



**Center on Access Technology:
For Students Who Are Deaf or Hard-of-Hearing**

An NTID/RIT Center of Excellence

Business Plan

For

Establishment of the
NTID Center on Access Technology
January 2006 through December 2008

APPROVED
14 February 2006

March 16, 2011

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Background of Business Plan

1. Goal
 - a. RIT/NTID is establishing a collaborative network of individuals at NTID and RIT, along with other universities, industry and professional organizations to promote research and development that explores the potential for technology to positively impact access to education for deaf individuals.
2. Background
 - a. The business plan for the establishment of the Center on Access Technology (CAT), will cover the period from January 1, 2006 to December 31, 2008.
 - b. This business plan was developed following the *Action Steps to Develop a Business Plan for the Center on Access Technology* submitted to Dr. Hurwitz by Dr. DeCaro. (9 May 2005; <http://www.pen.ntid.rit.edu/ewc/atc/steps.pdf>)
3. Initial Team
 - a. James J. DeCaro, Director and E. William Clymer, Coordinator of PEN-International, will work closely with Peter Lalley in the development of the business plan and subsequent proposal submissions.
 - i. Peter Lalley is assigned to this task for 25% of his workload.
 - b. PEN-International will manage the effort of the Center until the end of 2008; when the status of the Center will be evaluated and assigned to another unit of NTID/RIT.
4. Next Steps
 - a. After the business plan is reviewed and modified by the NTID Administration, the Center on Access Technology will be established. (March 1, 2006).

Business Plan

1. Center Description

- a. RIT and NTID will establish a collaborative research and development network of individuals at NTID and RIT, and those at other universities, industries and professional organizations to promote research and development that explores the potential for technology to positively impact access to education for deaf individuals.
 - i. Educational experiences refer to direct classroom, online learning, laboratory and associated experiences; and the overall educational environment where assistive or augmentative technologies, can improve the educational and communication experience of a student who is deaf or hard-of-hearing.
 - ii. The Center will seek to provide leadership and support to those individuals conducting research, development and evaluation of technology as it pertains to enhancing the postsecondary education experience of deaf persons.
- b. The Center will investigate, evaluate, report and train individuals in the most effective and efficient use of access technologies in order to accelerate the widespread implementation of best practices within deaf education at the postsecondary level.
 - i. The time frame for most undertakings will be 18-36 months, i.e. from initiation to dissemination.
 - ii. Emphasis will be placed on the analysis of existing technologies with potential for improving access for deaf persons. The basic, formative research and development of such solutions will be left to others.
- c. NTID financially support the Center on Access Technology for three years (See section 9 on page 10). It is expected that the Center will be self-sufficient after the first three years of operation. If this is not the case, NTID's commitment to the continuation of the Center will be reconsidered.
 - i. Upon the establishment of the Center on Access Technology, an immediate effort will be initiated to seek endowment, and other funds to support the Center.

2. Center Mission

- a. To establish and promote working relationships within RIT/NTID and other organizations with an interest in enhancing the use of access technologies regarding the educational experiences of deaf and hard of hearing students.
- b. To seek external funding through grants and donations to eventually fully support the operations of the Center on Access Technology

- c. To continually monitor and evaluate access needs within the deaf education community and contribute to the successful implementation of such technologies in as short a time period as possible.
- d. To scan access technology and general information technology for potential benefits within deaf education and incorporate that knowledge within NTID's programs.
- e. To prioritize possible solutions and projects given the knowledge gained from the analysis of needs and emerging innovative technologies.
- f. To seek support for initiatives that will compare and evaluate various access technologies and report findings to the academic community to guide decision-making with regards to offering support services to deaf students.
- g. To report and disseminate current findings and developments supported by the center to appropriate organizations and individuals.
- h. To develop and disseminate instruction and training on issues related to access technologies and deaf education.

3. Personnel

- a. Director
 - i. James J. DeCaro will serve as interim director of Center on Access Technology until a permanent Director can be hired by NTID or until December 31, 2008. Dr. DeCaro will report this project to Dr. Hurwitz until such time as it is determined to shift the center to NTID College Operations.
- b. Associate Director
 - i. E. William Clymer, will serve as Associate Director of the Center on Access Technology. The specifics of his assignment within the Center will be determined along with his continuing role as Coordinator of PEN-International by Dr. DeCaro.
- c. Supporting Faculty
 - i. Dr. Peter Lalley will support the effort of the Center on Access Technology, with an initial assignment through June 2007 (25% of his POW). His primary responsibility will be to seek external funding through grant submissions. The specifics of his assignment will be determined by Dr. DeCaro.
 - ii. This business plan calls for the immediate hiring of a doctoral level individual to serve as a senior research associate for the center.
- d. The PEN-International support team will provide traditional office support during the initial operations of the Center on Access Technology.

4. Target Market

- a. NTID students, faculty and staff; both as participants in the work of the Center and as beneficiaries of the improved implementation of access technologies at NTID.
- b. Deaf and hard of hearing students (including those with secondary disabilities) at the post secondary level
- c. Professionals who serve deaf and hard of hearing students
- d. Access technology professionals
- e. Information technology, business and industry personnel involved in the development of and sale of specific access technologies as well as general technologies businesses that could incorporate access solutions within their products
- f. Hearing people who regularly interact with deaf people in the educational environment

5. Analysis of Need, Assessment of Existing Access Solutions & the Potential for Success

- a. Five Focus Groups (A complete list of participants, agendas and summation notes can be found at the following URL: <http://www.pen.ntid.rit.edu/ewc/atc/catdoc.htm>) were convened to provide the Center on Access Technology development team a variety of perspectives regarding the general area such an access center could address. Each focus group had a specific perspective, but when reviewed as a whole, a very clear picture emerges as to the general areas where there exists a need and an opportunity. These areas are summarized under the strands listed below in 5b below. The summary notes are included at as attachments:
 - i. Instructional Technology Specialists Attending the Instructional Technology Symposium, June 28, 2005
 - ii. Technology and Deafness Specialists, September 16, 2005
 - iii. NTID National Advisory Group, October 28, 2005
 - iv. RIT/NTID Community, November 8, 2005
 - v. RIT/NTID Student Representatives, December 14, 2005
- b. Strands of the Center's Work
 - i. Classroom Access Technologies
 1. Notetaking
 2. Captioning
 - a. Classroom/Presentation
 - b. Video Display on WWW

3. Text Display Systems
 - a. C-Print
 - b. CART
 - c. Summation and Search Features
4. Online and distance access technologies
5. Universal Access Technologies
6. Voice recognition technologies
7. Establishment of Flexible State of the Art Classroom “Laboratory” for Experimentation
8. User Interface and Options for Services
9. Emergency Services
- ii. Mobil technologies
 1. Wireless
 2. Cellular
 3. Messaging
- iii. Training and Evaluation Services
 1. Adaptation/Adoption/Assessment of Access and Assistive Technologies in Various Stages of Development
 2. Product Evaluation Reports on Existing Technologies and Access Strategies and Implementation
 3. Evaluate Reports regarding the Impact of Access Technologies based on sound educational theory and practice.
 4. Assessment Tools/Success Measurement
 5. Assessment of Teaching and Learning with Technologies
 6. Processes for moving access technology to marketplace
 7. Representation of deaf access issues to industry
- iv. Audio and Sound Technologies of interest to hard of hearing persons
 1. Advanced audio technologies that can be incorporated into academic, employment and social environments
 2. Related Access Technologies
- c. Strands of Work as Guidelines for Project Selection
 1. It is fully expected that the above strands of work will simply serve as a framework for the general types of

projects and content the Center is interested in supporting. It is not an exclusive list and is not meant to discourage ideas and concepts. The purpose of the list is to provide a means of describing the general areas of most significance to the Center.

