

  - Opinions

  - Making plans

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Feedback from writing participants

- *"Because before I can always ask my friend, boyfriend can you write, can you write for me this, can you write this for me, but now I not go there every time, so I just do it for myself"*

- *"before I didn't have confidence to write an email, but now oh I can write a little bit!"*

- *"I like, like emails and doing things like social media... it's helped".*

- *"I said there is no way I'm going to give* [Dragon] *back to* [names therapist] *until I know my own, because it's like an opening wow, I can" (gesture opening arms)*

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Conclusions

- People with aphasia were able to learn to use Dragon and WriteOnline ✓

- Gains generalised to everyday tasks, e.g. sending emails ✓

- Technology compensated for writing difficulties ✓

- Feedback from participants was overwhelmingly positive ✓

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Overall Conclusions from therapies

- People with aphasia were able to learn to use the different technologies ✓

- Technology enhanced therapy
  - compensated for reading and writing difficulties ✓
  - helped people to re-connect socially ✓

- Feedback from participants was overwhelmingly positive ✓

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Mainstream technologies in aphasia therapy

- Possible advantages of using mainstream technologies
  - Widely available
  - Low cost
  - Socially acceptable
  - Technically robust

- Possible disadvantages
  - Not designed for PWA

    BUT PWA were able to use these technologies successfully when provided with aphasia friendly support and training

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Choosing technology for PWA

Individualised assessment is essential:

- Consider how technology will be used in person's daily life

- Take account of language and cognitive abilities vs. complexity of user interface

- Dynamic assessment: observe how easily PWA picks up tech skill when facilitated

- Demo tech options and let people try them with support before jointly deciding

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Technology training for PWA

- Individualised approach to training
  - which tech features are important or can be skipped?

- Importance of aphasia friendly technology manuals

- One to one support needed, especially early on
  - Not an 'out of the box' solution

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Technology is always changing…

- SLTs need to adapt therapies

  e.g. updating aphasia friendly tech instructions, new apps

- PWA need ongoing access to support

  e.g. for trouble shooting when things go wrong, or top up training when software gets updated

… but general principles for technology enhanced therapies are transferable

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Group discussion

- Which piece of technology would be most useful in your clinical practice?

- Which piece of technology would be most challenging for a person with aphasia to use?

- Could you suggest an improvement to a piece of technology?

- What future research into reading and writing technologies would you find most useful to inform your practice?

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