

C-Print[®] Captioning Services for Deaf Students

©Michael Stinson and Pamela Francis
Rochester Institute of Technology
National Technical Institute for the Deaf
Center on Access Technology

Rationale for Captioning in the Classroom

- **Challenges in providing adequate support**
 - Students with diverse needs
 - Varied settings
- **A classroom accommodation option**
 - Others
 - Interpreting
 - Note taking
- **Value of printed information**



What is C-Print?

A support service option for access and communication.

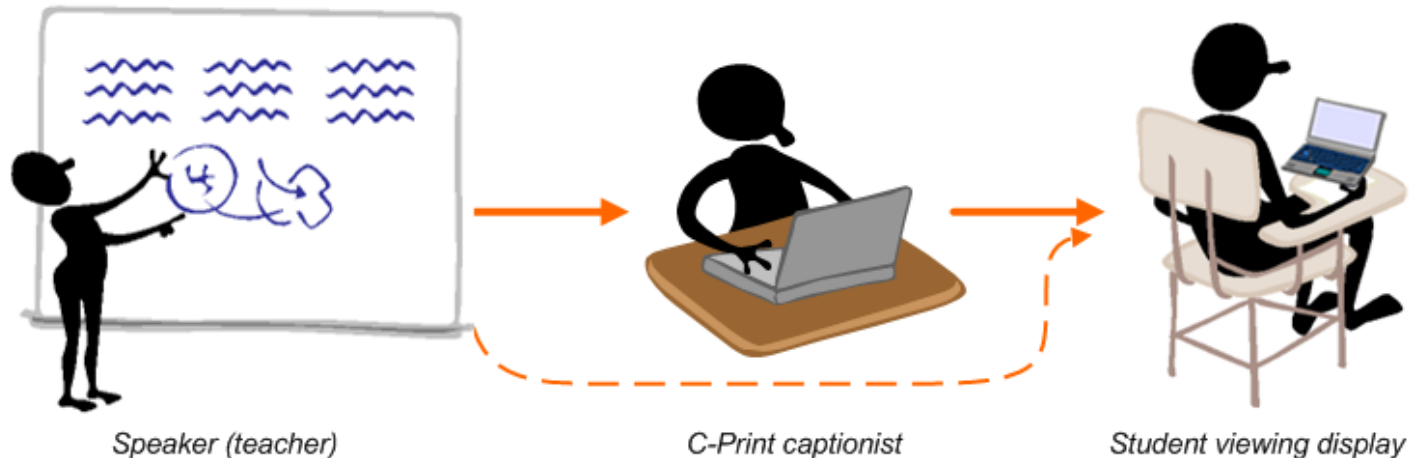
- **Provides a text display of spoken information in real time for individuals who cannot hear (or individuals who process auditory information indirectly)**
- **Meaning-for-meaning translation**
- **Can be used by itself or with another accommodation**
- **Provides access to information during class and notes afterward**

Keyboard-based Systems

- **Service provider produces captions using**
 - Standard keyboard
 - Computerized abbreviations
- **Service provider uses condensing and summarizing strategies to make message more concise**
- **Speaker's words displayed on computer screen**
- **May be done remotely by phone and Internet**

How does C-Print work?

- A trained service provider, called a C-Print captionist, types abbreviations and full words to capture what a teacher (or another student) is saying.
- A computer software called C-Print Pro displays the full words for students to view and read to access the spoken information.





C-Print abbreviations are primarily based on phonetic rules.

A captionist types...

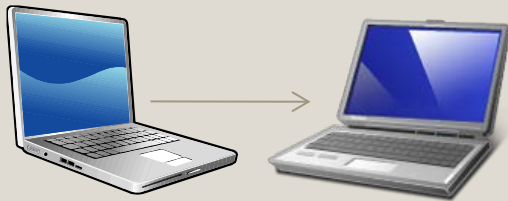
wlkm to t nxl tknkl nsttt f t deaf.

The information displayed...

