

The C-Print Service: Using Captions to Support Classroom Communication Access and Learning by Deaf and Hard-of-Hearing Students

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Getting to Know You

Who do you represent?

What are your current practices?

What information would you like to take away today?

Overview

- Rationale
- Classroom captioning options
- What is C-Print
- Demonstration of C-Print
- Key research findings
- New directions

Rationale for Captioning 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

Captioning as a Support Service Option in U.S.: A Response to Educational Practice

- Most deaf/hard of hearing children in the United States are educated in public schools
 - About 80% attend public schools
 - About 70% of these children attend classes with hearing children
- Approximately 90% of postsecondary deaf/hard of hearing students attend classes with hearing students

A Response to Education

- IDEA
 - Least restrictive environment
 - Individual education plan
 - Parental involvement in decisions

- ADA and Section 504 of the Rehabilitation Act
 - Provision of reasonable accommodation for students with disabilities to participate in courses, programs, and activities

Text-Based Options

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

Keyboard-based Systems

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



CART: Communication Access Real-time Translation

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

CAN (Computer Assisted Notetaking) and ASR (Automatic Speech Recognition)

- CAN
 - Support service person types notes
 - No extensive abbreviation system
- ASR
 - Uses Dragon Naturally Speaking, or other
 - Speaker dependent
- CAN and ASR are not often used



Pros & Cons of Keyboard-based and CART

Keyboard-based

CART

PROS

- Desirable length of text for use after class
- Low cost
- Short training
- High availability

