Reports

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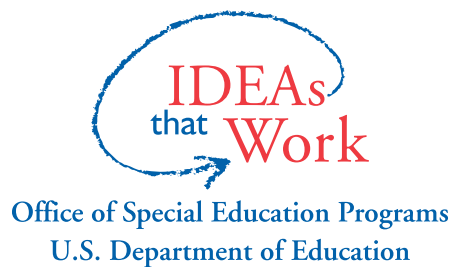### National Deaf Center
on Postsecondary Outcomes

Summary

This booklet is a collection of Pepnet 2 reports on services and accessibility in postsecondary education.

INTERPRETING FOR POSTSECONDARY DEAF STUDENTS

Gary Sanderson, Linda Siple, and Bea Lyons[1]

This report consists of four parts, all of which pertain to interpreting for deaf students in the post-secondary educational environment.

Part I. Introduction sketches interpreting services for students who are deaf[2] in postsecondary educational settings. The origins and importance of interpreting services are discussed, followed by reference to several "types" of interpreting that are used to accommodate various communication needs across a spectrum of students, their peers, and faculty/staff.

Part II. Administering interpreting services is written primarily for college and university personnel who are responsible for coordinating interpreting services. It focuses on practical considerations in hiring an interpreter and using the interpreter effectively, addressing questions such as:

• What do you look for in an interpreter?
• How do you recruit and keep an interpreter?
• How do you schedule the interpreter's workload?
• What about interpreting outside the classroom?
• Is there a need for special policies and agreements?

Part III. To the instructor focuses on the effective use of an interpreter in the classroom and addresses the instructor. Many of the suggestions also apply to communicating with deaf students outside the classroom with an interpreter's assistance. Part III deals with questions such as:

• What is the interpreter expected to do in the classroom?
• Do the deaf student's hearing classmates need to know and do anything special?
• What should the instructor be aware of in using an interpreter?
• What should the instructor do differently?

The actual users of interpreting services, particularly teaching faculty, may wish to proceed directly to Part III, returning to Part II for background information if they wish.

Part IV. Postscript pertaining to laws and regulations provides us with a legal perspective on the utilization of interpreting services at the postsecondary level.

PART I. INTRODUCTION

Origins of interpreting in college. Prior to the 1960's, interpreting for deaf students in regular college environments was unknown, explaining in part why so few students who were deaf attended college. Those who qualified could attend Gallaudet University in Washington, D.C., which at the time was the only college in which instructors were proficient in sign language, or they could attend a "regular" college with virtually no prospect of interpreting services. Often the quality of the education received by deaf students who chose the second option was based on their ability to lipread their instructors, the charity of their peers to share notes, and their own level of tenacity.

Until the 1960's, almost all interpreting for deaf people was offered on a voluntary basis by hearing individuals who were related to, or worked with deaf people, such as family members, teachers of deaf students, or members of the clergy. In 1964, with the establishment of the national Registry of Interpreters for the Deaf, Inc. (RID) , interpreting began to emerge as a profession, with its national certifying body, its Code of Ethics, and its own conventions and periodicals. Augmented by the development of college-based interpreter education programs nationally, interpreting came into its own, and began to provide a professional pool for potential college employment.

Without the availability of well-qualified interpreters, the dramatic increase in numbers of deaf students in regular colleges could not have occurred. Today, more than 20,000 deaf and severely hard of hearing students attend approximately 2,000 two and four-colleges and universities in the United States (Lewis, Farris & Greene, 1994[3]; Stuckless, Ashmore,

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[2] Many severely hard of hearing students also seek and benefit from interpreting services.

[3] Lewis, L., Farris, E., & Greene, B. National Center for Educational Statistics. (1994). Deaf and hard of hearing students in postsecondary education. (NCES 94-394). Washington, D.C.: U.S. Government Printing Office.

Schroedel & Simon, 1997)[4]. Most of the estimated 10,000 deaf students, and many who are severely hard of hearing, use an interpreter in their classes, in selected campus activities, or both.

In 1973, the passage of the Vocational Rehabilitation Act, Section 504, provided additional impetus for the national mainstreaming of deaf students in postsecondary institutions. This law stated that:

> *No otherwise qualified handicapped individual in the United States — shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program of activity receiving federal financial assistance.*
>
> United States Congress
> Section 504, The Rehabilitation Act of 1973
> P.L. 93-11

The regulations enacted pursuant to this cite several auxiliary aids that can ensure program accessibility for students who are disabled. For deaf college students, interpreters provide the critical service of making lectures and other orally-delivered materials accessible.

The first report in this series, *Introduction* (Stuckless, Ashmore, Schroedel & Simon, 1997), includes a closing section titled "ADA and other laws" that discusses the 1990 Americans with Disabilities Act, Section 504, and other federal statutes, and makes reference to interpreting. Also, this report closes with an interpretation of law as it relates to interpreting for deaf students at the postsecondary level.

Interpreting as a critical service. The role of the interpreter within the postsecondary setting is to facilitate communication between deaf and hearing individuals throughout the educational environment, both academic and extracurricular. This link plays a major role in the success of most college students who are deaf. Its significance is eloquently expressed in the following letter written by one deaf student upon graduation.

> *I owe a great deal to my many wonderful professors in Social Work. They have taught me so much and have given me a path to follow the rest of my life. However, I owe my greatest debt to the countless numbers of interpreters who sat in my classroom and allowed me to learn Social*

> *Welfare History, Methods of Social Work, and even Statistics. It was through their hands that I learned my most important lessons and it was through their voices that I expressed my ideas and questions. My interpreters have provided the link for me to connect to my education. I do not believe that I could have finished my degree without them. I will forever be indebted.*

COMMUNICATION STYLES

Deaf students bring a variety of communication backgrounds and experiences to the college setting. Most have first and second languages, such as English/ASL, ASL/English, or even first, second, and third languages if a third language is spoken in the home, such as Spanish (Stuckless et al, 1997). A small number of deaf students are also severely visually impaired, often depending on tactile communication.

For face-to-face communication, some deaf students, and most students who are hard of hearing, rely mainly on their spoken English for expressive communication and on speechreading (including sound) for reception (Warick, Clark, Dancer, & Sinclair, 1997).[5] Though fewer in number, some prefer the use of what is called Cued Speech.

TYPES OF INTERPRETERS

Sign language interpreter. The most common type of interpreter is one who works between English and sign language. The interpreter listens to the spoken English message of the instructor and other students, and then signs the message to the deaf student.

There are two common forms of interpreting practiced at the postsecondary level: transliterating and interpreting. Transliterators listen to the spoken message and sign it in a way that closely approximates English. The second type are interpreters who listen to spoken English, then interpret it into American Sign Language (ASL) which has its own grammar and syntax.

[4] Stuckless, R., Ashmore, D., Schroedel, J., & Simon, J. (1997). *Introduction*. A report of the National Task Force on Quality of Services in the Postsecondary Education of Deaf and Hard of Hearing Students. Rochester, N.Y.: Northeast Technical Assistance Center, Rochester Institute of Technology.

[5] Warick, R., Clark, C., Dancer, J., & Sinclair, S. (1997). *Assistive Listening Devices*. A report of the National Task Force on Quality of Services in the Postsecondary Education of Deaf and Hard of Hearing Students. Rochester, N.Y.: Northeast Technical Assistance Center, Rochester Institute of Technology.

However, there is a second dimension to the interpreter's task. Many deaf students do not have speech that is intelligible to most listeners; others may have somewhat intelligible speech but feel uncomfortable using it publicly. Instead, they may choose to express themselves using sign language, while relying on the interpreter to translate the signed message into spoken English. Interpreters are trained to voice interpret for these students, and to do so as accurately as possible.

Oral interpreter. Not all deaf or severely hard of hearing students can and/or choose to use sign language interpreters in the classroom. Some favor speechreading and/or the use of assistive listening devices (Warick et al., 1997). Oral interpreters are used primarily by deaf and severely hard of hearing students who rely mostly on their own speech and speechreading skills, supported in most instances by personal hearing aids, or, increasingly, by cochlear implants. The student reads the lips of the interpreter who has been specially trained to articulate speech silently and clearly.

An oral interpreter is particularly important in situations where the oral student cannot speechread his/her instructor. This can be for a number of reasons, including the instructor's speaking rate or accent, and in situations where there is considerable student participation. Parenthetically, it should be noted that deaf students often cannot follow the rapid changes in speakers that occur in many classes, because they are not aware of where to look for the speaker.

Cued Speech interpreter. The Cued Speech interpreter resembles the oral interpreter except that he/she uses a hand code, or cue, to represent each speech sound. Some deaf students begin to use this system within their families at an early age and become very proficient in its use for communication.

Interpreter for deaf-blind individuals. This interpreter, usually referred to as a deaf-blind interpreter, assists those who have both limited or no hearing and limited or no sight. There are several deaf-blind interpreting techniques, but most frequently the deaf-blind individual receives the message by placing his/her hands on top of the interpreter's hands and following the interpreter's hand movements.

PART II. ADMINISTERING INTERPRETING SERVICES

Obviously the administration of interpreting services for a single deaf student on campus (who may or may not wish the service) will differ from its administration on a campus where a large number of deaf students use the service. In the first situation, the college is likely to need just one full-time equivalent (FTE) interpreter, or perhaps less. At the other end, a college with a large number of deaf students enrolled in regular classes may have 50 interpreters or more.

Let's talk some more about interpreting services in these two colleges. The college with the single deaf student probably contracts with one or two interpreters on a short-term hourly basis. On the other hand, the college with the large number of deaf students probably hires at least a core of its interpreters on a more permanent basis.

The interpreter in the first college probably covers all the classes taken by the deaf student, regardless of their content. In the second college, where possible, interpreters are assigned to classes where they have familiarity with the course content.

The staff person responsible for recruiting and perhaps scheduling the interpreter in the first college is unlikely to be familiar with the process and may look off-campus for help. The second college will have its own resources for both these functions and for supervision of the interpreting staff.

Most of what is said here about administering interpreting services is probably commonplace knowledge and practice within colleges with histories of providing interpreting services to large numbers of deaf students. The focus here is on offering basic suggestions to those colleges with limited experience in providing interpreting services for deaf students.

QUALIFICATIONS OF INTERPRETERS

Hiring a sign language interpreter can be a daunting task for a college administrator who has little or no knowledge about sign language or interpreting. Fortunately, most interpreters have interpreting credentials of some kind. The following information is an overview of the types of education and certification interpreters may have, followed by a discussion of other qualifications that may pertain.

Qualifications to consider include graduation from an interpreter preparation program. Most, if not all, of these programs are associate or baccalaureate degree programs. Sixty-eight (68) of these are listed by state in Appendix A.[6]

Interpreters may also hold national certification from either the Registry of Interpreters for the Deaf, Inc. (RID) or the National Association of the Deaf (NAD). Other qualifications include credit for life experience, such as growing up with sign language as a first language, combined with substantial real-world interpreting experience and training. Some states provide quality assurance screening assessments that may be considered when no nationally-certified interpreters are available.

Certification. On the national level, certification of sign language and oral interpreters is conducted by two organizations: RID and NAD. Each certification is an indication that the interpreter has been assessed by professional peers according to a nationally-recognized standard of competence. A valid certificate documents that the interpreter has met or exceeded this national standard, has met all requirements for membership in the organization, and adheres to a Code of Ethics governing ethical and professional behavior.

It is suggested that people responsible for hiring interpreters, and who use certification as the main criterion for determining qualification, hire interpreters who hold a certificate shown in parentheses from the following lists.

RID currently awards the following interpreting certificates:
  CI   (Certificate of Interpretation)
  CT   (Certificate of Transliteration)
  CDI   (Certified Deaf Interpreter)
  OIC   (Oral Interpreting Certificate)
  SC:L (Specialist Certificate: Legal)

The NAD awards the following certificates that indicate proficiency levels:
  Proficiency Level 1 (novice)
  Proficiency Level 2 (intermediate)
  Proficiency Level 3 (generalist)
  Proficiency Level 4 (advanced)
  Proficiency Level 5 (master)

State screening or quality assurance programs. State quality assurance screening is available in many states across the country. These screening processes vary greatly from one state to another and are not approved by RID or NAD. State assessments serve as a stepping stone for the working interpreter who may not be ready for the RID or NAD certificates, but who wants verification of some beginning level of interpreting skill.

Additionally, many states are beginning to implement legislation requiring some type of licensure of interpreters. It is strongly recommended that a college considering hiring interpreters with this type of licensure contact its State Department of Education or local RID or NAD chapters to inquire about the requirements in its particular state.

Graduates of interpreter preparation programs. Interpreter preparation programs typically involve two or four years of undergraduate study, leading to associate or baccalaureate degrees. The curriculum at the two-year level typically includes ASL studies, knowledge of Deaf culture[7] and deaf communities, skills for interpreting, transliterating, voicing, knowledge of the RID Code of Ethics, and practicum experiences. Typically, the curriculum also includes liberal arts, math, and science components. A list of 68 programs appears in Appendix A.

Baccalaureate degree-level programs are likely to include a larger liberal arts component, intensive ASL study, interpreter skills development, knowledge of the RID Code of Ethics, and considerable and varied practicum experiences over the student's four years of preparation. As of 1998, there were 17 baccalaureate programs in the United States. Graduate study in this field is new, with only one university presently offering a master's degree-level program.

It should be noted here that graduates of interpreter preparation programs have varying degrees of skill level, and the possession of a degree in interpreting does not guarantee the ability to interpret effectively at the postsecondary level. Further assessment of skills remains necessary.

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[6] This list of interpreter training programs is taken from the *American Annals of the Deaf, Reference Issue* (1998), *143*, 172-176, with the permission of its managing editor.

[7] The capitalization of "Deaf" generally denotes deaf individuals who consider ASL to be their primary language and who identify with Deaf culture.

Non-traditional interpreters. Credit for life experience and extensive informal interpreting may constitute another type of qualification. Interpreters who grow up with deaf parents, siblings, or other family members, often develop ASL skills naturally and serve as interpreters beginning at a young age. They develop valuable interpreting skills through an informal process of learning to sign and communicate for one or more family members.

Other interpreters have developed interpreting skills through association with members of the Deaf community and serving as interpreters in church worship services or other informal settings over a period of time. The number of years and the quality of performance of informal interpreting experience should be an integral part of the qualifications considered. Having participated in college-level experiences as a student are an asset and, arguably, a prerequisite for interpreting college-level courses.

These interpreters probably have little "formal" education in interpretation, but may have many hours of workshops and seminars. As with interpreter preparation program graduates, this group does require an additional level of evaluation prior to hiring.

CHOOSING INTERPRETERS

So, how does a college choose an interpreter? On the surface it would seem that the easiest way is to hire only nationally or state-certified interpreters. The problem with this is that most certified interpreters live in metropolitan areas. This problem is compounded by the fact that there are too few certified interpreters to begin with.

Many institutions have implemented their own in-house assessment to assist them in hiring interpreters, particularly when there is an interpreter shortage. This can consist of either a "live interpreting" demonstration or a videotaped assessment. These assessments use special assessment teams, usually composed of working interpreters from the geographic area. Assessments of this kind vary in quality and scope from college to college. Other institutions rely on a local referral agency to help them locate qualified interpreters. Referral agencies for sign language interpreters are generally listed among foreign languages in the telephone yellow pages under "Translators and interpreters."

Colleges with considerable numbers of deaf students are more likely to rely on their interpreter coordinator or their deaf services specialist for advice. In any event, it is paramount that interpreters be screened and hired on the basis of the level and kind of interpreting services needed by deaf students at the postsecondary level.

SCHEDULING INTERPRETERS

Number of interpreting hours. When scheduling interpreters, several considerations should be taken into account. The first of these pertains to the number of hours of interpreting an interpreter can physically handle (See "Working Conditions" for more discussion about potential physical injury, i.e., Repetitive Motion Injuries [RMI]). As a preventative measure, many institutions schedule two interpreters for any class that extends over one hour of continuous lecturing.

Understanding of the subject. Under the Americans with Disabilities Act (ADA), institutions are required to provide effective communication for deaf students in the college classroom. Interpreters can be much more effective when they're placed in classes in which they have a basic understanding of the subject. Interpreters will also need access to course materials such as the textbook, handouts, and/or media resources.

When feasible, and prior to scheduling interpreters, it is recommended that the interpreters be asked to provide a list of preferred types of courses for interpreting. In colleges that employ a considerable number of interpreters, a team of interpreters can be developed to concentrate their work in specialized areas, such as in the arts, sciences, or humanities. Colleges that have few deaf students and perhaps only one or two interpreters are unlikely to have this flexibility.

Early collection of students' class schedules. A specific office should be responsible for assuring that deaf students requesting interpreters have an interpreter available to them on the first day of classes. To ensure this, deaf students must provide their class schedules sufficiently in advance to enable the person(s) responsible for scheduling interpreters to make the necessary arrangements, including the time needed to locate off-campus sources of interpreting services if necessary. This is especially

important in rural and other non-metropolitan areas since an intensive search may be required to locate a qualified interpreter.

