Access to Mainstream Classroom Instruction Through Real-Time Text

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Overview
• What is real-time text
• Rationale
• Options
• Benefits
• Evidence
• Challenges of real-time text

What is Real-Time Text?
• A support service option for access and communication
• The text display provides communication access for individuals who cannot hear (or individuals who process auditory information indirectly)
• Can be used by itself or with another accommodation
• Provides access to information during class and notes afterward

Rationale for Real-time Text in the Classroom
• Challenges in providing adequate support
  – Students with diverse needs
  – Varied settings
• A classroom accommodation option
  – Others
    • Interpreting
    • Notetaking
• Value of printed information
Text-Based Options

- CART (Communication Access Real-time Translation)
- Keyboard-based systems (e.g. C-Print)
- ASR (Automatic Speech Recognition)

CART: Communication Access Real-time Translation

- Speaker’s words displayed on screen or laptop
- Usually a verbatim display of text
- Recording at above normal speaking rates
- Uses stenographic machine

Keyboard-based Systems

- Meaning-for-meaning translation
- Service provider produces captioning using
  - Standard keyboard
  - Computerized abbreviations
- Speaker’s words displayed on screen or laptop

A C-Print Captionist Providing Captioning Support to a Student in a Classroom Setting
Examples of Display Devices for Students Who Use Speech to Text

- Downloadable app that runs on iOS and Android devices (utilizes Adobe Air)
- Easy to access and use (simple “connect & go” solution)
- Some services use web browser

Brief Demo of C-Print Transcription

Deaf Students Using C-Print Mobile in Molecular Biology Lab at RIT

Automatic Speech Recognition (ASR)

- Systems include
  - Nuance
  - IBM Watson
  - Google
- Speaker dependent
- Currently rarely used
  - Inadequate Recognition
  - Limited formatting
  - Technical difficulties
  - May be lag time
Benefits of Speech to Text

- Speech-to-text provides information that is permanent and complete
  - The text display remains on the screen for approximately one minute (depending on the size of the text)
  - The stored text of the lecture transcript is available after class and is a valuable study tool

Uses for Speech to Text - Students

Support services need to be matched to needs and preferences of students.

- Deaf students or deaf/blind students
- Students grades 5-college (need grade 4 reading ability or above)
- Hard of hearing students; limited ASL skills; anyone who needs to see a text version of class
- Students with learning disabilities or injuries
- English language learners (ELL)

Key Research Findings

- Grant funded research program begun in 1993
  - US Dept of Education
  - National Science Foundation
  - Private Foundations
- Populations studied
  - Postsecondary (8 studies)
  - Secondary (Grades 4-12) (4 studies)
- Assessed reading proficiency Grade 2.5-College
  - Recommend Grade 4 or higher
- Research with keyboard-based C-Print speech-to-text

Key Research Findings

- Preference for C-Print often (but not always) related to English proficiency
- Real-time presentation helpful for range of students
  - Supplies missing information
  - 90-100% self-rated understanding of lecture
  - 80-90% self-rated understanding of other students’ comments
  - Significant retention of information (from simulated classroom lectures)
- Notes helpful
  - Easier to read than handwritten notes
  - Generally provide more information than other notes
Three Challenges of Speech to Text

• Participation in class by DHH with limited speech intelligibility
• Simultaneous presentation of real-time text and graphical information
• Participation in teams and small groups

Simultaneous Presentation of Graphical Information and Real-Time Text

• Instructors often include graphical information and talk at the same time.
  – e.g. PowerPoint slides
• DHH students often need to divide their attention between:
  – the instructor,
  – real-time transcription/interpreter,
  – PowerPoint slides

Video Sample:
PowerPoint and transcription separate

Video Sample:
PowerPoint and transcription together
Performance as a Function of Type of Item and Separation of Displays

Sample of Captions over PowerPoint

Challenges in Groups
Groups Where Students Have Mixed Hearing Statuses Often Face Communication Challenges

- Direct Communication
  - Students often prefer direct communication with peers, but may not understand each other’s speech / signing

- Access Services (Interpreter, Captionist)
  - Lag due to service processing time frequently limits D/HH students’ participation

Mobile Devices in Small Groups

- Mobile device can facilitate communication
  - Messaging helps all participate
  - Reliable information for D/HH students

- Small group experiment
  - With messaging, members more fully share information with teammates
  - D/HH and hearing students prefer messaging to writing
  - Prefer familiar, easy to use technology
Conclusion

- Real-time text is now widely used
  - e.g. C-Print used in at least 34 states at 541 sites
- Beneficial for many DHH students
  - Permanent, complete information and stored text
- Comprehension and retention of information
- Identified challenges to the service

C-Print Research Contact Information

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Questions or Comments?