Characteristics of Augmentative and Alternative Communication Technology

Learning Outcomes

- Identify the major communication needs of persons with disabilities
- Identify the major characteristics of AAC devices

How do we communicate?

Expressive Communication

- Convey a message
- Speech
- Gestures, writing and signing
- AAC tools and strategies for people with severe speech and/or motor control impairments
- Facial expression

How do we communicate?

Receptive Communication

- Receiving and understanding
- Listening and auditory processing
- Cues: touch/tactile, object, olfactory/smell, visual, kinesthetic/movement, auditory/sound

AAC Functions

Conversation

- To improve the ability to converse with others for:
  - Expression of wants, needs, and feelings
  - Information transfer
  - Social closeness
  - Social etiquette

AAC Functions

Conversation

- To expand interaction strategies to include:
  - Choices
  - Initiation
  - Greetings
  - Requests
  - Information exchange
  - Commenting
  - Conversational repair

AAC Functions

Conversation

- To increase or optimize communication rate
  - Natural speech communication 150-250 wpm
  - Single finger typing 10 wpm
  - Single switch scanning up to 5 wpm

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AAC Functions

Written communication

- To improve independent writing for:
  - Note Taking
  - Messaging
  - Formal writing

AAC Functions

Communicative competence (Light, 1989)

- To expand or improve operational competence
  - Using the device
- To expand or improve linguistic competence
  - A person's ability to manipulate or use language

AAC Functions

Communicative competence (Light, 1989)

- To expand or improve social competence
  - To improve social closeness and etiquette
- To expand or improve strategic competence
  - To optimize the content and speed of communication, repair misinterpreted messages

AAC Functions

Receptive Language

- Increase understanding of language using Aided Language Stimulation
  - Modeling of the communication system by a communication partner

AAC Systems include:

Low-Tech/Non-Electronic

- Manual communication boards & books
- Eye gaze boards
- Used as Back up to High Tech systems

Low-Tech/Non-Electronic

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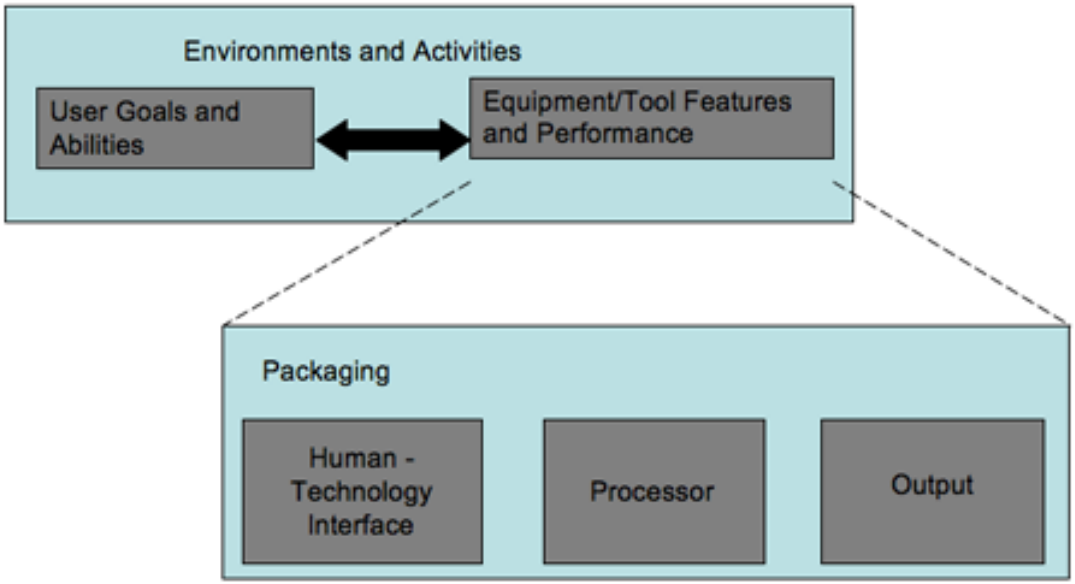
AAC Systems include:

