Evaluating Information Technology Continuing Education Workshops Offered to Deaf and Hard-of-Hearing Professionals

by Donald H. Beil and Gary Long

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Introduction

This paper describes the techniques developed for evaluating week-long computer workshops offered to deaf and hard-of-hearing adults by the Applied Computer Technology Department (ACT) of NTID. The workshops are provided under the auspices of the Deaf Initiative in Information Technology (DIIT), created through a three-year award of $535,000 from the National Science Foundation (NSF).

This project, currently entering its third year, provides the following features. It:

• develops and offers workshops that provide an opportunity for deaf and hard-of-hearing information technology professionals to enhance their technical skills
• provides significant benefit for the current full-time ACT faculty, because each faculty member takes a grant-supported, scheduled leave-of-absence to complete self-study activities in a new area of technology and then offers a workshop
• provides significant benefit for our full-time NTID deaf and hard-of-hearing undergraduate students, who benefit as the materials the faculty learn and develop for the workshops are integrated into our regular curriculum

Each workshop is led by an ACT faculty member, each of whom presents his/her workshop directly in sign language; no interpreters are used in the workshop setting. All attendees are deaf or hard-of-hearing. To date, eleven separate workshops have been held, and 65 individuals have attended the workshops. Complete information regarding the technical aspects of the project is available at *www.rit.edu/diit*.

Proposed Evaluation Components

Our grant proposal promised that workshop evaluation instruments would include both:

• Quantitative measures – giving specific feedback on components of the training
• Qualitative measures – open-ended questions that would reflect perceptions of the impact of workshop contents on the jobs/lives of attendees, or on what can be done to improve the workshops

We promised to use interpretive research, which is gaining prominence as a method of evaluating information technology activity. Since these qualitative research methods deal–to a degree–with human experience, they would allow us to understand the social phenomena surrounding these workshops, including perceptions of their effectiveness and the impact of the workshops on the careers of those attending.

We also promised to use interviews, evaluation forms, and first-hand observation to understand the effectiveness of our workshops in examining the impact of the training within the context of the attendees' careers. This was to include


Notes of Note

Susan Fischer was a short-term Visiting Fellow at the Research Centre for Linguistic Typology at La Trobe University in Melbourne, Australia, during two weeks in August, 2002. She gave a presentation on her cross-linguistic sign language research, participated in a conference on adjective classes, and worked with a colleague, Dr. Ulrike Zeshan, analyzing videos of about eight different sign languages.

Fischer was also an invited speaker for the International Symposium held at NTID's sister institution in Japan, Tsukuba College of Technology (TCT) on October 1, 2002. She presented her research on the importance of studying a wide variety of sign languages. Previous invited speakers from NTID have included Dean Alan Hurwitz and Professor Jerome Cushman.

During July, 2002, **Frank Caccamise** and **Bill Newell** conducted Sign Communication Proficiency
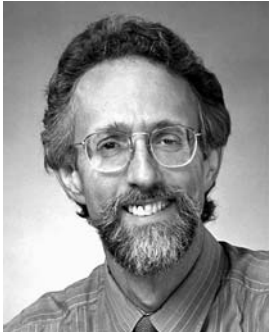
How Does Research Change Practice?

Research can change assumptions and practice. Like Dowaliby and Lang (1999), I would have assumed that video clips of the text content and clips showing the text translated into sign language would greatly assist a deaf reader to comprehend and remember details about the anatomy of the human eye. The findings of their research indicated, however, that answering and receiving feedback on adjunct questions in English boosted the performance of lower ability readers to match that of higher ability readers who read the text alone. This study has helped to change my assumptions about deaf students' reading and what and how I teach graduate students preparing to teach deaf students in high school.

How do such studies change practice? The fact is, just by being published in professional journals, they don't. Teachers require time, support, and in-service training to consider recent research and its implications. If research is to have any affect on the academic and professional lives of deaf students, it must be translated into practice by researchers and teachers working together. Further, to determine whether a practice is immediately effective and applicable to other groups, it needs to be systematically evaluated.

In this issue of the Research Bulletin, we present descriptions of two innovative training projects. In the Deaf Initiative in Information Technology Project (Beil & Long), deaf professionals participate in barrier-free computer workshops. The effectiveness of the training is being evaluated by a variety of measures and research methods. The design and implementation of the project was based, in the first place, on an evaluation of post-graduate training needs.

