Designing ESI Planner:

The Participatory Design of a Sound and Image Enhanced Planner for People with Aphasia

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for Graphics, Visualization, and HCI

What is Aphasia?

Aphasia is a loss of words - not intelligence

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- Acquired language disorder
  - Caused by brain damage (e.g. stroke, trauma, etc.)
- Impairment of communication abilities
- Relative sparing of other cognitive abilities

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Skip has Aphasia

Video and name used with permission.

Key Design Problems

- mismatch of individual abilities and skills required to use the technology
- failure to address the spectrum of communication contexts

Research Goals

- Understand the strategies used by individuals with aphasia to communicate and to carry out language-based tasks.
- Seek opportunities where technology can support individuals in those activities.

ESI Planner

The Enhanced with Sound and Images Planner

- PDA application (iPaq from HP)
- A computerized daily planner designed for people with aphasia
- Uses images, sound, and text to represent people and places in appointments

Design Approach

- Two phase design:
  - Phase One: Participatory Design
  - Phase Two: Experimental Evaluation

Phase One: Participatory Design

Four sub-phases:

Phase One: Participatory Design

Four sub-phases:

1. Idea brainstorming
   - Interviews
   - Identified needs:
     - Daily planner
     - Recipe book
     - Word dictionary
     - Personal history recorder
     - Conversation primer - to help preplan conversations

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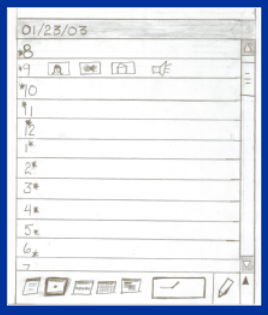
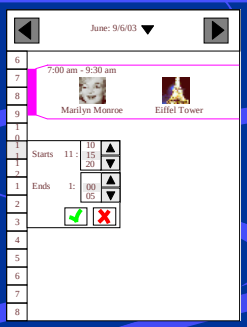
Phase One: Participatory Design

Four sub-phases:

1. Idea brainstorming
2. Low-fidelity paper prototyping



1 - Drawn by hand

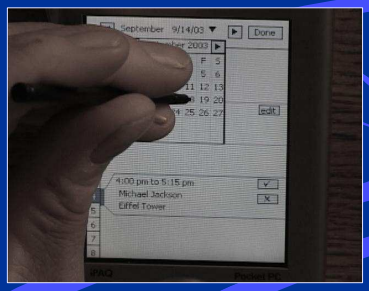


2 - Using computer tools

Phase One: Participatory Design

Four sub-phases:

1. Idea brainstorming
2. Low-fidelity paper prototyping
3. Medium-fidelity software prototyping



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Phase One: Participatory Design

Four sub-phases:

1. Idea brainstorming
2. Low-fidelity paper prototyping
3. Medium-fidelity software prototyping
4. High-fidelity software prototyping and formal evaluation

> Demo!

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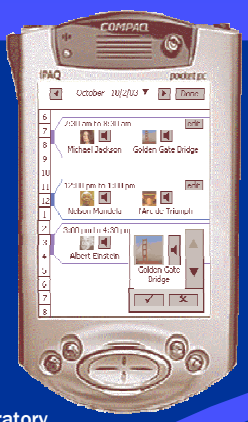
ESI Planner Demo

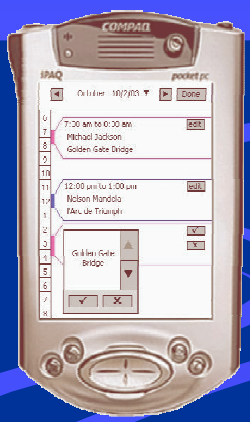
Phase Two: Evaluation

- Hypothesis: A planner using triplets of images text and sound would be more usable than a text-only planner.

Images, Sound, and Text:
ESI Planner



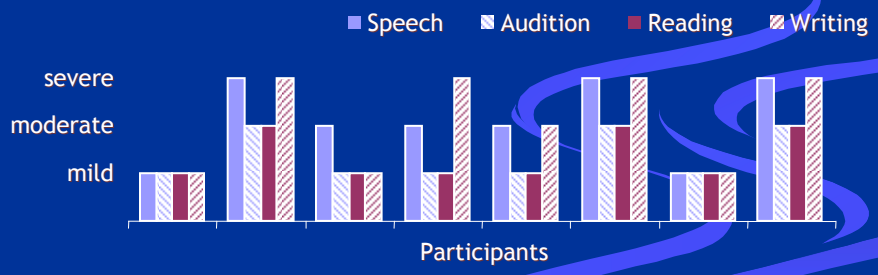
vs.