AAC Devices

- Non-speech-generating AAC Devices
- Speech Generating Devices (SGDs)

Human/Technology Interface

- Input device or control interface
- Selection (or symbol) set
- Display layout/arrangement
- Selection method



Human/Technology Interface

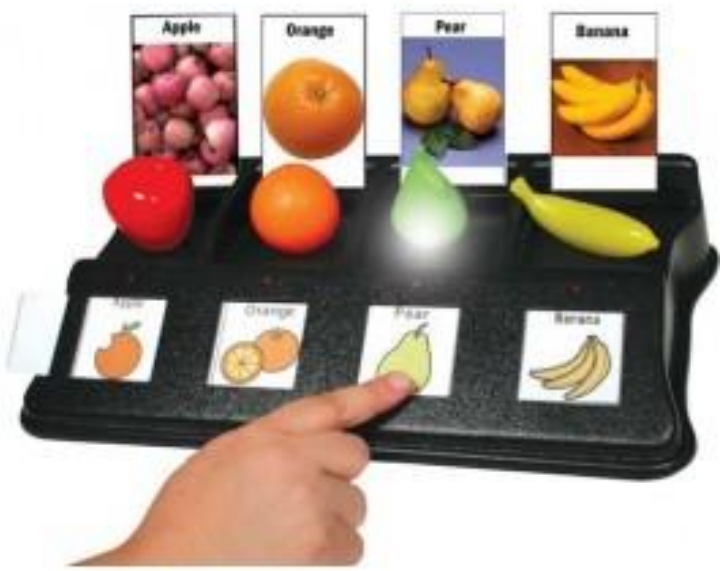
Input device or control interface

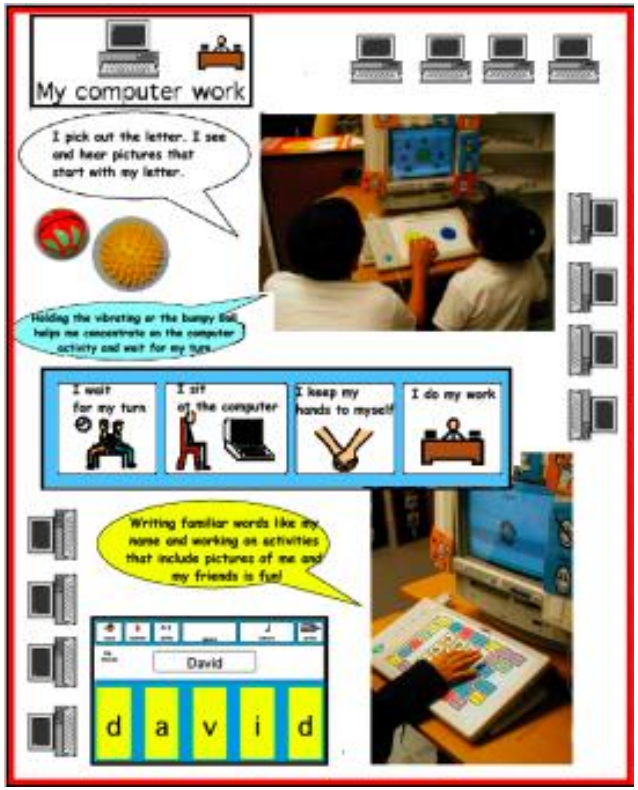
- Keyboards
- Single switch
- Switch array
- Joystick
- Mouse emulation
- Eye Gaze