The other is an in-service project that brings research (and technology) to teachers of the deaf around the world, and the other is a post-graduate project that brings state-of-art computer training to deaf professionals in the U.S. In the PEN-International Project (Clymer and DeCaro), participants consider research on how deaf students learn, instructional approaches supported by research, development and use of technology in classrooms, career opportunities for deaf students, and the attitudes surrounding them.

In both of these projects, we are fortunate to have the generous support of sponsors who understand the need for research-based training and evaluation. The likelihood of change is also increased by the extensive collaboration witnessed to date among researchers, teachers, technicians, professionals, and students in these projects. On this note, it is fitting to acknowledge the role Dr. Jeffrey Porter played in fostering such collaboration at NTID as Interim Center Director of the Center for Research, Teaching and Learning, and publisher of the *NTID Research Bulletin*. Thanks, Jeff, and welcome back to the lab and the classroom.

Reference

Dowaliby, F., & Lang, H.G. (1999). Adjunct aids in instructional prose: A multimedia study with deaf college students. *Journal of Deaf Studies and Deaf Education*, *4*, 270-282.

John A Albertini

John Albertini
Chair, Department of Research

Don Beil has been a faculty member at NTID for over 27 years. He has 31 years of computer experience, and has been working intensely with the Internet for the last five years. He has offered several workshops to deaf and hard-of-hearing adults on creating web pages. For more information about this project, contact Beil at DHBNDP@RIT.EDU.

Gary Long has designed programs of research to examine student learning, classroom communication, and student academic engagement. The majority of his research efforts has focused on the interplay of cognitive and social/emotional variables that impact on academic achievement for persons who are deaf. For more information about the evaluation of this project, contact Long at GLLERD@RIT.EDU.

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post-workshop employer and attendee questionnaires. These data would then be used by the project evaluation consultant to prepare separate reports evaluating each workshop. The following section describes the evaluation techniques that we have in fact been using with the workshops.

Actual Evaluation Components
A five-part evaluation procedure was developed for the workshops, with the first three components conducted on the last day of each workshop, and the remaining two evaluation techniques used after a workshop was completed. Each procedure is described below.

1. *The NTID Student Rating Survey* (SRS). The SRS computerized worksheet is the formal evaluation system in use by all faculty at NTID to obtain classroom perceptions from our full-time undergraduate students. It is composed of two sections, a Summative Questions section containing four standardized statements (e.g., "I am satisfied with this instructor's teaching skill" and "I am satisfied with this instructor's communication skills") asked of all students for all classes. Students are asked to rate their agreement with the statements on a five-point Likert scale.

This instrument provides a strong baseline for assessment since a workshop can be compared to an extremely large number of courses taught at NTID/RIT. The Summative Questions section also includes a one-page graphical analysis that shows the means, standard deviations and proportion of students responding to each of the four summative questions. That analysis provides a single graphical comparison of the feedback from a workshop compared with student feedback recorded from a continuously growing number of NTID students (currently over 7,000), in the daytime courses offered by NTID.

The second section of the SRS contains Teacher Selected Questions–formative items–with items chosen from a large bank of available questions. Twenty questions were selected by the authors for evaluating these workshops (e.g., "There was a good feeling in the classroom between the instructor and the students"), and have been used consistently for all workshops offered.

2. *Open-ended questionnaire.* The second instrument consists of a computer file with approximately 20 open-ended questions developed by the authors. This instrument obtains attendee responses, in their own words, on items that are specific to the workshop. Examples of questions are "How could the workshop be improved?" and "Did you come to the workshop with the right technical skills to be successful in this workshop?"

Participant responses are collected by providing each attendee with a diskette containing a word processing file with the questions. Each attendee, working at a computer, is asked to open the file and take as much time as needed to type answers to the questions. Their responses are used along with other data in preparing the formal summary written evaluation of each workshop. In addition, the complete survey with all verbatim anonymous responses is also included in each evaluation report.

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Interview (SCPI) Training Workshops at the Virginia School for the Deaf and Blind and the Alabama Institute for the Deaf and Blind. In August, 2002, Frank, in collaboration with Kentucky School for the Deaf (KSD) SCPI Team members Gayle Deville and Rita Zirnheld, conducted SCPI Workshops for KSD and Eastern Kentucky University.

