

SECTION II
Professional Development

Evaluating Speech-to-Text Communication Access Providers: A Quality Assurance Issue

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Abstract

A hard of hearing student blames his low grade on inadequate CART services. A free-lance stenographer raises her rates because she feels she isn't making what she's worth. How can you objectively evaluate these complaints? More and more, deaf students are receiving real-time speech-to-text communication access services in their classes. These services are provided by real-time stenographers, trained transcribers/captionists, speech recognition devices, and traditional typists. How can you know if the information presented is correct and adequately complete? This quality assurance question is the incentive for the development of an objective method to evaluate these service providers and provides the basis for this paper.

What is Communication Access?

Speech-to-text communication access serves several purposes. Primarily, it provides the content of information given in a class, the lecture information, and all relevant information that the student needs. It also provides social information, such as banter between students or between the professor and a student. Providing this information makes the student using this service as much a part of the goings-on of the classroom as the hearing

students. This access is provided in the class, as it is happening, usually via text presented on a computer screen. This makes it possible for the deaf or hard-of-hearing student to participate as fully as anyone else in the class.

There are several options for providing speech-to-text services in the classroom. The first is stenographic, the service that is provided in courtrooms by a trained court reporter using a steno machine. Outside of the courtroom, this is usually called CART (Communication Access Real-time Translation). This service can be provided live, via telephone, or via web. In the courtroom, the output is a transcript of the spoken word of what has transpired; in educational settings, the output is the spoken word and environmental sounds as they are happening viewable on a television or computer monitor.

There are two summary transcription services that prevalently are used in the United States: TypeWell and C-Print. They do not strive for a word-for-word translation of what the speaker is saying, but rather provide a meaning-for-meaning translation. It is much like a sign language interpreter in concept. The transcriber listens to the content of what the instructor is saying and gets the meaning down and doesn't worry about getting every single word. TypeWell and C-Print provide a similar service, but they operate quite differently. Please see their websites (www.typewell.com and <http://cprint.rit.edu/>) for more information.

The next method is speech recognition. Speech recognition still needs some improvement before it will be easily used in the classroom. For instance, punctuation is generally not included, and so the user must make sense of a screen of words that are strung together. In addition, homonyms (words that sound the same but are spelled differently and mean different things, e.g., pare, pair, pear) are problematic, which can be confusing to students. Nonetheless, it has come far enough and is showing enough promise that several research projects and programs are under development. Examples of these include the I-Communicator (<http://www.isi-icomunicator.com/index.php3>) and the Signtel Interpreter (<http://signtelinc.com/main.htm>) which use both automatic speech recognition and video clips of signs to provide written English and signed (in English) presentations of the spoken word; the voice-recognition program that is currently being tested for use in conjunction with C-Print by National Technical Institute for the Deaf researchers; and the Liberated

Learning Project (www.liberatedlearning.com). Note, with some of these programs each instructor trains the program to her voice (requiring a different file for each instructor); for others, such as C-Print, a service provider trains the program to her voice. She goes from class to class, and repeats what the teacher says, adding spoken punctuation, into a steno mask. Using the steno mask reduces extraneous noise coming into the microphone and muffles the service provider's voice so that others in the room can't hear. That information comes up on the computer screen for the student to read.

The final method is one many have used simply due to lack of a better method, and that is using a regular software program, typing as fast as possible. Of course this is not the preferred method, since the rate of most speech is so much greater than the rate of typing that most typists possess.

Understand there is a difference between communication access and regular notetaking. Notetaking provides students with a reminder of what was discussed in class. Communication access is visual information provided in real-time, giving students the opportunity to participate in class.

Why Provide a Speech-to-Text Accommodation?

There are a variety of reasons why a speech-to-text accommodation would be appropriate for a student. For example, the student who has a severe or profound hearing loss and does not know sign language might not be able to follow a lecture via amplification alone. The student may also have depended upon print accommodations in high school. If the student is accustomed to getting information in this way, it will be very difficult for him or her to switch to another system in an environment that is even more challenging.

As students progress through their educational programs, the need for print accommodations increases. Students who have successfully used assistive listening devices in the past begin to request speech-to-text accommodations as more is expected of them academically and professionally. In programs that are competitive, it is important for students to be aware of the nuances in communication so that they are on an equal footing in competing with other students.