Student access to priority registration. Deaf students should be counseled to understand the importance of planning ahead. Those seeking services should be responsible for planning their next term's courses at least three months prior to the start of that term. To do this, they must have access to priority (early) registration. It is suggested that the office responsible for coordinating deaf students' schedules meet with the department responsible for course registration to stress the fact and the reasons.[8]

Parenthetically, if a college utilizes interpreters who are also students in that college, priority registration can also be used as a recruiting tool for interpreters. However, it is not advisable for interpreters to take and interpret a course simultaneously.

A college with a small number of deaf students may find it necessary to use interpreters from interpreter referral agencies in the community. To conserve resources, a college can encourage deaf students to take their classes back-to-back whenever possible (especially freshmen and sophomores). This can avoid a "two hour minimum" charge for a single hour of interpreting service as often stipulated by referral agencies. But again, this requires that the student's classroom interpreting needs for each term be known well in advance.

Other scheduling concerns. Lab classes may give the appearance of being too easy for interpreters; outwardly they may not seem to warrant interpreters since students work alone much of the time. However, they do serve a twofold purpose. One, if the deaf student has an interpreter, he/she can participate fully. Two, it can give the interpreter a break during the day, and for this reason can be a very effective tool for the prevention of RMI. Needless to say, two interpreters are not required in this case.

A second general concern is that lecture or seminar classes are often fast-paced and require stamina from the interpreter. Where possible, these fast-paced courses should be preceded or followed by a "lighter duty" class.

Third, relatively few interpreters are specialists in a specific content area. Depending on their familiarity

with a course and experience in interpreting for the instructor, they may require "prep" time in order to be able to interpret effectively. Interpreters often have to research a topic to determine the best way to translate its concepts into sign language.

Fourth, while the assignment of interpreters to cover classes takes priority, scheduling will often be necessary to cover interpreting requests for out-of-class course-related activities. Many instructors require students to attend seminars, colloquia, plays, field trips, observations, and so on, as part of their class requirements.

The scheduling office should establish a realistic deadline for the student or faculty member to notify the interpreter coordinator of any interpreting needs outside the classroom. Depending on the size of the interpreting pool, this time might be anywhere from 48 to 72 hours. For recordkeeping purposes, a form should be developed for use in dispatching interpreters. This also provides a record of how the interpreter's time is being used.

As a matter of policy, only the office that coordinates interpreter services should assign interpreters. Also, any work done by the interpreter must be approved in advance. Without these understandings, there may be no way of tracing the charges, and the costs for interpreting services are likely to get out of hand.

EXTRACURRICULAR INTERPRETING

There is general agreement that college students should be encouraged to participate in both academic and extracurricular activities. Yet, while it is clear that interpreting services are invaluable to most deaf students (and their instructors) in their course-work, many institutions are reluctant to provide interpreting services for extracurricular events. The law requires support for interpreting in some instances, but not others.

Course-connected support. Under the law, extra-classroom activities for which interpreting services are mandated hinge on whether these activities are required for course completion. These might include student/faculty meetings, field work, observations, plays, volunteer work, student teaching assignments, and off-campus classes.

[8] Early registration may also be essential for the provision of other services such as notetaking, tutoring, and the provision of assistive listening devices.

Students and interpreters should be asked to inform the office responsible for interpreter assignments as soon as they learn about these course requirements so that staff and funds can be allocated.

Non course-connected support. Every effort should be made to meet with the ADA and 504 Compliance Officer on-campus, if in fact there is one, to establish a dialogue on how extracurricular interpreting needs can be covered. It is clearly the deaf student's responsibility to make known the fact that he/she plans to attend an extracurricular activity if seeking interpreting services.

The major issue is usually not whether interpreting services should be provided for extracurricular activities, but who is responsible for paying for the service. Many situations will require the cooperation of several campus organizations and departments. A campus-wide policy on interpreting services should be developed and disseminated that includes how to request an interpreter for an event, who pays, how to advertise interpreting services, and time frames necessary for advance scheduling.

The following are some of the programs and activities for which policies and procedures for delivery of interpreting services, as well as payment, should be developed, preferably in advance:

The Student Health Center. A close relationship needs to be cultivated between the department responsible for providing support services and the Student Health Center. Scheduling payment of interpreters in a medical setting can be difficult. It is difficult to predict how long a deaf student and his/her interpreter may have to wait for a 1 p.m. appointment if the physician has an emergency and his/her appointments are backed up.

Student Government activities. This includes all chartered clubs and organizations on-campus if they are supported through student fees.

The Counseling Center. If all students are eligible to receive personal counseling, these services are to be free to deaf students like all others.

Fraternities and sororities. These organizations sponsor activities "around the clock." A clear understanding needs to be reached with the local chapter and/or the national office of the fraternity or sorority.

Campus theater productions. Students and community members may attend, in which case interpreting costs may need to be included in the productions' budgets.

Visiting speakers or productions. The planners should be made aware during the negotiations that interpreters may be required.

Commencement. For graduating students, the Commencement budget may absorb the interpreting costs, or the funds may come from the general interpreting fund. There may also be times when deaf parents of hearing students attend college activities such as Commencement. In that event, funding will need to be determined.

Campus-wide events. Many times a college will want to provide interpreting as a goodwill gesture in case a deaf student participates.

Working conditions

Supervisors of interpreters should be familiar with the contents of this section so they can fully understand the complexities of providing interpreting services. It helps if the supervisor is an interpreter him/herself, as is the case in most colleges serving large numbers of deaf students.

Repetitive motion injury (RMI). Because of the high RMI-caused injury rate among sign language interpreters in educational settings (some estimates range as high as 30 percent), care must be taken in the assignment of interpreters to classes. RMI, for the most part, is preventable with reasonable scheduling, team interpreting, and frequent breaks.[9] For more information on RMI, its prevention among interpreters, and rehabilitation measures for bringing interpreters "back on line," contact the Department of Interpreting Services at the National Technical Institute for the Deaf, Rochester, NY, (585) 475-6455 (V/TTY).

Team interpreting. For the purposes of this report, "team interpreting" means two interpreters working and "spelling"/assisting each other at brief intervals for the full time assigned. It does not mean "relief interpreting" where one interpreter interprets while the other leaves the room and returns 20 - 30

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[9] Sanderson, G. (1987). Overuse Syndrome among sign language interpreters. *Journal of Interpretation, 4.* 73-78.

minutes later. By teaming as many classes as possible, the danger of RMI can be greatly reduced while providing better interpretation throughout the assignment.

Colleges serving numerous deaf students should include a clear policy statement on team interpreting within their overall policies pertaining to interpreters. It should include the number of consecutive interpreting hours before teaming applies. For example, many interpreters are willing to work three 50-minute hours back-to-back because of the built-in break factor. However, doing two 90-minute classes back-to-back without teaming is too stressful for most. Two intensive back-to-back 90-minute lectures should require a team. Any continuous class of two hours or more should be teamed as a matter of course.

Team interpreting raises many concerns about its necessity among administrators. Initially, it seems prohibitive in its cost. But in the long run, the quality of the service is maintained at a high level, eliminating mental and physical fatigue.[10] By teaming, one can avoid the necessity for a single interpreter to interpret for prolonged periods. This should reduce costly worker compensation cases due to RMI.

If team interpreting is not possible due to a lack of personnel, then every care must be taken to ensure that interpreters do not interpret non-stop throughout the day. Their schedules should be such that heavy non-stop lectures should not be given back-to-back; light duty classes should be interspersed throughout the day. Examples of light duty classes might include PE activity classes, labs, shops, certain math classes in which all the information is put on the board, and art studies classes.

POLICIES AND PROCEDURES

Policies and procedures for interpreters working in colleges vary in accordance with who employs them. If they are considered employees of the college, they can be expected to follow the policies established by the institution. However, if the college uses freelance interpreters, the established policies surrounding employees may not pertain equally to them. This section will examine policies for interpreters who are hired as bona fide employees. Freelance interpreters will be mentioned only briefly.

Policies and procedures relative to interpreting should be established so that the interpreters, the college, and all those who use their services, most particularly deaf students and their instructors, have a clear understanding of who is responsible for what. All such policies and procedures should be reviewed by the Human Resources Department of the college. Many campuses find a handbook for interpreters and deaf students to be a useful tool for disseminating information on policy.

RID has established a Code of Ethics for interpreters that is accepted across the country as the standard for interpreter behavior. Colleges are encouraged to adopt this code as a way of protecting the rights of students who are deaf.

Policies should also cover areas such as:
- Role of the interpreter in class.
- What to do when a deaf student who uses the service does not show up for class, i.e., a "no show" policy.
- Notification that a substitute interpreter will be needed.
- How often and under what conditions interpreters can apply preparation time to their reported working hours.
- Guidelines for team interpreting.
- Conditions and procedures for requesting an interpreter for a non-class event.
- Time reporting.
- Institutional policies that affect interpreters.
- Wages, raises, and benefits; guaranteed hours.
- Provisions and requirements for professional development.

RECRUITMENT OF INTERPRETERS

Numerous organizations, agencies, and educational institutions can be used to provide leads for the recruitment of interpreters, including educational institutions, deaf services agencies, RID (local, state, and national), Alexander Graham Bell Association for the Deaf, and the national Cued Speech Center. The annual (April) reference issue of the *American Annals of the Deaf* provides a directory of these and most other organizations and agencies of and for people who are deaf or hard of hearing nationally. This issue of the *Annals* also includes a listing of certificate and degree-granting interpreter education

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[10] Interpreting requires the performance of thousands of mental calculations per class hour.

programs nationally. This is an excellent resource for recruiting interpreters, since interpreter educators can often provide leads on interpreters who are seeking jobs in various areas of the country. Appendix A of the present report contains a listing of these programs as reported in the 1998 *Annals* (Micheaux, 1998).[11]

The *Annals* also lists most of the colleges and universities that have an established program for deaf students. Each of these programs is likely to have a staff person who is knowledgeable about interpreting services and the recruitment of interpreters.

Still another resource for recruiting interpreters is the deaf services agencies available in most cities. Also, RID publishes a membership directory which lists its members by state. Two specialized recruitment resources for interpreters are the Alexander Graham Bell Association for the Deaf and the Cued Speech Center. The A.G. Bell Association maintains a list of certified and qualified oral interpreters by state, and the Cued Speech Center maintains a listing of Cued Speech interpreters throughout the United States. Addresses of these are listed in Appendix B.

ATTRACTING AND RETAINING INTERPRETERS

The market to attract and retain interpreters is highly competitive. A college that wants to compete with the high hourly wages offered through many community service agencies may have to provide additional inducements for making work in the college environment attractive. Several are discussed below.

The reader is also referred to the section on working conditions. For colleges requiring the services of just one or two freelance interpreters, some of the following suggestions may apply, and some may not.

Professional development. Both the RID and the NAD require their certified interpreters to obtain continuing education units in order to maintain their certification. The college can help upgrade interpreters' skills and enhance their loyalty to their college by encouraging interpreters to participate in these programs. This can include providing time off to attend professional development activities, paying for registration to these activities, maintaining a bulletin board to announce activities, and establishing differential pay scales that encourage certification and professional development.

Incremental pay scales. By using an incremental pay scale for interpreters, the college can add motivation for continuing professional development and/or advanced certification. Its steps can be contingent on factors that include hours interpreted, professional development hours, and/or certification.

Faculty/staff parking. This may sound trivial to those who do not work in an urban area, but not to those who do and for whom parking is a major aggravation. Presumably, interpreters who are employed full-time by the college have the same parking privileges as other faculty/staff members. However, this is not always true of interpreters who spend scattered hours at the college. By providing freelance and part-time interpreters with regular parking privileges, they will feel more a part of the college.

For programs employing larger numbers of interpreters, the following may be attractive and cost-effective.

Mentoring. Mentoring differs from supervising interpreting interns. Mentoring is the pairing of two interpreters to work together toward agreed-upon goals. This provides incentive for more seasoned interpreters to improve their skills while giving novice interpreters goals to strive toward. Also, done in a non-supervisory manner, senior interpreters can observe other interpreters and provide constructive feedback on their interpreting.

Student feedback. Each term, deaf students should be given the opportunity to provide feedback to their interpreters. Most interpreters place major value on feedback from their deaf clients/students. Interpreters, deaf students, and supervisors should collaborate on the creation of an evaluation form.

DEAF STUDENTS' ORIENTATION TO INTERPRETING

About three-quarters of all deaf and severely hard of hearing students entering college today are likely to have received their earlier education in mainstream environments augmented by special services, while about one-quarter will have graduated from schools for the deaf. Seal (1998)[12] has stated, "In fact, the

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[11] Micheaux, P. (Editor) (1998). *American Annals of the Deaf: Reference Issue.* 143, 172-176.

[12] Seal, B.F. (1998). *Best practices in educational interpreting.* Boston: Allyn & Bacon.

current generation of deaf and [severely] hard of hearing students is potentially the first generation of college students who may have experienced all formal education with an educational interpreter (p.172)."

However, this is not to say that all these students have used interpreters in the past or are sophisticated users of interpreting services. Hard of hearing students are least likely to have used sign language, and many of these students will choose not to include interpreters among their services.

The college's orientation of deaf and hard of hearing students should include information about the role and availability of interpreters in the classroom, and how to access this service if needed. This information should be provided both as part of an orientation program and included in a student handbook on available services.

For students seeking the use of interpreters, their orientation to interpreting services should include minimally:

- appropriate procedures for requesting an interpreter
- no-show policies for both students and interpreters
- a clearly-stated process for replacing an interpreter
- a process for satisfactory resolution of conflicts

Requesting an interpreter is the student's responsibility. When asking for an interpreter, the student should bring his/her official registration and schedule of classes to the interpreter coordinator. If changing classes, the student should bring the official drop/add form to the interpreter coordinator for use in making needed changes in interpreters. In the event that the class is canceled, the student should inform the appropriate office immediately.

Interpreters may be available for extracurricular activities. The student is responsible for giving sufficient advance notice of special activities by completing a Request for Interpreter Form for each activity and submitting this form to the interpreter coordinator.

The interpreter no-show policy should be spelled out very clearly for the student in writing. If possible, the no-show policy should be printed in a student handbook of comprehensive services

available for deaf and hard of hearing students attending the college. For example, the following provisions could be established.

- If a student is late by more than 15 minutes for a one-hour class, the interpreter will leave the classroom.
- If the student is late by more than 30 minutes for a two or three-hour class, the interpreter will leave the classroom.
- If the student does not notify the appropriate office of his/her planned absences for three continuous days of class, the student will not have an interpreter again for that class. The interpreter will be assigned to another class.
- If the interpreter fails to show up or is late for class, the student should report this promptly to the interpreter coordinator.

Replacing an interpreter. Clearly defined steps for replacing an interpreter should be available for the student to follow. Procedures for replacing an interpreter should include the student talking with the interpreter first in an effort to resolve the problem. If this doesn't result in a solution, the student should then report to the interpreter coordinator for assistance with the problem. In the event that conflicts continue between the student and the classroom interpreter, a meeting with the interpreter coordinator and the program coordinator may be necessary to resolve conflicts.

Student handbook. A student handbook should be available and provided to every deaf and hard of hearing student attending the college. This handbook should include information about program staff, registration procedures, and office locations. It should also contain information about the use of interpreters, tutors, notetakers, counseling services, telecommunications and signaling systems, assistive listening systems, vocational rehabilitation services, as well as availability and use of captioned films and instructional videotapes. General college policies and procedures, organizations serving deaf and hard of hearing people, and campus student organizations should also be included. In short, the handbook should include everything the student needs to know about the college and its services.

Faculty workshops. Faculty can also benefit from a workshop in which they will have the opportunity to interact with interpreters and deaf students.

The collective experience of deaf students and interpreters suggests that the most effective presentation format is to have three different panels discuss their views on the effective use of interpreters: deaf students, interpreters, and college instructors who have had previous experiences working with interpreters and deaf students.

PART II. TO THE INSTRUCTOR[13]

So there you are. It is the first day of classes. You are standing in front of a class of 40 students (who, according to the department head, were supposed to number 25 at most). To make matters worse, one of them is deaf, and there's an interpreter! If you're like most college teachers, you will probably smile weakly at the two and proceed as if nothing had changed, assuming that the interpreter will take care of the deaf student.

Then, 16 weeks later, you may realize that the deaf student never really participated in class discussion, and the other students never benefited from that student's unique presence in your classroom. Everyone, including the deaf student, will have missed an opportunity. Simply having an interpreter does not automatically mean that the deaf student will become fully integrated into the class.

But, it need not end this way. Several studies indicate that students report an improved educational experience when their instructors understand the role and function of the interpreter and take steps to manage the dynamics of the classroom communication (Mertens, 1990[14]; Foster & Brown, 1989[15]; Quinsland & Long, 1989[16]).