In an effort to increase access to science, mathematics, engineering and technical education for students who are deaf or hard of hearing, the National Science Foundation recently awarded a grant of $780,000 to fund "Access to Technical Education Through Sign Language Interpreting, led by **Marc Marschark**, with **Patty Sapere**, **Michael Stinson**, **Rosemarie Seewagen**, and Carol Convertino, research intern for the first year. The project will examine the factors thought to influence the comprehension of sign language interpreting and learning by deaf students in the classroom and will identify characteristics of students,

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Two attendees at Professor Anthony Spiecker's hardware workshop, one of eleven workshops offered to date through the Deaf Initiative in Information Technology project, discuss a technical point in the hardware laboratory.

3. *Group interview*. The third evaluation procedure is a group interview conducted with attendees by the project evaluation consultant. The interview elicits additional information that might not have been provided by the other two evaluation instruments. Multiple issues are raised by the researcher, ranging from "How difficult was it for you to receive support to participate in this workshop?" to "Does taking this workshop with other deaf participants provide an advantage to you?"

As participants sign their responses, one of two interpreters present voice the comments into an audiotape-recorder. The tape is later typed, providing a transcript of the interview. The transcript of that interview is then used in preparing the written evaluation of the workshop, and is also included verbatim in the evaluation document.

Two additional evaluation protocols were developed for the project, with both intended to evaluate the usefulness of the workshop to the attendee once he/she returns to work. The authors developed query items for both instruments below.

4. A questionnaire was developed to be sent via email to each attendee several months after the completion of the workshop. Our return rate from attendees was extremely low, and this protocol was abandoned after several workshops.

5. A questionnaire was designed to be used on the phone with the supervisor of each attendee. Again this questionnaire was designed to be used several months after the workshop was completed. At the end of each workshop we asked each attendee to give us permission to contact his/her manager and ask the questions. We learned early in the project that a very small number of attendees gave us permission, and for that reason this protocol was also abandoned after several workshops.

Results

Multiple evaluation strategies provide significant data on which to draw evaluative conclusions. The data provided by the Student Rating Survey is significant in providing a comparison of the teaching in these workshops to a very large database of other similar evaluations. As a result we are able to analyze these data within a meaningful context, rather than within a vacuum.

The data collected from the open-ended questions and the interviews were perhaps the most revealing and unexpected. As we reviewed these data we realized that a strong unintended benefit of the workshops is their social nature. While we realized that this would be an important benefit, we had no idea of its critical importance to attendees. Since we have exact quotes, we are able to report this finding in attendees' words, as shown in the following comments from four attendees.

"I was able to fully participate in the class through questions and discussions and interaction with other deaf and hard-of-hearing attendees. This doesn't often happen in a class with a hearing instructor. Communicating in sign language permitted me to fully participate in the class."

"It's great to have an information technology workshop for hearing impaired and deaf professionals.

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teaching situations and interpreters that can enhance learning in postsecondary education.

Marschark was keynote speaker at the Florida Symposium on Early Childhood Hearing Loss, September 26-27. His presentation, "Elvis has left the building: Rethinking deaf education, cognitive development, and language learning," addressed integrating research and practice in deaf education.

An article, "How deaf students learn to write: The interaction of language, modality and instruction" by **John Albertini**, appeared in the April 2002 issue of *Hörgeschädigten Pädagogik*, a German journal for teachers of the deaf.

On September 26, 2002, Albertini presented a live teleconference on what research says about teaching reading to deaf students. Arranged by the Pennsylvania Training and Technical Assistance Network, the teleconference was broadcast to multiple sites across the state of Pennsylvania.

The social environment is also great since you have your peers to communicate with."

"Hearing workshops were pretty hard for me to understand, but in this workshop I understood better because of the feedback from deaf classmates."

"I enjoyed learning from a deaf professor who can sign and being in class with other deaf students who can communicate with sign language."

Not only did the results above provide us with the satisfaction of knowing that our workshop model was a successful one, but they also had an unintended side-effect on our activities. As a result of this early feedback from attendees, we revised our marketing activities–which had previously focused only on the technical benefits of the workshops–so that the social benefits of the workshop were also marketed to potential attendees.

Without the qualitative measures provided by these evaluation techniques we would not have had the advantage of this knowledge.