Text-Only:
NESI Planner
(The Not Enhanced with Sound and Images Planner)

Phase Two: Methodology

- 8 Participants:
  - 1 female, 7 male; ages: 47 to 86
  - All at least one year post onset



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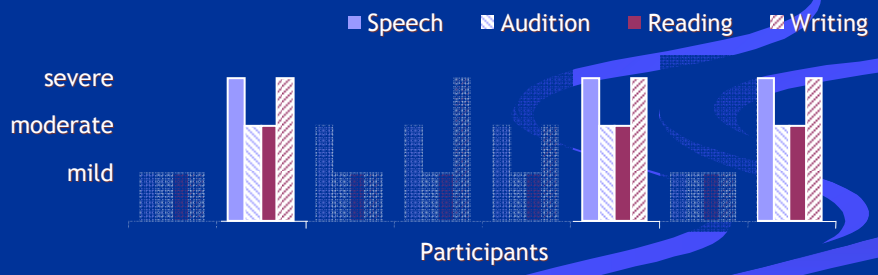

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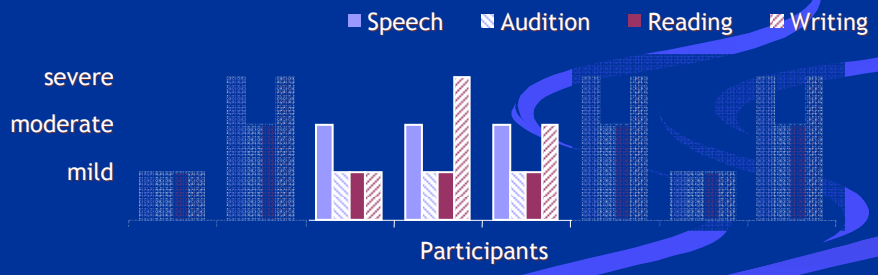

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Phase Two: Methodology

- Two Sessions:

Phase Two: Methodology

- Two Sessions:
  - Session 1: Planner Evaluation
    - 30 min with each planner
    - 10 tasks per planner
      - retrieval, creation, modification
      - presentation format: text and oral
    - Quantitative performance measures:
      - Number of tasks completed *correctly*
      - Number of tasks completed
    - Qualitative self-reported preferences

Create an appointment		4A
With	Person:	Marilyn Monroe
At	Place:	Eiffel Tower
When?		
	Date:	September 14, 2003
	Start Time:	4:00pm
	End Time:	5:15pm

Example Task

Phase Two: Methodology

- Two Sessions:
  - Session 1: Planner Evaluation
  - Session 2: Western Aphasia Battery
    - Standardized battery used to assess:
      - speech, auditory comprehension, reading, and writing
    - Used to describe abilities in terms of severity:
      - mild, moderate, or severe

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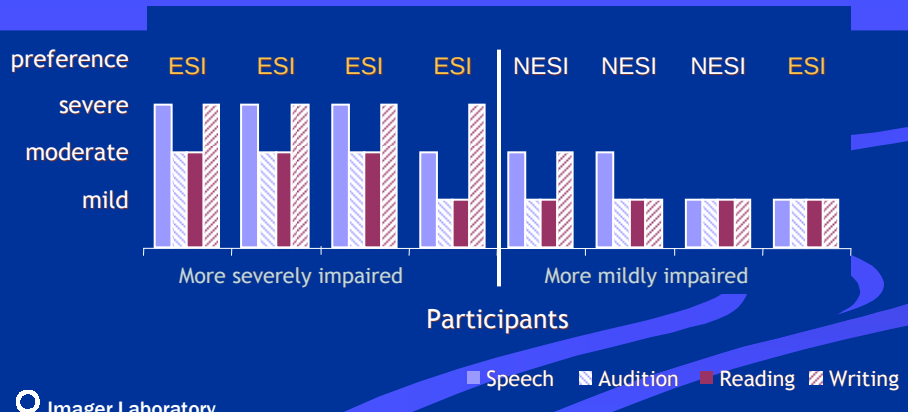
Phase Two: Results

- Qualitative Self Reported Measures
  - Preference varied with severity of impairment