Be cautious about using level of hearing loss as the standard for when to provide a speech-to-text accommodation. The student may have less than a severe to profound hearing loss and still need speech-to-text support. For example, the instructor might have an accent or facial hair that makes accurate speechreading impossible; poor room acoustics or excessive background noise (e.g., noisy air conditioning and heating systems) may present conditions that cannot be overcome by assistive listening devices; or the student might not be able to get enough information using speechreading and residual hearing to understand what is being said. Finally, be aware that whenever a class is set up in a

group discussion format, a student who has a hearing loss will probably not be able to follow it and will need speech-to-text support in order to understand and to participate.

Rationale for Formal Evaluation

A quote from the Internet site of a well-known court reporter states, "all in all, hiring captioners is no different than hiring any other professional on contract. Check them out beforehand, pay them what they're worth, and all will work out well." This philosophy is well intentioned, but offers little to no guidance to the person who is hiring the speech-to-text provider. The hiring personnel may have no experience in this area and no idea what they should be "checking out" in terms of a competitive rate, expectations of the service provider or what skills are required for the job. As an example, some programs use and recommend that students in court reporting programs, or those who have purchased the equipment but never finished the training, should be used for classroom speech-to-text services. They argue that it saves money and gives the steno students much needed practice. However, the rate of speech, lecture format, and vocabulary-dense environment mean that the court reporting student working at a slower rate and with a smaller steno dictionary will more than likely not be able to keep up with the information flow in the classroom. Is this communication access?

Especially in college classrooms, the person who hired the communication access provider is not there to ensure that the service is being adequately provided. The deaf or hard of hearing consumer is not aware, necessarily, whether or not s/he is getting the entirety of the message.

In many ways, the situation with speech-to-text providers is comparable to interpreter certification, testing and quality assurance. Through many years of practical experience, the interpreting profession has learned that the theory of "things will work out well" is certainly not the case. Several tools of measurement have been put in place to ensure to the interpreter, employer and most importantly, the deaf or hard of hearing consumer that the person providing the service has the necessary skills to do so.

Certification for interpreters can be obtained from several entities. The National Association of the Deaf (NAD) rates interpreters on a scale from one to five. Levels one and two are *not* certification levels, but novice levels. Level three is a Generalist, four is an Advanced, and five is a Master level. The Registry of Interpreters for the Deaf (RID) carries a Certificate of Interpretation, a Certificate of Transliteration as well as specialized certifications in areas such as legal interpreting. There are also state certifications such as the Quality Assurance Screening Test (QAST) that provide skill ratings on a one through five level system (with five be-

ing the strongest and one being an entry or beginner level). The state of Texas, for example, has one such in-state certification for their interpreters in addition to national certifications. For employers who have little or no experience in interpreting, these levels provide guidelines for matching service providers with assignments that are commiserate with their skill level.

The interpreting profession has also realized that language skills were not the only criteria necessary for a good interpreter and, with this in mind, a code of ethics was developed. This provides some boundaries to interpreters in terms of professional recognition, message equivalency and appropriate decision-making. A code of ethics helps to guide and protect interpreters, consumers and employers.

As stated earlier, a code of ethics is a mainstay of the interpreting profession. NAD and RID both have a similar code of ethics and certified interpreters must prove their knowledge of the RID Code of Ethics in order to get their certification. The Code of Ethics tenets cover confidentiality, faithful rendering of message, not interjecting or biasing the person with personal opinions, accepting assignments that are commiserate to their skill level, requesting payment in a professional and judicious manner, working to further their knowledge and skills as well as membership or certification to RID/NAD and the compliance to the Code of Ethics. In the case of interpreters a serious breach of it can lead to the revocation of certification.

Another benefit of the certification process is maintenance of the certification. Once an interpreter has achieved certification, the interpreter must also provide proof of continuing education. By maintaining certification, the interpreter lets consumers and employers know that they have met or exceeded a minimally acceptable level of continuing education.

