Using an Animation-based Technology to Support Reading Curricula for Deaf Elementary Schoolchildren

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Literacy

- Essential skill for success
- Improved employment opportunities
- Better access to professional services
- Greater earnings

Deaf Literacy

- Poor reading skills
- Median level of 17 and 18 year olds: 4th grade
- National concern

Deaf Education

- Many approaches
- One commonality among visual approaches: fingerspelling

Fingerspelling

- Method of representing the symbols of a written alphabet as signs
- An essential part of American Sign Language
- Deaf children of Deaf parents produce fingerspelling as early as two years

Fingerspelling

- An important bridge to printed English
- Used in
  - Various forms of manually coded English
  - Total Communication
  - "bi-bi" approaches

Fingerspelling challenges

- Instructor challenges
- Classroom management challenges
- Challenges outside the classroom.

Instructor challenges

- Difficulty
- Confidence
- Fatigue

Classroom management

- Wide range of ability
- Addressing all skill levels

Outside the classroom

- Practice outside the classroom is essential.
- "Pair practice" – working with another person

Barriers to practice

- 90% of children born deaf have hearing parents.
- English may not be used at home.
- Parent may not be able to participate in pair practice.

Possible solution

- Augment with technology
  - Alternative to pair practice
  - Many learning tools exist for hearing students.
- Goals
  - Interaction (feedback)
  - Realism

Previous technologies

- Videotape/ DVD

Previous technologies

- CD-based "flash-card" style technologies
  - Fingerspelling and Numbers
  - Marvin Teaches Fingerspelling

Previous technologies

- Web-based "flash-card" style technologies
  - Dr. Bill's
    - asl.ms
  - ASL University:
    - lifeprint.com/asl101/fingerspelling/

Drawbacks

- Goals
  - Interaction
    - Videotape/DVD: no
    - Flash cards: yes
  - Realism
    - Videotape/DVD: yes
    - Flash cards: no

Realism issue

Our solution

- "Fingerspelling Tutor"
- Combines the best of previous technologies
- Goal: facilitate more effective use of fingerspelling

Fingerspelling Tutor

- Displays true-to-life 3D motion
- Closely resembles the actual motion of fingerspelling
- Displays natural transitions of fingers and thumb
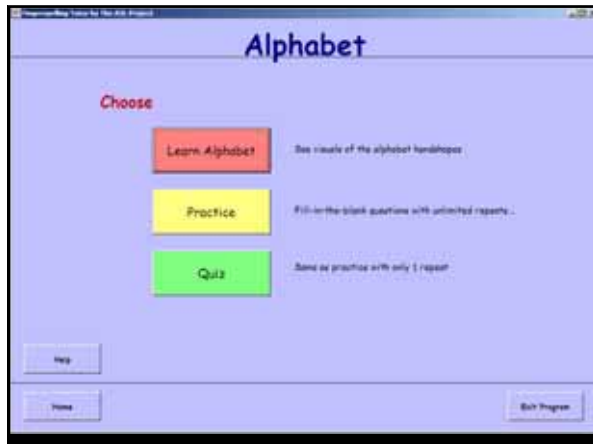
Natural motion

Fingerspelling Tutor

- Accommodates all skill levels:
  - Alphabet
  - My First Fingerspeller
  - Intermediate
  - Advanced
- At each skill level,
  - Practice
  - Quiz

Alphabet level

- Shows all letters
  - Front view
  - Back view
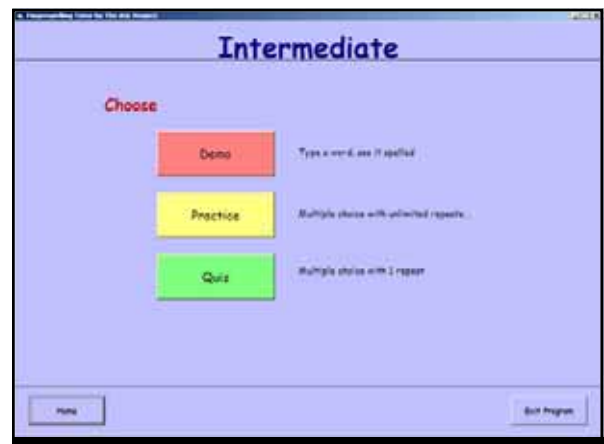- Letter recognition practice
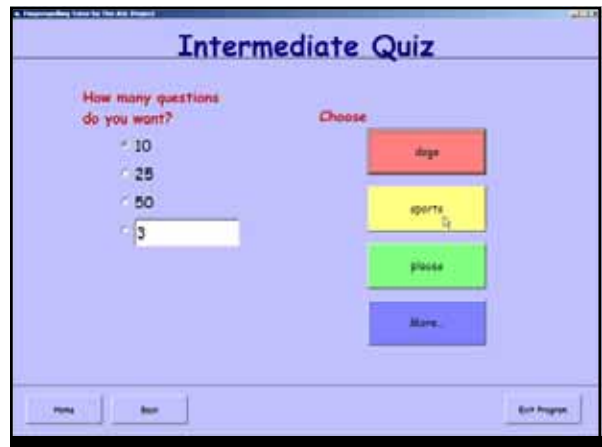- Letter recognition quizzes

Intermediate level

- Demonstration
  - Type any word, see it spelled
- Practice
  - By category
  - Choose answer from a list of possible responses (multiple choice)
  - Unlimited repetitions
  - Adjustable speed
- Quiz

Intermediate level

- Quiz
  - Choose category
  - Choose number of questions
  - See the word, choose answer from a list of possibilities
  - Only one repeat
  - Adjustable speed

Advanced level

- Practice
  - By category (or "mega list")
  - Type the answer ("fill-in-the-blank")
  - Adjustable speed
  - Unlimited repetitions
- Quiz
  - Only one repetition

Classroom testing

- Tested in a Deaf program at a public elementary school in Chicago
- Winter, Spring terms 2006
- K through 8
- Several times a week

Classroom testing

- Supported the Fairview method
  - Dolch words
  - Word analysis

Results

- Effective for individual practice
  - Motivator
  - More time on task
- Students liked
  - Novelty of motion
  - Individual, private feedback

Results

- Facilitated classroom management
  - Reduced interference/interruption from other students
  - Facilitated individualized instruction
    - Select the appropriate learning challenge
    - Facilitated small group work

Future work

- Option to change vocabulary lists
- Print the "how am I doing" page
  - Record student progress
  - Serve as ongoing assessment

Demonstration

Questions?

Thank you

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