- Verbatim transcription
- Quiet
- Can cover 2 hour class

CONS

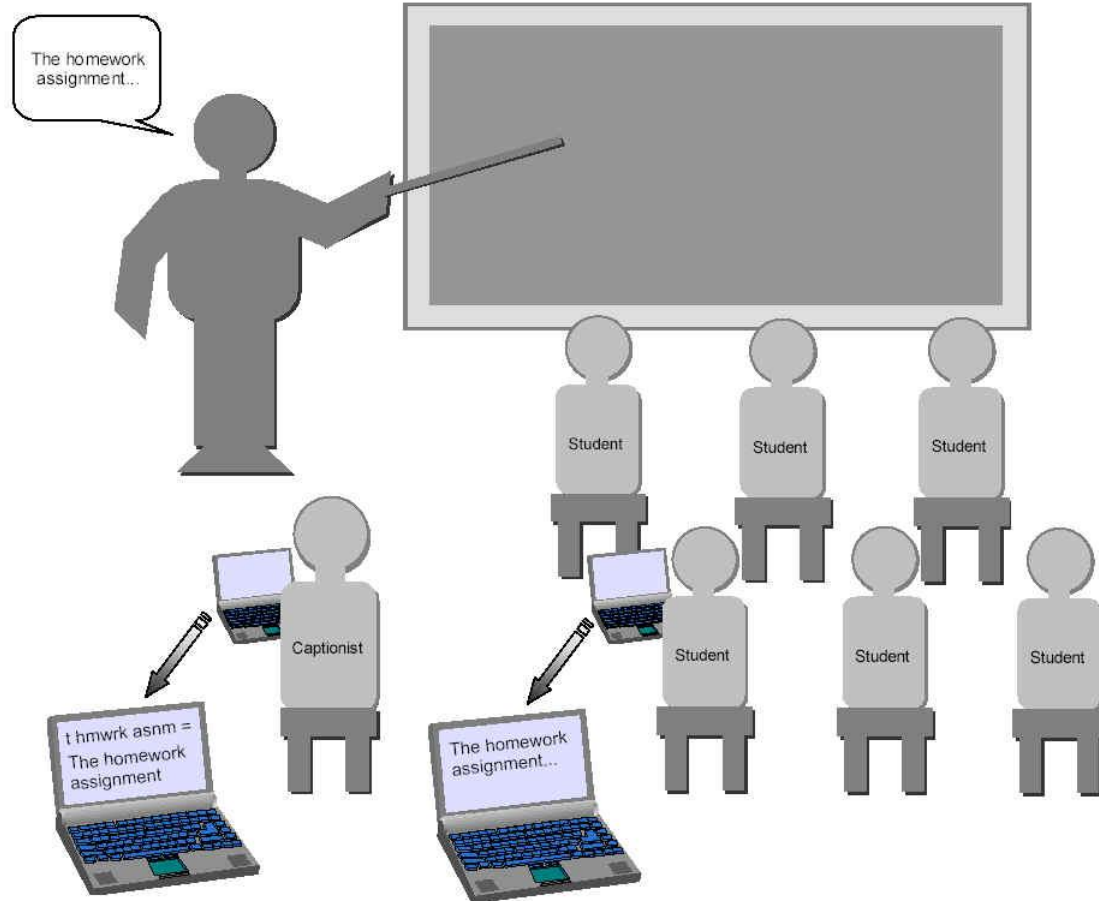
- Time limit due to intense typing

- High cost
- Limited availability
- Long training
- Specialized equipment

Both Keyboard-based and CART

- May be done remotely by phone and Internet
- Quality depends on skill of service provider
 - Accuracy level
 - Speed
 - Vocabulary in dictionary
 - Prior experience and knowledge

What is C-Print?





What is C-Print?

- 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



Verbatim and C-Print Samples

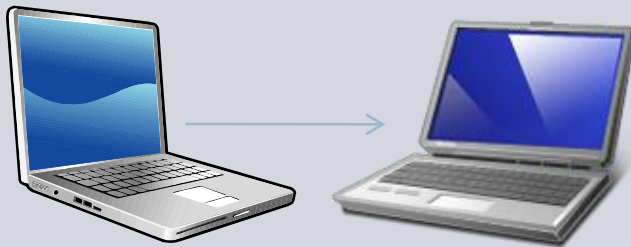
VERBATIM SAMPLE	C-PRINT SAMPLE (meaning-for-meaning)
<p>Well now, today class I want to talk about the topic, which is very interesting, of sexism in advertising - advertising that we see in magazines, on billboards, TV, and other places. Have you ever noticed, I'm sure you've noticed, you can't miss it, how women are exploited in the advertisements we see every day. In the manner of attractive, always attractive, beautiful women being used as props and adornments for men or products meant to appeal to men in advertisements.</p>	<p>Today I want to discuss the interesting topic of sexism in advertising. Have you noticed how women are exploited in advertising? Beautiful women are used as props and adornments for men or for products meant to appeal to men.</p>

The C-Print Abbreviation System

- Service provider types abbreviations and full words
- Computer software finds full words for abbreviations and displays them
 - e.g. Captionist types “kfe” which expands to “coffee”
- Phonetic rules and other brief forms
- Condensing

Display Options

Laptop → Laptop



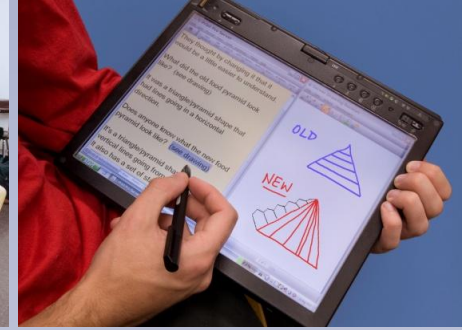
Laptop → Monitor/TV





The Technology

- C-Print Pro™ software
- Laptop computer
- Network connection



Demonstration



C-Print Pro Software

- Separate text displays
 - User (captionist or student) can adjust screen to individual needs
- Types of input
 - Abbreviation system, etc.
- Network capabilities
 - Connection over TCP/IP
 - Two-way communication
- Educational tools
 - Notes

Benefits of C-Print

- C-Print 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 C-Print - *Students*

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

- Deaf students or deaf/blind students
- 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)



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)
 - Training and prep/editing time



Recommended Skills (Captionist)

- Excellent listening skills
- Excellent English skills
- Technical ability, computer skills
- Typing speed of 60+ wpm
- Desire to learn

Captionist Training

- Online training program
- Mentoring/In-service strongly recommended
- Time required for training and skill development
 - Varies depending on individual
 - Estimated time for online and offline assignments \approx 60 hours



Implementation

- Determine if C-Print is appropriate
- Locate or train a C-Print captionist
- Purchase/setup equipment and software
- Provide orientation for the student, classroom teacher, parents, and other as appropriate
- Clarify roles and responsibilities
- Determine how the notes will be edited and distributed

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

Key Research Findings

- Research Techniques - Mixed Methods
 - Focus groups
 - Observations
 - Surveys
 - Individual interviews
 - Experiments
- Informants
 - Students
 - Classroom instructors
 - TODs
 - Service providers

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

Key Research Findings

- Study skills
 - Younger students (MS, HS) fewer strategies, less elaborate strategies (e.g., reading notes), use less often
 - Older students (College) more strategies, more sophisticated strategies (e.g., highlighting, flashcards, outlines), use more often
 - Teachers rarely teach notetaking & study skills!

