SmartPredict: AAC app that integrates partner knowledge into word prediction

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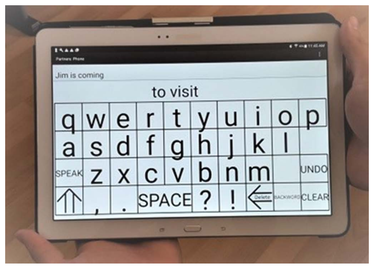
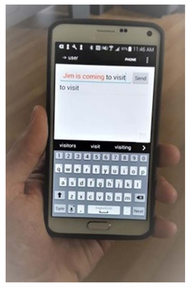
ALPHA DESIGN

Challenge: Using an AAC devices for spontaneous conversation is *very* slow.

Goal: To develop a technology-based vocabulary supplementation strategy that increases the speed of message formulation and partner engagement by relying on the word knowledge of a partner during conversation.

Research Question: Can we develop a novel dual-app AAC system that engages a communication partner and enables an AAC user to produce efficient messages while maintaining control over expression?





Alpha Evaluation

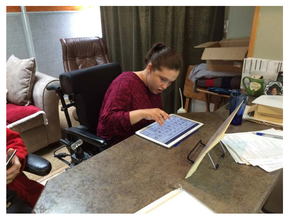
Design:
A single subject alternating treatments (A-B) design

Subjects:
- Five literate adults with spastic cerebral palsy and their personal assistants
- 3 use direct selection
- 2 use scanning

Task: Describe 3 pictures
- Western Aphasia Battery Picnic Picture
- BDAE Cookie Theft Picture
- Kentucky Aphasia Test Lightbulb Picture

Pictures are described twice:
- Typing with standard word prediction only (CoConstruct app only)
- Addition of partner-assisted word prediction (Partner app)
- All conditions were counterbalanced

Dependent variables:
- Words/minute in 10 minute typing task
- Selections/minute
- Selections/word in 10 minute typing task



Describing the Cookie Theft Picture

Condition	Words per minute	Selections per minute	Selections per word
AAC User Alone	2.0	15.0	**4.55**
AAC User with vocabulary supplementation	2.8	14.2	**3.6**

ITERATIVE DESIGN

-The dual app AAC system shows a trend toward efficient message production and improved satisfaction by user

-A more sophisticated language model is needed

-Motor access is different for every user; touch tablet not ideal for people with CP

-Added a stylus or a customized keyguard

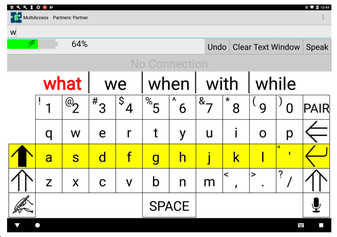
-Literacy is a challenge for many people with developmental disabilities

-The initial app had no numbers option

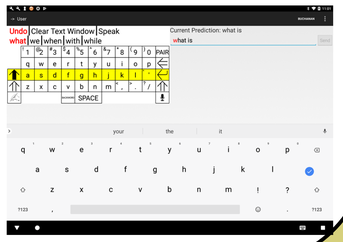
Improvements for Smart Predict

- Use the COCA language model to predict trigrams.
- Evaluate with users who rely on switch scanning.
- Handle near-miss predictions and the creation of story prediction databases from text documents.
- Add the option to display the partner's prediction in the word prediction list.
- Display the UI for the AAC user on the partner's app.
  - This provides a lot of information to the partner during scanning.
    - Words in the word prediction list that are not chosen
    - Letters during scanning that are passed up

AAC interface



Partner Interface



SmartPredict Tech Transfer Goal

-SmartPredict vocabulary supplementation should appear in every device as we harness contextual information and vocabulary within new technologies for people who rely on SGDs.

-Every SGD should have to capability of adding vocabulary options from a knowledgeable partner into the word prediction function. The person with CCN will always have the choice to select or ignore the vocabulary so autonomy and independence are maintained.

-An accompanying device should provide additional vocabulary into the lexicon of every SGD.

BETA DESIGN

Our work to date indicates that we need to learn more about the partner's experience.

Can SmartPredict improve **partner engagement** during conversation with a person who relies on switch scanning for message generation?

Evaluation Probes

During conversations about a shared experience:

1. Are differences observed in level of **partner engagement** with and without the *Smart Predict* app?
2. Are differences observed in AAC user **message efficiency** with and without the *Smart Predict* app?
3. Are differences observed in AAC user & partner **workload and satisfaction** with and without the *Smart Predict* app?

Beta Evaluation

Subjects

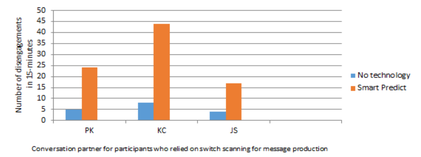
- Adults with CCN and motor impairments
  - Between 21-85 years old
  - Demonstrated ability to use single switch scanning access (Scanning Wizard software evaluation)
  - Adequate spelling, reading, and receptive language skill
- Non-disabled conversation partners
  - Between 18-85 years old
  - Adequate spelling and texting skills
  - No reported attention impairment

Study Design

- Single case ABAB withdrawal design
- Condition A (Standard condition)
  - Dyad watches short video clip, then engages in a 15 minute conversation
  - AAC user uses *Smart Predict* app
  - Partner contributes to conversation with speech only
  - A visual distraction will be present throughout the conversation
- Condition B (*Smart Predict* condition)
  - Dyad watches short video clip, then engages in a 15 minute conversation
  - AAC user uses *Smart Predict* app
  - Partner uses *Smart Predict* co-constructor app to augment the conversation
  - A visual distraction will be present throughout the conversation

Data visualization

Average number of disengagements by partner during a 15 minute conversation



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