ASSISTIVE COMMUNICATION

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cad Laboratory

Communication Disorders

Language Formulation & processing

Aphasia

Speech motor programming

Apraxia

Speech execution

Dysarthria

Motor Speech Disorders

Apraxia

- speech motor programming deficit
- inconsistent errors
- increased difficulty with unfamiliar words
- increased difficulty with multisyllabic words
- automatic speech preserved
- requires rebuilding motor programs

Dysarthria

- speech execution deficit
- reduced strength, rate, speed & accuracy of movement
- consistent errors
- increased difficulty with articulatory complexity
- may fatigue with increased practice

Continuum of need & technology

mild — impairment — severe

Speech clarification/ enhancement — intervention / tools — Augmentative / Alternative communication

Commercially Available AAC

Videos of users:
http://www.youtube.com/watch?list=PL92D954223793571 6&feature=player_detailpage&v=Eb_URYj_L_k (general video)
http://vimeo.com/46831064 (example of limited synthetic voices on AAC devices)
http://www.youtube.com/watch?feature=player_detailpage&v=VIC8G5nNE7k (one success story)

Key limitations to AAC

Rate of message formulation: 2-15 words/minute

Difficulty with search and navigation

Trade off between screen real estate and vocabulary size

Form factor of device: portable, fixed

Voice output: generic voices and poor naturalness

Social stigma

Concomitant Impairments

Cognitive and linguistic deficits
- may not have adequate reading/spelling skills
- may restrict vocabulary
- may require categorization scheme

Weakness or paralysis of limb(s)
- reduced strength, accuracy and range of motion
- may not be able to access full board

Visual field / acuity deficits
- may restrict size of icons/words
- may alter placement of icons/words

Design Considerations

Platform - mobile, dedicated computer, multiuse (iPad, tablets)

Language Representation - icons, words, phrases

Layout - size, placement of icons/words

Organization / Navigation Scheme - hierarchical, nested

Input modality - touch, scanning, brain-computer

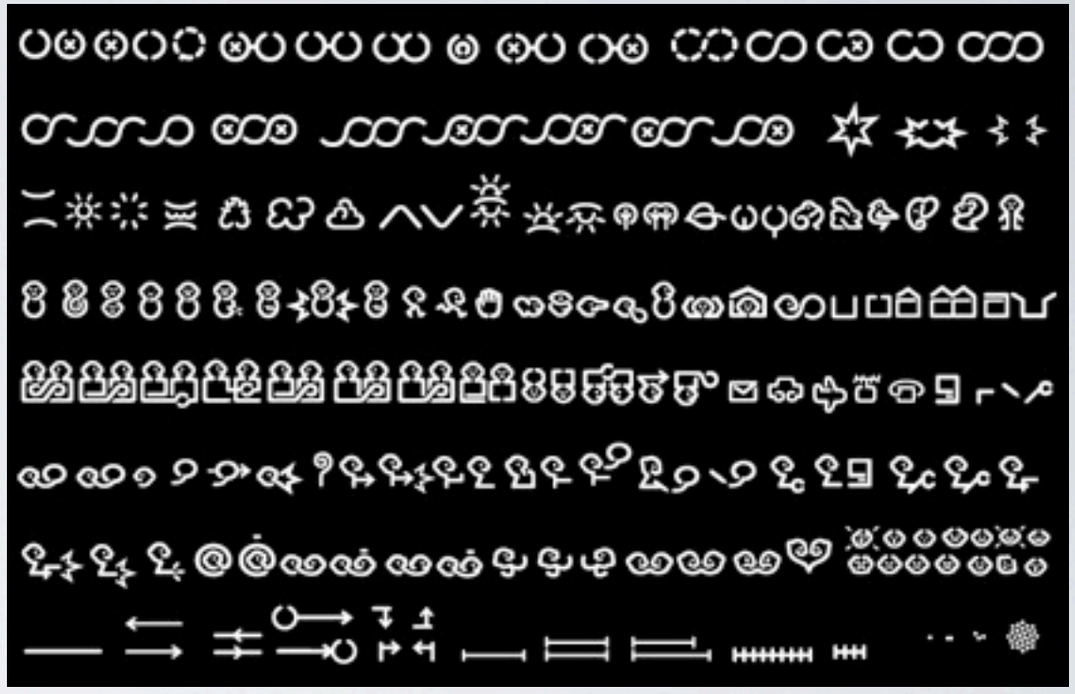
Output modality - audio feedback, TTS, visual