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
 - Enjoy the personalization (e.g. fonts, colors)

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 (“coolness” factor)
 - Empowers students
 - Independent learning skills
 - Students as teachers--computer skills

Key Research Findings

- Benefits to Educators
 - Written record of class
 - Distribute to other students
 - Use to prepare lesson plans, tests, activities
 - Assess what students are learning
 - TODs have better understanding of what happened in class
 - Changes perceptions of students capabilities

New Directions

- Tablet PC
 - Real-time Notetaking
 - Captioning Plus Graphics
 - Trials in Middle School - Postsecondary Classrooms

The screenshot shows the C-Print Pro Server interface. The main window displays a document with the following text:

product being made:

We would read it as: ammonia which is a big ingredient in ammunition. The Germans used bat guano for the nitrogen and added hydrogen to make ammunition that made the war last 2 years longer.

LeChatelier's Principle.
 Increase N_2 we need to shift to make more of this stuff.
 ↑ Increase means stressing you out...Go away from it.
 ↓ Decrease is making a gap...Fill in or you will fall into a gap.

Increase NH_3 you will move away because it is stressing you.
 These are all concentrations.
 ↑ Increase amount of heat SL
 ↓ Decrease heat SR

The last thing is pressure.
 Surface area. Pressure won't affect solids. If I freeze water it will compact it.

Questions?
 Little trick. Teeter totter

Remember assignment 11 + 12 you do not need to do. Cross them off.

The right-hand window, titled "Server Drawing Booklet", shows handwritten notes on a grid background:

$$N_2 + 3H_2 \rightleftharpoons 2NH_3 + \text{heat}$$

1 mole N_2 3 moles H_2

↑ N_2 - Shift Right

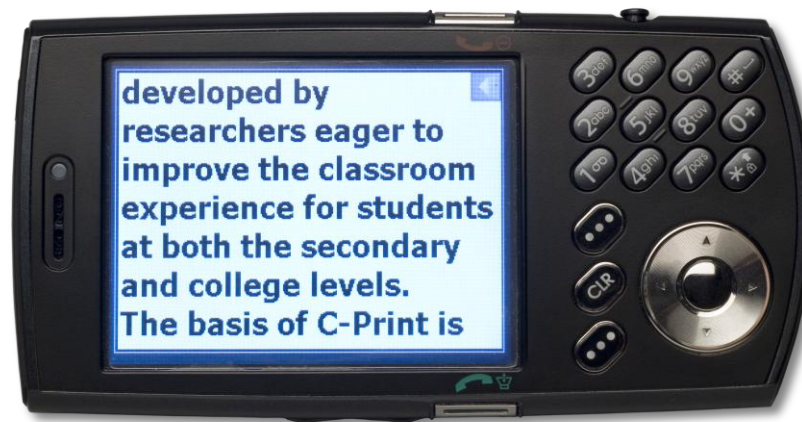
↓ N_2 - Shift Left

↑ NH_3 - SL

↓ NH_3 SR

New Directions

- Mobile Devices
 - Smart Phones
 - Small Tablet Devices
 - Trials in Postsecondary classes--Field Trips, Laboratory Classes





C-Print Research Contact Information

Email

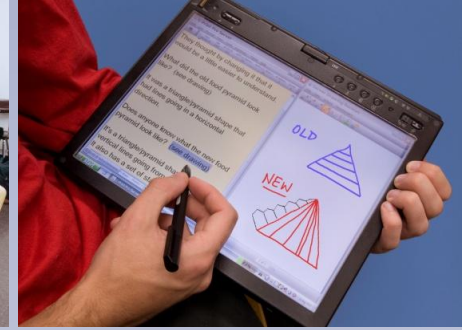
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Questions or
Comments?