Human/Technology Interface

Selection (or symbol) set

- Objects
- Pictures/icons/line drawings/photos
- Traditional orthography

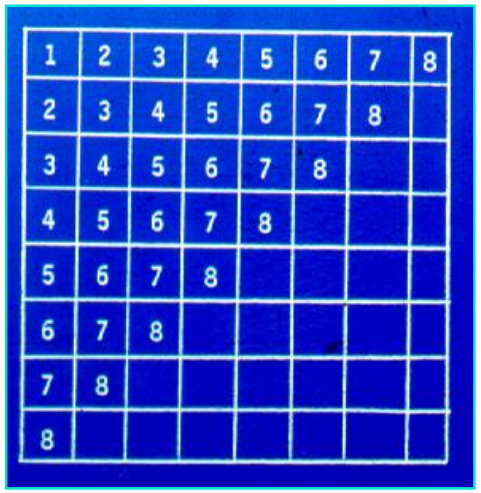




Human/Technology Interface

Display layout/arrangement

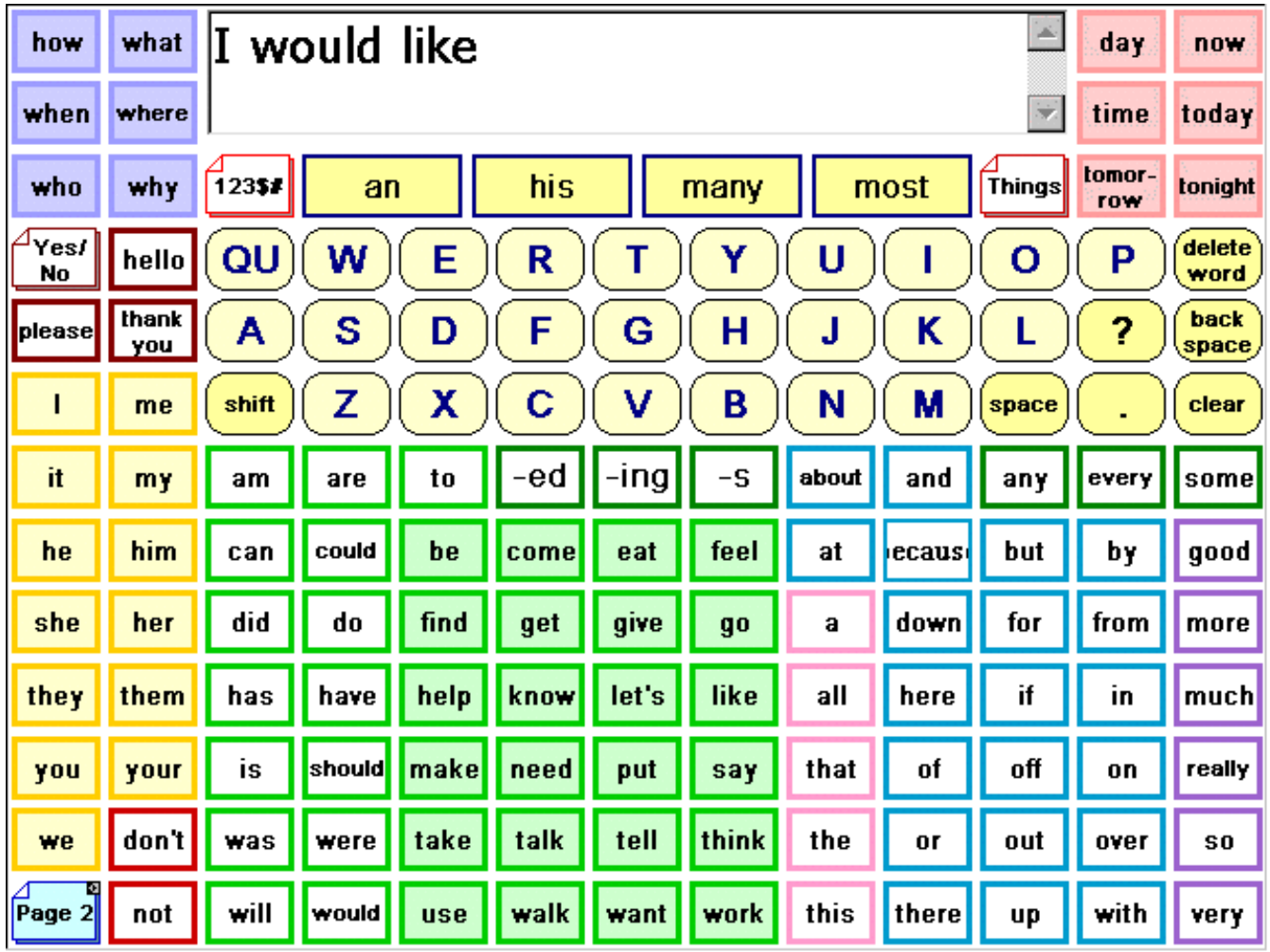
- Optimized for row column scanning



Top left is fastest to select, bottom right slowest

Frequency of use

Wordpower



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Wordpower

- Core vocabulary of 100 words accounts for about 50% of spoken communication
- Word prediction and spelling are used for the other 50%
- Words are organized so that you can select from the left to right to communicate a sentence