Even with the certification process in place, an ongoing struggle for interpreters has been the recognition and designation by policy makers of interpreting as a profession requiring specific skills. Even though many certifications are available, employers may not be aware of them and may hire someone who calls himself an interpreter but who has not had training and is not certified. Some of these people are skilled communicators, but many are not. The employer believes he has fulfilled his obligation by hiring an interpreter, when, in fact, the service provided is substandard. Several states are researching and establishing licensure laws, requiring that state and federal agencies hire only interpreters with the specified accreditation.

Current Evaluations and Certifications

To protect consumers, employers, and service providers, clearly certification and evaluation of speech-to-text services is appropriate. What can be learned from the efforts in the interpreting field to evaluate the quality

of transcribers and captionists?

One option is a formal certification. The National Court Reporter's Association (NCRA) has in place a well-developed system for evaluating legal court stenographers. Like RID and NAD, it references the message, what was actually said, and the accuracy of what the stenographer transcribed.

The basic certification level is Registered Professional Reporter (RPR). At this level a stenographer must capture speech in three legal settings at a minimum level of 95 percent verbatim accuracy at speeds of 180 to 225 words per minute. The three types of legal settings are evidentiary Q & A, jury instructions, and literary discourse (e.g., lawyers giving information and background information).

Even though it is the minimal skill level, passing the RPR test is very, very tough. The NCRA certification has five different levels, and each one presents progressively faster speech and has other technical skills the person has to demonstrate. About half of the people who go to court stenography school do not complete the program and do not achieve this minimal level of certification. It is certainly not always the case, then, that the stenographer working in a classroom is certified, or taking down information at a verbatim level. There are many very good CART providers and certified CART providers out there, but many sites don't realize until after students complain that they're not getting a verbatim transcriber who can take speech at fast rates.

The second method of evaluation can be referred to as the "look-see" method; i.e., a supervisor looks over the notes or sits in the class and reads the text to see if it makes sense and watches for glaring errors. It is very, very tough to truly evaluate the accuracy and completeness of a person's work with this look-see method. This process is extremely time-consuming for most supervisors, and they (and the service providers) need something more objective.

Alternatively (or in addition to the supervisory review) students are given questionnaires to fill out about the perceived quality of the service. Again, the deaf consumer may not be able to tell if information is missing. Getting an evaluation from the consumer is useful, but it should not be the only evaluation of the quality of the speech-to-text transcriber.

The third method was developed as part of the TypeWell Quality Assurance system. After working with captionists and transcribers in classrooms for several years, many people began to realize that there was a great difference among them in their ability to do the job, but there were very few ways to document that. Concern about the quality of that information made it clear an objective evaluation method was needed.

The system that was developed for TypeWell grew out of consultation with Rich Mayor, a qualitative re-

searcher, individuals in the San Diego city schools; Gary Sanderson at the National Center on Deafness, and other concerned individuals. The resulting system is not specific to TypeWell; it can be used to evaluate any speech-to-text service.

Evaluation Development

How does someone evaluate the quality of a service that is not verbatim? Deal with the message, the meaning-for-meaning aspect of it rather than the word-for-word aspect. The evaluation process began with tapes of a variety of high school and college lectures on different topics. Verbatim transcripts were produced for each one. The team evaluated the transcripts in terms of "idea units" a concept from the field of qualitative or narrative research. An Idea Unit is "any phrase or sentence with an active or state verb in it. Idea units can be major, minor and repeated points. Here are some examples of Idea Units – the verbs are highlighted:

Scientists **know** feathers **evolved** from scales, from the scales of reptiles. They **think** that the reason they **evolved** was, **was** for insulation. To **keep** these warm blooded type of animals warm.

Keep their heat inside, like a blanket **insulates** a person's body heat.

Two judges code each verbatim transcript. There are now a number of people now trained to do this. They work on a transcript until the inter-judge reliability reaches at least 87%.

Next, major, minor and repeated points were identified. The person who gave the lecture reviews the verbatim transcript and identifies which points are major, minor, or repetition. Major points are those that are necessary to the understanding of the topic or the flow of ideas; or those that might be on the test. A minor point is defined as information that supports main ideas, but is not absolutely required for understanding of the topic. Repetition is defined as information that is restated after the point has already been made or before major point has been fully elaborated.

The following are examples of major, minor and repeated ideas (major points are bolded; minor points are underlined, and the part s without formatting indicate repetition):

Scientists **know** feathers **evolved** from scales, from the scales of reptiles. They **think** that the reason they **evolved** was, **was** for insulation.