6. Center Services and Products of Work

- a. The Center for Access Technology will collaborate with faculty and staff at NTID/RIT and other organizations to seek grants and donations to support specific research projects that fit within the above strands.
- b. The Center will provide support to RIT/NTID faculty in the development of the project concept and identify possible funding sources.
 - i. The Center will develop and submit a minimum of 5 grant proposals per calendar year to appropriate and qualified agencies.
- c. Publicize the Center's interest in seeking collaborative projects across the RIT community and encourage faculty and staff to contact the Center to explore ideas.
- d. Establish an advisory board to provide guidance to the director.
- e. Establish a means of disseminating the plans and successes of the center across the RIT campus and eventually expand the target audience for dissemination to external organizations.

7. Management and Organization

- a. Management Team
 - i. Director
 1. James J. DeCaro, Interim Director, (.10 fte)
 - ii. Associate Director
 1. E. William Clymer, Associate Director (.05 fte)
 - iii. Supporting Faculty
 1. Peter Lalley (.25 fte)
 2. Newly hired Senior Research Associate (1.0 fte)
- b. Advisory Panel
 - i. Center on Access Technology Management Team
 - ii. Representative of NTID VP Office
 - iii. Representative of NTID Research Department
 - iv. Representative of NTID College Operations
 - v. Student Representation
 - vi. Member of External Access Technology Organization

- vii. Representative of Technology business with an interest in Deafness and Access
- viii. Funding Advisors
 - 1. Representative of NTID Development Office
 - 2. Representative of RIT/NTID Grants Office
- c. PEN-International Support
 - i. To provide ongoing administrative support for the work of the Center until it is moved to a permanent home at NTID in College Operations.
- d. The work of the Center on Access Technology will be integrated into the NTID Strategic Research Plan.

8. Outcomes and Timeline

- a. Year One (March 1, 2006 – February 28, 2007)
 - i. Establish internal advisory committee to monitor the process of the Center.
 - ii. Hire a 100% staff member for the Center by September 1, 2006
 - iii. Prepare 4-5 funding proposals that relate to the strands of work identified in this business plan and execute those funded.
 - 1. 18-36 month duration and at least \$100,000 minimum funding per 12 months.
 - iv. Attend 1-2 national conferences on access technology in order to remain current in the field and to disseminate the operating expectations of the center.
 - v. Prepare a web page and related explanatory documentation for NTID campus wide dissemination
- b. Year Two (March 1, 2007 – February 28, 2008)
 - i. Assuming 2-3 proposals are successful, support the implementation of the first Center on Access Technology projects
 - ii. Prepare 4-5 funding proposals that relate to the strands of work identified in this business plan
 - 1. 18-36 month duration and at least \$100,000 minimum funding per 12 months.
 - iii. Begin the dissemination process of reporting on the evaluation.
 - iv. Attend 1-2 national or international conferences relating to access technology to provide an update regarding the work of the Center.
- c. Year Three (March 1, 2008 – December 31, 2008)
 - i. Support on-going projects that received funding through the Center

- ii. Continue the process of proposal submission based upon completed work at the Center and reflecting emerging technologies
 - iii. Expand the dissemination and reporting process.
- d. Beyond Year 3
- i. Continue to prepare proposals and monitor ongoing projects
 - ii. Work with business and industry regarding the implementation of access technologies in products that relate to higher education

9. Financials

a. Operating Parameters

- i. The Center on Access Technology will be self-sufficient in that operating and specific project funds will be obtained through grants and contributions from various funding sources within 3 years of establishment.
 - 1. NTID will fully fund the Senior Research Associate position for 3 years
- ii. During the first three years of operation of the Center, PEN-International will provide up to \$40,000 each year as seed money to support the generation of successful proposals.

b. Areas of Financial Support

i. NTID

- 1. \$105,000/year for one new hire (salary and benefits—for up to 3 years)
- 2. Space for new hire (in PEN/NETAC Office Area)
- 3. \$10,000 in year one for office equipment for new hire and \$10,000/year for 3 years to support operations for new hire to execute CAT functions (phone, supplies, travel etc.)

ii. PEN-International

- 1. \$40,000 per year for up to 3 years as detailed above

iii. External Funding

- 1. grants and contracts at \$100,000/ year for 3 years (minimally)

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Business Plan: Corporate Funding

Prepared by Bryan Hensel, NTID Office of Development

The following document outlines the objective, strategies, implementation, and timeline for soliciting and securing corporate funding for the *Center on Access Technology in Deaf Education for Students Who Are Deaf or Hard-of-Hearing*. Also included are thoughts on initial approaches to six possible corporate partners.

Objective: Secure \$300,000 in cash and gifts-in-kind (\$100,000 per year for three years) to launch the *Center on Access Technology in Deaf Education for Students Who Are Deaf or Hard-of-Hearing*.

Strategy: We will demonstrate that when the requested external support is combined with the human and technological resources at NTID/RIT, and the Center's expertise in the area of access technology in deaf education, the Center will be able to provide structured analysis of products, technologies, and learning tools relating to the Center's four main strands of work (classroom and online learning, user training of access technologies, administration of access technology consumer evaluation, and hard-of-hearing access technology needs). When shared with our corporate partners, these structured analyses will enable them to refine and advance their product(s) thereby increasing the likelihood of healthy product sales and enabling them to better serve the access technology needs of the deaf and hard-of-hearing.

Resources and capabilities that will allow the Center on Access Technology to make the structured evaluations include:

(1) Access to a "living laboratory": Easy access to a 1,100 person strong group of mainstreamed deaf and hard-of-hearing individuals places the Center in a unique position to study the access technology needs, challenges, and uses of this population, both in and outside of the classroom.

Further, RIT/NTID is a world-class institute of technology. Our students, faculty, and staff are technology savvy and our campus has the infrastructure to easily adopt new technologies. These characteristics make RIT/NTID a natural choice of location to pilot new access technologies.

(2) Faculty expertise: NTID has been providing deaf and hard-of-hearing students with technical and professional educational experiences for over 35-years. Our faculty are keenly aware of the role technology plays in contributing to these student's education, as well as the challenges adapting to and learning new technologies present to both students and faculty.

(3) Role as information hub: During its 35-year history, NTID has become recognized as a leader in providing educational experiences to the deaf and hard-of-hearing, all the while building close relationships with many educational organizations for the deaf (PEN-International, PEPNet, NETAC, secondary schools for the deaf, and others). As such, NTID is well positioned to serve as an information hub - collecting and disseminating information pertinent to the development, usefulness, and suitability of new access technologies.

Implementation & Timeline: We will submit a minimum of five proposals for funding per year to interested corporate partners. Five thousand dollars per year will be made available from PEN-International to cover proposal development and travel expenses.

The timeline for prospect identification, and proposal development and submission is as follows:

January 2006: Upon approval of the Center's business plan, we will meet with the RIT Director of Corporate Relations to identify potential corporate partners with whom an RIT/NTID relationship exists.

January – February 2006: Introduction letters / letters of inquiry describing the Center's goals and objectives will be mailed to the before determined prospects, along with additional prospects as determined by the RIT Director of Corporate Relations, NTID Development Office, and the Director of the Center on Access Technology. Ten to twenty letters will be mailed.

February – May 2006: Appropriate follow-up to the introduction letters / letters of inquiry will be conducted. Initial meetings with interested corporate partners will be held. We hope to begin discussions with a minimum of ten interested potential corporate partners.

April – August 2006: As discussions progress and specific areas of interests are identified, formal proposals will be drafted and submitted. We will submit a minimum of five proposals.

June 2006 – forward: Funding commitments are obtained. As needed, this cycle will repeat until funding requirements are met.

Possible Corporate Partners: The following are thoughts on initial approaches to six possible corporate partners. Strategies for approaching these corporations will be adjusted and expanded upon to meet the specific goals of the Center and/or project.

(1) Sprint/Nextel Corporation and Sprint Foundation: RIT/NTID has a strong relationship with Sprint who has employees serving on the RIT Board of Trustees and NTID Foundation Board. Gifts in the form of equipment and scholarship aid are made annually. Sprint would benefit by accessing our “living laboratory” and faculty expertise in developing/testing new technologies, and exploring opportunities to adapt/adopt Sprint's wide-range of existing communication products.