Features: Error correction, feedback, prediction

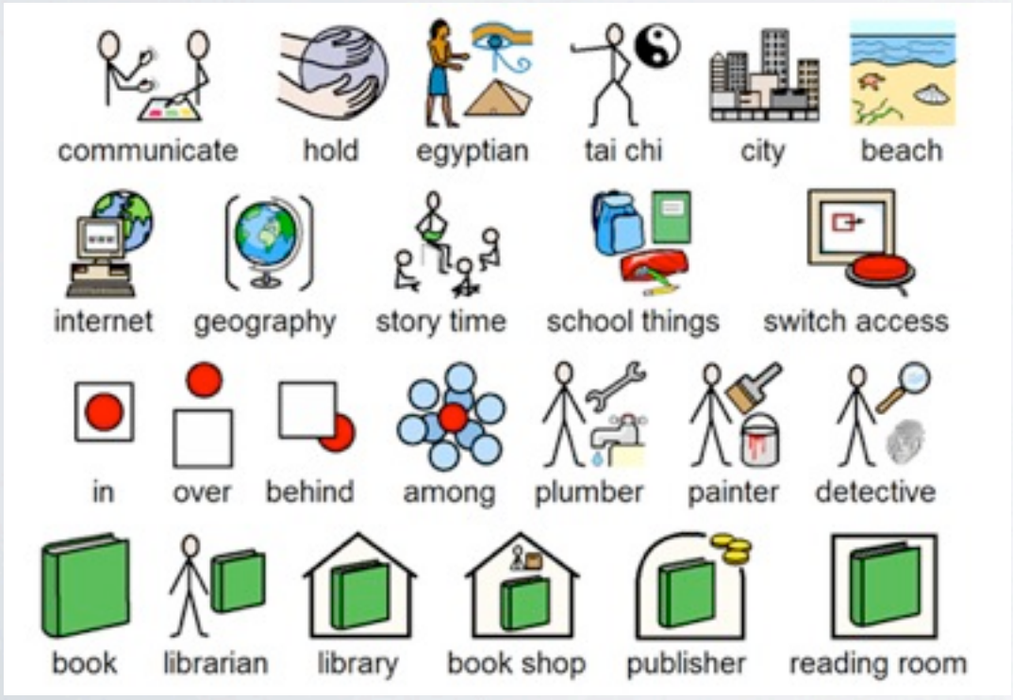
Usage scenarios

Picture communication symbols

Elephant's memory symbols

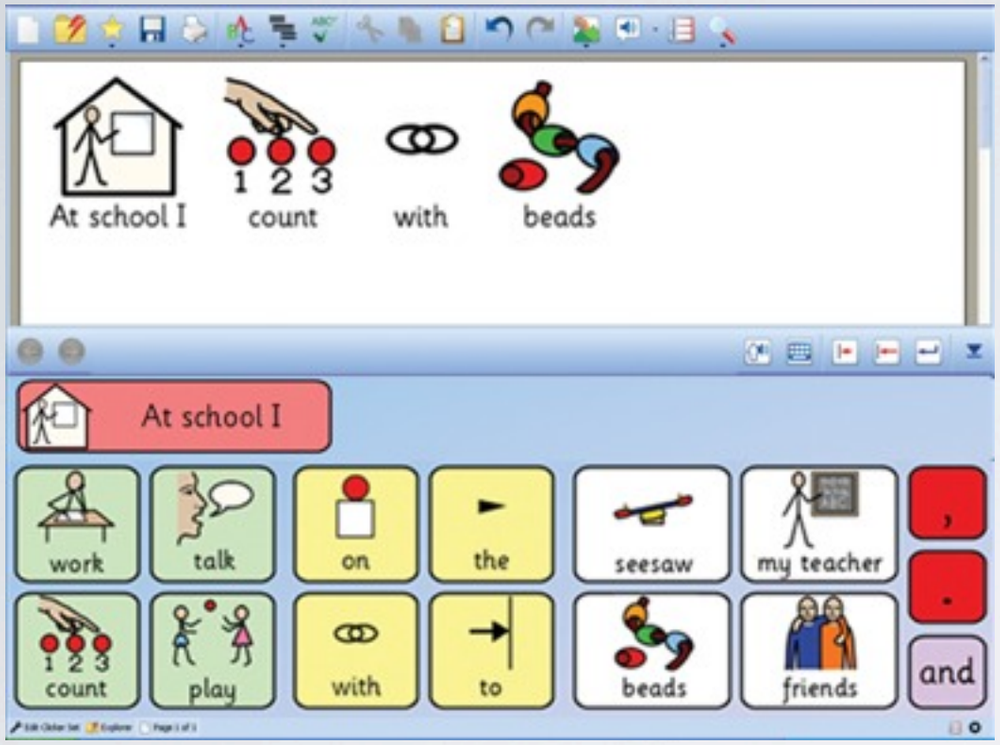


Widgit Symbols



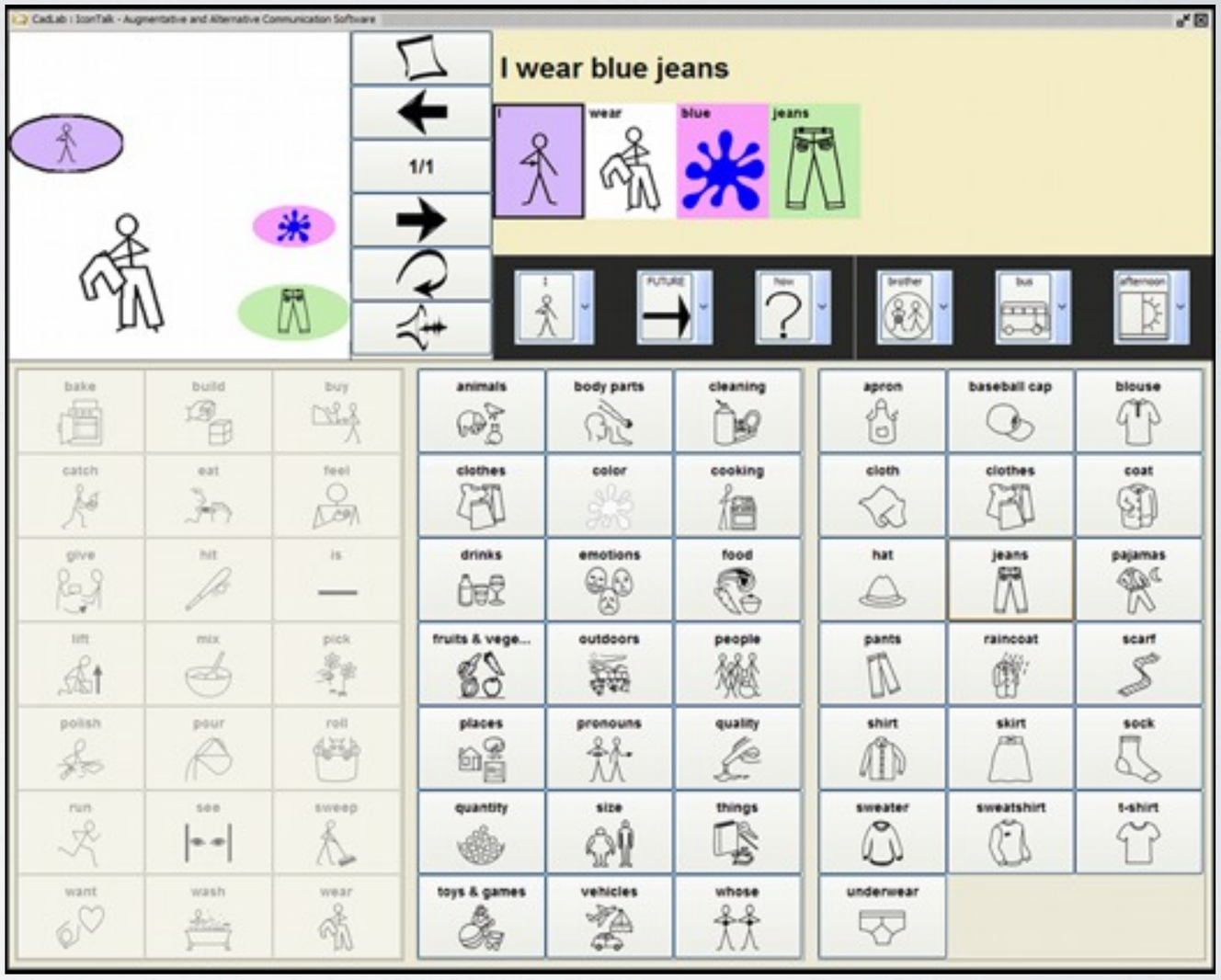
Symbonyms

Syntactic message formulation



Proxtalker

Frame based message formulation

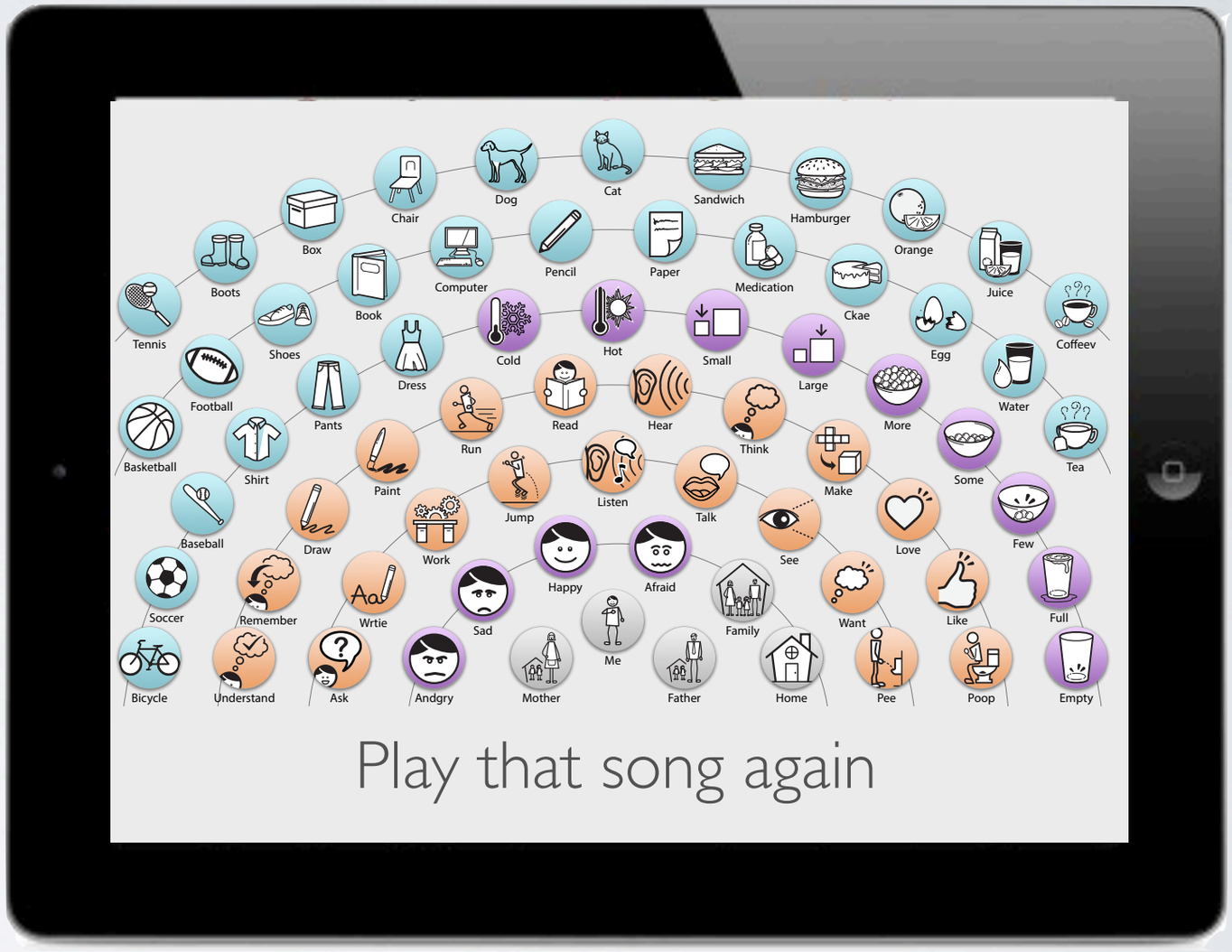