Human/Technology Interface

- Selection method
- Optimize speed and accuracy
  - Direct selection
  - Scanning
    - Item-by-item
    - Group-item or row/column
    - Halving or quartering
  - Coded (e.g. Morse Code)

Human/Technology Interface

- Evaluation

http://www.kpronline.com/

Human/Technology Interface

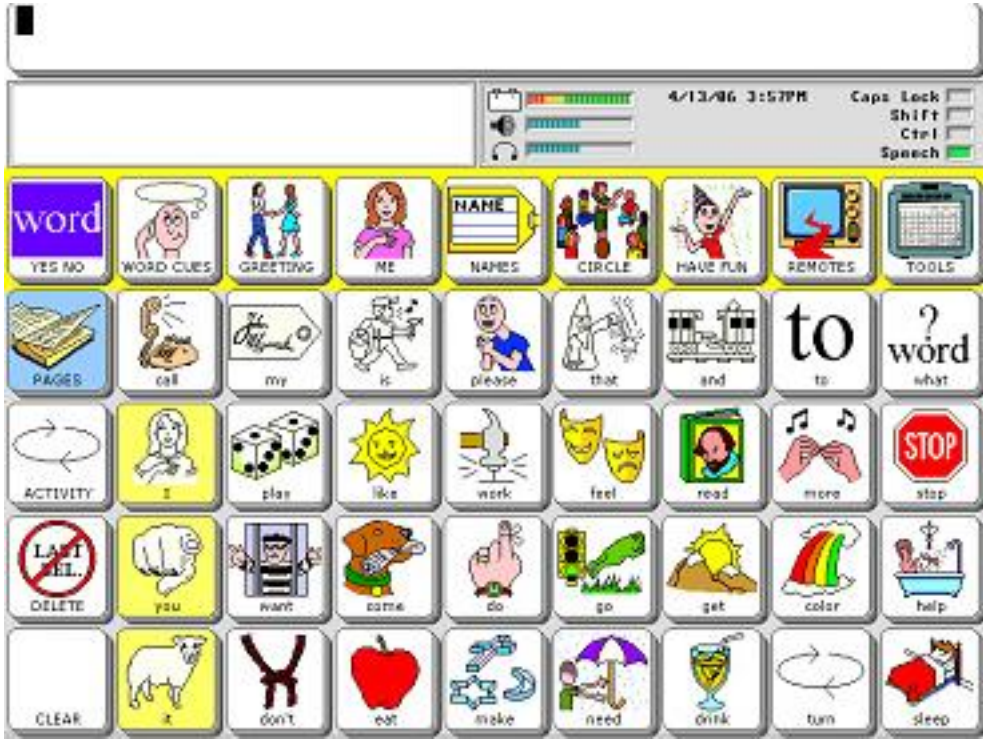
- Selection technique
- Effects speed and accuracy
  - Step or manual
  - Automatic
  - Inverse
  - Directed

Processor

Rate enhancement and vocabulary expansion

- Encoding techniques
  - Arbitrary coding (e.g., numeric codes)
  - Abbreviation expansion
    - hh=Hello how are you?
  - Semantic encoding (e.g., Minspeak)