(2) Motorola Corporation and foundation: RIT has a strong relationship with Motorola, who makes significant gifts to the COE annually. Similar to Sprint, Motorola would benefit by accessing our “living laboratory” and faculty expertise in developing/testing new communication products. Adaptation/adoption of existing technologies will also be of interest.

(3) Blackboard Inc.: Blackboard's main product is software applications that enable educators to support online learning environments. Expansion of this software to support online learning for the deaf and hard-of-hearing may be of interest to Blackboard. Access to our faculty expertise in online learning and deaf education would assist in the adaptation process, as would the opportunity to pilot software at RIT/NTID. The role of NTID as an information hub may assist in the widespread adoption of Blackboard technologies in the deaf community.

(4) Apple Computer Inc.: Apple's wide-range of products in the personal computing technology / software market present many opportunities for adaptation/adoption of these technologies to meet the needs of the deaf and hard-of-hearing. Access to our “living laboratory” will be of interest. GCCIS receives gifts-in-kind and gifts of cash from Apple on an annual basis.

(5) General Motors Corporation and foundation: RIT has an existing relationship with GM who has an employee serving on the Board of Trustees, and who makes gifts to RIT on an annual basis. A recent addition to NTID's NAG is the Senior VP of R&D for GM. This individual may be in a position to move a proposal forward. We will want to stress the research opportunities available to GM via access to our “living laboratory.”

(6) Korea Telecom: Jim DeCaro and Bill Clymer have met with Korea Telecom who has expressed interest in working with NTID. Korea Telecom's work in G3 technologies would make them a valuable access technology partner. Access to our “living laboratory and faculty expertise in deaf education/technology needs will be of interest to Korea Telecom.

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Corporate Prospects

The following document lists potential corporate prospects for the *Center on Access Technology in Deaf Education for Students Who Are Deaf or Hard-of-Hearing*. The prospects have been grouped according to industry. A brief profile of each prospect has been included.

Application Software

Adobe Systems Inc.	Offers software and services for public and private sectors worldwide.
Microsoft Corp.	Engages in the development, manufacture, license, and support of software products for various computing devices worldwide.
ScanSoft Inc.	Offers speech and imaging solutions to businesses and consumer markets.

Cochlear Implant & Hearing Aid Technology

Advanced Bionics	A subsidiary of Boston Scientific, the only American developer of cochlear implant technology
Cochlear	A leading manufacturer of cochlear implants and implant technology.
MED-EL	A leading manufacturer of cochlear implants and implant technology.
MXM	Innovator of medical implant devices and hi-tech medical equipment.
Oticon	Based in Denmark, a major manufacturer of hearing aid technology.

Communication Equipment

Alcatel	Provides telecommunications equipment and services to fixed line and wireless telecommunications operators, ISP's, governments, and businesses worldwide.
LM Ericsson Telephone Co.	Engages in the development and supply of telecommunications equipment and related services to mobile and fixed network operators worldwide.
Motorola Inc.	Provides wireless, broadband, and automotive communications technologies and embedded electronic products worldwide.
Nokia Corp.	Manufactures mobile communication devices. The Multimedia division focuses on bringing connected mobile multimedia to consumers in the form of advanced mobile devices.
QUALCOMM Inc.	Engages in the development, design, manufacture, and marketing of digital wireless telecommunications products and services based on code division multiple access technology.
Rogers Commun's Inc.	Operates as a communications and media company in Canada. It offers wireless voice and data communications services, including text, picture, video messaging, downloadable games, wireless Internet, and desktop access services.

Diversified Communication Services

Global Crossing Ltd	Offers voice, data, and conferencing services.
Sprint Nextel Corp.	Offers a range of communication products and solutions, including wireless, long distance voice and data transport, global Internet protocol, and multi-product bundles.

Diversified Computer Systems

Hewlett-Packard Co.	Provides products, technologies, solutions, and services to consumers, businesses, and governments.
IBM Corp.	Operates as an IT company worldwide.
Sun Microsystems Inc.	Focuses on providing products and services for network computing.

Electronic Equipment

Hitachi Ltd.	Provides diversified products and services worldwide in segments including Information and Telecommunication Systems, Electronic Devices, Digital Media and Consumer Products, and High Functional Materials and Components.
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Matsushita Electric Industrial Co. Ltd.	Engages in the production and sale of electronic and electric products for consumer, business, and industrial uses, as well as various components.
Philips Electronics NV	Provides products, systems, and services in the fields of medical systems, domestic appliances and personal care, consumer electronics, lighting, and semiconductors.
Sony Corp.	Engage in the development, design, manufacture, and sale of electronic equipment, instruments, and devices for consumer and industrial markets worldwide.

Long Distance Carriers

AT&T Corp.	Provides voice, video, and data communications services.
General Communication Inc.	Provide local and long-distance voice, video, and data communication services to residential, commercial, and government customers.
MCI Inc.	Provides Internet, data, and voice communication services

Multimedia & Graphics Software

Activision Inc.	Publishes interactive entertainment software products.
Blackboard Inc.	Provides enterprise software applications and related services to the education industry that enable education providers to support online teaching and learning environments that can be used to augment a classroom-based program or for distance learning.
Electronic Arts Inc.	Engages in the development, publishing, and distribution of interactive software games.
Macromedia Inc	Provides software for designers and developers, business users, and consumers markets to create and deliver user experiences on the Internet, fixed media, and wireless and digital devices.

Networking and Communication Devices

3Com Corporation	Provides converged networking solutions for enterprise, and small and medium-sized business customers worldwide.
Cisco Systems Inc.	The company provides products for transporting data, voice, and video within buildings and across campuses.
Juniper Networks, Inc.	Provide customers with IP network solutions that are incorporated into the worldwide Web of interconnected public and private networks across which, various media, including voice, video, and data travel to and from end-users throughout the world.

Personal Computers

Apple Computer Inc.	Engages in the design, manufacture, and marketing of personal computers and related software, services, peripherals, and networking solutions worldwide.
Dell Inc.	Offers a range of products, including enterprise systems, client systems, printing and imaging systems; and software and peripherals.

Processing Systems and Products

Avaya Inc.	Engages in the design, building, and management of communications networks for businesses worldwide.
Comverse Technology Inc.	Engage in the design, development, manufacture, marketing, and support of software, systems, and related services for multimedia communication and information processing applications.
Lucent Tech. Inc.	Engages in the design and delivery of systems, services, and software to communications service providers, governments, and enterprises worldwide.
Nortel Networks Corp.	Engages in the design, development, manufacture, assembly, marketing, sale, licensing, installation, servicing, and support of networking solutions that consists of hardware, software, and services.

Telecom Services

Alltel Corp.	Provides wireless, long-distance, network access, and Internet services
BellSouth Corp.	Provides voice, broadband data, and e-commerce solutions.
BT Group plc	Provides communications products and services, including voice, data, Internet, and multimedia services, as well as managed and packaged communications solutions.
Deutsche Telekom AG	Provides telecommunications and information technology services worldwide.
Nippon Telegraph & Telephone Corp.	Provides fixed and mobile voice-related services, Internet Protocol/packet communications services, sales of telecommunications equipment, systems integration, and other telecommunications related services in Japan.
Qwest Com. Int'l Inc.	Provides voice, video, and data services. Operates in wire line, wireless and other services.
SBC Com. Inc.	Provides telecommunications services primarily in the United States. It offers various services and products, such as wireless communications, long-distance services, Internet services, and telecommunications equipment.
Siemens AG	Operates as an electronics and electrical engineering company in segments including Information and Communications, Automation and Control, Power, and Medical.
Verizon Com. Inc.	Provides communications services primarily in the United States.

TO: Bill Clymer
FROM: Gail Hyde
DATE: March 16, 2011
RE: **Potential Funding Sources for Access Technologies**

Bill,

You asked for a 2-page business plan. Because I was pulling materials together for Mike Stinson, I've included more information than perhaps you want at this point.

Essentially, I have included government funding from National Science Foundation and the US Department of Education. Some of these programs fund development; some fund research – so depending on your needs at various point, I think the attached covers almost everything at these two agencies that, in one way or another, will fund access for deaf and hard-of-hearing students.