iconCHAT

Grid layout

Proloquo2go

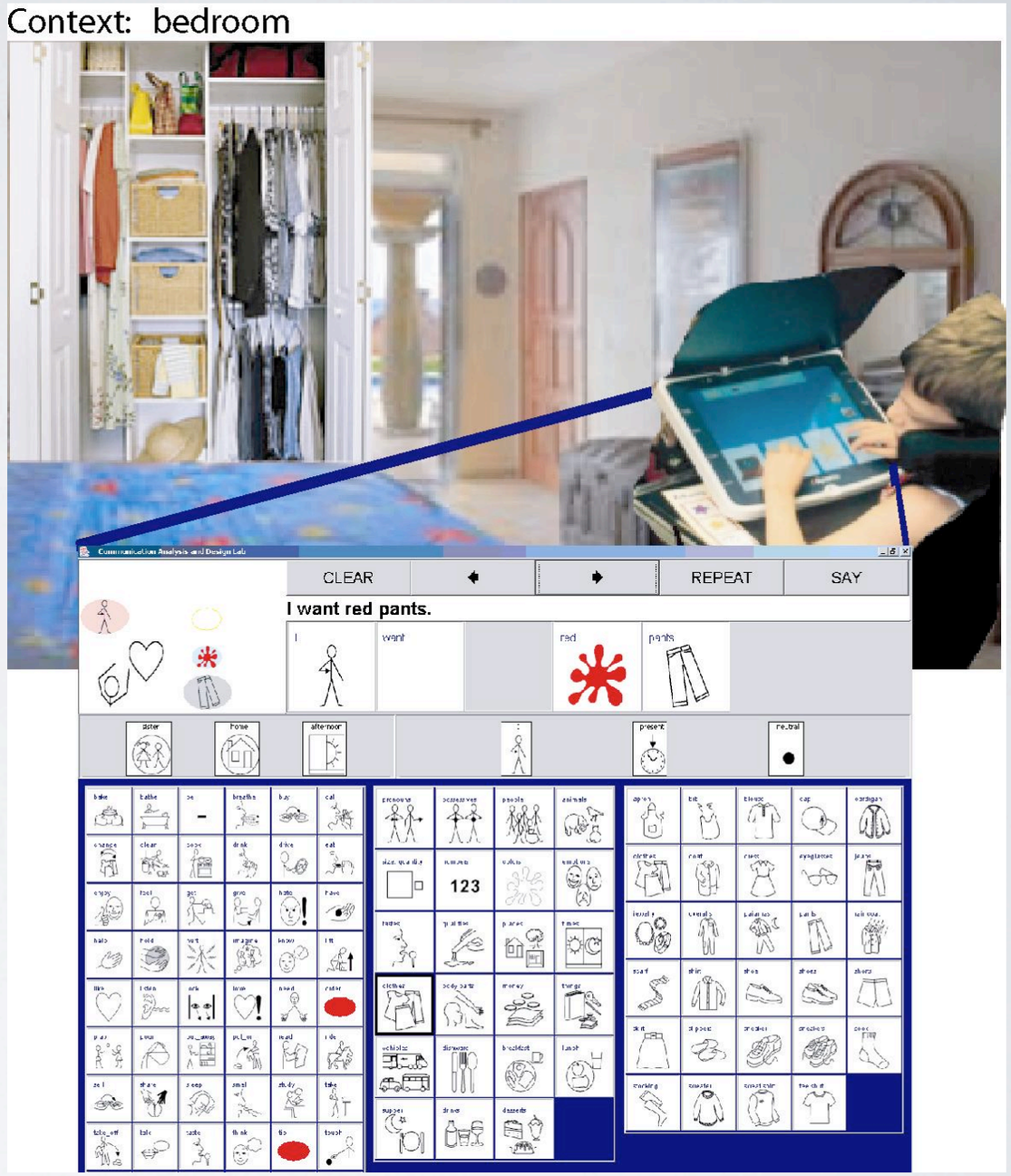
User defined layout



Static nested layout

xpress

Context dependent layout



iconCHAT

Serena

12 year old girl with cerebral palsy
paraplegic, uses a wheelchair
spastic upper limbs
wears glasses
pre-literate but 500+ word vocabulary
attends integrated school
prefers to use voice with family/friends
has 1:1 aid in school
uses a symbol communication board to communicate
quiet student who participates infrequently in class

Problem: wants to be a regular teenager - to make friends, socialize, etc.
She finds AAC board childish and stigmatizing.

Mr. Finnerty

58 year old lawyer with an unknown progressive speech disorder
ambulatory
good control of his hands; able to write
wears glasses
soft voice with poor prosodic modulation
continues to practice but has difficulty being understood in the courtroom
uses an amplification system but speech is slurred
has difficulty making convincing arguments due to speech impairment

Problem: wants to continue to practice law. will not use a commercial AAC or TTS system. Needs to be more convincing in closing arguments.

QUESTIONS?

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