Comparison of CART to Alternative Notetaking Methodologies
(Prepared by NCRA's CART Community, April 2004)

Introduction

More than 28 million Americans require some form of communication access assistance in order to function effectively in society. Thus, the critical need to ensure that these individuals have a complete understanding of all the available communication access services and how they may or may not benefit from them. The goal is to ensure that every person with hearing loss obtains the service they not only require, but also deserve.

Communication Access Realtime Translation (CART) stands out from nonverbatim notetaking methodologies, as only CART offers an immediate, verbatim voice-to-text translation of what is being said. Further, CART offers myriad benefits that no other communication access option can match.

Ultimately, the choice of methodology belongs to the consumer. While we can assert the benefits of using CART as opposed to alternatives, each individual must decide which option will best meet his or her needs for communication access. The key is to ensure that the consumer understands the advantages and disadvantages of each method, and thus can make an informed decision.

CART Basics

CART is a service provided by skilled realtime writers, many of whom have been trained to write at over 225 words per minute (wpm) at a rate of accuracy that generally exceeds 99 percent. Moreover, a CART provider has passed stringent educational requirements and undergone several years of college-level training. The service gives individuals who are deaf or hard-of-hearing complete and equal access to everyday events, such as a business meeting, religious service, town meeting, or a class.

A CART provider strives to provide a word-for-word translation of what was said at an event and incorporates environmental sounds, such as laughing. The transcript is available immediately via computer monitor or projection screen and allows the consumer to determine which parts of the discussion or conversation are important. At the conclusion of the event, the consumer in some instances can obtain a digital or hard-copy transcript for later review and use.

CART is an approved assistive device under the provisions of the Americans with Disabilities Act (ADA). However, there is more than one method of providing communication access to the deaf and hard-of-hearing community. This paper examines alternative nonverbatim notetaking methodologies, discussing both their strengths and weaknesses, and offers a review of CART, noting the environments in which it can be used and the variables to consider that will allow for full and effective communication access with CART.

What Constitutes CART?

Providing realtime translation services for deaf and hard-of-hearing people is a growth industry, and, not surprisingly, many people are looking to enter the field. Besides stenographic CART providers and captioners, some operators of nonverbatim notetaking methods such as C-Print and Typewell have started describing themselves as "CART providers," "captionists," and "captioners." The resulting confusion has caused a misperception of the services within the deaf and hard-of-hearing community and sometimes results in consumers not getting the services they need.

In order to better inform the consumer of the true distinguishing factors between CART and notetaking methodologies, the NCRA Board of Directors approved the following policy statement:

"NCRA believes that all individuals in need of communication access services should have the right to select what method will best meet their needs. Communication Access Realtime Translation or realtime captioning, as performed by a realtime reporter, offers the only current method for providing verbatim, immediate voice-to-text translation for those people requiring communication access. Some operators of nonverbatim notetaking methodologies have begun to describe their services as CART. This mischaracterization confuses the services offered and endangers the consumer's ability to receive the service not only requested, but required for full and effective communication access. Moreover, this flagrant misidentification of the services that an individual can legitimately provide is a clear violation of the trust of those individuals in need of communication access assistance. Therefore, NCRA believes that only those individuals who can provide a verbatim, immediate, voice-to-text translation can legitimately describe themselves as Communication Access Realtime Translation (CART) providers or realtime captioners."

Review of Nonverbatim Notetaking Methodologies

This section highlights several of the nonverbatim notetaking methodologies. Each method is distinct from CART in that none offer verbatim translation of what was said in a specific environment. The various systems all include their own equipment and software requirements. However, each provides one-on-one and potentially group communication access for deaf and hard-of-hearing individuals. (Note: The information that follows came from materials produced by vendors. Any claims made by these vendors have not been verified.)

C-Print. C-Print is a computer-aided speech-to-print transcription system that has been developed as a classroom support service for deaf and hard-of-hearing students in mainstream educational environments, though it may also be used in other settings such as community and business meetings.

A C-Print operator types a summary of the teacher's lecture and student's comments into a laptop computer. The information is simultaneously displayed on a second laptop computer or a television monitor for the deaf and hard-of-hearing students to read during the lecture. After class, the printed text is made available to the students for review purposes.