I've included *Federal Register* announcements for some US Dept. of Education programs, and the full application packet for the Steppingstones programs. It isn't easy to get at application packets for the Dept. of Education; they don't archive these materials in the same way that NSF does – so I've included more materials than I did for NSF. NSF application guidelines are all available online, and I've given you the URL's for each program.

FYI, the USDE's Steppingstones program is the one that has funded Mike Stinson for several years. Peter Lalley almost applied to it this year, and this program is probably the best for access technologies development funding. Peter is also looking at NIDRR's Field Initiated Projects program; the application is due mid-January, but the packet on how to prepare a proposal won't be out until mid-November (Peter has a copy of last year's packet to work from now).

If you have any questions, please don't hesitate to contact me.

I hope you had a great trip to Japan!

Gail Hyde Documents

Jim DeCaro / Bill Clymer
Potential Sources of Funding –
National Science Foundation

- **Industry/University Cooperative Research Centers** - Directorate for Engineering
Provides support to academic institutions to plan joint industry/university research interests and to determine the feasibility and viability of developing a cooperative research center.
 - Award: \$10,000
 - Deadlines, mandatory letters of intent: 12/31/2006, 6/30/2006
 - Deadlines, invited full proposals: 3/31/2006, 9/30/2006
 - Program URL: www.nsf.gov/pubs/2001/nsf01116/nsf01116.htm
 - Contact:
 - Alex Schwarzkopf
 - Division of Engineering Education & Centers
 - 4201 Wilson Blvd., Suite 585N
 - Arlington, VA 22230
 - Email: aschwarz@nsf.gov
 - NOTES: This program develops long-term partnerships among industry, academe, and government. Research centers are catalyzed by a small investment from the sponsor (NSF) and are primarily supported by industry center members, with NSF taking a supporting role in their development and evolution. Each center is established to conduct research that is of interest to both the industry and the center. An I/UCRC contributes to the Nation's research infrastructure base and enhances the intellectual capacity of the engineering and science workforce through the integration of research and education.
 - A planning grant supplies funds to study the feasibility of developing the industry/university interaction necessary to establish and support a Center. As part of this study, it is a requirement that a meeting that brings together potential members to explore opportunities and establish a research plan that fits their needs be held.
 - There are financial considerations for industry, institutions, organizations and other Federal agencies. The PI must have firm commitments of \$300,000 annual for five years in cash "membership fees."
 - Only 4-6 awards are available per year.

- **Research in Disabilities Education** – Directorate for Education and Human Resources
Provides support for efforts to increase the participation and achievement of persons with disabilities in science, technology, engineering, and mathematics (STEM) education and careers.

- DEI – Demonstration, Enrichment and Information Dissemination Track (10-12 grants). The goals are to:
 - further institutionalize products and other educational materials that promote accessibility to STEM disciplines and career experiences by students with disabilities
 - enhance the STEM learning experience for students with disabilities
 - disseminate information about model programs, exceptional products, successful research methods, and proven education practices to a broad national audience
 - limited to 1 year and \$100,000.
- FRI – Focused Research Initiatives Track (3-4 grants). The goals are to:
 - encourage research and development of specific but utilitarian assistive technologies that will help persons with disabilities pursue careers in STEM
 - build tools for students with disabilities that can quickly be developed and effectively deployed in the educational environment
 - add value to the education of persons with disabilities in STEM
 - limited to 3 years and \$300,000
- RAD – Regional Alliances for Persons with Disabilities in STEM education (1 grant). The goals are to:
 - establish networks with linkages throughout academe and in partnership with industry, government, and national research laboratories.
 - comprehensive multidisciplinary programs
 - address critical issues that hinder or deter the inclusion and participation by persons with disabilities in STEM education and careers.
 - limited to 5 years and \$3,000,000
- Deadlines, letter of intent: 1/16/2006
- Deadlines, full proposal: 2/13/2006
- Program URL: www.nsf.gov/pubs/2005/nsf05623/nsf05623.htm
- Contact:

Ted Conway
 Division of Education and Human Resources
 4201 Wilson Blvd., Suite 815
 Arlington, VA 22230
 Email: tconway@nsf.gov

- **Course, Curriculum, and Laboratory Improvement** – Directorate for Education and Human Resources
 Seeks to improve the quality of science, technology, engineering, and mathematics education for all undergraduate students. CCLI supports efforts that conduct research on STEM teaching and learning, **create new learning materials and teaching strategies**, develop faculty expertise, implement educational innovations, assess learning, and evaluate innovations.

- Adaptation and Implementation track – see program URL
- Educational Materials Development – see program URL
- Assessment of Student Achievement – see program URL
- National Dissemination – see program URL
- Each of the above tracks can be a Phase 1, 2 or 3 project
 - Phase 1 – exploratory project, 1-3 years, \$150,000
 - Phase 2 – expansion project, 2-4 years, \$500,000
 - Phase 3 – comprehensive project, 3-5 years, \$2,000,000
- Deadlines, Phase 1: 5/17/2005 (2006 deadlines not yet announced)
- Deadlines, Phase 2 or 3: 1/24/06 (2006 deadlines not yet announced)
- Program URL: www.nsf.gov/pubs/2005/nsf05559/nsf05559.pdf
- Contact:: see program URL

- **Small Business Innovation Research / Small Business Technology Transfer Programs**

The SBIR/STTR Programs stimulate technological innovation in the private sector, by strengthening the role of small business concerns in meeting Federal research and development needs, increasing the commercial application of federally supported research results, and fostering and encouraging participation by socially and economically disadvantaged and women-owned small businesses.

- Awards: SBIR (125 awards), approx. \$80,000; STTR (25 awards), approx. \$100,000.
- Deadlines, full proposal: 12/8/2005 (2006 deadlines not yet announced)
- Program URL: www.nsf.gov/pubs/2005/nsf05605/nsf05605.pdf
- Contact:

Rosemarie Wesson
 4201 Wilson Blvd.
 Arlington, VA 22230
 Email: rwesson@nsf.gov

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- **Interagency Education Research Initiative**

The goal of the Interagency Education Research Initiative for NSF is to support scientific research that investigates the effectiveness of educational interventions (defined as educational practices, strategies, curricula, or programs) in preK-12 science and/or mathematics as they are implemented in varied school and home settings with diverse student populations. From an empirical perspective, the aim of IERI is to identify the conditions under which effective, evidence-based interventions to improve preK-12 student learning and achievement succeed when applied on a large scale. This necessarily requires a multidisciplinary approach; the participation of a variety of experts including science, mathematics, and engineering faculty along with education researchers is encouraged. In addition, successful projects will include a variety of partners such as states, universities, schools, teachers, and parents and will also require the use of technology for the scaling or the study of the intervention. NSF especially encourages proposals focusing on middle and high school mathematics and/or science.

- Contextual projects – smaller projects that aim to develop components of a potential scaling project (e.g., feasibility studies, instrument development and replication studies).
 - limited to 5 years and a total of \$2,000,000:
- Scaling projects – larger projects that aim to demonstrate that an intervention can scale in either size of affected population or in the variety of contexts in which the intervention is successful.
 - limited to 5 years and a total of \$6,000,000
- Deadlines, letter of intent: 3/1/2006
- Deadlines, full proposal: 4/7/2006
- Program URL: www.nsf.gov/pubs/2004/nsf04553/nsf04553.pdf
- Contact:

Finbarr Sloane
4201 Wilson Blvd., Suite 855
Arlington, VA 22230
Email: fsloane@nsf.gov

- **Biomedical Engineering Program and Research to Aid Persons with Disabilities Program** – Directorate for Engineering

The BME/RAPD programs encompass the Biomedical Engineering program and the Research to Aid Persons with Disabilities program. Biomedical Engineering supports research that, often with diagnosis or treatment-related goals, applies engineering principles to problems in biology and medicine while advancing the engineering knowledge base. Integration of engineering expertise with life science principles is an essential requirement for advances in this field. The RAPD program supports the development of technologies for new and improved devices or software for persons with disabilities. Support is provided through submission

of unsolicited proposals as well as through special initiatives. Additional information is at www.eng.nsf.gov/bes.