The open-ended questions and the group interviews provide a significant additional benefit–flexibility, while the SRS provides an important, consistent, comparison between the workshops. But the strength of the SRS consistency as a comparison methodology is a weakness when, during the course of the project, we want to change the information we collect. The open-ended questions, however, are easily modifiable, as are the questions asked in the interviews. When we realized we needed different information from attendees, or when the national advisory group for the project asked us to collect different data, we easily revised the open-ended and interview questions.

Conclusion

The mix of quantitative and qualitative instruments used to evaluate these workshops provides significant data for consistent on-going workshop evaluation, while at the same time providing the flexibility to alter the type of feedback received from workshop attendees.

In our experience, the evaluation of workshops other than those described in this paper, are typically conducted only with a short, printed handout; however, we encourage those charged with these evaluations to consider expanding their repertoire of evaluation techniques to include qualitative methodology such as open-ended questions provided via a word processing file, or the use of participant group interviews.

NTID/RIT has just received two grants from the US Department of Education, totaling over $2.5 million. Both are from the Special Education—Personnel Preparation to Improve Services and Results for Children with Disabilities program of the Office of Special Education and Rehabilitation Services, and both are primarily training grants.

The first, directed by Gerald Bateman, Associate Professor and Director of the Master of Science in Secondary Education of Students who are Deaf or Hard of Hearing (MSSE) program will attract high quality students and promote stronger partnerships with local school programs.

The second, coordinated by Paula Brown, Associate Professor and Chair of the NTID Speech and Language Department, and Catherine Quenin, Associate Professor of Speech-Language Pathology at Nazareth College of Rochester, is for a model collaborative certificate program that will provide training in the full range of communication approaches for deaf and hard-of-hearing children and youth.

Gerald P. Berent, Ph.D., NTID Department of Research, conducting an English as a Second Language Workshop for faculty from Russia, Czech Republic, Japan and the Philippines.

William Clymer is an associate professor at NTID.

James DeCaro is a research professor at NTID.

Postsecondary Education Network International For Students Who Are Deaf and Hard-of-Hearing

By E. William Clymer and James J. DeCaro

On June 29, 2001, dignitaries from the Rochester Institute of Technology, National Technical Institute for the Deaf, Tianjin University of Technology (China), Bauman Moscow State Technical University (Russia), Tsukuba College of Technology (Japan) and the Nippon Foundation (Japan) signed a formal agreement establishing a cooperative partnership to create an international network supporting the technical education of postsecondary deaf students from around the world. This network, The Postsecondary Education Network International (PEN-International), funded by the Nippon Foundation of Japan, supports the sharing of expertise among universities teaching science and technology to deaf students.

In the 16 months since the signing ceremony, PEN-International has moved quickly to realize its goals. By working closely with NTID faculty, staff and students, the PEN-International team has been able to facilitate sharing the collective NTID experience and state-of-the-art expertise in postsecondary deaf education with international partners.

PEN-International Goals

PEN-International is the first-of-a-kind international partnership of colleges and universities serving the postsecondary education needs of deaf and hard-of-hearing students. Faculty training, online learning technology, information technology and instructional technology are being used to improve teaching and learning, increase the application of innovative instructional technology, and expand career opportunities for deaf and hard-of-hearing people.

Over a five-year period, PEN-International will include up to six nations. PEN-International will enhance local capability and global networking in each participant country. Member institutions will develop the ability to export what has been learned through the project to other programs serving deaf and hard-of-hearing students in their home countries and to other countries around the world.

Implementation Strategy

Two key elements of collaboration with each PEN-International partner are central to project success: the creation of a professional faculty development model and training plan, and the design and construction of an instructional multimedia computer lab with videoconferencing capability.

• **Training.** PEN-International training is based upon a professional development model that begins with a needs assessment, the creation of workshops that are objective-based, web-based workshop resources and a formative and summative evaluation of effectiveness. The ultimate goal of the entire effort is to improve student learning at partner universities. The training model is based upon the successful NTID Instructional Technology Consortium (ITC) (*http://www.rit.edu/~ntiditc*) faculty development paradigm. The ITC is a collaborative, faculty-driven initiative for enhancing teaching and learning with deaf and hard-of-hearing students through the use of technology and related innovative teaching strategies. PEN-International depends upon successful teachers teaching other teachers about proven strategies for use with postsecondary deaf students. As with the ITC, the key component of PEN-International training is the experienced NTID and TCT faculty and staff who are willing to share their experience with their colleagues from around the world.