LET'S TALK FIRST ABOUT THE INTERPRETER

The interpreter's role in your classroom. You should understand that the interpreter has a single responsibility in your class, that being to facilitate communication between you and your deaf student(s), and between the deaf student(s) and hearing classmates.

Most interpreters have a college degree in interpreting, or a degree in a related area with additional education in interpreting. The interpreter assigned to your class is unlikely to be an expert in your particular area, but he or she is an expert in communication between deaf and hearing individuals. Among other things, this means that in

order for effective communication to occur, he or she must have the trust of you and your students that he or she will do the following:

Interpret accurately. The interpreter is responsible for interpreting all information as accurately as he or she can, without embellishment or deletion.

Remain impartial. The interpreter will avoid the expression of personal opinions.

Interpret all the communication that occurs in the presence of the deaf student. In essence, the interpreter becomes the ears of the deaf student. This means relevant and irrelevant messages, off-color jokes, two students arguing in the hall, the discriminatory comment about the "deaf and dumb kid" in the class – anything that hearing people would be able to hear. Likewise, when the deaf student uses the interpreter to translate/"voice interpret" his or her signs into speech, the interpreter vocalizes every aspect of the deaf student's message, including its emotional tone.

Maintain confidentiality. Maintaining confidentiality is another way of ensuring trust. Interpreters are often involved in many aspects of the student's life, particularly in a college setting. If your college employs only one or a small number of interpreters, chances are that the interpreter knows the deaf student quite well. The same interpreter may interpret for the student at the student health service, in a religious support group, at the financial aid office, or in connection with any of the services on-campus, all in addition to the student's classes. Because interpreters have access to a

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[13] This section is adapted from an article titled, "Working with the sign language interpreter in your classroom", first published in *College Teaching*, 1993, *412*, 139-142. Its author was Linda Siple, also co-author of this report. We thank the Helen Dwight Reid Educational Foundation and Heldref Publications, 1319 18th St. N.W., Washington, D.C. 20036-1802, for permission to adapt Dr. Siple's article for this report.

[14] Mertens, D.M. (1990). Teachers working with interpreters: The deaf student's educational experience. *American Annals of the Deaf*, 136, 48-52.

[15] Foster, S., & Brown, P. (1989). Factors influencing the academic and social integration of hearing-impaired college students. *Journal of Postsecondary Education and Disability*, 7, 78-96.

[16] Quinsland, L., & Long, G. *Comprehension of information in mainstreamed classes.* Paper presented at annual meeting of American Educational Research Association, San Francisco, CA, 1989.

great deal of private information, confidentiality is strictly maintained.

Avoid counseling or advising deaf students. If a deaf student needs help for a course-related or other personal matter, the interpreter will refer him or her to an appropriate source and may even volunteer to go along to interpret, but will not offer the student direct counseling or advice.

THE FIRST FEW CLASSES

Interpreters have a unique role in the classroom. They are quite visible and will attract considerable attention during the first few days of classes, especially from uninitiated hearing students. Because of this visibility, some instructors and students try to include interpreters in discussions or activities. However, in order to be actively involved with interpreting, interpreters must take a passive role in classroom participation. They will therefore avoid offering opinions, even if asked directly.

Also, the person who provides classroom interpreting services is a member of the instructional team. Some instructors inadvertently make comments that suggest they consider him or her to be more like a member of the class. This of course is not so, and comments of this kind should be avoided.

The first day. If the presence of an interpreter is new to most students in your class, it is important to allow them an opportunity to learn how best to use an interpreter. On the first day of class, it is a good idea to ask the interpreter to take 5 or 10 minutes to explain what interpreting is and how best to use this support service. The following points are key.

- Sign language interpreting is very much like spoken foreign language interpreting, except that it involves the use of the language of signs (see exceptions described in "Type of interpreters").

- Everything that is said is interpreted; everything that is signed (again, see "Type of interpreters") is interpreted.

- If you would like to speak to the deaf student, the interpreter will interpret your question or comment. It is easier to interpret if you speak directly to the deaf student: "I'd like to know how you feel about …", not, "Ask him how he

feels about…" The first few times will feel awkward because the deaf student will be looking not at you but at the interpreter.

- Multiple conversations cannot be interpreted, so it is important that only one person speak at a time.

- An interpreter can only interpret what can be heard, so please speak clearly.

- The interpreter is not a participating member of the class. If you have a question for the interpreter, feel free to ask during a "non-interpreting" time.

- In classes where sensitive information is being shared, interpreters regard all assignment-related information as confidential.

DEAF STUDENTS' RELIANCE ON VISION

Line of sight, visual field, and lighting. Deaf students frequently sit in the front row in order to see the instructor, the interpreter, and the board. The interpreter generally sits in the front of the classroom facing the deaf student(s). It is important to keep this visual line of communication open by avoiding walking between them.

Sometimes the interpreter may need to reposition. For example, if the class is discussing the circulatory system, which is represented on a model, it will be better if the interpreter is next to the model. If the class is watching an uncaptioned videotape, the interpreter will move next to the television screen. Be sure to pause to allow the interpreter time to take up his or her new position.

Watching an interpreter for any length of time is tiring for the deaf student's eyes. For that reason, interpreters avoid sitting in front of a window or other light source.

In addition, it is important that you inform the interpreter in advance when movies, slides, or other projections requiring low light are shown. The interpreter will then bring a small portable light so that the deaf student can see the interpreter while the room lights are off. When the lights are turned back on, allow the deaf student's eyes time to adjust to the new lighting conditions before resuming the lecture.

Deaf students' participation. Deaf students tend to participate less actively in class than their hearing classmates. One reason for this is the fact that, in order to process information correctly, the interpreter sometimes must lag several seconds behind the speaker. This in turn impacts on the deaf student's ability to participate spontaneously in the class discussion. If the instructor waits until the interpreter catches up and pauses before recognizing a student, this gives the deaf student a better opportunity to participate actively in discussion.

Captioned or interpreted movies and videotapes. Deaf students prefer to have captioned media when available. Your college media center can provide information on the availability of captioned programs. If the program selected is not available in a captioned format, it will need to be interpreted.

Movies and videotapes are often the interpreter's worst nightmare. They are designed to be fast-paced and the information is often very dense. This means that there are many important facts or complex concepts presented with little time to process the material mentally.

You will therefore need to aid the interpreter ahead of time by providing a summary of the program and the points you want the deaf student to know. Ideally, the interpreter should have access to the program in advance of the class viewing.

DEALING WITH THE LENGTH AND PACE OF THE CLASS

Interpreting is very demanding physically. Many interpreters suffer from various conditions categorized as Repetitive Motion Injuries (RMI) (DeCaro, Feuerstein, & Hurwitz (1992).[17][18] It is therefore recommended that you:

- Build in breaks when classes exceed 50 minutes.

- Ensure that breaks are at least 10 minutes in length.

- Remember that using the break to talk to the deaf student means that the interpreter is still working.

Team interpreting. Depending on the length and pace of your class, two interpreters may be assigned to your class as a team, switching every 20-30

minutes, if possible, during a pause in your lecture or discussion.

Pace of the class. It is also important that you control the pace of the class. An investigation of the speaking/lecture rate of 10 college instructors reported an average rate of 150 words per minute (wpm), inclusive of brief pauses between utterances, with a range from 112 to 180. However, one instructor whose average speaking rate was 143 wpm, peaked at 260 wpm over a brief 35-word utterance (Stuckless, 1994).[19] If you tend to speak rapidly, or have rapid inter-changes between yourself and your students, you may want to consider pausing more frequently. If you do not know whether your pace is too fast, ask your interpreter to let you know if the speed becomes a problem.

Also, brief but frequent pauses in your lecture will be appreciated by the interpreter, and possibly by your students as well. Incidentally, pauses of this kind can also be helpful if a notetaker is assigned to your class.

Reading is generally much faster than extemporaneous speech. That makes student presentations particularly problematic for interpreters. Students are usually nervous and tend to read very fast. If they are reading prepared speeches, require that a copy be provided to the interpreter in advance. It is a good idea to discuss strategies that the hearing student can use in order to make his/her presentation more clear and easier to interpret. For example, one can insert pauses by writing "Breath" or "Pause" at key locations in the paper. Overheads also can make the information more visual for everyone.

COMPLEX CONCEPTS AND OBSCURE TERMS

Many instructors who work regularly with interpreters encourage them to interrupt the class if something becomes too difficult to translate. Interpreters are "professional listeners" having been trained to decipher all levels of communication. If the interpreter is having difficulty, that is a good

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[17]DeCaro, J., Feuerstein, M., & Hurwitz, A. (1992). Cumulative trauma disorders among educational interpreters: Contributing factors and interventions. *American Annals of the Deaf, 137*, 288-292.

[18] See also "Working conditions."

[19] Stuckless, R. (1994). Developments in real-time speech to text communication for people with impaired hearing. In M. Ross (Ed.), *Communication Access for Persons with Impaired Hearing*. Baltimore, MD: York Press.

indication that most students are not understanding the information being presented.

As stated earlier, most interpreters are not content experts. They need access to course materials in order to provide more accurate information. It is helpful for the interpreter to have copies of the textbook, course syllabus, and handouts. You might even consider giving the interpreter a copy of your lecture notes to review before class.[20]

The interpreter will do a better job of interpreting if, before the class begins, you can briefly give him or her a sense of what you hope to accomplish during the class session. This gives the interpreter an "advance organizer."

Interpreters in educational settings often rely on fingerspelling to communicate ideas. Fingerspelling is a way of representing the alphabet on the hand. Many terms, including people's names and uncommon scientific vocabulary, do not have a sign equivalent and therefore must be fingerspelled. For example, an anthropology class can discuss *australopithecus afarensis*[21] without ever having to spell it, but an interpreter must fingerspell the entire term and therefore needs to know its correct spelling. Writing new vocabulary of this kind on the board will greatly aid the interpreter.

Another common translation problem for sign language interpreters is the use of idiomatic or conceptual expressions for which there are no equivalents. When the Botany professor begins his/her lecture on mushrooms with a statement like "You know I'm a real 'fung-gi'", the jest will fall both literally and figuratively on deaf ears. Sound-based humor, such as puns, are extremely difficult to translate meaningfully into sign.

Regardless of how well you prepare to work with an interpreter, there will be times when she or he will interrupt you for a repetition of information or a clarification of something just said. These interruptions don't necessarily mean you are doing something wrong but that the interpreter needs additional help in deciphering your message. Sometimes the interpreter becomes engaged in a particularly difficult translation and may miss subsequent information. Or an environmental noise – a student's cough, for example – may obscure a particularly important word, such as not or don't.

WRITTEN TESTS

The deaf student may ask the interpreter to interpret all or part of a test. For many deaf students, English is not their first language, so written tests present a type of communication barrier. The deaf student may have difficulty not so much with the content being tested as with the wording of the question or instructions. An interpretation involves the translation of the English text into sign, not help in the content or wording of the student's answer.

Consider how a non-native speaker of English might perceive this question: "After reading the five short stories by Moore, what conclusion can you draw about her view of feminism?" The deaf student, like many second-language learners, might read the question as requiring one to draw a picture. The instructor may want the interpreter to read over the exam to identify potentially ambiguous test items. If time does not permit, then encourage the deaf student to ask for interpretation when an item is unclear.

SEMINARS AND OPEN CLASS DISCUSSION

Seminars and classes that encourage free-flowing discussion present a special challenge to interpreters. Such classes (and other student activity meetings) often exclude the deaf student, not by intent, but, because of the quick pace and unstructured interchanges.

To process information correctly, interpreters must lag behind the speaker(s), sometimes by as much as several seconds. Conversationally, this places the deaf student at a great disadvantage. When the deaf student perceives an opportunity to jump into the conversation or discussion, the turn usually has already been taken by someone else.

Classes such as these also encourage multiple conversations, creating an impossible situation for the interpreter. Discussing this issue with the class, with an occasional reminder, is usually enough to heighten sensitivity. Often there is a self-appointed "conversational policeman" who will point out when it appears that the deaf student has a question or comment to make, or remind the class when

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[20]Similar suggestions are expressed in the companion reports on *Notetaking* and *Tutoring*.

[21]Skeletal remains of an early human discovered in Australia, popularly known as "Lucy."

individuals are speaking over each other. When asking a question in a regular lecture class, wait until after the interpreter has completed signing the question before you call on students for an answer. This pause allows deaf students an opportunity to see the full question and then raise their hands if they wish to participate.

In conclusion

The presence of a deaf student and the inclusion of an interpreter in your classroom is an opportunity for you to reassess and enhance the communication dynamics of your classes. The best resource for additional information on your use of interpreters is the interpreter in your class, who is also an expert on how to help communication flow better.

For many deaf students, the presence or absence of an interpreter in the classroom can spell the difference between success or failure in college. But without quality instruction, the student has little chance to succeed. Working in tandem, the instructor, together with the interpreter, other needed support service providers, and most especially the deaf student himself or herself, can tilt the scale in the direction of success.

Part IV. Postscript pertaining to laws and regulations[22]

The subject of interpreters is one that brings up numerous issues and perspectives which are difficult to articulate because, without a certain level of personal experience, many important elements in using an interpreter effectively can easily go unrecognized.

Under the ADA and Section 504, interpreters are considered an "auxiliary aid or service." Post-secondary educational institutions must "furnish appropriate auxiliary aids and services where necessary to ensure effective communication with individuals with disabilities" 28 C.F.R. § 36.304. See also, 28 C.F.R. § 35.160. The ADA regulations define a "qualified interpreter" as "an interpreter who is able to interpret effectively, accurately, and impartially both receptively and expressively, using any necessary specialized vocabulary" 28 C.F.R. § 35.107, 28 C.F.R. § 36.104.

In essence, from these regulations we learn that the critical criteria which guide us in the use of interpreters from a legal perspective are "effective communication" and "qualified interpreter." Thus, this commentary will address points made earlier in this report in relation to those two concepts.

This report outlines many areas that service providers and deaf/hard of hearing students need to consider in the provision of interpreter services in postsecondary education. Viewed through the prism of equal access, each of the areas discussed contributes to the achievement of the goal of legal compliance, in this case, "effective" communication. On the other hand, failing to consider these areas will inevitably detract from "effective" communication, thus contributing to legal vulnerability.

For example, the sooner students can be paired with qualified interpreters the better. The timeliness of requests for interpreters is important, administratively, educationally and legally. One should be cautious, however, and recognize that while a preference for early notification regarding interpreter requests plays an important part in service provision, the law holds institutions responsible for providing accommodations from the time the request is made, even if it is "late." Generally, an institution will not be found in violation because it was ultimately unsuccessful in locating an interpreter after a late request. Nevertheless, it must make a good faith attempt to comply with the request and may not refuse to honor the request for interpreting services simply because it is difficult to fill or because it may cost more to provide an interpreter at that late date.

Another area to be addressed which impacts upon full participation and the availability of interpreters for extracurricular activities, public events on campus, and soon, is who picks up the tab? The law is fairly clear that the responsibility to provide access lies with the institution, not with the interpreter coordinator or the Disabled Student Services office, for example. The law does not concern itself with whose budget covers interpreters' fees, but provides that in assessing whether a particular service constitutes an "undue burden," that the courts will look to the resources of the institution as a whole. In essence, if an institution has money for football

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[22] Contributed by Jo Anne Simon, consultant/attorney specializing in laws and regulations pertaining to students with disabilities.

players, it has money for deaf and hard of hearing students. In addition, the law would not support access to traditional lecture courses without providing access to labs also. However, as the law requires that the provision of accommodations be made on a case-by-case basis, it is possible that certain students may not need an interpreter for a lab section, but that others will. The determination must be made on the basis of the student's needs.

Another critical issue is the qualifications of the interpreters an institution uses to provide services. Notice that the ADA does not use the term "certified", but rather uses the term "qualified" which encompasses the uses of specific terminology, an issue that arises often in the postsecondary environment. This is an important distinction. Certification is some evidence of qualification, but there are many interpreting situations for which a certified interpreter may not be qualified. Court interpreters are highly skilled people, but many of them would not feel qualified in a medical or computer setting. Still other interpreters may not be as highly certified, but more than adequate for a particular interpreting assignment. Matching the skill of the interpreter with the needs of the student and the course being taught is very important to the provision of effective communication.

The institution which takes care to mitigate the possibility of repetitive stress injuries (RMI) through creative scheduling helps to ensure that the services it provides will be effective and in compliance for many years to come.

While the issue of parking spaces may seem tangential, an interpreter in the classroom is worth two in the parking lot! An interpreter who is consistently late for interpreting assignments due to parking problems may not be providing the level of service that would be considered to be in compliance, thus putting the institution at risk. The institution would be well advised to alleviate that circumstance, where possible.