- Award: \$80,000-\$110,000 per research award.
- Deadlines, full proposal: accepted annually between 9/1 and 10/15
- Program URL: www.nsf.gov/pubs/2003/nsf03560/nsf03560.pdf
- Contact:

Semahat Demir
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Gilbert Devey
Division of Bioengineering & Environmental Systems
Email: gdevey@nsf.gov

- **Developmental and Learning Sciences**

This program supports studies that increase our understanding of cognitive, linguistic, social, cultural, and biological processes related to children's and adolescents' development. Additional priorities are to support developmental research that incorporates multidisciplinary, multimethod, microgenetic, and longitudinal approaches; develops new methods and theories; examines transfer of knowledge from one domain to another and from one situation to another; assesses peer relations, family interactions, social identities, and motivation; examines the impact of family, school, and community resources; assesses adolescents' preparation for entry into the workforce; and investigates the role of demographic characteristics and cultural influences on children's development. Research supported by this program will add to our basic knowledge of how people learn and the underlying developmental processes that support learning, with the objective of leading to better educated children and adolescents who grow up to take productive roles as workers and as citizens.

- Award: \$165,000-\$250,000
- Deadlines, full proposal: 1/15 and 7/15 of each year
- Deadlines, research center: 2/1 of each year
- Program URL: www.nsf.gov/pubs/2002/nsf02008/nsf02008.pdf
- Contact:

Marguerite Barratt
Division of Behavioral & Cognitive Sciences
4201 Wilson Blvd., Suite 995
Arlington, VA 22230
Email: mbarratt@nsf.gov

US Department of Education

- **Steppingstones of Technology Innovations for Children with Disabilities (OSERS) – CFDA 84.327A**

This program is designed to improve results for children with disabilities by promoting the development, demonstration, and use of technology; support educational media services activities designed to be of educational value in the classroom setting to children with disabilities; and provide support for captioning and video description that is appropriate for use in the classroom setting. The program supports technology development, demonstration, and utilization.

- Award, Phase I (Development) - \$200,000 per year for up to 2 years
- Award, Phase II (Research on Effectiveness)- \$300,000 per year for up to 2 years (3 years if a compelling rationale is given)
- Only 6 awards given for Development and 6 for Research on Effectiveness
- This is the program that has funded Mike Stinson
- Deadline: approx. mid-October each year
- See full guidelines, attached
- Contact:

Tom Hanley
Research to Practice Division
Office of Special Education Programs
US Dept. of Education
202-245-7369
Email: Tom.Hanley@ed.gov

- **Research on Technology Effectiveness and Implementation for Children with Disabilities (OSERS) – CFDA 84.327R**

This program has the same description as the one above, but with an absolute priority that this is a research project on technology effectiveness and implementation for children with disabilities.

- Only one award will be made
- Award: \$600,000 per year for up to 60 months
- *Federal Register* announcement attached.
- Contact:

David Mlouf
US Department of Education
400 Maryland Avenue, SW, room 4078
Potomac Center Plaza
Washington, DC 20202-2550
202-245-7427

- **Demonstration Projects to Ensure Students with Disabilities Receive a Quality Higher Education – CFDA 84.333A**
This program provides grants to institutions of higher education to develop innovative demonstration projects. The purpose of the demonstration program is to provide technical assistance and professional development for faculty and administrators of IHEs in order to provide them with the skills and supports that they need to teach students with disabilities.

 - This is the program that funded Sue Foster and Gary Long
 - Awards: \$100,000-\$350,000 per year for up to 3 years
 - Deadline: spring of each year
 - *Federal Register* announcement attached
 - Contact:
 - Shedita Alston
 - US Dept. of Education
 - 1990 K Street, NW, room 7089
 - Washington, DC 20006-8526
 - 202-502-808
 - Email: Shedita.Alston@ed.gov

- **NIDRR – Field Initiated Projects – CFDA 84.133G-1 (Research) and CFDA 84.133G-2 (Development)**
The purpose of the program is to further one or both of the following:

 - Develop methods, procedures, and rehabilitation technology that maximize the full inclusion and integration into society, employment, independent living, family support, and economic and social self-sufficiency of individuals with disabilities, especially individuals with the most severe disabilities.
 - Improve the effectiveness of services authorized under the Rehabilitation Act of 1973, as amended (Act). FI projects carry out either research activities or development activities.
 - Award: \$150,000 per year for up to 3 years
 - Deadline: mid-January each year
 - *Federal Register* announcement attached
 - Contact:
 - Donna Nangle
 - US Dept. of Education
 - 400 Maryland Avenue, SW, room 6030
 - Potomac Center Plaza
 - Washington, DC 20202
 - 202-245-7462
 - Email: donna.nangle@ed.gov

- **Small Business Innovative Research (SBIR) Program – CFDA 84.133S-1**

This program is similar to the NSF SBIR. Applications must be submitted by industry, with an educational institution partner.

- Deadline: roughly mid-March

- Contact:

Carol Cohen

US Dept. of Education

400 Maryland Avenue, SW, room 6035

Potomac Center Plaza

Washington, DC 20202-2700

202-245-7303

Email: carol.cohen@ed.gov



Action Steps to Develop a Business Plan

1 May 2005 – 15 January 2006

Establishment of a

Center on Access Technology in Deaf Education: For Students Who Are Deaf or Hard-of-Hearing

An NTID/RIT Center of Excellence

This document describes a brief action plan for formulating a detailed needs and market potential document, and subsequent **business plan**, for a Center on Access Technology in Deaf Education, at NTID/RIT.

5. Goal

- a. NTID will establish a collaborative research, development and implementation support network at this university that includes faculty for the colleges of RIT, researchers from other universities, industries, professional organizations and access service providers. The network will promote research and development that exploits technology for “access to education” for individuals who are deaf or hard-of-hearing.
 - i. “Access to education” refers to unencumbered and enhanced access to classroom, laboratory and associated experiences; and unencumbered access to overall personal, social and co-curricular realms of the educational environment where assistive or augmentative technologies can improve access for individuals who are deaf or hard-of-hearing.
 - ii. The Center will provide leadership and support to those individuals researching, developing, implementing and evaluating technologies as they pertain to enhancing the educational experience of persons who are deaf or hard-of-hearing.

6. Background

- a. The **business plan** for the establishment of the Center on Access Technology in Deaf Education will cover a two and one-half year period of time; 15 January 2006 to 31 December 2008.
- b. The business plan will incorporate work already completed as part of the deafness related First-in-Class efforts at RIT

7. Initial Team

- a. James J. DeCaro, Director and E. William Clymer, Coordinator of PEN-International, will work closely with Peter Lalley on the development of the business plan and its subsequent implementation.