A laptop computer that has both word processing and abbreviation software is utilized. The C-Print operator receives training in text condensing strategies and an abbreviation system to reduce keystrokes. Supporters of this methodology claim that it will increase the capture speed from 60 wpm to 100 wpm.

Typewell. According to the TypeWell Web site, it is a transcription system that allows a deaf or hard-of-hearing individual to hire and train his or her own transcriber to provide communication access and notetaking services. It was originally developed as an improvement of C-Print.

A transcriber uses a notebook computer with abbreviation software to transcribe what is said in class lectures and discussions. The students read the transcription in real time from a second computer. Students can also type questions and comments to the transcriber during class, and even take their own notes on the reader computer.

TypeWell transcribers provide students with a summary of information in realtime about both class content and social interaction. The transcriber captures the meaning of what is said, as well as how it is expressed. Supporters of this methodology claim that it will increase the capture speed from 60 wpm to 100 wpm.

Viable Technologies. The company offers Viable Realtime Translation (VRT), which is a system that integrates technologies such as a phone line and a laptop computer to provide transcription in a classroom setting.

Using VRT, a classroom instructor or lecturer speaks normally into a lapel microphone. The microphone is connected to a telephone line that transmits the lecture to a remote transcription center. A transcriber at the center revoices what the instructor said, using speech recognition technology to create a transcription of the lecture. Then the student receives the stream of text via a notebook computer connected to the Internet.

The company states that this technology provides the full text of a lecture and faculty/student interaction and is retained on a Web site for later review. Edited transcripts are available within 24 hours via the Internet. The system also includes a text-to-speech feature that allows students to participate in question-and-answer sessions, as well as class discussion.

iCommunicator. The iCommunicator software program, developed by Interactive Solutions Inc., is described as a fully integrated system that consists of a high-end laptop computer, iCommunicator software, a wireless microphone system and peripherals, and underlying software programs. It runs on Windows XP, Windows 2000 and Windows 98SE. Speakers create a speech/voice profile and then transmit to the end user's computer, where the iCommunicator program converts speech to text, video sign language, and a computer-generated voice in realtime. It's also portable and can be used in multiple environments — educational, workplace, and public venues.

Dragon NaturallySpeaking Professional, the underlying speech recognition engine, offers many features to personalize a speaker's speech and voice recognition file and enhance translation accuracy. It has the ability to provide speech to text, speech to video sign language, speech to computer-generated voice, text to computer-generated voice, or video sign language technology.

The iCommunicator uses continuous recognition of natural speech to translate speech to text and/or sign language in real time. It is important that end users, speakers, and implementation managers of this method receive appropriate training in order to achieve positive outcomes when using the technology. The company reports that it is possible for most speakers to establish a speech/voice recognition profile with very high accuracy in less than one hour of training, though the rate of accuracy is not known.

Computer-Assisted Notetaking. As stated by the Technology Assessment Program at Gallaudet University, computer-assisted notetaking (CAN) is a

technique that can assist deaf and hard-of-hearing people participating in meetings and lectures. A note taker uses a computer with word processing software to type summary notes of a meeting or lecture. The notes can be displayed on a computer monitor or projected onto a screen or wall.

This service can also be provided remotely. Such an arrangement requires two telephone lines, one analog speakerphone, a regular modem, a 386 or faster computer with an available serial port, a VGA computer monitor and the proper software.

Notetaking. Notetaking is the most basic form of communication assistance in a classroom. Students who are deaf or hard-of-hearing, who have learning disabilities affecting auditory discrimination, or who have hand function limitations may request notetaking services. Note takers are generally volunteers who are taking the same class. A professional note taker may be hired to attend all the classes with the student and provide notes throughout the day.

Handwritten notes are usually not verbatim and can be subject to misspellings, miscommunication, and issues with readability. However, the use of a professional rather than a student note taker generally lessens the frequency of those mistakes.

According to the Board of Cooperative Educational Services in New York, professional note takers often have many requirements to fulfill, such as becoming familiar with the assigned client/student and related support service personnel, being present and punctual on a daily basis during each class period, even when the student is absent, and familiarizing oneself before class in the course of study to facilitate notetaking procedure. In addition, they must use judgment for the most appropriate format to be used, re-evaluate, and make corrections, deletions and/or additions to notes, when necessary, before distribution.