Given the above, it is therefore extremely important that an institution develops policies and procedures for dealing with the interpreter needs of the student population and the need to educate faculty and staff about the interpreting process and varying

roles. As more deaf and hard of hearing students attend hearing schools, we are seeing the emergence of certain trends and, thus, areas in need of policy development.

Some of these issues seem simple in the abstract, yet become thorny in the specific. For example, besides policies regarding how much advance notice is required and who pays for interpreters, policies about what constitutes interpreting and what constitutes tutoring or "prompting" need to be addressed. Must a deaf student be responsible for reading examination questions in English, or should an interpreter "interpret" the written English into ASL? What happens if what is being tested is a student's ability to define terminology specific to a field of study, but the "school" sign invented for interpreting purposes in the classroom effectively gives the student the answer? Is this interpreting or giving the student the answer?

An institution is responsible for creating access and is legally prohibited from charging students for interpreting services. For whom does the interpreter work? The institution or the deaf student?

These and other questions are arising on campuses across the country and each institution needs to address them in a manner that is consistent with the law and the institution's mission and employment policies.

Appendix A. List of Interpreting Education Programs[23]

Interpreter Training Program
Phoenix Community College
1202 West Thomas Road
Phoenix, Arizona 85013
Voice: 602 285-7303
TTY: 602 285-7477 or 7476
Fax: 602 285-7309

Interpreter Training Program
Pima Community College
2202 West Anklam Road
Tucson, Arizona 85709-0295
Voice: 520 884-6974
TTY: 520 884-6974
Fax: 520 884-6020

Interpreter Education Program
Department of Rehabilitation
University of Arkansas at Little Rock
2801 South University Avenue
Little Rock, Arkansas 72204
Voice: 501 569-3169
TTY: 501 569-3169
Fax: 501 569-8129

Deaf Studies Department
California State University, Northridge
18111 Nordhoff Street
Northridge, California 91330-8265
Voice: 818 677-5116
TTY: 818 677-4973
Fax: 818 677-5717

Sign Language/Interpreter Training Program
El Camino College
16007 Crenshaw Boulevard
Torrance, California 90506
Voice: 310 660-3296
TTY: 310 660-3445
Fax: 310 660-3932

Sign Language Interpreting
Department of American Sign Language
San Diego Mesa College
7250 Mesa College Drive
San Diego, California 92111
Voice: 619 627-2789 (V/T)
TTY: 619 627-2923
Fax: 619 279-5668

Interpreting for Deaf People
Golden West College
15744 Golden West Street
Huntington Beach, California 92647
Voice: 714 895-8907
TTY: 714 895-8350

Interpreter Preparation Program
Deaf Center
Ohlone College
43600 Mission Boulevard
Fremont, California 94539
Voice: 510 659-6269
TTY: 510 659-6269
Fax: 510 659-6032

Sign Language Studies
Humanities Divivision
American River College
4700 College Oak Drive
Sacramento, California 95841
Voice: 916 484-8653
TTY: 916 484-8270

Interpreter Preparation Program
Front Range Community College
3645 West 112th Avenue
Westminster, Colorado 80030
Voice: 303 404-5366
TTY: 303 469-0459
Fax: 303 466-1623

Career Education for the Deaf
NW Connecticut Community College
Park Place East
Winsted, Connecticut 06098
Voice: 860 738-6382
TTY: 860 738-6382

Department of American Sign Language,
    Linguistics & Interpretation
Gallaudet University
800 Florida Avenue NE
Washington, DC 20002-3695
Voice: 202 651-5450
TTY: 202 651-5200
Fax: 202 651-5741

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[23]Appreciation is expressed to the managing editor of the
American Annals of the Deaf for permission to reproduce this
list from its 1998 Reference issue (143, 2, 172-176).

Interpreter Education Program
NE Florida Educational Consortium
c/o Florida School for the Deaf & Blind
207 North San Marco Avenue
St. Augustine, Florida 32084
Voice: 904 797-4795
TTY: 904 797-4795

Interpreter Training Program
Georgia Perimeter College
555 North Indian Creek Drive
Clarkston, Georgia 30021
Voice: 404 299-4322
TTY: 404 299-4322
Fax: 404 299-4364

American Sign Language/Interpreter
    Education Program
Office of Continuing Education Training
Kapiolani Community College
4303 Diamond Head Road
Honolulu, Hawaii 96816
Voice: 808 734-9154
TTY: 808 734-9154
Fax: 808 734-9893

Sign Language Studies Program
College of Southern Idaho
Post Office Box 1238
Twin Falls, Idaho 83303-1238
Voice: 208 733-9554 (x2181)
TTY: 208 736-4743

Sign Language Interpreting Program
Academic Enrichment & Language Studies
William Rainey Harper College
1200 West Algonquin
Palatine, Illinois 60067
Voice: 847 925-6415
TTY: 847 925-6415
Fax: 847 925-6048

Interpreter Training Program
Waubonsee Community College
5 East Galena Boulevard
Aurora, Illinois 60506
Voice: 708 466-4811 (x225)

Interpreter Training Department
Columbia College
600 South Michigan Avenue
Chicago, Illinois 60605
Voice: 312 663-1600 (x7218)
TTY: 312 360-9133
Fax: 312 663-0046

Interpreter Training Program
Iowa Western Community College
2700 College Road, Box 4-C
Council Bluffs, Iowa 51502
Voice: 712 325-3203
TTY: 712 325-3495
Toll Free: 800 432-5852
Fax: 712 329-4748

Interpreter Training Program
Johnson County Community College
12345 College Boulevard
Overland Park, Kansas 66210-1299
Voice: 913 469-8500 (x3903)
TTY: 913 469-4478
Fax: 913 469-4409

Interpreter Training Program
Department of Special Education
Eastern Kentucky University
Wallace Building, Room 245
Richmond, Kentucky 40475-0959
Voice: 606 622-4442
TTY: 606 622-4442
Fax: 606 622-4398

Interpreter Training Program
American Sign Language Studies
Delgado Community College
615 City Park Avenue
New Orleans, Louisiana 70119
Voice: 504 483-4553
TTY: 504 483-4553
Fax: 504 483-1953

Interpreter Preparation Program
Catonsville Community College
800 South Rolling Road
Baltimore, Maryland 21228
Voice: 410 455-4474 or 4274
TTY: 410 455-4474 or 4274 or 4398
Fax: 410 455-5134

American Sign Language Program
405 Meserve Hall
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115
Voice: 617 373-3064
TTY: 617 373-3067
Fax: 617 373-3065

Sign Language/Interpreter Training Program
Lansing Community College
Post Office Box 40010
Lansing, Michigan 48901-7210
Voice: 517 483-1410
TTY: 517 483-1310

Interpreter Training Program
Mott Community College
1401 East Court Street
Flint, Michigan 48503-2383
Voice: 810 762-0470 (V/T)
TTY: 810 762-0272
Fax: 810 232-9478

Sign Language Studies/Interpreting
Madonna University
36600 Schoolcraft Road
Livonia, Michigan 48150-1173
Voice: 734 432-5616
TTY: 734 591-9266
Toll Free: 800 852-4951
Fax: 734 432-5393

Interpreter/Transliterator Training Program
St. Paul Technical College
235 Marshall Avenue
St. Paul, Minnesota 55102
Voice: 612 221-1343
TTY: 612 221-1343
Fax: 612 221-1416

Health Care Interpreter Program
College of St. Catherine, Minneapolis
601 25th Avenue South
Minneapolis, Minnesota 55454
Voice: 612 690-8112
TTY: 612 690-7862
Fax: 612 690-7849

Deaf Communication Studies/Interpreter Training
St. Louis Community College at Florissant Valley
3400 Pershall Road
St. Louis, Missouri 63135
Voice: 314 595-2025
TTY: 314 595-2120
Fax: 314 595-4544

Interpreting Program
William Woods University
200 West 12th Street
Fulton, Missouri 65251-1098
Voice: 314 592-1123
TTY: 314 592-1123
Toll Free: 800 995-3199
Fax: 314 592-1164

Sign Language Interpretation
University of New Hampshire, Manchester
University Center
220 Hackett Hill Road
Manchester, New Hampshire 03102
Voice: 603 629-4143
TTY: 603 622-4511

American Sign Language &
    Deaf Studies and Interpreters Program
Union County College
232 East 2nd Street
Plainfield, New Jersey 07060
Voice: 908 709-3578
TTY: 908 412-0294
Fax: 908 754-2798

Department of American Sign Language
    & Interpreting Education
National Technical Institute for the Deaf
Rochester Institute of Technology
52 Lomb Memorial Drive
Rochester, New York 14623-5604
Voice: 585 475-6497
TTY: 585 475-6497
Fax: 585 475-6500

American Sign Language/English Interpreter
    Education Program
Division of Adult & Continuing Education
LaGuardia Community College
31-10 Thomson Avenue - Room C204
Long Island City, New York 11101
Voice: 718 482-5313/5324
TTY: 718 482-5313/5324
Fax: 718 482-5119/5136

Interpreter for the Deaf and
    American Sign Language Studies
Suffolk Community College
533 College Road, R-125
Selden, New York 11784
Voice: 516 451-4265
TTY: 516 451-4651
Fax: 516 451-4671

Deaf Adult Services, Inc.
Community Based Education
491 Delaware Avenue
Buffalo, New York 14202
Voice: 716-885-3323
TTY: 716-885-4955
Fax: 716-885-3384

Educational Interpreting
Education of Deaf Children
300 Ferguson Building
University of North Carolina at Greensboro
Greensboro, North Carolina 27402-6170
Voice: 910 334-5843
TTY: 910 334-5843
Fax: 910 334-3618

American Sign Language Program
Department of Foreign Languages
Gardner-Webb University
Box 7304
Boiling Springs, North Carolina 28017
Voice: 704 434-4418
TTY: 704 434-4418
Toll Free: 800 253-6472 (Admissions)
Fax: 704 434-4329

Interpreter Education Program
Central Piedmont Community College
Post Office Box 35009
Charlotte, North Carolina 28235
Voice: 704 330-6829
TTY: 704 330-6852
Fax: 704 330-6560

Interpreting & Transliterating Technology
Columbus State Community College
550 East Spring Street, Box 1609
Columbus, Ohio 43216-1609
Voice: 614 227-5164
TTY: 614 469-0333
Toll Free: 800 621-6407

Manual Communication Program
Sinclair Community College
444 West 3rd Street
Dayton, Ohio 45402-1460
Voice: 513 226-2722
TTY: 513 226-2722

Interpreter Preparatory Program
Tulsa Junior College
3727 East Apache
Tulsa, Oklahoma 74115-3151
Voice: 918 595-7444
TTY: 918 595-7444
Fax: 918 595-7598

Interpreter Training Program
Oklahoma State University
900 North Portland
Oklahoma City, Oklahoma 73107
Voice: 405 945-3288
TTY: 405 945-3300
Fax: 405 945-9131

Human Resources Department
East Central University
Ada, Oklahoma 74820
Voice: 405 332-8000
TTY: 405 332-3497

Sign Language Studies and Interpretation
Portland Community College
PCC, SY CT 219
PO Box 19000
Portland, Oregon 97280-0990
Voice: 503 977-4672
TTY: 503 977-4951
Fax: 503 977-4874

American Sign Language/English Interpretation
Western Oregon University
Monmouth Avenue
Monmouth, Oregon 97361
Voice: 503 838-8444
TTY: 503 838-8444
Fax: 503 838-8228

Interpreter Training Program
Community College of Allegheny County
North Campus
8701 Perry Highway
Pittsburgh, Pennsylvania 15237
Voice: 412 369-4172
TTY: 412 369-4108 (V/T)
Fax: 412 369-3624

Interpreter Training Program
Mount Aloysius College
7373 Admiral Peary Highway
Cresson, Pennsylvania 16630
Voice: 814 886-6310
TTY: 814 886-5533
Fax: 814 866-2978

Interpreter Preparatory Program
226 Navy Hall
Bloomsburg University
400 East Second Street
Bloomsburg, Pennsylvania 17815
Voice: 717 389-4076
TTY: 717 389-4076/4080
Fax: 717 389-3980

Interpreter Training Curriculum
Department of Behavioral Sciences
Community College of Philadelphia
1700 Spring Garden Street
Philadelphia, Pennsylvania 19130
Voice: 215 751-8291/8443
TTY: 215 751-8292

University of Tennessee
Rehabilitation, Deafness & Human Services
117 Claxton Addition
Knoxville, Tennessee 37996-3400
Voice: 423 974-2321
TTY: 423 974-2321
Fax: 423 974-8674

American Sign Language Studies Program
Chattanooga State Technical Community College
4501 Amnicola Highway
Chattanooga, Tennessee 37406-1097
Voice: 423 697-4415
TTY: 423 697-4415
Fax: 423 697-4430

Sign Language/Interpreting
Maryville College
502 East Lamar Alexander Parkway
Maryville, Tennessee 37804
Voice: 423 981-8148
TTY: 423 981-8149
Toll Free: 800 597-2687
Fax: 423 981-8010

Interpreter Training Department
San Antonio College
1300 San Pedro Avenue
San Antonio, Texas 78212-4299
Voice: 210 733-2071
TTY: 210 733-2072
Fax: 210 733-2074

Interpreter Training
Eastfield College
3737 Motley Drive
Mesquite, Texas 75150
Voice: 972 860-7161
TTY: 972 860-7161
Fax: 972 860-8342

Interpreting for the Deaf
Northwest Campus
Tarrant County Junior College
4801 Marine Creek Parkway
Fort Worth, Texas 76179
Voice: 817 515-7762
Fax: 817 515-7007

Interpreter Training Program
McLennan Community College
1400 College Drive
Waco, Texas 76708
Voice: 254 299-8733
Fax: 254 299-8747 M

Sign Language/Interpreter Preparatory Program
El Paso Community College
919 Hunter
Post Office Box 20500
El Paso, Texas 79998
Voice: 915 594-2432
TTY: 915 594-2432
Fax: 915 599-4925

Interpreter Training Program
Salt Lake Community College
4600 South Redwood Road
Post Office Box 30808
Salt Lake City, Utah 84130-0808
Voice: 801 957-4929
TTY: 801 957-4929
Fax: 801 957-4853

Interpreter Training Program
Drawer 1127
New River Community College
Dublin, Virginia 24084
Voice: 703 674-3600 (x290)
TTY: 703 674-3619
Fax: 703 674-3642

Interpreter Training Program/Deafness
Spokane Falls Community College
West 3410 Fort George Wright Drive, MS 3190
Spokane, Washington 99204-5288
Voice: 509 533-3618/3730
TTY: 509 533-3618/3730

Interpreter Training Program
Languages & Cultures Division
Seattle Central Community College
1701 Broadway, 2 BE 1142
Seattle, Washington 98122
Voice: 206 344-4347
TTY: 206 344-4347

Department of Education & the Arts
West Virginia Division of Rehabilitation Services
State Capitol Building
Post Office Box 50890
Charleston, West Virginia 25305-0890
Voice: 304 766-4965
TTY: 304 766-4965
Toll Free: 800 642-8207
Fax: 304 766-4690

Interpreter Training Program
Department of Exceptional Education
Post Office Box 413
University of Wisconsin-Milwaukee
Milwaukee, Wisconsin 53201
Voice: 414 229-6567
TTY: 414 229-6567
Fax: 414 229-5500

Education Interpreter Technician Program
Northcentral Technical College
1000 West Campus Drive
Wausau, Wisconsin 54401
Voice: 715 675 3331 (x 4084)
TTY: 715 675-6341
Fax: 715 675-9776

Educational Interpreting Program
NWCCD/Sheridan College
3059 Coffeen Avenue
Post Office Box 1500
Sheridan, Wyoming 82801-1500
Voice: 307 674-6446, ext 6231
TTY: 307 674-6446, ext 6231
Toll Free: 800 913-9139, ext 6231
Fax: 307 674-4293

Appendix B. Selected resources for recruiting various types of interpreters

Alexander Graham Bell Association for the Deaf
3417 Volta Place, NW
Washington, D.C. 20007

American Annals of the Deaf
KDES
Gallaudet University
800 Florida Avenue, NE
Washington, D.C. 20002

Conference of Interpreter Trainers
CIT News
C/O University of Arkansas, Little Rock
Department of Rehabilitation
2801 South University Avenue
Little Rock, AR 72204-1099

Cued Speech News
Gallaudet University
Department.of Audiology/
   Speech-Language Pathology
800 Florida Avenue, NE.
Washington, D.C. 20002

National Association of the Deaf
814 Thayer Avenue
Silver Spring, MD 20910

Registry of Interpreters for the Deaf, Inc.
8630 Fenton Street, Suite 324
Silver Spring, MD 20910-3803

The Cued Speech Center
Post Office Box 31345
Raleigh, NC 27622

REAL-TIME SPEECH-TO-TEXT SERVICES

*Michael Stinson, Sandy Eisenberg, Christy Horn, Judy Larson,
Harry Levitt, and Ross Stuckless[1]*

INTRODUCTION

Real-time speech-to-text has been defined as the accurate transcription of words that make up spoken language into text momentarily after their utterance (Stuckless, 1994).