• **Multimedia Computer Laboratory.** Each PEN-International partner is establishing a multimedia computer laboratory with videoconferencing capability, which can support student learning and faculty development of technology-based teaching solutions. To design a multimedia lab that meets local needs, teachers and technical experts from each partner university consult with NTID technical experts and tour the various multimedia classroom configurations at NTID. When completed, these labs offer faculty a teaching/learning environment with the latest instructional technology. When not used for classroom instruction, the labs are generally available to deaf students for independent work. Videoconferences can also be scheduled in the labs for seminars and instruction.

NTID technical experts conduct a tour of the NTID English Lab for faculty from Bauman Moscow State Technical University and Charles University, Czech Republic.

Bill Clymer is coordinator of the Postsecondary Education Network International, and coordinator of the Educational Technology and Education of the Deaf Symposium, to be held at NTID in June, 2003. He recently served as the coordinator of the NTID Instructional Technology Consortium and was the coordinator of the 2001 Educational Technology and Education of the Deaf Symposium. For more information, he may be contacted at EWCNCP@RIT.EDU.

Jim DeCaro is research professor and immediate past dean for NTID, a post he held for 14 academic years. He is currently director of PEN-International. For more information about this project, contact DeCaro at JJD8074@RIT.EDU.

Partners

Tsukuba College of Technology (TCT) for deaf and visually-impaired people was modeled after NTID when it was founded in 1990. It was the first college of its kind in all of Asia and has proven in a very short period of time to be a leader in the technical education of people who are deaf and hard of hearing. These credentials led NTID to partner with Tsukuba College of Technology to create the Postsecondary Education Network International and to begin work with universities in China, Russia, and the Philippines.

Tianjin Technical College for the Deaf of Tianjin University of Technology (TUT) is the first technical college for the higher education of people who are deaf in China. Established in 1991, the college enrolls students from throughout China. Presently, more than 125 deaf students study technical disciplines that prepare them for productive membership in Chinese society. A total of 12 members of the TUT faculty have been trained at NTID since June, 2001. An 18-station multimedia computer classroom was installed at TUT and opened in October, 2001.

Bauman Moscow State Technical University has been educating deaf students since 1934. In the early 1990's, the university administration determined to expand programs and services for deaf students and established the Center on Deafness. Presently, approximately 250 students study in various programs across the university as well as in compensatory programs at the Center on Deafness.

Members of the Bauman faculty traveled to NTID in July, 2002 for training regarding "English as a Second Language for Deaf Students at the University Level." This week-long series of seminars was specially designed and developed by Gerald P. Berent, Ph.D., NTID Department of Research. The seminars were presented by senior members of the NTID faculty, based upon their years of experience in deaf education and English as a Second Language instruction.

During the same week, two technical experts from Baumann worked with NTID technical experts in developing specifications for their computer classroom and video conference facility, which will be dedicated in late November 2002.

The School of Deaf Education and Applied Studies at College of Saint Benilde (CSB), De La Salle University, Manila, is the latest network member. CSB offers a bachelor's degree in Applied Studies. The college is the first to educate significant numbers of deaf students in the Philippines. Established in 1991, initially as a small program for the Deaf, it evolved into one of the schools of the college in 1996. The School of Deaf Education and Applied Studies has a 26-member faculty, with a current enrollment of 120 students. Two administrators from the CSB have attended small group seminars conducted by administrators and faculty from NTID and TCT, in the USA and in Japan. Additionally, a member of the CSB attended the English as a Second Language workshop this past July at NTID. CSB is constructing a multimedia computer lab, which will be officially opened in January, 2003.

PEN-International is evaluating its impact using a model suggested by Guskey (2002). This model is used to measure the impact of faculty development, beginning with faculty participant reaction to training and learning, and progresses to measuring changes in student learning outcomes.

Collaborative Spirit

The goal of providing high quality education to deaf students at the postsecondary level is the unifying goal shared by all PEN-International partner faculty and technical experts. Those NTID faculty and staff who have developed and presented workshops for PEN-International modeled the collaborative spirit that is the hallmark of this program to improve the educational circumstances of students who are deaf around the world.

Additional information about PEN-International is available on its website, *http://www.pen.ntid.rit.edu*.