NetScribe. Voice IQ, a company that develops digital audio technology, introduced the NetScribe software as an "automated voice and transcription solution." The company's Web site describes the technology as a unique suite of software and services for the production and distribution of reports or deposition transcripts.

The suite is comprised of three tools, the NetScribe Capture Component (NCC), the Transcription Component (NTC), and the Workflow Component (NWC) that can be implemented anywhere there is a phone line and ISP. NetScribe is a Windows program that runs on standard

Win2000 with a mid-range Pentium computer. An individual must only learn how to work the software to be able to use NetScribe.

The Capture component allows for annotations and attachments, offline transcription, multiple audio takes, and a document merging process. The Transcription component allows the user to select from document templates, streamline audio, add comments, and perform transcription in real time.

The final Workflow component allows for automated time and software synchronization, e-mail delivery, secure file and data transfers as well as both realtime and delayed job submission.

Caption Mic. The Ultech Caption Microphone is portrayed as an alternative to using American Sign Language or steno-based realtime captioning. Ultech is owned by the National Captioning Institute Foundation and claims that its product enables a person to become a voice captioner with minimal training.

During an event, a voice captioner speaks the presenter's words into a microphone that is connected to the Caption Mic notebook PC. The Caption Mic software converts the voice captioner's speech into words that are sent to a caption encoder. The encoder displays the resulting text on a TV monitor or projector.

The Ultech Web site states that Caption Mic voice captioning eliminates the need for highly trained and specialized stenographers and interpreters.

CapTel. CapTel, made by Ultratec and short for captioned telephone, was developed as a telecommunication device alternative to TTY. According to the company’s Web site, CapTel looks like a phone and is used like a phone. CapTel is designed for users who can speak intelligibly, such as late-deafened people, cochlear implant users, and people who would normally use voice carry over (VCO) and two-line VCO.

CapTel phone users place a call in the same way as dialing a traditional phone. The user dials the number of the person they wish to call on the captioned telephone. The call is transparently connected to a service that provides the captioning. At the CapTel service center, an operator using a customized voice recognition software re-voices whatever is said by the other party.

The voice recognition system transcribes the operator's voice into text, which is bundled with the speaking party's actual voice and sent down the telephone line to the captioned telephone. When the captioned telephone receives this

combined information, the voice and text are split so that the voice goes to the earpiece of the phone and the captions go to the display screen.

When a consumer makes a CapTel call, both the user and the operator hear the person that was called. Since the consumer can hear the person's voice, he or she is able to get important cues about emotion and delivery such as laughter, speed of speech, etc.

Strengths and Weaknesses

All of the nonverbatim notetaking methodologies offer benefits to those individuals in need of communication access. However, the most important variable is to provide the best quality and most accurate service that the consumer desires and requires. In order to do so, the exact type of service needed and the environment in which the service will be provided have to be considered.

For example, for some individuals notetaking may be the desired solution. However, the individual needs to be cognizant of the fact that a note taker only captures the basics of what is being said. It is by no means verbatim, but rather a general picture of the discussion, lecture, etc. While it may have a place in some settings, it does not provide the type of access to an event that many deaf and hard-of-hearing consumers require.

A step up from handwritten notetaking is computer-assisted notetaking, which unlike basic notetaking can be performed remotely. Again, it can provide a helpful outline of an event, but is unable to supply verbatim translation since the note takers are not trained or capable of capturing conversational English, which is generally spoken at around 150 wpm.

While other, more enhanced notetaking methodologies, such as C-Print and Typewell, are marketed as “close to verbatim,” they clearly fail to meet the same word-for-word standards expected and demanded of CART, as they eliminate “nonmeaningful speech” and offer a less accurate summary of the events as the speed of the discussion increases. CART also provides all environmental cues of an event, such as witty banter between a student and professor in a university course, which is often critical to full understanding of what is going on in a particular setting. These cues allow the consumer complete access to everything that is happening as well as having an exact translation of what is being said.