This report will describe and discuss several applications of new computer-based technologies, which enable deaf and hard of hearing students to read the text of the language being spoken by the instructor and fellow students, virtually in real time. In its various technological forms, real-time speech-to-text is a growing classroom option for these students.

This report is intended to complement several other such reports in this series which focus on notetaking (Hastings, Brecklein, Cermack, Reynolds, Rosen, & Wilson, 1997)[2], assistive listening devices (Warick, Clark, Dancer, & Sinclair, 1997), and interpreting (Sanderson, Siple, & Lyons, 1999). It is notable that the Department of Justice has interpreted the Americans with Disabilities Act (P.L. 101-336) to include computer-aided transcription services under "appropriate auxiliary aids and services" (28CFR, §36.303).

It should be emphasized at the outset that the real-time speech-to-text services described and discussed in this report are intended to complement, not replace, the options that are already available.

DEVELOPMENT OF REAL-TIME SPEECH-TO-TEXT SYSTEMS

Over the past 20 years, several developments have made it possible to use real-time speech-to-text transcription services as we know them today. These began with the development of smaller, more powerful computer systems, including their capability of converting stenotypic phonetic abbreviations electronically into understandable words. These parallel developments led to the earliest applications of steno-based systems both to the classroom and to real-time captioning in 1982.

In the later 1980s, laptop computers became widely available. This enhanced portability led to the use of computers for notetaking in which the notetaker used a standard keyboard in the regular classroom. It was at this time that stenotype machines were also linked to laptop computers, enhancing their portability. In the late 1980s, abbreviation software became available for regular keyboards (Stinson & Stuckless, 1998).

Currently, both steno-based and standard keyboard approaches are being used with deaf and hard of hearing students in many mainstream secondary and postsecondary settings. Although the full extent of their usage nationwide remains to be documented, over the past 10 years there clearly has been an increased demand for speech-to-print transcription services in the classroom (Cuddihy, Fisher, Gordon, & Shumaker, 1994; Haydu & Patterson, 1990; James & Hammersley, 1993; McKee, Stinson, Everhart, & Henderson, 1995; Messerly & Youdelman, 1994; Moore, Bolesky, & Bervinchak, 1994; Smith & Rittenhouse, 1990; Stinson, Stuckless, Henderson, & Miller, 1988; Virvan, 1991).

TWO CURRENT SPEECH-TO-TEXT OPTIONS

Currently, two major options are available for providing real-time speech-to-text services to deaf and hard of hearing students. The first and second parts of this report will discuss these two options in order. But first, several general comments about the two systems should be made.

Steno-based systems. For these systems, a trained stenographer uses a 24-key machine to encode

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[1] In the order listed above, the authors are associated with National Technical Institute for the Deaf (Rochester, New York), California State University, Northridge (Northridge, California), University of Nebraska (Lincoln, Nebraska), St. Louis Community College (St. Louis, Missouri), City University of New York (New York, NY), and National Technical Institute for the Deaf.

[2] The report on notetaking made reference also to computer-assisted notetaking, C-Print™, and real-time captioning, each of which is an application of real-time speech-to-text. In the present report, frequent reference is made to the generation of notes as a secondary application of real-time speech-to-text.

spoken English phonetically into a computer where it is converted into English text and displayed on a computer screen or television monitor in real time. Generally, the text is produced verbatim. When used in schools, this system is often called CART (computer-aided real-time transcription), an apt acronym in view of the fact that stenotypists often transport their equipment from one classroom to another on wheels.

Computer-assisted notetaking systems. For these systems, a typist with special training uses a standard keyboard to input words into a laptop/PC as they are being spoken. Sometimes these take the form of summary notes, sometimes almost as verbatim text. These systems are often abbreviated as CAN (computer-assisted notetaking).

Both types of systems provide a real-time text output that students can read on a computer or television screen in order to follow what is occurring in class. In addition, the text file can be examined by students, tutors, and instructors after class either on the screen or as hard copy.

These technologies offer receptive communication to deaf and hard of hearing students. However, they provide limited options for expressive communication on the part of these students, and service providers need to keep this in mind.

We will begin by providing some basic "nuts and bolts" information that service providers need in order to implement a steno-based or computer-assisted notetaking (CAN) system. For each of these systems, we address four major questions:

(1) How do these systems work?
(2) What major considerations need to be addressed with respect to their implementation as a support service in the classroom?
(3) Who is qualified to provide the service, and what is his/her training?
(4) How can the system's effectiveness be evaluated, and what has been learned from evaluations to date?

In considering these systems, we will discuss aspects of particular speech-to-text systems with which we have had personal experience. Our focus on particular systems or associated college programs is not intended as an endorsement over other systems or college programs.

The third part of this report pertains to the use of speech-to-print services relative to other forms of support service, and the fourth part to the development of new speech-to-text systems, focusing on the status and potential of automatic speech recognition (ASR).

STENO-BASED SYSTEMS

Steno-based systems began to be used in classrooms in 1982, with mainstreamed deaf and hard of hearing students at Rochester Institute of Technology (Stuckless, 1983). Today, steno-based systems rank as an effective support service for large numbers of deaf and hard of hearing students in mainstream college environments throughout the country. This growth is due to a number of factors, including refinements in the necessary software; faster, more reliable, and more portable computers; the increasing availability of stenographic reporters (and in many cases the lowering cost of their services); and most important, generally favorable classroom evaluations (Stinson, Stuckless, Henderson, & Miller, 1988).

HOW STENO-BASED SYSTEMS WORK

The person who provides this service in the educational setting may be called a stenotypist, stenographer, or stenographic or educational reporter. His/her equipment typically includes a laptop with several cables and special software, a stenographic machine that has been designed to interface with the laptop and its software, and a display of some kind for presenting the student with the text.

The stenotypist can display the text in real time in several ways, using a TV or computer monitor (including the screen of a second connected laptop), or projecting the text onto a screen by using an LCD or overhead projector. Unlike conventional captioning, which superimposes a line or two of text over a picture, real-time steno-generated text can fill a full screen. Depending on the need, the text output of a steno-based system can be displayed in the classroom itself and/or elsewhere via electronic connections.

Typically the stenotypist is present in the classroom with the deaf or hard of hearing student. However, depending on his/her level of skill and familiarity with the topic under discussion, it is also possible to

use a phone link to transmit speech to a stenotypist in a distant location, returning the text to the student via a second telephone line or using a computer modem. Cellular phones have also been used successfully for this purpose where fixed telephone lines were not available (Kanevsky, Nahamoo, Walls, & Levitt, 1992).

Equipment. The equipment consists of three basic components: a computer-compatible stenographic machine, an IBM-compatible laptop, and the software needed to convert the stenographic input of speech and display it as text.

Stenographic machine. The stenographic machine, similar to that used by "computer-connected" court reporters, permits the stenotypist to "write" (key in) verbatim dialogue at speeds of 200 wpm or greater.[3] These speeds are possible in large part because he/she can "chord" keys, depressing several keys simultaneously instead of sequentially as in conventional typing.

Laptop computer. A Pentium 166 MHz or faster laptop, with at least 32 MB of memory and an active-matrix screen is recommended. Two serial ports are preferred, but a PCMCIA slot is acceptable.

Software. The translation software is the heart of the system. Several companies produce the software, and each stenotypist has his/her favorite. Among the most popular are RapidText (Irvine, CA) and Cheetah Systems (Fremont, CA). Essentially, the software consists of four parts, often incorporated into a single software product.

(1) large built-in dictionary (50,000 words or larger), with provisions for the stenotypist to make additions as new words arise in class,
(2) program which selects words from the dictionary based on a specific logic and set of rules, and
(3) word processing program that arranges these words in a particular format and performs other editing tasks.

The following chart shows examples of steno code and their corresponding English words.

Steno code (input)	English text (output)
WREUG	writing
O	on
-T	the
PH-PB/APS	machine's
KAOE/PWORD	keyboard

(4) encoding software to format and display the text in tandem with any of several peripheral devices, e.g., TV or computer monitor, laptop screen, projected image, or printer/paper copy.

Need for technical support. It should be emphasized that a steno-based system is a technologically sophisticated service. Software needs to be installed correctly, and hardware needs to be set up properly. Students depend on the system, and if it breaks down it will need to be repaired promptly, so technical support should be available and close at hand.

APPLICATIONS WITH DEAF AND HARD OF HEARING STUDENTS

Steno-based systems provide a two-fold service that includes real-time speech-to-text transcription for deaf and hard of hearing students to read almost instantly in the classroom, and a written record of the class that they can use later for review. We will discuss these two applications in turn.

Real-time classroom implementation. Steno-based systems can be used to cover a variety of campus events, sometimes as "real-time captioning" where the text appears under the video image of a speaker. However, their primary application with deaf and hard of hearing students is in the classroom. Steno-based systems as used in the regular classroom provide a means for the deaf or hard of hearing student to replace listening with reading what the teacher and fellow students are discussing, in near real time.

As indicated earlier, the stenotypist sits near the front of the classroom, sometimes to the side where he/she is in visual range of the teacher, students, the chalkboard, and other visual media that might be in use. Incidentally, the stenotypist's equipment is silent and requires little space.

So long as the text is legible to the deaf or hard of hearing student, it can be displayed in a number of ways. If the service is being provided for a single student, a second laptop can be used as a screen. However, if a number of deaf and/or hard of hearing students are using the service, a large TV or projection screen is in order.

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[3] Parenthetically, the average speaking rate of college teachers as they lecture is around 150 words per minute, with a standard deviation across the faculty of about 30 wpm (Stuckless, 1994).

From a classroom perspective, the presence of a steno-based system or a computer-assisted notetaking system in the class is similar in some respects to having an interpreter there. More attention will be given to similarities and differences later in this report.

Hard copy text. Transcripts of lectures can be used as complete classroom notes, preserving the entire lecture and all students' comments for subsequent review by deaf and hard of hearing students taking the course. Typically, these transcripts are shared with these students and with the instructor. Some instructors welcome the transcripts as a way of tightening their lectures and reviewing their students' questions and comments.

If the instructor chooses, he/she should be at liberty to share them with hearing members of the class also.[4] The transcripts can be of value also in tutoring deaf and hard of hearing students, enabling tutors to organize tutoring sessions in close accord with course content. Also, interpreters sometimes use them to improve their signing of course-specific words and expressions.

Once the stenotypist has completed the real-time transcription of a class for the deaf or hard of hearing student(s) enrolled in the course, he/she will edit the text. Depending on the particular class, a 50-minute class is likely to generate 25 to 30 pages of text.

If the stenotypist has a high accuracy rate in a given class, e.g., 98-99%, he/she may be able to correct errors and make the text more readable in one-half hour or less. Obviously more errors (causes of which are discussed later under Accuracy) will require more editing time.

Many students who use the text for review purposes prefer receiving an ASKII disk (edited or unedited) so they can organize their own format and decide for themselves what they want to retain or discard.

ACCURACY

The most important task for the stenotypist working in the classroom is to maintain high accuracy in the production of text from speech. When the accuracy drops below 95%, i.e., more than one word error in 25, intelligibility of the text drops off rapidly.[5]

The following excerpt from a lecture[6] illustrates some of the types of errors that can appear with steno-based systems. The upper line indicates what the teacher said, and the lower line indicates a transcribed text version.

(Speech) Interestingly enough one of the most popular courses
(Text)   INTERESTINGLY ENOUGH ONE OF THE MOST POPULAR COURSES

on this campus is a course on   *death*   and dying. Since so many *of* us are
ON THIS CAMPUS IS A COURSE ON *DEARTH*   AND DYING. SINCE SO MANY ___ US ARE

trying to avoid that I have some *ambivalent* feelings about the
TRYING TO AVOID THAT I HAVE SOME *ALL BEVELLENTD* FEELINGS ABOUT THE

popularity   of that course. I do *know* that it's a very popular
POPULAR ARE THE   OF THAT COURSE. I DO *NO*   THAT IT'S A VERY POPULAR

course   and at the same time I *know* that   it's a subject   that most of us
COURSE AND AT THE SAME TIME I *NO* THAT IT'S A SUBJECT THAT MOST OF US

want to avoid.
WANT TO AVOID.

Types of errors. Based on the number of departures in the text from what was spoken, there are six word errors in the above 65-word spoken excerpt, yielding 90% accuracy. We can see the four most common types of word errors illustrated in the text above:

mistranslate	–	*death/DEARTH, popularity/ POPULAR ARE THE*
omission	–	*of/_*
untranslate	–	*ambivalent/ALL BEVELLENTD*
homonym	–	*know/NO (2)*

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[4] It is common for stenographic reporters in private practice to add a surcharge for distribution of extra copies of the text. In the educational environment, this should be discouraged.

[5] This pertains to all the real-time speech-to-text systems discussed in this report.

[6] This particular lecture was given in February 1982 at NTID/ Rochester Institute of Technology, as part of the first course in which a steno-based system was ever used. Today, we look for better than 95% accuracy.

Sources of errors. There are at least three general sources of errors:

(a) *Stenotypist errors.* The computer is unforgiving of input errors on the part of the stenotypist. Once made, they cannot be corrected "online".

(b) *Vocabulary limitations.* Each stenotypist is expected to add and maintain his/her own special course-related dictionary of words beyond the large dictionary that comes with the software. The goal here is nearly perfect pre-edited text, so ongoing dictionary-building time (like editing time) should be built into the service.

The textbooks used in class should be made available to the stenotypist for the purpose of dictionary building. Instructors are also encouraged to share specialized vocabulary likely to be used in class with the stenotypist so he/she can enter this vocabulary into his/her dictionary prior to the class meeting. Over time, the accuracy of the stenotypist's work will improve as he/she builds a specialized dictionary and his/her stenotyping errors diminish.

(c) *Teacher/classroom/course content factors.* Some teachers and hearing classmates of the deaf and hard of hearing students articulate more clearly and/or speak more slowly and deliberately than others. Also, some are more grammatically "correct" in their speech than others.

Adverse classroom factors include "noisy" classroom conditions, e.g., several people speaking simultaneously. The stenotypist cannot be expected to produce meaningful, accurate text under these conditions.

By their very nature some areas of study lend themselves better to the use of steno-based systems than others. For example, courses demanding considerable physical activity and foreign language courses may be poor prospects for the use of steno-based systems.

THE STENOTYPIST

Some stenotypists provide their services on an hourly basis, and some by the academic term. Still others are employed as members of the college's professional staff. Mostly this depends on the number and year-to-year continuity of deaf and hard of hearing students likely to be requesting the service.

A college with just one student requesting the service is unlikely to hire a stenotypist on a long-term basis when there is no assurance that the student will complete his/her program of studies in the same institution. At the other end, a college that has an ongoing need to provide steno-based services for numerous deaf and hard of hearing students each year is likely to prefer hiring stenotypists as regular staff members.

Training. The starting point for becoming a stenotypist is training in a stenographic or court-reporting school, of which there are more than 400 throughout the country. Many stenotypists and most active court reporters are affiliated with the National Court Reporters Association (NCRA). Both court reporting and stenotyping in the college setting require high-speed, accurate stenographic translation of the spoken word, often involving multiple speakers. Most court reporters, however, *ipso facto* are not adept at providing real-time transcription in the classroom. They have the luxury of being able to edit their material before producing a readable transcript.

In contrast, stenotypists in the classroom situation must produce near-perfect accuracy without the benefit of prior editing. This calls for special skills that overlap with those of real-time TV captionists and which come with training (if available) and experience. When feasible, it is useful for the beginning stenotypist to have a semester of practice time, and time to build his/her special dictionary, before taking on full responsibility for supporting students in the classroom. Another opportunity for practice is to produce transcripts from videotapes for captioning purposes.

Certification. The National Court Reporters Association offers certification at several levels. Some stenotypists argue that NCRA certification has little relevance to working as a stenotypist in the classroom, but certification undeniably provides added assurance of both speed and accuracy.[7]

Recruitment. Sometimes the most direct and efficient way to recruit stenotypists, at least for short term, temporary support, is through local stenographic agencies. Insist on real-time experience

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[7] The Center on Deafness at California State University Northridge periodically offers workshops for stenotypists interested in working with deaf and hard of hearing students attending college.

and require that they provide their own hardware and software (including their own dictionary).

Local court reporting/stenographic schools may be able to provide leads from among their own graduating students and graduates. For long-term recruitment of stenotypists into college programs for deaf and hard of hearing students, an internship agreement with one of these schools can be an effective way of incorporating newly graduated real-time stenotypists into the college's support services for deaf and hard of hearing students.

Pay levels. Compensation standards for stenotypists working with deaf and hard of hearing students at the college level vary considerably, based on training and experience. Colleges with little or no prior experience using real-time stenotypists in the classroom may wish to check with other colleges that have, before varying much either way from the following ranges.