- i. Peter Lalley is assigned to this task for 25% of his POW and will report this portion of his activities to James J. DeCaro. A detailed set of tasks, timelines and expected outcomes will be established by 1 September 2005.
 - b. Dr. J.J. DeCaro will manage the Center and report the project to the Vice President and Dean for NTID until 31 December 2008; at that time the status of the Center will be evaluated and, if successful, it will be housed in NTID in conjunction with the Department of Access Services and the Department of Technical Support Services in NTID's College Operations (as detailed in the NTID Strategic Vision 2010 document).
 - c. Dr. DeCaro will devote 10% of his time to developing and implementing the Center between 1 May 2005 and 31 December 2008. E.W. Clymer will assume an overload assignment in order to work with DeCaro on this effort.
- 8. Timeline for Development of a Business Plan
 - a. Convene a Roundtable of Experts from the Deaf Community, Educators of the Deaf and Service Providers and Summarize Recommendations.
 - i. Develop a procedure for eliciting a list of general and specific technologies that deaf and hard of hearing experts in the community believe have the potential for positively impacting upon access to education for students who are deaf (1 August 2005)
 - ii. Select the most knowledgeable deaf and hard-of-hearing individuals, educators of the deaf and service providers as regards the broad field of access and technology and convene them in Rochester for a Roundtable (15 September 2005).
 - iii. Produce a report with a priority listing of problems and potential technological solutions as derived from the Roundtable (1 October 2005).
 - b. Convene RIT Technology Experts and Summarize Recommendations.
 - i. Develop a procedure to collect a list of general and specific technologies that are being investigated as regards access to education (10 October 2005).
 - ii. Convene invited individuals from the RIT and NTID communities to attend an all day meeting to discuss, identify and categorize the types of research and development currently being investigated at RIT (15 October 2005).
 - iii. Prepare a summary report identifying work that is currently underway at RIT and/or could be implemented easily at RIT (1 November 2005).
 - c. Conduct videoconference sessions with selected expert organizations and industries to determine the type, scope and nature of research and development activities occurring at their respective facilities and elicit suggestions as regards other organizations where relevant work is being conducted (1 December 2005).
 - i. Information developed in i., ii., and iii above will be used as a guide for these discussions
 - ii. Organizations that might be called upon to participate in the videoconferences include but are not limited to IBM, Microsoft, Trace

Center, WGBH, Georgia Tech and CSUN. Others could include NAD, SHHH, AGBell, PEPNet, Cochlear implant companies and international organizations such as the World Bank, WFD, ICED, NOKIA, SONY and IFHOH.

- iii. From information gathered in i. through iv. above, a report regarding the most significant research and development currently being conducted across the country will be produced. How the Center can articulate with and build upon those efforts will be detailed in the report (15 December 2005).
- d. Prepare a Prioritized List of Technology Solutions Which Offer the Most Promise for Positively Impacting Access in Deaf Education.
 - i. Summarize and share for review and critique (with those who participated in the roundtable sessions) the data gathered in b.i. through b.iv. above and the priorities that will be pursued by the Center (1 January 2006).
 - e. Prepare a Business Plan which includes a budget, a set of tasks and a timeline for a two and one-half year timeframe (15 January 2006).
9. Develop cooperative working relationships and agreements for collaborative R&D with other units of NTID and the greater university—in particular, the Laboratory for Enabling Technologies and Disability Studies in the Center for Advancing the Study of Cyberinfrastructure of the B. Galisano College of Computing and Information Science, and the NTID Center for Research on Educational Foundations; among others (Continuing activity).
10. Related Activities and Agreements
 - Prepare an RIT/NTID NIDRR proposal entitled Comparative Study of the Efficacy in Post Secondary Education of CART, Speech to Text, Augmented Speech to Text and C-print in Providing Access for Deaf and Hard of Hearing Students (15 July 2005) and submit this proposal in the next NIDRR competition. This effort will be coordinated with the proposal currently being developed for submission to the US Department of Education by Professor Marschark.



Center on Access Technology in Deaf Education:
For Students Who Are Deaf or Hard-of-Hearing

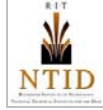
An NTID/RIT Center of Excellence

March 16, 2011

General Topics of Interest Regarding Development of Access Technologies
Notes from June 28, 2005 Mtg.

Attending: Cindy Camp, Captioned Media Program; Harold Johnson, Kent State University; Cindy King, Gallaudet University; Annette Leonard, Western Oregon University; Jan Richards, University of Toronto; Jim Hartman, Canadian Hearing Society; Brent Robertson, Automatic Sync Technologies, LLC; Beth Carlson, St. Petersburg College; Barbara Strassman, The College of New Jersey. Bill Clymer & Peter Lalley, NTID/RIT.

1. Distance learning and support for deaf students
2. Better classroom access technologies for (community) colleges with deaf students
3. Improvement in quality and cost of classroom note taking
4. Captioning of all video and multimedia displays from the web
5. Signing aviator message display from live or recorded events
6. Strategies to share information with interested professionals
7. Funding sources
8. Process for moving research product to marketplace
9. Digital signage – large digital displays for sharing information within a building or campus
10. Voice recognition technologies
11. Wireless/cellular technologies –mobile technologies (PDA, cell phone, pagers)
12. Assessment tools to measure impact, and national databases to report on, access technologies
13. Searching and summation technologies (ability to automatically scan and summarize captured media for students); i.e. searchable lecture notes, captions, and video captions
14. Captioning enhancement; change level and context of caption displays
15. Remote services (interpreting, C-Print, captioning)
16. Universal design and equipment access within the educational environment.
17. Internet based messaging technologies
18. Specific recommendations and comparison of effectiveness vs. cost for various access technologies.



Center on Access Technology in Deaf Education: For Students Who Are Deaf or Hard-of-Hearing

An NTID/RIT Center of Excellence

March 16, 2011

Minutes from Informal Discussion, June 28, 2005

Note: Several pages from Google searches on topics discussed below are attached to this document. They are noted with an asterisk (*)

Participants: Cindy Camp, Captioned Media Program; Harold Johnson, Kent State University; Cindy King, Gallaudet University; Annette Leonard, Western Oregon University; Jan Richards, University of Toronto; Jim Hartman, Canadian Hearing Society; Brent Robertson, Automatic Sync Technologies, LLC; Beth Carlson, St. Petersburg College; Barbara Strassman, The College of New Jersey

Bill Clymer welcomed the participants and asked each to introduce themselves with a brief statement regarding their interests in assistive technology (AT).

Goal of the informal discussion: Through an open and informal discussion the participants would share their ideas on which emerging technologies they believe have potential to enhance access to education for students who are deaf or hard of hearing.

Bill explained that NTID is investigating the possibility of establishing a Center of Excellence in AT in Deaf Education. As a first step a business plan (BP) will be developed for consideration by the NTID and RIT Administration. Input to the BP will be gathered through a series of informal discussions, internal and external to NTID/RIT. Participants will be recruited from user groups and national and international experts. The BP will be submitted for review in January 2006. Today's meeting is the first in the series.

The discussion was open, direct and interactive. Clearly there is considerable interest in this area and a need for these types of discussions with a variety of stake holders.

There is a critical need to involve Users of the technologies in all the discussions, the earlier the better.

The range of ideas and suggested areas for fruitful investigations was impressive and include:

1. The distance learning (DL) environment is becoming more and more popular. However, students are being lost due to lack of access. Real time display would be very helpful, but is generally not available for these programs.
2. The number of students staying close to home and attending community colleges is increasing. Again, retention/graduation rates are low due to lack of access services. Can real time display become a viable option?
3. Classroom notes are a significant problem due to lack of quality, accuracy and training of students. Voice-to-text technologies could resolve this deficiency if it becomes easier to use by faculty/instructors.
4. The lack of access to language development in Canada.

The development of a nationwide database (DB) that documents performance and outcomes of programs and strategies was suggested. The DB would be open to parents and students for their information.

Web videos are not generally accessible and that this may be pursued by Gallaudet University (GU). It may be possible that videos could be captioned as they are being viewed. Avatars for sign language might be a solution, removing the need for “humans”. In New Zealand there is something called Ectosa (??) in use for web casts. Is this synchronous or asynchronous? The APRESO system was mentioned as a technology for offering video display via the web. *

The use of “Digital Signage” was mentioned as an emerging technology that may be useful to deaf students on mainstreamed campuses. *

Information sharing:

1. Use PEPNet as a clearinghouse and outreach services for technology advances.
2. Need to involve Vocational Rehabilitation Counselors in sharing and disseminating information to clients.
3. Harold Johnson’s network might be a forum for dissemination
4. Working with industry leaders through a consortium of 10 – 12 CEOs who are interested in AT development might provide a means of sharing information with business.

It is difficult to get schools involved in this area. It was suggested that after school education enrichment programs and providing packages for parents and future teachers use.

The Automated Closed Captioning (CC) project is in Phase 2, Small Business Innovation Research/ National Institute on Disability and Rehabilitation Research (SBIR/NIDRR) is funding this program. Using the SBIR route may be a good way to proceed in developing emerging technologies for use by students who are deaf or hard of hearing.