The Benefits of CART

Nonverbatim notetaking methodologies are like CART in that they leave the possibility of human error, with the original information going through a conduit, be it typed or spoken, before production of a transcript. However, compared to C-Print or Typewell operators, who often have no more than a few weeks training before offering their services, a CART provider is a highly trained professional who has passed stringent educational requirements and undergone several years of college-level training. CART providers that have attained entry-level certification have proven their ability to capture at least 180 wpm at 96 percent accuracy while incorporating punctuation, the absence of which decreases comprehension. Moreover, NCRA offers several voluntary higher-level certifications with speed requirements ranging from 225 to as high as 260 wpm.

Because of the increasing demand for CART services, NCRA initiated a new certification specifically for CART providers, the Certified CART Provider (CCP). This certification offers consumers an important standard to consider when looking for qualified CART providers.

CART can be used in virtually any setting where communication access is required. Some examples include:

- Business, government and educational functions
- Classrooms
- Courtrooms
- Religious services
- Senior citizen meetings
- Conventions and conferences
- Doctor appointments
- Weddings, funerals and other personal events
- Civic events, such as town council meetings
- Cultural presentations, such as Broadway shows
- Recreation or entertainment events

Regardless of the environment, CART offers some distinct benefits to those making use of this service:

- **Equal access.** CART consumers receive the same information as anyone else and can interact fully in any setting.
- **Complete communication access.** CART provides a verbatim record of the class, meeting, conference, etc., capturing every word spoken as well as environmental sounds and punctuation, which increases reading comprehension.

- **Flexibility.** CART can be used in a variety of settings, whether one-on-one with a single consumer reading off of the CART provider's laptop computer screen, in a small group such as a business meeting with the text appearing on a television monitor, or even in a much larger setting like a convention with the CART provider's realtime text projected to a large screen for everyone in the room to read.
- **Independent learning/understanding.** With the provision of CART, the responsibility for the consumer's learning or understanding lies with the consumer. For example, rather than relying on notes provided by others, the consumer will have a verbatim record of the event from which to determine what is or is not important, based upon the consumer's understanding of the material presented.
- **Increased comprehension.** In the classroom setting, studies have shown that CART enhances the deaf or hard-of-hearing person's ability to comprehend the speaker. Moreover, CART improves a hearing person's verbal comprehension.
- **Full participation.** Because the CART provider combines a word-for-word translation with environmental sounds, such as laughing or a cell phone ringing, and descriptions of tone or inflection (excited, despairing, angry, etc.), the consumer has the opportunity to fully participate.
- **Choice of notetaking options.** The consumer can have the text file fed through display software as the CART provider realtimes the class, meeting, or event. The consumer can then use the highlight or annotate features of the software to pick out what he or she wants to retain. Thus, the consumer has the choice of obtaining the verbatim record of the event and/or only those portions that he or she deems important. In addition, the realtime text can be sent to a computer with appropriate software and hardware for output in refreshable Braille for a deaf-blind consumer.
- **Remote availability.** Through the use of telephone lines and Internet connections, there is no requirement for a CART provider to be in the same location as the consumer.

Though lower cost is often an argument used for employing nonverbatim notetaking methodologies, as the ADA points out, cost is not the dominant variable when requiring communication access service. Rather, the consumer's needs take precedence. In fact, the Department of Education Office of Civil Rights states, "An institution may not limit what it spends for auxiliary aids or services or refuse to provide auxiliary aids because it believes that other providers of these services exist, or condition its provision of auxiliary aids on availability of funds."

Based on this statement, it appears that funding is a less than acceptable excuse for failing to provide CART or other requested services. If CART is the desired

and most effective solution for an individual requiring communication access, then it should not be dismissed as an option based solely on cost.

Moreover, the saying "You get what you pay for" clearly applies. CART providers are highly educated and trained professionals. In addition to formal educational training, certified CART providers must also meet a continuing education requirement in order to maintain that certification. Furthermore, many CART providers have gone through sensitivity training to ensure full understanding of and good interaction with members of the deaf and hard-of-hearing community.

Conclusion

Clearly, each method of communication access offers distinct advantages and disadvantages. It is important to note that there is a clear distinction between CART and nonverbatim notetaking methodologies, as only CART offers an immediate, verbatim voice-to-text translation of what is being said in a particular environment.

Regardless of the service to be provided, the consumer should have the final choice, as he or she must determine based on the environment and personal need which method will best allow them to obtain full and effective communication access.