For "educational realtime reporters" with full-time (two semester, 40 hour week) college positions, the National Court Reporters Foundation (NCRF) of NCRA has suggested a salary range of $20,000 to $38,500 plus a full benefits package.[8] This range can be adjusted for use in colleges that use another calendar such as the quarter.

For those who are retained on an hourly fee basis, NCRF has suggested the following: $40-$75 per class hour (2-hour minimum), $15-$40 per hour for preparation time (30 minutes for each class hour), and $15-$40 per hour for production time (editing for distribution). However, fees of up to $150 per hour have been reported.

The importance of preparation and editing has already been discussed. Typically those who provide the service on an hourly fee basis furnish their own steno machines, laptops, and software.

Workloads. On-line classroom stenotyping requires sustained and undivided attention. And like teaching and interpreting, when done without periodic breaks it can be mentally and physically fatiguing. As a rule, for full-time staff, course coverage should not exceed 20-22 class hours per week. Back-to-back classes should be infrequent. Between-class time, e.g., three to four hours a day, can be used mainly for preparation and editing purposes. First-time coverage of new courses (and different instructors

teaching the same courses) will require more preparation and editing time than those previously covered.

Evaluation of the service. Support service providers need some way to determine whether students using a steno-based system are being adequately served. Two aspects of evaluation are (a) quality of the real-time display and the hard-copy text, and (b) student/consumer feedback regarding his/her benefits from use of the system.

Quality of real-time display and edited text. Early and later on in the course, the stenotypist's college supervisor should appraise the quality of the display and the edited text for each course being covered by the stenotypist. The supervisor's principal interest here is that the real-time display be relatively free of errors (recognizing that the stenotypist is not the source of all errors), and that its format contribute to its readability. This can be determined by examining the *unedited* text, including word correctness/errors, punctuation, paragraphing, and indications of changes in speakers.

The *edited* text should be appraised relative to its intelligibility and ease of student use for review purposes.

Student/consumer feedback. Students using the steno-based service should be asked to make a formal evaluation midway through the course. Information may be collected on the student's perceptions regarding the skills and attitudes of the stenotypist. The Appendix shows a sample form used at California State University, Northridge to obtain student/consumer feedback.

In addition, each instructor who uses the steno system in his/her class should be given the opportunity to express his/her perception of the value of the service relative to its use by the deaf or hard of hearing student(s) in the class.

A study conducted with deaf and hard of hearing students at Rochester Institute of Technology taking courses in the College of Business and/or Liberal

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[8] Information from *Realtime in the educational setting: Implementing new technology for access and ADA Compliance* (1994), National Court Reporters Foundation: Vienna, VA. Booklet available through NCRA Member Services and Information Center, 8224 Old Courthouse Rd., Vienna, VA 22182-3808.

Arts indicated that students responded favorably to the system, although there was variability in their responses. A majority of the students reported that they understood more from the steno-based text display than from interpreting (Stinson, Stuckless, Henderson, & Miller, 1988).

When supporting an individual student, a steno-based or other speech-to-print system obviously is more expensive when combined with other services such as interpreting, than when it is the only service provided, i.e., used "stand alone". It may be difficult to justify the provision of both the speech-to-text service and interpreting services for a single student in the class.

Nor do there appear to be consistent policies for dealing with such requests in colleges around the country when one student in the class requests speech-to-text, and another requests interpreting. In some circumstances, both services have been provided, whereas in others, students have been limited to only one of these services. Clear guidelines regarding when to provide one or both services remain to be developed.

A CAVEAT ON STENO-BASED SYSTEMS

In the hands of competent stenotypists, steno-based real-time speech-to-text offers a powerful support service to many deaf and hard of hearing students in college. Unfortunately, the relatively high costs of well-qualified stenotypists (not their equipment), together with their scarcity in most locations of the country, combine to make the service unavailable or underused in many colleges.

With this in mind, we proceed to examine some related alternatives.

COMPUTER-ASSISTED NOTETAKING (CAN): COMPUTER SYSTEMS WITH STANDARD KEYBOARDS

When used with deaf and hard of hearing students, computer-assisted notetaking (CAN) systems, like steno-based systems, are used primarily in the classroom, in lieu of interpreters and notetakers. Like steno-based systems, CAN converts speech into text in real time for the deaf or hard of hearing student to read in the classroom. And like steno-based systems, CAN provides the student with an edited or unedited copy of the text for use as notes.

Unlike steno-based systems, CAN involves the use of a standard keyboard and a typist with special training, referred to in this report as a captionist but called a transcriber in some settings. There are a number of CAN systems, each of which varies in its details. In general, these systems all involve a (hearing) captionist sitting in the classroom and using a standard keyboard and a commercially available word processing program (such as WordPerfect) to transcribe information as it is being spoken in class.

The text is displayed in real time for deaf and hard of hearing students to read on a TV monitor or on a second laptop display (depending upon the number of deaf or hard of hearing students using that system in the particular class). At the end of class, the text is saved as a word processing file that can then be edited, printed, and distributed to these students as hard copy.

KEYBOARD INPUT

Various CAN systems have "evolved" from the use of standard typing (character by character). The limitation of standard typing, even at high speed, is that it cannot keep up with the speed of speaking. Instructors' speaking rates typically run around 150 words per minute, and sometimes in bursts exceeding 200 words per minute.

Nevertheless, one basic approach is simply to substitute the handwriting of notes (at around 30 words per minute) with typing (at around 60 words per minute) – that is, the typist takes down in summary what the instructor says. With the advent of laptop "notebook" computers, this has become common among students who take notes for themselves, and increasingly among those who take notes for deaf and hard of hearing students (Hastings, Brecklein, Cermak, Reynolds, Rosen, & Wilson, 1997).

Various CAN systems employ different strategies to enable the captionist to increase his/her speed of input in order to capture more spoken content and detail. The goal is to come as close as possible to capturing all the relevant information being discussed in class, in a readable format. Two strategies are employed to enable transcribers to cover as much information as possible: (a) computerized abbreviation systems to reduce keystrokes, and (b) text-condensing strategies to enable the transcriber to type fewer words without losing spoken information.

CAN systems have several practical advantages over steno-based systems. CAN systems use portable, low-cost equipment. Also, the potential pool of typists/captionists is much larger than that of stenotypists and the costs of their services are usually lower than those of well-qualified stenotypists or interpreters. In general, the special training required for a well-qualified typist to become an acceptable CAN captionist can be a month or less, depending on the specific goals of the system (McKee et al., 1995).

Several CAN systems have been developed for or used in providing support services to deaf and hard of hearing students. The following table presents a summary of characteristics of eight computer-assisted systems for which published information is available.

SUMMARY OF CHARACTERISTICS OF DIFFERENT COMPUTER-ASSISTED NOTETAKING SYSTEMS
CHARACTERISTICS OF SYSTEMS

System	Uses abbreviation to increase speed	Location of text display	Attempts verbatim or real-time notes	Communication between student and transcriber	Required skills and/or training
CAN-Cleveland (Messerley & Youdelman, 1994)	Not described	Connect with monitor	Generally, summary notes	One-way communication: transcriber to student	Minimal: must be able to summarize; type more than 60 wpm; good English use
Computer-Assisted Notetaking-NY (Kozma-Spytek & Balcke, 1995)	Not described	Connect with laptop	Summary notes	Two-way communication between transcriber and student	None described
CAN-Washington, D.C. (Virvan, 1991)	Abbreviations used as long as everyone understands. Does not use computerized abbreviation expansion program	Connect with monitor or laptop	Usually summary notes, but is capable of near-verbatim tran-scription	One-way communication: transcriber to student	Overall little training, but required skills are ability to type over 60 wpm and summarize well, good English skills, hear well
C-Note (Cuddihy, Fisher, Gordon, & Shumaker, 1994)	Student & transcriber develop appropriate shorthand system	Connect with laptop	Varies from near-verbatim to summary notes	Two-way communication between transcriber and student	Not described
Project CONNECT (Knox-Quinn & Anderson-Inman, 1996)	Not described	Connect with laptop	Summary notes and near-verbatim text	Two-way communication between trans-criber and student	Not described
C-Print™ NTID System (McKee, Stinson, Everhart, & Henderson, 1995; Everhart, Stinson, McKee, Henderson, & Giles, 1996)	Emphasizes extensive use of phonetically-based abbrevia-tion system to reduce key strokes	Connect with monitor or laptop	Near-verbatim text	Two-way communication between transcriber and student	Transcriber should be able to type 60 wpm. Formal course provided, with 62-page training manual and 50 training audiotapes
InstaCap (Hobelaid, 1988; Warick, 1994)	Uses single key-strokes to invoke full words for 20 abbreviations	Wireless connection with monitor	Varies from near-verbatim to summary	One-way communication: transcriber to student	Not fully described; transcriber's skills evaluated every 3-5 years
Notebook Computer Notetaking System (James & Hemmesley, 1993)	Not described	Connect with laptop	Generally summary notes	Two-way communication between transcriber and student	Not described

HARDWARE

The hardware used for CAN systems is simpler than that required for steno-based systems. However, when used in tandem with appropriate software, it can be sufficient to produce an effective text display.

Laptop computer. The basic piece of equipment is a laptop computer. Some systems use IBM-compatible computers (e.g., IBM's ThinkPad, NEC Versa 2000). Others report using Apple Macintosh PowerBooks (Messerley &Youdelman, 1994).

Display. The real-time text on the transcriber's laptop can be displayed for the deaf or hard of hearing student using (a) a second laptop computer, (b) a VGA-to-TV adapter that connects the laptop to a regular TV monitor, or (c) an LCD projection display.

SOFTWARE

A CAN system requires word processing software and in most instances communication software. The more sophisticated systems also use abbreviation software.

Word processing software. Products such as WordPerfect 6 and Word 97 often have special built-in features that increase their effectiveness, such as WordPerfect's "Macro" and "QuickCorrect" features. These permit creating the abbreviations of a limited number of words and phrases for input into a computer.

Communication software. This software permits communication between two or more laptop computers by creating an asynchronous link. These systems include C-Note (Cuddihy et al., 1994) and Carbon Copy (McKee et al., 1995).

This software provides two ways of communicating between two computers: (a) a full-screen mode, where only one individual can enter a message at a time, and (b) a split-screen mode where both individuals may enter messages simultaneously. Most of these programs permit scrolling back to review previous material on the student's computer while new material is being entered on the captionist's computer. (Cost: $200).

Word abbreviation software. Several software packages have been developed specifically for

extensive abbreviation of words and phrases being entered into the computer. At this time, the two systems most commonly used with CAN appear to be the following:

Productivity Plus
Productivity Software
  International, Inc.
1220 Broadway
New York, NY 10001

Instant Text
Textware Solutions
83 Cambridge St.
Burlington, MA 01803-4181

Using one of these systems, the computer automatically converts the abbreviations typed by the captionist into the full words that appear on the screen. This software serves to increase typing speed without increasing the necessary number of keystrokes, and permits the text to more closely approach the speed of the talker.

An example of the application of one of these abbreviation systems to a CAN service is a speech-to-text transcription system called C-Print™ which was developed at the National Technical Institute for the Deaf (McKee, Stinson, Giles, Colwell, Hager, Nelson-Nasca, & MacDonald, 1998).[9] C-Print™ uses an extensive word-abbreviation dictionary, along with specific text-condensing strategies.

A major difference between C-Print™ and other CAN systems is its commitment to coming as close as possible to providing a verbatim transcription, due largely to the extensive abbreviation system it employs. As the teacher (or class participant) talks, the captionist types a series of abbreviations. For each abbreviation, Productivity Plus searches the dictionary for its equivalent full word and displays it on the screen. Two examples of abbreviations and their expansions as used in C-Print™ appear below.

Abbreviations
t kfe drqr
slvg t pblm

Full expansions
the coffee drinker
solving the problem

The C-Print™ captionist is not required to memorize all the abbreviations in the C-Print™ system. Instead, she/he learns a set of phonetic rules developed specifically for C-Print™, which are then applied to any English word that has been added to its system's general dictionary. The general

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dictionary developed by the C-Print™ staff currently contains approximately 10,000 words, including suffixes, which were selected from research on word frequencies in English. Specialized dictionaries can also be created that allow for the abbreviation of vocabulary, phrases, and acronyms unique to a course or subject area.

TEXT DISPLAY

Format. The text display for a CAN system generally shows words appearing letter by letter, as opposed to a steno-based system that displays individual words or groups of words in a single burst. For the C-Print™ system, the student sometimes sees a split-second conversion from the abbreviation to the full word. Student feedback indicates this is not distracting.

The number of lines of text displayed in real time varies by the type of display and size of letters. A single-spaced laptop display may show 30 or more lines of text. A television monitor display with letters of a large font size, such as 30-point, may permit up to 15 lines, depending upon the particular system.

Content. For the C-Print™ system, the operator does not type every word, but does try to capture as much important information as possible. The text generated by some CAN systems (for both real-time display and hard copy) can be considerably more detailed than notes taken by trained notetakers, but is more condensed than the transcriptions provided by steno-based systems. Below is an unedited paragraph of text, with follow-up comments, produced in a history class by a C-Print™ captionist. Note the use of complete sentences.

> *Professor*: King has successfully gone into Birmingham after the failure in Albany, and has provoked a great deal of violence and has gotten a great deal of press coverage. It is severe violence. Although violence is seen on national television and Kennedy responds by not defending the existing legislation as Eisenhower did, this is a crucial shift, but by saying he will create legislation in support of the cause. That is the Civil Rights Bill of June, 1963. He is initiating his own legislation. It would strengthen desegregation in all places. In response to this is the march on Washington that takes place on Aug. 28, 1963. This is in support of Kennedy's bill.

Bayard Rustin and A. Philip Randolph come back into the picture to organize the event. King gives his famous "I have a dream" speech. It is a great symbolic event. It shows a great deal of unity within the country behind doing something about civil rights.

> *Student*: Is that an all-Black march?

> *Professor*: No. It was by no means an all-Black march, it was greatly diverse. A. Philip Randolph gets his dream of the march, but it is not all Black. The movement is unified around one strategy — provoke violence, get it on television, and get government to do something.

At the end of class, the CAN text is saved as a word processing file that can then be corrected and distributed to students as hard copy text, on a floppy disk, or electronically. Electronic distribution requires that the captionist have access to a computer and can send the file electronically to the student. The student in turn can download and print the text at his/her convenience. Student feedback indicates that an effort should be made to distribute the text on the same day as the class or the following day.

PREPARATION FOR CLASS

The captionist has a number of duties prior to actual in-class transcription. In preparation for each class, she/he needs to become familiar with new terms and concepts likely to be used in class. If working with a CAN system that uses extensive abbreviations, she/he may add abbreviations to the specialized dictionary so that words used frequently in a particular course (e.g., technical words, proper names, new terms) will appear when their corresponding abbreviations are typed.

Equipment must be set up prior to the class. This may mean connecting two laptops with each other. If a television monitor is to be used, it must be requisitioned and connected.

Prior to the first class, the captionist should discuss with the students for whom the speech-to-text will be used how the CAN system works, what they can expect from it, and their respective responsibilities. They may also need to discuss specific ways in which the captionist can be helpful during class. This may include matters such as repeating the students'

questions if they're not understood in class, or reading aloud the questions and other comments the student types on his/her laptop with the intent of sharing them with the class. The latter assumes that the particular student chooses not to voice for him/herself, and that the particular CAN system being used has this interactive feature.

If the class activity is a small group discussion, it is desirable for the real-time display to be a laptop monitor rather than a television monitor. It seems easier for deaf and hard of hearing students to shift between viewing a laptop display directly in front of them and observing the speaker(s) than to shift attention between a television monitor and the speaker(s).

Preparation and distribution of notes[10]

The hard copy notes are intended to be educational tools, not necessarily near-verbatim accounts of what happened in class. Therefore, information that is extraneous to the educational content can be omitted. Also, any confidential information about the students or others should be omitted. The captionist should be sensitive to the wishes of the instructor regarding other information to be omitted from the hard copy notes for a particular class.

Assignments should be accurately recorded. Beyond assignments, a good approach for captionists to use when deciding what information to include and what to omit is to provide notes that would help a student who was absent know what educational information was presented. This approach will help captionists decide what to include, and what changes to make, to render the class content both accurate and understandable.

Ergonomics and the scheduling of captionists

Transcribing for more than one hour without a break increases the risk of what has variously been called repetitive motion injuries and cumulative trauma disorder. Captionists in the college environment are likely to engage in intense typing of continuous lectures for up to one hour and will generally need an hour of "down" time before resuming typing. This time can often be devoted to preparing notes or preparing for the next class.