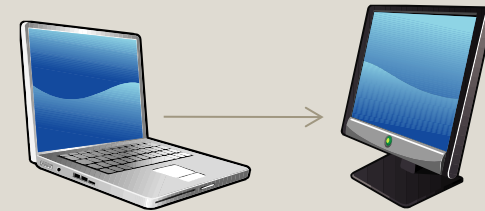
**Welcome to the National Technical
Institute for the Deaf.**

Display Options

Laptop-to-Laptop



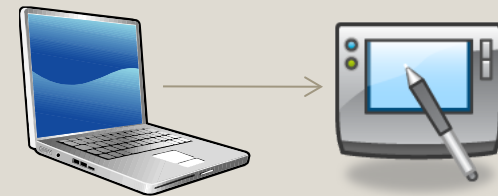
Laptop-to-Monitor



Laptop-to-Mobile Device



Laptop-to-Tablet PC





Considerations in using Automatic Speech Recognition as a Classroom Support

- **Experience with speech recognition in four grant-supported projects 1998-2008**
- **Projects' challenges in using speech recognition**
 - Accuracy
 - Formatting
 - Maintenance of dictionary
 - Handling new vocabulary
- **Preference for keyboard based C-Print**

Benefits of C-Print

- **Provides information that is permanent and complete**
- **Succinct delivery of spoken information**
- **Manageable transcript**
- **Visually accessible (visual emphasis)**
- **Model of language usage**



Uses for C-Print - *Students*

- Deaf students or deaf/blind students
- Students 10 years of age 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
- Second language learners



Uses for C-Print - *Settings*

- **Classroom lectures**
- **Group discussions**
- **Business meetings**
- **Community and private events/meetings**

The Service Provider

- A ***C-Print captionist*** is trained to include as much information as possible, generally providing a meaning-for-meaning translation of the spoken English content.
 - Input using abbreviation system
 - Text condensing strategies (meaning-for-meaning translation)
- The quality of the service depends on skill of service provider

Recommended Skills (Captionist)

- **Excellent listening skills**
- **Excellent English skills**
- **Technical ability, computer skills**
- **Typing speed of 60+ word per minute**
- **Desire to learn**

Captionist Training

- Online training program
- Mentoring strongly recommended
- Time required for training and skill development
 - Varies depending on individual
 - Estimated time for online and offline assignments – 60-70 hours

Research Program

- **Grant funded research program begun in 1993**
 - US government funding and private funding
- **Populations studied**
 - Postsecondary (8 studies)
 - Secondary [ages 10-18] (4 studies)
- **Assessed reading proficiency of children age 10 to postsecondary**

Key Research Findings

- Preference for C-Print often related to language proficiency
- Real-time display of text helpful for range of students
 - Supplies missing information
 - Significant retention of information (from simulated classroom lectures)
- Notes helpful
 - Easier to read than handwritten notes
 - Generally provide more information than other notes

Key Research Findings –

STUDENT PERSPECTIVES

- Increased understanding of class content
- Increased understanding of other students
- Greater engagement with class material
- Less boredom
- Enjoy using the technology

Student Comments

- **Postsecondary**

“Well, I would say that it helps a lot. And it surprised me because I never realized how much information was provided in class. Before, I always thought that the teacher did not provide enough information and it was boring, but when I was using the C-Print it seemed more interesting. It makes me feel like I have been missing something in the past. Like I missed the last few years.”

Student Comments (continued)

- **Postsecondary**

“Yes, I accept it is summarized. I can hardly tell if it is summarized. It looks like she is typing every single word that the teacher is saying. I can hardly tell that she is summarizing. When I look at the interpreter, I can tell that they are summarizing. So I can see the difference.”

Student Comments (continued)

- **Secondary**

Interviewer: “So you think you had this really, really hard information you were learning about DNA?”

Student: “Yeah, I think that the (C-Print) really helped actually.....because sometimes you miss things. Because the interpreter’s like a couple of seconds slower because they have to hear exactly and then you might miss things and then it’s already there for you.”

Key Research Findings –

TEACHER PERCEPTIONS

- **Increased vocabulary acquisition**
- **Class participation more focused (fewer clarifying questions; more response to content)**
- **More engagement (less distracted behavior)**
- **Other students accepting of the technology**
- **Empowers students**

Teacher Comments

- **Postsecondary**

“It just makes me feel better to know that they're going to get just as much as everyone else in the class is entitled to. It really matters to me that these students are just like everybody else...It makes the other students in the class aware that they are equal partners in the class...And it makes them responsible, as well.....”

Teacher Comments (continued)

- **Secondary**

“I would say that it made her learning experience far more thoroughI can see that in the past maybe she worried that she got about 70% or maybe 60 to 70%, but now she is getting everything. And there’s no worries, and being as serious of a students as she is, I know this is probably a huge concern for her.”

Key Research Findings –

BENEFITS TO EDUCATORS

- **Written record of information presented in class**
 - Can distribute to other students and prepare lesson plans
- **Assess what students are learning**
- **Tutors have better understanding of what happened in class**
- **Changes perceptions of students capabilities**



C-Print Research Contact Information

Email

- cprint@rit.edu

Web

- http://www.ntid.rit.edu/research/cprint_home.php

Phone

- **585.475.7557 (voice/TTY)**