Bolt, Beranak & Newman produces AVOKE STX, a speaker independent recognition technology and is a technology to be investigated. *

Wireless Communication: We should be exploring ways to take advantage of cell phones (very advanced technology in Japan), PDAs, etc for enhancing communications and access to information. We should also explore the use of digital signage and cable emergency alerts for developing emergency communication systems.

Assessment tools: It was recommended that assessment tools be developed for determining the impact of these technologies, such as retention and access, as the use of the technologies develop.

Summarization technology is critical for student learning: Searchable text, lectures, and vocabulary need to be enhanced, especially when dealing with class transcripts from text-to-speech technologies. (Google’s new video web search is based on CC). *

A summarization the IBM meeting on Liberated Learning was offered, mentioning the work at St. Mary’s and MIT in speech recognition. *

The importance of visual learning and recommended enhancement and use of 3D visual representations. J. Thomas Allen: National Science Foundation (NSF) grant on Visual Learning. *

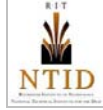
One type of captioning does not fit all. Children, adults, etc have different needs. Think about ways of incorporating color, emotions, and other enhancements.

PDAs, because of their size, may be very effective communication tools and should be looked at for expanding their role in this area.

Remote Interpreting (and speech-to-text services) need to be considered.

AHEAD should be contacted for input and attending the conferences. *

The Disabled Student Services in Higher Education (DSSHE-L) list serve contains a great deal of information regarding access technologies. *



Center on Access Technology in Deaf Education:
For Students Who Are Deaf or Hard-of-Hearing

An NTID/RIT Center of Excellence

September 16, 2005 Discussion Group

NTID Studio A, LBJ Building 60

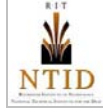
Purpose of Meeting

NTID is contemplating the establishment of a *Center on Access Technology in Deaf Education for Students Who Are Deaf or Hard-of-Hearing*. To that end, a business plan is being developed for consideration by NTID and RIT administration. Action steps to develop the business plan can be found at <http://www.pen.ntid.rit.edu/ewc/atc/steps.pdf>.

The goal of the center will be to provide leadership and support for those RIT/NTID individuals researching, developing, implementing and evaluating technologies as they pertain to enhancing the educational experience of persons who are deaf or hard of hearing.

We would like to obtain the thoughts of experts on general and specific technologies you believe have the potential for positively impacting “access to education” for students who are deaf.

This meeting is one of several planned for the Fall 2005. The first discussion occurred at the June 2005 Instructional Technology Symposium. Notes and a summary from the meeting is posted at: http://www.pen.ntid.rit.edu/ewc/atc/Summary_of_AT_Discussion_6-28-05.pdf



Center on Access Technology in Deaf Education:
For Students Who Are Deaf or Hard-of-Hearing

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September 16, 2005 Discussion Group

NTID Studio A, LBJ Building 60

Participants

National External Tech Experts:

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Center for Advanced Communications Policy
Director, Wireless RERC
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helena.mitchell@gcatt.gatech.edu
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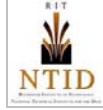
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Center on Access Technology in Deaf Education:
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September 16, 2005 Discussion Group

NTID Studio A, LBJ Building 60

Agenda

- | | |
|---------------|---|
| 8:15 – 9:00 | Continental breakfast / Get acquainted |
| 9:00 – 9:15 | Welcome by T. Alan Hurwitz and James DeCaro
Purpose, goals and outcomes for the meeting and brief review of “state of the art” |
| 9:15 – 10:30 | Discussion Topic: Products, Services and Outcomes of an Access Technology Center |
| 10:30 – 10:45 | Break |
| 10:45 – 12:00 | Discussion Topic: Research, Development and Evaluation of an Access Technology Center |
| 12:00 – 1:00 | Lunch (60-2590) |
| 1:00 – 2:00 | Review of Discussion: Products, Outcomes, and Strands of Research |
| 2:00 – 2:30 | Summary / Next Steps |
| 2:30 – 5:00 | Optional Tour of NTID/RIT |



Center on Access Technology: For Students Who Are Deaf or Hard-of-Hearing

An NTID/RIT Center of Excellence

16 September 2005 Discussion Group Summary Notes

- **Impacting emerging technologies and adapting off-the-shelf technology**
Be able to explain user need, what we want, potential market, and trends
 - Meet with as many product developers as possible early on because it is more costly to adapt the product after. Develop a database of manufacturers.
 - Perhaps form user groups of manufacturers.
 - Gather representatives from difference companies and use their best practices. Show them what really works because seeing is believing. Explain what other businesses are doing and then they will believe.
 - Before meeting with manufacturers, have a clear idea of outcome and student needs so they can figure out how to apply it to their product. Think about where the industry is going – Internet is the trend. Decide what the real needs are.
 - It is good to make contacts, however pick just a select few.
- **What is the Center's niche?**
 - Microcosm of mainstream educational environment**
 - Academic and engineering credentials**
 - Research, development, and training**
 - The Center's niche should be a test bed, research more a need. Others advocacy well, contact well, etc. Need to be different.
 - We don't want to spread ourselves too thin. I'm hearing that testing and application is one niche. Also training. Application can't be left to chance to facilitate access technology.
 - Training yes!
 - Training component necessary.

- Organization solutions notion of independence. Niche is independence. Technology that promotes personal control choices of interpreting remotely.
 - Attending a conference that supports standards so deaf people can communicate. Set up technology here. For example, fire alarms no longer serve needs. Most are not aware of the impact. Need to color code.
 - Don't forget to differentiate the needs of the hard-of-hearing.
- **Contact industry with hook / Bringing something unique to the table**
 - There is a list of companies that are contacted often by many different people. They need to be intrigued to return your call. Use the educational institution, large population of deaf in mainstream campus as your hook that sets you a part.
 - Agreed. Take advantage of your special population. A large population mainstreamed testing environment. Show the company these benefits. Don't always ask for cash, give next generation, we use that to adapt. They want to know what the needs are and what can be tested inexpensively.
 - Helps to cut to the chase. CTIA – a training group, providing cell phone services. She tries to connect with students and also people in the workplace. They don't want technology that's conflicting. Needs compatibility with previous generation of technology in setting up standard.
 - Never go to development go to the person who has a vested interest in moving the product to the next generation.
- **Digital multimedia library / Searchable and accessible**
 - Emphasize Internet, particularly video search engines which are a growing trend. The lack of captioned videos is a huge problem which leads to the need for product development testing. Hearing people can go to any site in the world, the deaf can't. There is a need for universal access.
 - Online video, only one history captioning delivery system. Suggest providing leadership to facilitate delivery and production of captions.
- **Critical importance of captioning for all / Integrating new technologies in and outside of classroom / Blended learning environment / Technology to enhance interaction and participation**
 - All have different learning styles. Important to improve the learning environment for all students. Envision laptop in front of student with captioning access, available everywhere from dorm to library. Other resources available to supplement. This would help everyone, especially the deaf.
 - Whatever we do for the deaf, does improve things for the hearing. We don't take advantage of that enough. We already work quite a bit supplying hearing with special needs.