In an attempt to minimize ergonomic risk factors, it is recommended that:

(a) captionists continue to develop their skills with the abbreviations system to reduce keystrokes, and use other text condensing strategies

(b) where possible, captionists choose seating that reduces discrepancies in table, elbow, and keyboard height

(c) regular interviews with the captionist be conducted by her/his supervisor to monitor changes in comfort, fatigue, and effort

(d) where feasible, the college make the captionist's position part time.

Qualifications and training of a CAN captionist

Qualified captionists need first to be skilled typists (with typing speeds of 60 words per minute or better), need to have good verbal and auditory skills, and need to be familiar with the operation of laptop computers. It is helpful if the captionist has familiarity with the course material, although this often is impractical as a requisite.

A survey of existing pay scales suggests an hourly rate ranging from $10 - $15, inclusive of preparation time and time required for text editing and distribution as notes. One college surveyed indicated a pay scale comparable to that of interpreters.

With respect to training, the C-Print™ system at NTID appears to be the only college offering CAN training as a course (McKee, Stinson, Everhart, & Henderson, 1995). This one-month course is designed to teach the abbreviation rules that enable the C-Print™ captionist to save substantial numbers of keystrokes. The course also teaches strategies to condense information. Training includes practice transcribing real college lectures from audiotapes. Training materials consist mostly of a 62-page manual and 50 audiotapes.

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[10]This topic and several others that follow draw extensively from McKee, B., Stinson, M., Giles, P., Colwell, J., Hager, A., Nelson-Nasca, M., & MacDonald, A. (1998). *C-Print™: A Computerized Speech-to-Print Transcription System: A Guide for Implementing* C-Print™. Rochester, NY: National Technical Institute for the Deaf.

Regardless of the CAN system that is used, a real issue is how soon captionists can become comfortable displaying what they are typing in real time in the classroom. Coming into the classroom and keying in rapidly spoken lecture material, which will be viewed by a student who is dependent upon it for learning, is a challenging and sometimes stressful task.

Captionists may be concerned about keeping up with a lecture pace, omitting important information, and making errors. Before they can become comfortable doing this, they may need in-class experience transcribing lectures where the text is not displayed in real time for the student.

ILLUSTRATIVE POLICIES AND PROCEDURES

As with steno-based systems, the cooperation of the captionist, the deaf and hard of hearing students, hearing classmates, and the instructor is necessary in order for the CAN service to work successfully in the classroom. The following policies and procedures are adapted from those developed for one college (NTID) in its use of a CAN system (Giles, 1996), and are organized around *General Information, Captionist's Responsibilities, and Student's Responsibilities.*

General Information

- CAN notes are intended to be used by supported student(s) registered in the course and should not be copied unless otherwise specified by the instructor.
- CAN notes are not a substitute for attending class.
- Because the notes need to be edited quickly and distributed as soon as possible, CAN notes are not guaranteed to have 100% correct grammar or spelling.

Captionist's Responsibilities

The captionist will:

- provide an in-class text display for appropriate support service students. In addition, notes (generated from the text display) will be made available to supported students who attended class.
- make every effort to type spoken information word-for-word, and communicate the information in the manner in which it is intended. At times (during fast speech), the captionist will need to summarize information, but she/he will type as much of the important information as possible.
- assist by voicing comments or questions typed by students on the laptop provided (if it has the necessary communication software), or in another way mutually agreed upon.
- begin typing upon arrival of the students. Any announcements made by the instructor before the student(s) arrive will be typed. After 10 minutes, if none of the supported students are in attendance, the captionist will leave. However, if the student has notified the CAN office or the instructor at least 24 hours in advance, the captionist will take notes if approved by the instructor.
- indicate different speakers in the text by indicating "Professor", "Female Student", and "Male Student".
- be responsible for facilitating communication between the supported student(s) and others, i.e., the instructor and other students. This includes asking for clarification from the instructor or other students when necessary.
- be responsible for trying to resolve any problems stemming from student or instructor concerns about CAN.
- arrive at least 10 minutes before class to allow time for equipment set up.
- become familiar with the scheduled lecture by preparing for class through reviewing the textbook and related materials.
- find a replacement if she/he is sick. If a replacement cannot be found, the captionist will notify the appropriate Support Department that will notify the supported student(s).
- provide on-the-spot troubleshooting for equipment breakdown with minimum disruption to the class. If no solution is found, the captionist will make an effort to accommodate the supported student(s) to the best of his/her ability. Technical breakdowns are unforeseen and most often require diagnoses outside the classroom environment.
- when necessary, request an interpreter for special circumstances such as an oral presentation by the supported student(s).
- provide class handouts to authorized individuals, e.g., tutors.
- Summarize videotapes (captioned or uncaptioned).

Student's Responsibilities

The student will:
- introduce him/herself to the captionist so the captionist is familiar with each student.
- be responsible for taking notes and diagrams from the blackboard and overhead.
- be responsible for notifying the CAN Office if he/she will not be attending class or has withdrawn from the course. Three consecutive unexcused absences will result in the termination of CAN services.
- be responsible for double-checking spelling on any vocabulary.
- raise her/his hand when interested in communicating comments or questions through typing on the laptop (if so equipped).
- inform the captionist of any special needs for special circumstances, e.g., interpreter, at least two weeks in advance.

EVALUATING CAN SERVICES

In evaluating the effectiveness of CAN services, college staff will want to consider (a) the quality of the real-time display in class, and (b) the quality of the hard-copy text or notes distributed to students after class (together with the timeliness of their distribution). Evaluation should be tied to the objectives of the system, i.e., summary notes vs. near-verbatim text.

If the intent is that the captionist record as much information as possible, there is a need for some kind of comparison between what the teacher and students actually said in class and what the captionist typed. For example, some preliminary data indicate that it is possible for a CAN system to capture 65 percent of the total ideas expressed in a lecture and 83 percent of the important ideas. These figures were obtained by using a standardized procedure for comparing recordings of teachers' lecture material with the corresponding text typed by the captionists.

It is also important to obtain deaf and hard of hearing student feedback regarding (a) the benefit of the real-time display, (b) the extent of their understanding of the classroom discourse, (c) their ability to participate in class, (d) the professionalism of the captionist and appropriateness of her/his behavior, and (e) helpfulness of the notes.

Feedback should be obtained also from the captionist and the instructor. The evaluation form

for stenotypists as shown in the Appendix can be modified for use in connection with CAN systems.

Questions for the instructor can include whether the role of the captionist was adequately explained, whether the captionist performed her/his job with minimum disruption to the class, whether teaching methods were altered to accommodate the CAN system, and whether the instructor was able to express her/his concerns to the captionist.

To date, the systematic collection of feedback regarding CAN systems from students and faculty has been limited. One major theme that emerges from all the reports is that students perceived these various systems as beneficial, particularly in creating increasing understanding of classroom communication (Hobelaid, 1988; McGee et al., 1995; Everhart, Stinson, McKee, & Giles, 1996).

Data also have been collected in the process of evaluating the C-Print™ system at Rochester Institute of Technology. Questionnaire interview data from mainstreamed deaf and hard of hearing students indicated that they reported significantly greater understanding of information during a lecture with C-Print™ than with an interpreter. In addition, students stated a preference for the hard-copy detailed notes generated by the C-Print™ system over notes from a traditional notetaker (Everhart et al., 1996).

These findings are similar to those for steno-based systems, but should not be construed to suggest that such systems should replace these more traditional services. The important point is that these data do show that some students and some classes find the services beneficial.

RELATIVE ADVANTAGES OF STENO-BASED AND CAN SYSTEMS

Steno-based systems. Steno-based systems have the following advantages:
- Steno-based systems capture virtually every word that is spoken. Thus, it is possible for the student to read the text of exactly what was said in real time.
- One stenotypist can cover a two-hour class, with a brief break.
- The stenotype machine is virtually silent.

CAN systems. CAN systems have the following advantages:

- CAN systems yield notes that are briefer and potentially easier to study than the verbatim transcripts yielded by steno-based systems.
- CAN captionists require relatively little special keyboard training beyond the ability to type 60 words per minute, increasing their availability.

Consideration of the relative advantages of the two systems indicates that it is not possible to make a general recommendation of one system over the other. A college may even wish to include both services in its repertoire of technologies.

The decision regarding which of the two services to provide will depend on a variety of issues, including availability of potential staff to provide support, costs, the type of class, and individual student needs.

NEW TECHNOLOGIES FOR COMMUNICATION AMONG MACHINES

A relatively recent application of technology, used most often with steno-based systems, is the provision of real-time transcription between two "remote" sites by telephone lines. The voice of a speaker is picked up by a microphone and transmitted to a stenotypist at a remote location via the first of two telephone lines. The stenotypist relays the real-time text via a second telephone line back to a television or computer display for the deaf or hard of hearing individual to read where he/she is located (Preminger & Levitt, 1997; Eisenberg & Rosen, 1996; Levitt, 1994; Stuckless, 1994). Although reports of this approach describe applications only with steno systems, it should apply also with CAN systems.

Infrared and *radio frequency-based networking devices* use a technology that increases the portability and ease of use of speech-to-text systems in the classroom. This technology eliminates the need for the cables that are commonly used to connect laptop computers with each other. One drawback of these cables is that the two laptop computers, i.e., the one being used by the captionist or stenotypist and the one being used by the student, need to be relatively close to each other. Also, cable connections require set-up time (often between classes) and are inconvenient when strung out in a classroom setting.

Infrared networking devices use a PCMCIA adapter (such as *Cooperative* that is produced by *Photonics*), or devices now being integrated into many laptop models, permitting wireless communication between computers. This means that the two (or more) computers do not need to be in close proximity to each other, and time does not need to be devoted to connecting the computers (Knox-Quinn & Anderson-Inman, 1996).

Software that permits two-way communication between the student and captionist or stenotypist already has been described. Network software (such as *Aspects* produced by *Group Logic*), provides for real-time collaborative interaction among up to 32 persons working in the same word-processing or graphics document. This network software permits the stenotypist or captionist to simultaneously communicate with more than one other computer, i.e., with numerous students in different locations of the classroom.

Using this software, it is also possible to create a split-screen display in which students may communicate with each other or add their own notes on half the screen, while observing the CAN or steno-generated text on the other half (Knox-Quinn & Anderson-Inman, 1996). One particular benefit of such an arrangement is that it may encourage note-taking on the part of the deaf or hard of hearing student, since she/he need not look at the keyboard. An added feature is that the program can correlate the student's own notes with the CAN or steno-generated text.

USE OF REAL-TIME SPEECH-TO-TEXT RELATIVE TO OTHER CLASSROOM SUPPORT SERVICES

Real-time speech-to-text is one of four direct classroom support services that are discussed in this series of reports, the others consisting of *assistive listening devices, interpreting*, and *notetaking*. Some of the factors we should consider in choosing one or more of these services with a given deaf or hard of hearing student taking a particular course follow. These factors are classified loosely under *Individual deaf or hard of hearing student, Course and/or instructor*, and *Other considerations*. For the purpose of this report, we will discuss these only in relation to real-time speech-to-text services.

Factors to be considered in selection of real-time speech-to-text and alternative support services in the classroom

Individual deaf or hard of hearing student. Student-specific factors include:

- **Preference of the student.**
  Major consideration should be given to providing this service when it is the student's preference over other services.
- **Prior experience and satisfaction with specific classroom support service.**
  Favorable prior experiences in using real-time speech-to-text in the classroom support the student's preference.
- **Ability to participate orally in question-asking and discussion.**
  Real-time speech-to-text services require that students either use their own voice if their speech is intelligible, or type and have the captionist read the display aloud to the class. For students with intelligible speech, it generally is easier for them to speak than to type.
- **Ability to make effective use of an assistive listening device in the classroom.**
  If the student is able to make effective use of an assistive listening device in the classroom, if the device is well maintained, and if both the instructor and fellow students cooperate in its use, the student may have little need for the real-time service. However she/he may continue to need its notetaking features.
- **Level of reading proficiency.**
  A requisite for functional use of real-time speech-to-text at the college level is the student's ability to read the text.
- **Level of signing proficiency.**
  A deaf student is likely to have proficiency in sign language, and this may be her/his first language. If so, the student may profit more from the use of an interpreter than from real-time speech-to-text. However, this will not obviate the probable need for a notetaking service of some kind.

Course and/or instructor. Course/ instructor factors include:

- **Lecture vs. discussion-oriented course.**
  Some courses involve more active in-class student participation than others. Because of the interactive constraints on real-time speech-

to-text systems, they are better adapted to courses that feature a lecture mode than to courses that are highly discussion-oriented. This reservation may not apply to students with intelligible speech skills.
- **Course content.**
  In general, speech-to-print services may work less effectively with certain courses, such as mathematics. However, experience in providing services indicates that the student's preferences and needs are critical in deciding which of his/her courses should use speech-to-text services. Where one student may not feel that a computer science class is appropriate for speech-to-text services, another student may.
- **Duration of class period.**
  Regardless of the type of service, a class extending beyond an hour without a break can be stressful for the service provider. Given a 10-minute break after the first hour, the stenotypist providing a steno-based service appears to be better able to continue through the second hour without relief than the captionist offering a CAN service or the interpreter providing the interpreting service.
- **Instructor's communication style.**
  The perfect instructor for real-time speech-to-text services (and for interpreting and conventional notetaking services as well) is one who speaks at or below normal speaking rates, i.e., 150 wpm, articulates clearly, and tends to use grammatically correct sentence structures. She/he is well organized by topic, and shares her/his lecture notes with the service provider well in advance of the class.

Other considerations. The following two considerations can be administratively and legally complex. Conditions might include:

- **Presence of more than one deaf or hard of hearing student in the class.**
  In colleges with large enrollments of deaf and/or hard of hearing students, it is common for two or more of these students to be enrolled in the same class. This does not necessarily mean the same classroom support service(s) are needed by each. This pertains particularly to a situation where one student needs an interpreter and a second student needs real-time speech-to-text services. In this instance, both services should be provided, but presumably the speech-to-text service could

supply notes to both, eliminating the need for a special notetaker.

- **Availability/unavailability of qualified service provider(s)**
  By law, a college cannot conclude that the most appropriate "type" of classroom support service for a given student is unavailable, without clear indication that considerable effort has been made to obtain the services of the needed provider(s). Because of the requisite training factor, one of the CAN systems should be considered among the most available, and a substitute for a steno-based system. The substitution of a transcription system for interpreting depends on several factors mentioned above, including reading proficiency (Brueggemann, 1995).

AUTOMATIC SPEECH RECOGNITION (ASR) IN THE CLASSROOM

At a national meeting in April 1997 on the topic of "Applications of automatic speech recognition with deaf and hard of hearing people" (Stuckless, 1997), numerous speech scientists spoke enthusiastically about recent developments in the ASR field, with particular reference to the recognition of continuous speech. This coincided with an announcement that Dragon Systems was about to release its first version of NaturallySpeaking, a major product breakthrough (Mandel, 1997). IBM followed later in the same year with ViaVoice.[11]

For many years, scientists have been seeking the model ASR system, one that would have three fundamental properties:[12]
- the capacity to recognize a large vocabulary
- the ability to process natural speech
- the ability to recognize different speakers

Large vocabulary. For more than a decade, systems have been available with vocabularies numbering in the thousands of words. Current products have "active" vocabularies of 30,000 words or more, with the capability of allowing the user to add thousands more, e.g., to add obscure names and technical terms. Vocabulary size *per se* is not a limiting factor for the use of ASR in the college classroom.

Natural speech. Until 1997, commercially available ASR products featured discrete speech recognition, requiring the speaker to pause briefly between each word. While these pauses were tolerable for dictation

purposes, speaking in this manner was anything but natural. A secondary effect was that our rate of speech was severely curtailed.

Since 1997, we have been able to choose among a number of products that are capable of recognizing *continuous* speech. By *continuous* we simply mean that no longer must we pause between every word. The provision of continuous speech in ASR certainly enables us to speak more naturally than was possible previously. Also, it enables us to speak at or near our normal speaking rate. A third major advantage is that it tends to lead to greater accuracy, which has been reported as high as 97 percent.

That having been said, we must distinguish between *continuous* and *natural* speech. The two are not synonymous. Continuous speech *per se* does not include the recognition of some of the cues found in natural speech, such as voice inflection and pauses. As a consequence, it does not automatically produce punctuation and other markers, e.g., space between paragraphs, which contribute so much to the readability of text. This is illustrated by the following excerpt from an actual lecture, as transcribed from an audiotape into text, using continuous speech recognition.

> Why do you think we might look at the history of the family history tends to dictate the future okay so there is some connection you're saying what else evolution evolution you're on the right track which changes faster technology or social systems technology

The above excerpt was transcribed with 100 percent verbatim accuracy, using continuous speech recognition. But imagine trying to read lecture text for an hour as it appears above, particularly when it is being displayed at the rate of 150 words per minute. Taken alone, high verbatim accuracy is no guarantee of readability.

As seen next, the same excerpt becomes much more readable when *punctuation* and *speaker identification* are added, using the appropriate voice commands.