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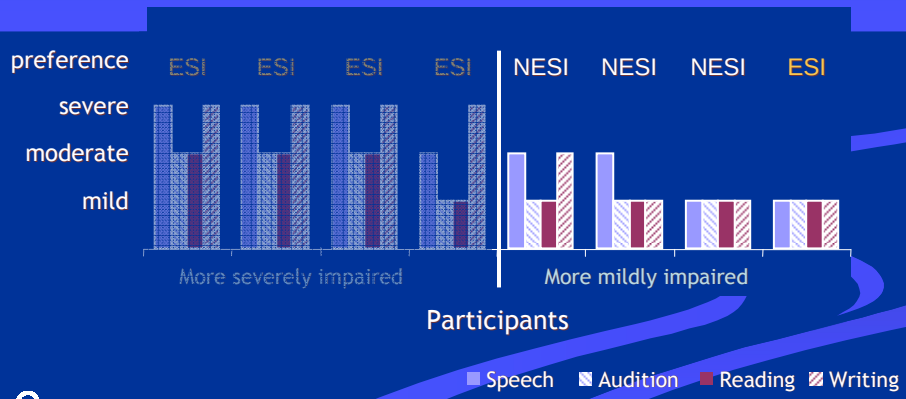

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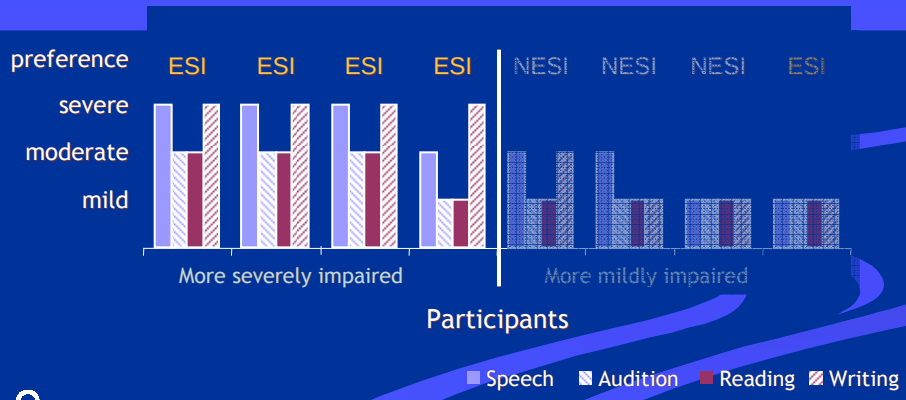

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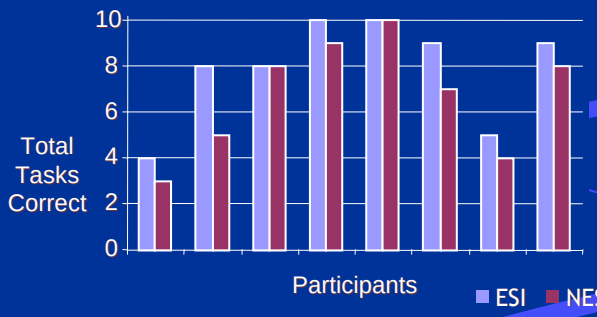
Phase Two: Results

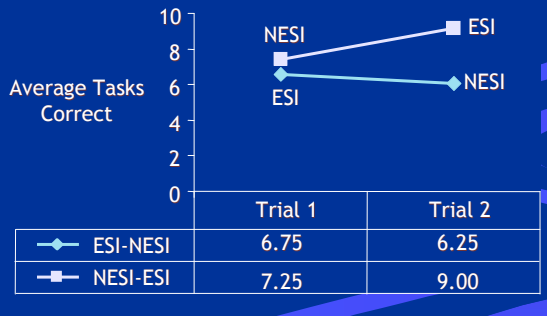
- Quantitative Performance Measures: Tasks Correct
  - Significantly more tasks correct with ESI Planner ($F(1,7) = 27.00$, $p<.01$)



Averages:
ESI Planner: 7.9
NESI Planner: 6.8

Phase Two: Results

- Quantitative Performance Measures: Tasks Correct
  - Significant interaction between tasks correct and interface order ($F(1,7) = 8.33$, $p<.05$)



	Trial 1	Trial 2
ESI-NESI	6.75	6.25
NESI-ESI	7.25	9.00

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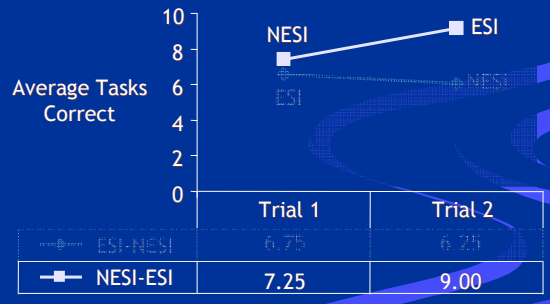

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Ongoing Research

- Additional Analysis
  - Patterns of Behavior
- Longitudinal Field Study
  - Adoptability vs. Usability
- Explore Customization

Research Outcomes

- ESI Planner: An application to support a specific daily living activity
- Guidelines
  - For working with special populations
  - For improving the accessibility of handheld technology

Questions?

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http://www.cs.ubc.ca/projects/Aphasia/