- Minspeak Application Programs (MAPs)
  - Words Strategy®
  - Unity®
- To select a food, the user selects the apple, then a food group, then a specific food
- To talk about food, the user selects the apple, then the sun to talk about breakfast

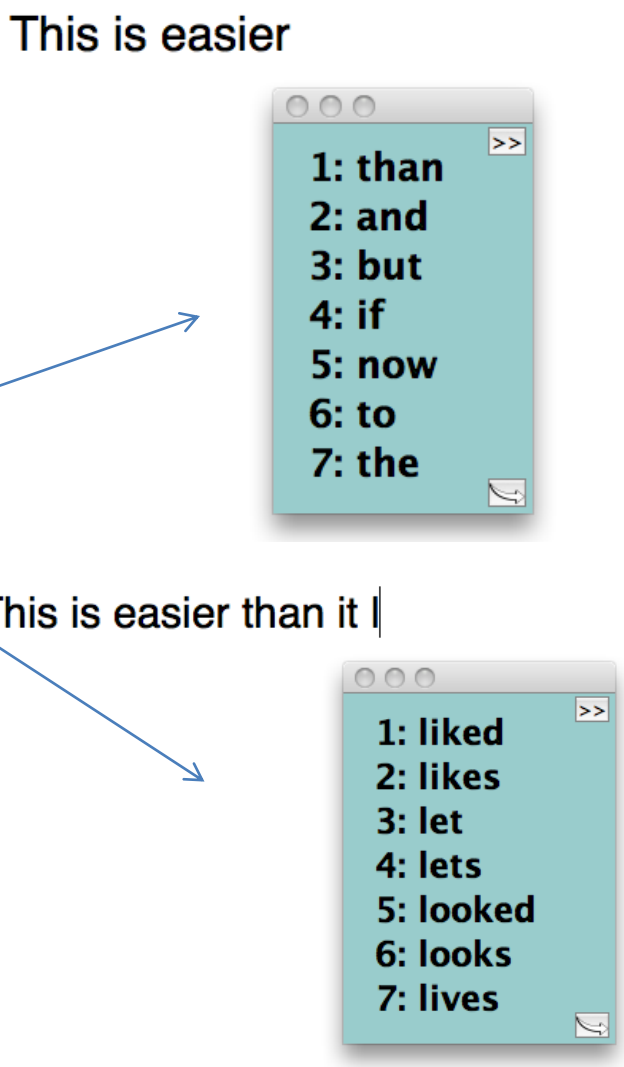


Minspeak®

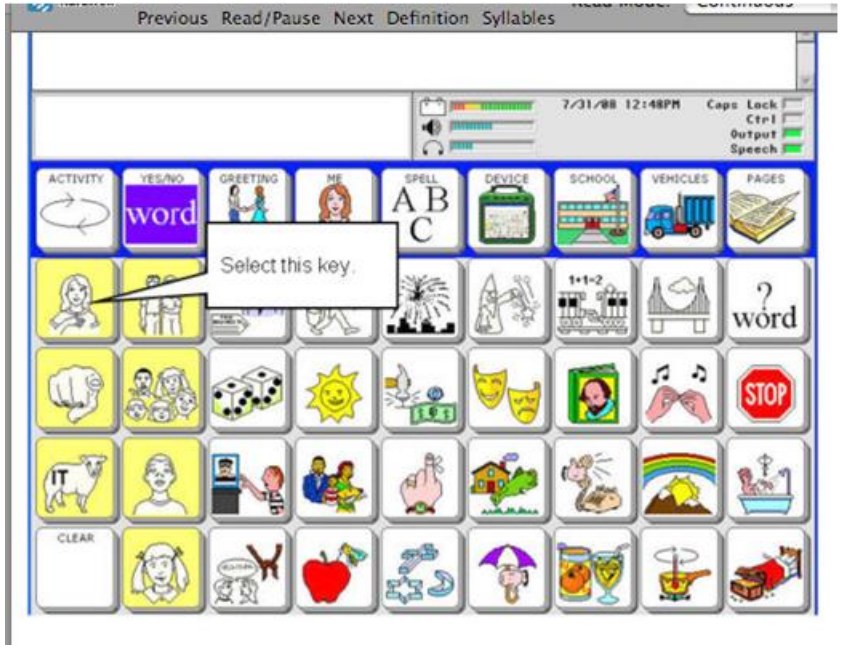
Processor

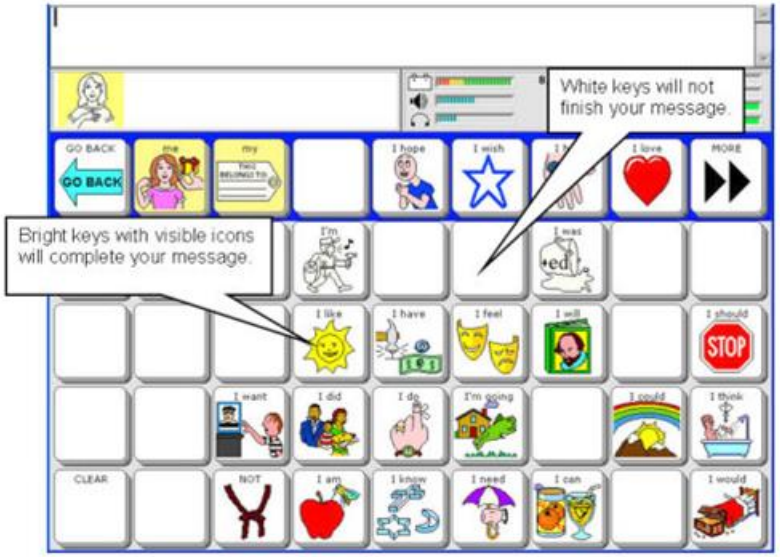
Rate enhancement and vocabulary expansion

- Prediction techniques
  - Word prediction
  - Word completion
    - Fixed
    - Adaptive
  - Icon prediction



Icon prediction





Processor

Rate enhancement and vocabulary expansion

- Conversation-based techniques
  - Interaction/Pragmatic categories
    - Initiation, greetings, requests, information exchange, comments, conversational repair
  - Semantic categories/dictionaries/menus
    - Using dictionaries or menus organized by letter of alphabet or other categories

Processor

Rate enhancement and vocabulary expansion

- Conversation-based techniques
  - Mood/context superimposition
    - Organizing by topic, environment or communication partners
  - Scripts
    - Story telling: ourselves, family, things that have happened

Processor

Rate enhancement and vocabulary expansion

- Levels – expands available vocabulary
  - Static displays
  - Dynamic communication displays
- Themes
  - Same icons have different meanings, depending on theme

Levels on a Static Display

Dynamic Display

Dynamic Display

Processor

- Rate enhancement and vocabulary expansion
  - Vocabulary storage
    - Pre-stored vocabulary or application programs
    - User defined or programmed

Processor

Selection editing

- Option for the client to edit selections
  - Delete characters or symbols
  - Insert characters or symbols
  - Check spelling or grammar