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[11] Both products since have been upgraded and been joined by Lernout and Hauspie's *Voice Xpress* and Philips' *Free Speech*. See Alwang (1998) for a comparative review of these four products.
[12] A recommended clearly-written reference source on ASR is Markowitz, J.A. (1996). *Using speech recognition*. Upper Saddle River, NJ: Prentice Hall.

Instructor: Why do you think we might look at the history of the family?
Student: History tends to dictate the future.
Instructor: Okay. So there is some connection you're saying. What else?
Student: Evolution.
Instructor: Evolution. You're on the right track. Which changes faster, technology or social systems?
Student: Technology.

Recognition of different speakers. A single speaker transcribed the excerpt above because at present, ASR products are incapable of recognizing more than a single speaker (user) at a time, i.e., they lack speaker-independence. To become a user, an individual must sign on and devote half an hour or more to (a) becoming oriented to the system, and (b) orienting the system to his/her distinctive speech characteristics. She/he can then become a user, with her/his own speech files. To use the system, the user identifies her/himself, calling up these speech files.

Without speaker-independent ASR, we cannot pass around a microphone to students in a class with the expectation that their speech will be recognizable. This is one of several reasons why ASR products cannot yet capture conversational speech (Allen, 1997; Woodcock, 1997).

Extending ASR applications into the classroom. Given the present (1999) state of the art, it is not feasible to apply ASR for general real-time classroom use with deaf and hard of hearing students. However, if the application consists of a single user, e.g., a single instructor presenting an uninterrupted lecture, the task becomes less formidable. The following passage was transcribed from an audiotape of another lecture, using ASR.

> Today I'd like to discuss with you a little bit about the history of money my purposes to give you a flavor for the role of money and some of the interesting problems and types of money that existed throughout history to begin with I'd like to raise the question as to where did money come from today how to paper money get here

Note that this monologue is easier to read than the previous unpunctuated passage that involved numerous changes in speakers. Parenthetically, this

passage contains two ASR errors (purposes/purpose is; to/did), and a 97% verbatim accuracy rate. Judge its readability for yourself, notwithstanding its absence of punctuation. You may agree that this passage is quite intelligible, in spite of its two ASR transcription errors.

Now let's say the instructor had said *period* or *question mark* as he was speaking to break up his four sentences. These commands not only insert punctuation but also lead automatically to capitalization of the first word in the following sentence, adding to readability. The passage would then have appeared as follows:

> Today I'd like to discuss with you a little bit about the history of money. My purposes to give you a flavor for the role of money and some of the interesting problems and types of money that existed throughout history. To begin with I'd like to raise the question as to where did money come from today. How to paper money get here?

We are not suggesting that the instructor with a class consisting predominantly of hearing students use this strategy, but this sample does suggest how close we have come to making ASR feasible under specific conditions.

One researcher is presently exploring the use of *shadowing* as an interim technique for the use of ASR in the college classroom. This project involves the services of someone with an aptitude for shadowing the speech of the instructor and students together with a few hours of training and practice with ASR.

This person uses a special mask with a built-in microphone connected to a computer containing ASR software and her speech files. Her task is to listen to the instructor, restating what is being spoken as fully as possible, adding sentence-ending punctuation, and identifying each change in speakers, all in real time (Stuckless, in progress).

If recent progress is any indication, there is reason to be optimistic about extending the application of automatic speech recognition into the classroom (Levitt, 1997; Mandel, 1997; Picheny, 1997). Has its time arrived? The answer has to be *no*. However, within a few years, automatic speech recognition is likely to replace other real-time speech-to-text and

notetaking services for many deaf and hard of hearing students in the college classroom. If and when this occurs, it will come about because of its demonstrated value to these students, its relatively low cost, its convenience including availability when needed, and the direct control it will give to the student.

CONCLUSIONS

Speech-to-text systems have increased the educators' tools for effectively supporting deaf and hard of hearing students who are educated with hearing classmates. Currently there are many mainstreamed students who cannot hear well enough to follow the classroom discussion, but have intelligible speech and good reading skills. Such students are sometimes given an interpreter, but this service is of limited benefit if the student does not understand signs well.

There are also some situations where the student understands sign communication, but for success in a particular class, it is important after class to be able to review a text that details the class discussion. Speech-to-text services provide a quality option that can effectively address such situations.

The two technologies currently in use to provide speech-to-text services are steno-based systems in which a stenotype machine is linked to a computer, and CAN systems that use standard keyboard laptop computers. Automatic speech recognition systems, in which the conversion to print is done entirely by computer and without an intermediary, will become available in the future and may support communication access even more effectively (Kurzweil, 1999). Other advances in technology are also likely to make these systems more flexible and easier to use.

A serious issue is the fact that none of the speech-to-text technologies discussed in this report adequately address expressive communication by deaf and hard of hearing people.

Individuals with intelligible speech, such as many who are hard of hearing or late deafened, may be able to use their voices to make a comment or ask a question. Others may write or type into a keyboard to produce text or synthetic speech, but in many situations these means may be limited or inadequate.

Speech-to-text services are not a panacea for the communication difficulties of deaf and hard of hearing students. In instructional situations such as small group discussions, laboratories, and one-to-one tutoring, these services may be less appropriate than they are in lecture situations (Haydu & Patterson, 1990). Furthermore, many deaf students prefer an interpreter to a speech-to-text system in most class situations (Stinson et al., 1988).

Even with these limitations, speech-to-text services have been used repeatedly to effectively support accessibility to information in the classroom. This experience has clearly demonstrated that these services are a viable option for supporting the communication access of many deaf and hard of hearing students in settings where they are interacting with hearing people. In the future, as the necessary technologies improve, and as we learn more about how these services can effectively support students, speech-to-text services should make even greater contributions to improving the postsecondary education of students who are deaf or hard of hearing.

POSTSCRIPT PERTAINING TO LAWS AND REGULATIONS[13]

With relation to deaf and hard of hearing students, higher education is currently on the horns of a dilemma: given the advent of various speech-to-text systems and advances in voice recognition software, will institutions forego the services of sign language interpreters in reliance on speech-to-text systems, and/or will the shortage of qualified sign language interpreters in certain areas of the country inadvertently push colleges and universities into taking this step?

There are no easy answers. This chapter lays out the pros and cons of various speech-to-text systems and the factors, both student related and instructional, which should enter into a college's determination as to whether speech-to-text is a reasonable accommodation and if so, which type of speech-to-text system would be appropriate in a given circumstance. It also demonstrates that the data suggests that speech-to-text systems can be very effective for a good number of students, but that regardless of future developments, speech-to-text systems will always have the limitations inherent in such a process, most notably, reducing the ability of

deaf and hard of hearing students to fully participate in classes conducted in an interactive manner.

Ultimately, the law requires two things: (a) that communications with students with disabilities, here deaf and hard of hearing students, be "as effective as" that provided to students without disabilities; and (b) that an individualized assessment be made in order to determine what (a) is. This chapter goes a long way toward helping service providers make those assessments. In addition, public colleges and universities must give "primary consideration" to the communication preferences of deaf and hard of hearing students, although as discussed in other commentaries herein, this does not mean the student will always get what s/he wants.

For the most part, if a student prefers sign language and uses interpreters, institutions will opt for providing notes to students via notetaking systems which are effective but less expensive than a speech-to-text system which would arguably provide more complete notes. However, the law does not require that students with disabilities receive the "best" notes, only that they have notes which are "effective." Deaf and hard of hearing students should bear in mind that most hearing students rarely take notes of the quality which would be provided by a speech-to-text system.

At present, speech-to-text systems are roughly as expensive as sign language interpreters. In the future, this may change and lowered costs may become an incentive for institutions to choose speech-to-text over interpreters. Nevertheless, until and unless the law is amended, the legal analysis of which type of auxiliary aid or service should be provided and thus, whether access is achieved, will remain the same.

In addition, if a student's communication preference is speech-to-text and this is not available, the Office for Civil Rights (OCR) has made clear that a good faith effort to locate and implement such a system must be demonstrated before a public institution may provide an alternative system of communication. While private colleges and universities do not have to give "primary consideration" to students' communication preferences, they must nevertheless provide communications which are "as effective as" those provided to students without disabilities. Thus, in order for a private institution to provide an auxiliary aid or service which is arguably less effective than that requested by the student, it should likewise be able to demonstrate that it made a good faith effort to secure the auxiliary aid or service which is "as effective as" that provided nondisabled students, but nevertheless was unable to secure that aid or service.

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[13] Contributed by Jo Anne Simon, consultant/attorney specializing in laws and regulations pertaining to students with disabilities.

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PEPNet Perspectives

Postsecondary Education Programs Network

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Introducing:
PEPNet *Perspectives*

Dianne Brooks, Director
Northeast Technical Assistance Center

Colleagues:

I am pleased to introduce yet another exciting joint venture undertaken by the four regional centers that comprise the Postsecondary Education Programs Network (PEPNet). Welcome to the first issue of … *PEPNet Perspectives*!

As many of our readers may be aware, PEPNet came into existence in 1996 when the four regional centers agreed to work in a collaborative and coordinated framework. This partnership was undertaken with several key goals in mind, including efforts to enhance our abilities to reach more of our target audiences, to avoid duplication of effort, to increase cost-effective practices, and to more effectively address major issues that impact educational access and opportunities for students who are deaf and hard of hearing. Further, it is worth noting that perhaps one of the most distinctive and compelling characteristics of this multi-Center collaboration is that it is structured and implemented around a clearly defined set of strategic objectives and outcomes that are reviewed annually relevant to both quality and impact.

PEPNet Perspectives represents yet another of many strategic initiatives on which the four centers have collaborated over the past several years and continue to collaborate in a common and shared mission that, ultimately, focuses on expanding the knowledge and skills of educators, professionals, service providers, and educational institutions who work with students who are deaf and hard of hearing.

The newsletter will combine many features of existing local or regionally produced publications, as well as some new enhancements designed to facilitate cross-regional communication and interaction. These enhanced features include, but are not limited to, details and updates of planned intra- and inter-regional activities such as regional and national professional conferences and professional development opportunities. Also featured will be details about new PEPNet products that have been or are in the process of being developed. Articles contributed by regional and national authorities also will be a regular feature. In other words, all four centers will contribute to this joint publication, which will be published in two annual issues (Fall/Winter and Spring/Summer).

It is our hope that this will not be "just another newsletter," but one that offers significant and increased opportunities to benefit deaf and hard-of-hearing students across the country and those professionals who serve them.

Dave Buchkoski, Director
Midwest Center for Postsecondary Outreach

It is exciting to write an article for the first edition of *PEPNet Perspectives*! As a member of PEPNet since its inception in 1996, I have observed scores of positive changes that have enhanced postsecondary opportunities for students who are deaf and hard of hearing. Thousands of professionals working in two- and four-year colleges and universities and community rehabilitation programs have received training, attended the PEPNet national conferences, completed on-line training courses, and received technical assistance from one of the four regional centers.

Working for the Midwest Center for Postsecondary Outreach (MCPO), I have the opportunity of seeing the strength in numbers and the impact of collaboration among the centers and their respective outreach sites. Through collaboration we have developed more and better products in a more cost-efficient manner. The PEPNet national conferences, the Western Symposium on Deafness, national live teleconferences, the national needs assessment, on-line training, this newsletter, and representation at various national professional conferences are a few examples of the activities that provide opportunities for collaboration.

We hope that readers will find the articles valuable to their professional development needs and aid in expanding their knowledge base to provide quality accommodations to students who are deaf and hard of hearing in higher education. We hope that you visit our Web site at www.pepnet.org, which offers information about our current and future activities directed to professionals in the field.

Marcia Kolvitz, Director
Postsecondary Education Consortium

Life is really simple, but we insist on making it complicated. Confucius

How different is life today from life in Confucius' time? Hmmm, it may not be very different when you consider some of the basic facts of human nature! After almost 10 years of working together in PEPNet, we've started to realize that we *can* turn things around and make some complicated things much simpler. One example is this newsletter. Until recently, each regional center had its own newsletter. We recognized that what was printed in one region would likely be helpful in another region. So why not create just one and share it with everyone? I'm very pleased to see this collaborative effort among the four regional centers. Although it's a tremendous opportunity for us to share information across the entire country, we'd also like it to be a resource that addresses timely issues and offers ideas for effective practices. And as always, we welcome your involvement and feedback as we launch this new publication.

Cathy McLeod, Director
Western Region Outreach Center & Consortia

Dream Becomes Reality Within a Year!

As you read our first ever collaborative publication, we have achieved a milestone with the four PEPNet centers creating a national magazine.

Visualize how we would respond in sign: First! Pah! Awesome! Cool! About Time! Good Idea! Makes Sense! Nice! Finally, we have multiple voices in one national magazine for all.

Here in the West, we view this creative publication as an opportunity to learn from one another, to celebrate the efforts and achievements of people from all walks of life as we make postsecondary programs accessible and available. As professionals, this is a remarkable occasion for us to become better advocates and better teachers. Students, faculty, and professionals will all benefit from these diverse perspectives and different approaches.

On behalf of the PEPNet West team – Welcome *PEPNet Perspectives*!

Access, not service, is protected by law
by Jane Jarrow

Recently, I have been working with several institutions that are struggling with complaints/demands from deaf students regarding the nature and quality of services they are receiving. There seem to be some common themes among these complaints:

1) *Complaints about the quality of interpreter services provided*

In several cases, students have demanded that only *certified* sign language interpreters be assigned to interpret for them. While I know that some states have passed their own statutes to that effect (which, in many instances, has created tremendous problems because of the shortage of certified interpreters in some geographic locations), it is important to note that federal law does NOT require that the interpreters be certified.

Section 504/ADA requires that "qualified" interpreters be available to assure full communication access. The question then becomes one of assessing whether the interpreter is qualified for the task at hand. This is a difficult judgment in many instances (especially when the disability services person is NOT a specialist in this area and thus has limited personal ability to assess competency). The issue needs to be addressed, but it must be addressed in the context of the specific skills and abilities of the interpreter and the nature of the course, NOT in the context of some sterile assessment of past training or formal recognitions. In fact, in one instance the deaf student complained much more bitterly about the two certified interpreters he was working with than the one non-certified, qualified interpreter working with him in another class.

The real question is not about the skills of the interpreter, but of the adequacy of the information being conveyed. It is important to remember that the goal of federal laws is not to provide service(s), but to provide protection from discrimination (in this case, full and equal access to information).

2) *Attempts to co-opt/corrupt the role of the interpreter*

It appears there are still deaf students who see the provision of an interpreter in an educational setting as something more than a communication aid. Rather, they want the interpreter to be providing a level of educational support that goes significantly beyond the limited role that we typically assign to interpreters.

One student wanted the interpreter to read the textbook for her and interpret it (that is, put it into language she could understand). Another made repeated references to dissatisfaction with interpreters who would not "work with her" in classes. When pressed, the student said that all the interpreter was doing was signing what the instructor and others in the class said but was not expanding on spoken communications. Still another wanted the interpreter to both interpret the questions on an examination and also to scribe (translating from sign back to clear written English) on the tests. This last example is something that some institutions choose to do for some students in some circumstances, but it appears to go well beyond the assigned role of facilitating face-to-face communications.

It may be that these misunderstandings arise from the role played by educational interpreters in the K-12 setting, when it often is deemed appropriate for the interpreter to extend his/her functioning beyond strict interpretation. However, such mismatch in expectations can create significant tensions between students, disability service providers, and the interpreters themselves.

3) *Complaints about the lack of institutional focus on deaf services*

Several examples have surfaced recently of students who are distressed because they believe there is not enough attention paid to their needs, as deaf students, within the institutional environment. In one case, this concern manifested as a demand by the student that the institution hire a full-time interpreter to be available when she needed it, any time she needed it. (The student was only in class for 10.5 hours per week.) In another instance, the student maintained that the institution had failed in its responsibility to train the disability service provider to be more sensitive to issues of deafness. Yet another student suggested that having a full-time coordinator for learning disabled students, when there was no comparable staff assignment to cover the needs of the (two) deaf students on campus, was discriminatory. In each case, the focus of the deaf individual seems to be, once again, on the services rendered, rather than on the adequacy of the communication access provided.

It seems appropriate, then, to reiterate one of the basic tenets of Section 504/ADA. Both are considered civil rights statutes. They were both meant to provide equal access. The many pages of federal regulations that support the implementation of the federal laws focus on obligations for fulfilling this mandate for access/opportunity, NOT on how these obligations are to be fulfilled. It is important for both service providers and consumers to keep the focus on nondiscrimination and equal opportunity. Whether or not access is to be provided is never a concern. It must be. How that access is provided is open to negotiation!

Jane Jarrow, Ph.D., is president of Disability Access Information and Support (DAIS). An expert in disability services, she has been providing technical assistance and training to service providers on access and support services for persons with disabilities in higher education and has co-authored or authored numerous books and articles in the field of disabilities in higher education over the past 21 years.