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Professor Anthony Spiecker describes a computer component to attendees during the lecture portion of his workshop on computer hardware. For more information about the NSF–sponsored Deaf Initiative in Information Technology project, and its evaluation, see the article on p. 1.

In 1993, the National Technical Institute for the Deaf established the Center for Research, Teaching and Learning. A primary mission of the Center is to "foster advances in teaching and learning that enhance the academic, professional, social and personal lives of people who are deaf or hard of hearing." Among its other functions, the Center both conducts research relevant to that goal and supports research conducted by colleagues from across NTID.

As part of our collaborative efforts, the Center regularly undertakes the collection and dissemination of relevant research findings from across NTID. Included for each publication is a description of the implications of the research findings the author thinks will be most relevant for NTID's audiences.

Elliot, L., Stinson, M., McKee, B., Everhart, V., & Francis, P. (2001). College students' perceptions of the C-Print speech-to-text transcription system. *Journal of Deaf Studies and Deaf Education, 6, 285-298.*
C-Print™ is a real-time speech-to-text transcription system used as a support service with deaf students in mainstreamed classes. Questionnaires were administered to 36 college students in courses in which the C-Print system was used in addition to interpreting and notetaking. Twenty-two of the students were also interviewed. Student ratings of lecture comprehension indicated good comprehension with C-Print, and the mean rating was significantly higher than that for understanding the interpreter. Students also rated the hard copy printout provided by C-Print as helpful, and they reported that they used these notes more frequently than the handwritten notes from a paid student notetaker.

Implications
The rapid increase in the numbers of deaf and hard-of-hearing students participating in mainstream classrooms has challenged educators who are obligated to provide communication access to all their students.

The C-Print speech-to-text transcription system provides an alternative support service to those students who continue to miss vital classroom information for various reasons. Students in this study who preferred C-Print tended to be relatively proficient in reading and writing English and speechreading. Evidence supports the perspective that it is desirable to match support services to the needs and preferences of individual students, given considerations of cost and availability.

Lang, H.G., & Albertini, J.A. (2001). Construction of meaning in the authentic science writing of deaf students. *Journal of Deaf Studies and Deaf Education, 6, 258-284.*
This study examines how students construct meaning through writing during authentic science activities. Over 200 writing samples from deaf students in grades 6 through 11 were analyzed, as well as the explanatory and reflective comments of their teachers. Three instructional conditions and two teacher variables were found to play roles in determining the accuracy and adequacy of the writing: (1) the writing prompts that teachers used; (2) the focus for the writing; (3) follow-up to the initial writing activity; (4) the teacher's

content knowledge; and (5) the teacher's ability to interpret student writing.

Implications

Results indicated that process-writing strategies help students learn science. The best results were obtained by teachers who provided clear and focused prompts for the writing and who were able to respond to or follow up the writing with another activity. The results also suggest that regular use of such writing in science classes helps teachers monitor and assess student learning.

Marschark, M., Lang, H.G., & Albertini, J.A. (2000). *Educating deaf students: From research to practice*. New York: Oxford University Press.
This volume examines the education of deaf children by considering existing research pertaining to the strengths and needs of deaf children and educational methods that have been used—successfully or unsuccessfully—with both deaf and hearing children. Academic, cognitive, language, and personal/social development are seen as integrated and mutually influencing throughout the years from preschool to university. By evaluating what we know, what we do not know, and what we thought we knew about learning among deaf children, the book provides new insights into educating deaf students and others with special needs.

Implications

This book examines the education of deaf children by considering both their strengths and needs. It has been shown that development and education influence each other throughout the school years. *Educating deaf students: From research to practice* provides new insights into optimizing education of deaf children, and gives suggestions for parents and teachers of deaf children from a non-technical summary of existing research. Implications for administrators and policy makers are also provided.

If you would like to obtain information in an area beyond what you see listed, you can write to the first author of closely related papers, c/o NTID. If you are unable to obtain one of the publications on this sheet from your local library, you may send this form to: Educational Technology Resource Room, National Technical Institute for the Deaf, 52 Lomb Memorial Drive, Rochester, NY 14623-5604.

_____ *Elliot, L., et al. (2001). College students' perceptions of the C-Print speech–to–text transcription system.*
_____ *Lang, H.G., & Albertini, J.A. (2001). Construction of meaning in the authentic science writing of deaf students.*
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