Output

- Visual
- Auditory
- Coded
  - From AAC to computer or other device

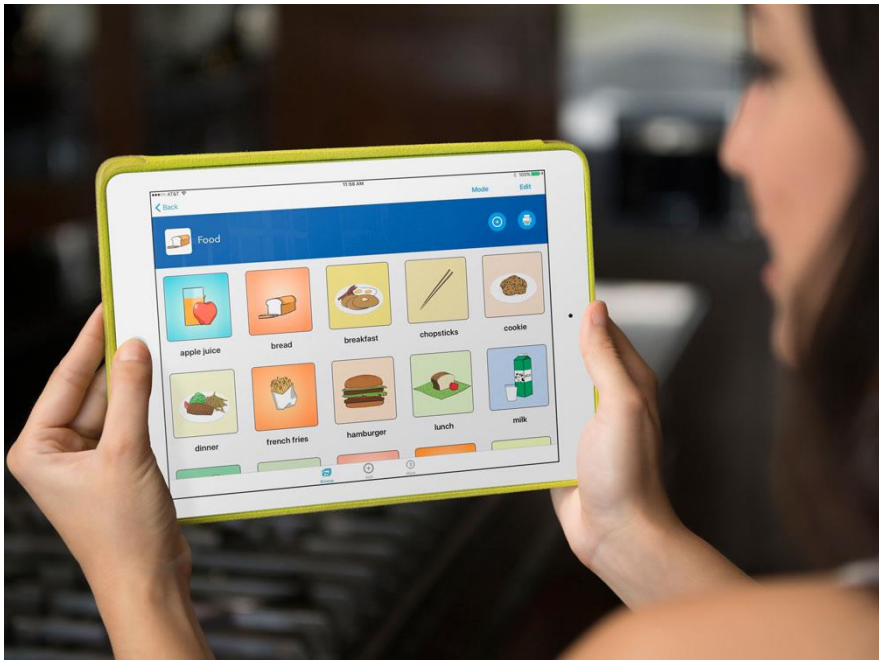
Coded Output

- Wire
- Remote
  - Infrared
  - Radio Frequency (RF)
  - Bluetooth

Packaging

Dedicated vs. computer based systems

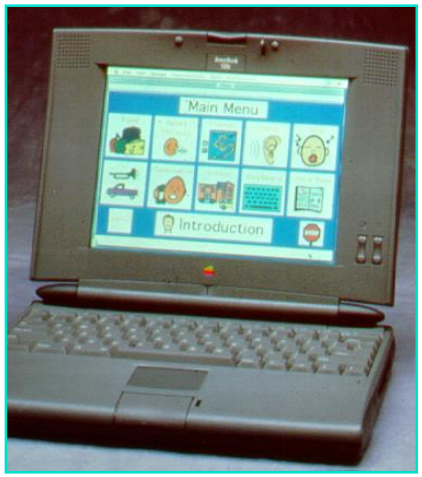
- Ambulatory clients
  - Small enough to carry



Packaging

Dedicated vs. computer based systems

- Computer based
  - Communication is just one feature
- Dedicated
  - More battery life
  - Often more durable
- Tablets
  - Portable
  - More functions
  - Blends in
  - Limited access



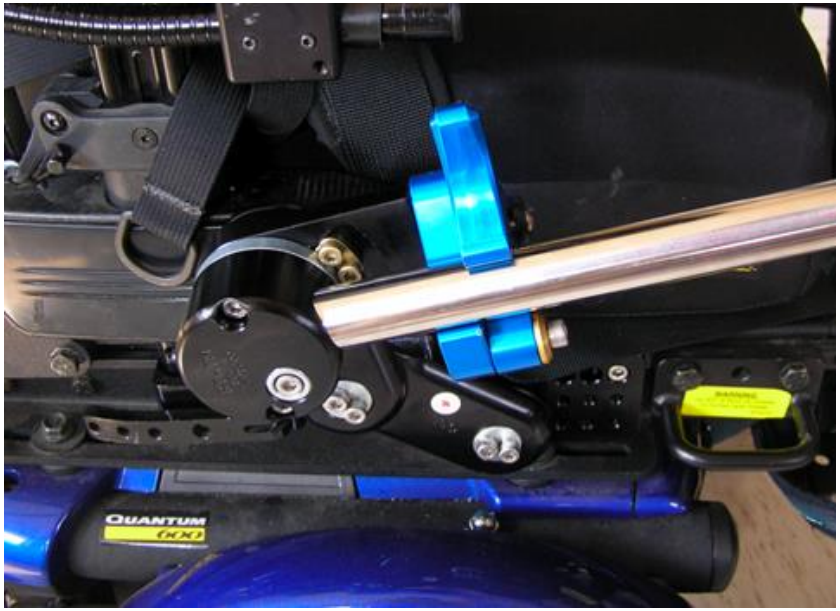
Packaging

Integration with other assistive technologies

- Wheelchair mounting strategies
- Computer keyboard emulation
- Integrated EADLs
- Integrated controls