To keep these warm blooded type of animals warm.

Keep their heat inside, like a blanket insulates a person's body heat.

Besides the lecturer, a second professor of the same

level and the same department also codes the transcript. It is more difficult to obtain agreement among professors about what phrases are major, minor or repeated. Inter-rater reliabilities range from 80-95% for this part of the coding.

Initial Evaluation Results

Over the last two and a half years, there have been three phases of this evaluation development. The level 1 certification testing has been given to 26 people who had between five and eight months experience in the classroom (19 used TypeWell, 4 used C-Print, and 2 used CART; 11 worked in secondary settings, 15 worked in postsecondary settings). Findings show that after five to eight months in the classroom, most service providers were capturing between 80 – 85% of the information, with a range of 58 - 98%. Contrary to everyone's expectation, the person obtaining 98% was *not* a CART provider.

Some Interesting Trends

There was a real connection between quality of what the transcribers captured and a base typing speed. People who had a base typing speed below 55 words per minute could not capture as much information. Related to that, for both C-Print and TypeWell, the number of abbreviations that the individual transcriber or captionist used was related to how much information was captured. The abbreviations in both systems were developed help the person keep up with the speed of speech. The more the transcriber or captionist takes advantage of this, the better they are able to keep up with the speech.

Lag time is very important for a transcriber, just as it is for an interpreter. A transcriber or a captionist who begins to type immediately, tends to make more errors and capture less information. That's a very important observation for trainers to consider.

Finally, as far as characterizing speakers is concerned, the rate of speech (i.e., words spoken per minute) may not be as salient to the service provider as the density of information they provide. That is, the rate of occurrence of those major and minor points in a lecture is much more important to the service provider than words per minute.

Future Directions

To tie this back to the earlier discussion of the field of interpreting, our dream is to have an evaluation system for speech-to-text service providers based on nationally recognized standards. The certification process would include the verification that the individual passed a pre-specified level on a skills test, and would include requirements to adhere to a code of ethics and proof of continuing education toward skill development for recertification. A national organization would be able to provide in-service or ongoing continuing education

where attendees could obtain CEUs. PEPNet would be an ideal organization to consider the establishment of such a national standards organization.

Resources

Several resources are available with information about speech-to-text accommodations as well as other accommodations for individuals who are deaf or hard of hearing. These materials will be useful to service providers, instructors, and consumers alike.

The C-Print (<http://cprint.rit.edu>) and TypeWell (www.typewell.com) websites provide information about the programs, training schedules, and skill requirements for training, as well as information for administrators, parents, and students on the service.

CARTWheel (www.cartwheel.cc) is a website for court reporters using CART techniques in educational settings. This is a very specialized field and it is encouraging to see that there is an organization of CART reporters who are working together and sharing information. The National Court Reporters Association (www.ncraonline.org/pd/index.html) is the larger national organization.

The Postsecondary Education Programs Network (PEPNet www.pepnet.org) and the PEPNet Resource Center (<http://prc.csun.edu>) have many free, downloadable materials about providing accommodations to individuals who are hard of hearing or deaf developed by the various outreach sites that serve the country. For example, the two-page teacher tip sheets developed by NETAC (Northeast Technical Assistance Center) are overviews of more than 40 topics related to providing services to students with hearing loss. For more in-depth information, NETAC has also produced several papers from the National Taskforce on Providing Quality Services to Postsecondary Students who are Deaf or Hard-of-Hearing, including one on speech-to-text services. The WROCC (Western Region Outreach Center & Consortia) Outreach Site at Western Oregon University (www.wou.edu/wrocc) has posted several training modules on various accommodations, including assistive listening devices, alerting devices, and job accommodations. The Postsecondary Education Consortium's (PEC) Arkansas SOTAC website (www.ualr.edu/~sotac) links to their university's disability services manual, very useful when looking for policies around providing services, a code of ethics for service providers, as well as information to provide to students and instructors.

It is vital that service providers begin to move on developing an evaluation for speech-to-text service providers, no matter what the medium used. The field has

long struggled with simply finding individuals to fill the position when requests for the service were made. Now that a critical mass of service providers is available, the time has come to implement a system that can guarantee that quality services are provided.