Side-folding wheelchair mounting bracket

Rear-folding wheelchair mounting kit

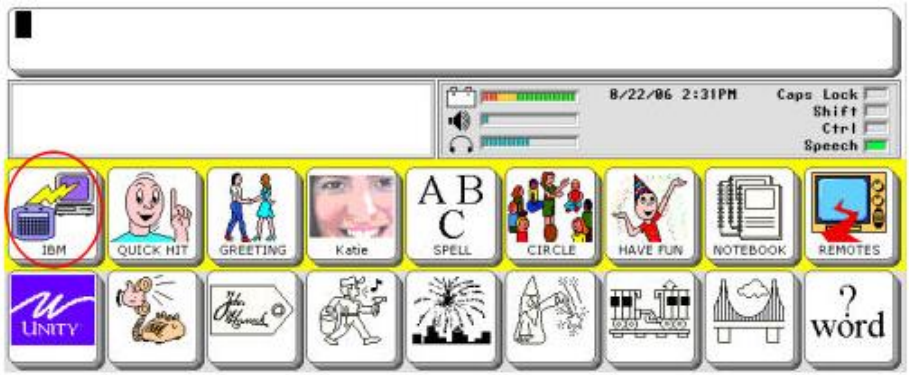

QUANTUM

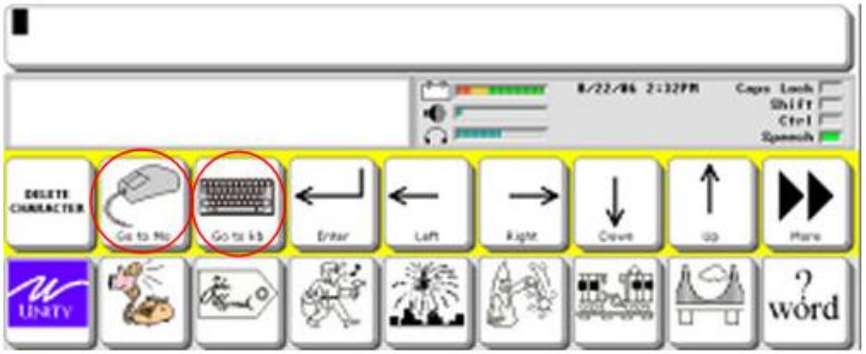

seen here on Vanguard

Wheelchair Mounting

- Avoid mounting to moveable components
- Mount above the tilt, if a tilt is present
- Consider a locking frame clamp if tilt is present

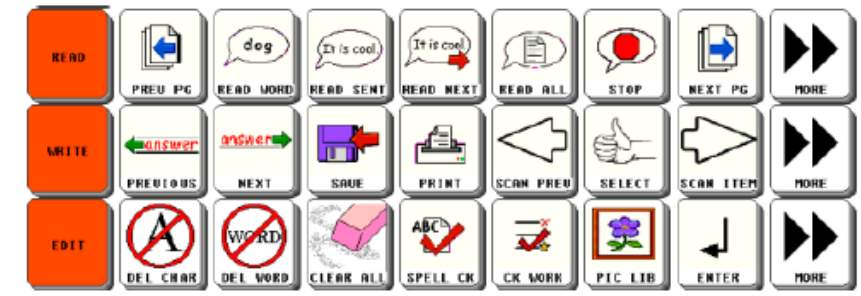
Keyboard and Mouse Emulation





IntelliTools Activity Rows for Vanguard/Vantage

IntelliTalk Toolbar



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- Integrated Email & Internet
- EADLs

Review Questions (feel free to discuss with your neighbors)

1. Which of the following is NOT a function of augmentative and alternative communication?
    a. Conversation
    b. Control of devices within the environment
    c. Written communication
    d. Communicative competence

2. When mounting a speech generating device to a wheelchair with tilt in space, where should the frame clamp be placed?
    a. Above the tilt
    b. Below the tilt
    c. On the armrest
    d. On the footrest

Review Questions (Here are the answers. How did you do?)

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Questions?