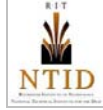
- Lecture recording idea really expanding, universities are adopting this everywhere. Need to expand one further. By only having one camera on one person doesn't capture rest of the class. The camera should have a sensor for movement.
- Opportunity to look into speech recognition. How to evaluate Captionist and text products. How to mic classrooms quickly to wireless technology, remotely. Bringing in captions by hitting browser window lead system integration of already existing technology. What consumers want and what works.
- Technology about interactions. Focusing on hands-on activities. Everyone in the classroom and lab environment.
- Share chat technology. Deaf and hearing work in groups. Enhancing that environment.
- Better technology support in the classroom.
- Interactive laptops and software to promote interaction between hearing and deaf in the classroom and for better success for deaf above a C+ grade.
- Old TTY days as opposed to relay days now. Need to think about output from deaf too.
- Also need to support functionality world out there. Assume get deaf information, but also want participation. Can't just rely on two main functions. Need to be able to participate. Very limited right now. Trade notes, etc. break down at that point. Use information to interact.
- Brenda's organization maybe helpful in brainstorming (in this area of participation).
- **Should Center advocate legal issues related to copy right and accessibility laws**
 - Legal issues are very important, there's no equal law. The blind have a law that can translate any book. Technology can easily solve this, but the problem is more of a legal concern.
 - Both Claude and Brenda can provide leadership and advocacy to change that.
- **Center to take lead role in advocating inclusion and access issues in specialized courses in general studies, education, and technology majors**
 - There are issues with relay services and TV captioning. It's difficult to convince the federal government the need for universal access to all. If noisy in a public setting, captioning benefits both hearing and deaf. The primary focus should be for the deaf however. Our frustration is access technology baptism by fire. Perhaps provide access technology courses at NTID for both hearing and deaf. Give them knowledge to take into these companies.
 - Excellent idea. We develop special technology courses. The whole point is to have a better understanding of what it takes to deal with these technologies. Technology/captioning can be used by anybody – need to realize that.

- **Consider student panel**
 - Consider a student panel. They would love the opportunity to brainstorm. Perhaps a precursor to the actual course. Include both hearing and deaf on the panel.
- **Modes of communication: audio, video, text, tactile**
 - Don't assume our needs. Keep in mind, there are lots of different needs. Make sure communication interactions are met: video, audio, text – combo of two or more. In Sweden they are working at looking at a screen and seeing an interpreter and then they have the option to turn on the voice.
 - Tactile for deaf and blind. Build in redundancy so everyone has access, different choices. They can make the choice of what type of access best meets their needs.
- **An ideal system is a redundant system / Integration of a variety of classroom instructional modes**
 - Redundant vision, pick up if missed, get somewhere else.
 - Definitely redundancy has to be built in.
 - Individual needs to be able to make choices. All modes need to be available. Hearing may select captioning as they may present material differently. That's the basis of redundancy. The underlining principal.
- **Microphone and loud speaker technology and placement / Not to forget the significance of audio / Deaf-Blind and low vision important audience**
 - There needs to be good audio. Signal, microphone placement, audio component very important. Those with implants are listening to you. More and more implants want to use hearing, visuals as back up.
 - In 3-4 years, 50% of students will have implants. The real challenge is that they hear only some words. It's difficult to process what to focus on. There's a need to synchronize everything.
 - Learn about acoustics not available elsewhere.
 - Video, audio, text, and tactile. This list is strong in text, some visual. Not strong on audio. Less ability to hear in an outside activity and with people with low vision.
- **Designing environment optimizing access and training**
 - Need to research for sound input, usually the way the sound is put into the system.
 - Sound hot zone. Hyper focus system like laser focuses light. No one doing research in this area for the deaf. Points the speaker to a zone. Like someone is whispering in your ear.

- Ultra wide band technology – Turbo Blue Tooth – useful for those with hearing aids.
- **Application technology that is sustainable and easy to use, portable / Universal design, community integration / Ideal communication support platform / Variety of windows**
 - Need to adopt universal design for different products. Important to include.
 - Have technology available but doesn't interface with another program. PowerPoint and captioning is one example.
 - All technology needs to be mobile.
 - Successful intervention. Opportunity to look for next killer application, so many competing methods. Looking for universal design. What can be sustainable...what can be brought into the work situation?
 - Agreed. Needs appropriate technology. Know how. Technology needs to be easily applicable, sustainable – most important.
- **Student independence in selecting access options / Personal control through choices**
 - End user has the option the change font, adjust how they want the product – customize to meet their individual needs.
- **Examine commonalities between workplace and classroom and how technology can support both environments**
 - How technology supports those in the workplace.
 - Look at commonalities. Another specialties class opportunity.
 - Cooperative program is huge here. Very much a part of the educational process.
- **Accuracy is important (e.g., voice recognition; what is good enough?)**
 - Problems with voice recognition, it not being good enough. User not being recognized.
 - Accuracy level 90%. What real usefulness of speech recognition is without just claims?
- **Consider changing the name of the center to “Center on Access to Education through Technology: For Students Who are Deaf or Hard of Hearing**
 - Think about abbreviating, too long
 - Consider how the name will affect funding
- **Consider emergency service related work / Use campus as model**

- Use campus as an emergency notification warning system model.
 - Acceptable accuracy rate for TTY 1% or less. In emergency situation, it is crucial to be perfect.
 - Is emergency services your priority? Need to consider your priorities?
 - Should be an integral part of the educational process.
 - Working on emergency services alone is a huge undertaking.
 - Would need to be seamless.
- **Suggest organizing this information into four main areas:**
 - Type of access (audio, video, text, tactile)
 - Equipment (hardware, software)
 - Location (dorm room, classroom)
 - Type of relayed information (emergency, educational)
- **Dissemination opportunities**
 - PEPNet started a great network. Start initially through email, very inexpensive.
 - Organization American Education of the Deaf and Hard of Hearing
 - DeafEdu.net, Network of teacher consortiums
 - Not-for-profits, TBI and state and local agencies – all networking together.
 - Network with each state. Each state has assistive technology programs and will go there for assistance.
 - CSUN, like strategic planning for colleges, universities, businesses.
 - Parents network
 - Through your own Web site
 - There is a definite need; the challenge is putting together the product and service. If that is done successfully, people will be knocking at your door.
 - Best strategy is to contact businesses directly
 - Important working with trade associations that representatives can give broader picture, easier to sell ideas to.
 - Advocacy trade associations always more protective – just a word of caution.
 - We work with one person at the federal communications – the director – he’s more knowledgeable. More aware, more sensitive. Sometimes you have to go to the top. Happy to push your agenda items for you.
- **Cap the length of time spent on a particular technology (9-12 months), similar to industry model / Adjust to changing needs / Set up Web site that provides gateway to these new technologies**
 - Looking at technology, need to put a cap at how long you look at technology. Shorter life line for technology, longer life line for advocacy issues.
 - 9-10 month cycles to make a difference. Appreciate the comment. Quick turn-around is needed.

- TDI experience – strategic in order to succeed. Need to evolve and adjust. Identify market, meeting needs and keep them coming. Identify new needs. People need to be aware. Important for Web site.
- Let market decide the level of adoption rate.
- Whatever core piece – 5 years to adapt.
- **Measuring success**
 - Student performance
 - Attracting students to area of accessibility research
 - Change within RIT as a result of the Center (e.g., curriculum, research, etc.)
 - Level of adoption
 - Product effectiveness is unique to each product or situation.
- **Dare to dream**
 - In the future? Dare to dream? Caption on my pen. Communicate between two of us without an interpreter. We have the resources to have access, to meet needs, need to work smart. For example, use remote interpreting or captioning to meet needs. 5-10 years – hologram of interpreters. 85% of student learning is outside of the classroom. The scoreboards will have captioning. Take advantage of technology that exists already. Many are lost when they come to extra-curricular activities. I personally had difficulty socializing at George Washington University.
 - Part of the dream is to look at the future. Learn from visualization. Science floats through holograms. That technology already exists. Eye glasses for example.
 - Full equal and independent access – have access wherever - independently.



Center on Access Technology:
For Students Who Are Deaf or Hard-of-Hearing
An NTID/RIT Center of Excellence

October 28, 2005
NAG Focus Group

NTID LBJ Building 60 Room 2590

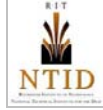
Purpose of Meeting

NTID is contemplating the establishment of a *Center on Access Technology for Students Who Are Deaf or Hard-of-Hearing*. To that end, a business plan is being developed for consideration by NTID and RIT administration. Action steps to develop the business plan can be found at <http://www.pen.ntid.rit.edu/ewc/atc/steps.pdf>.

The goal of the center will be to provide leadership and support for those RIT/NTID individuals developing, implementing and evaluating technologies as they pertain to enhancing the educational experience of persons who are deaf or hard of hearing.

We would like to obtain the thoughts of experts on general and specific technologies you believe have the potential for positively impacting “access to education” for students who are deaf.

This meeting is one of several planned for the Fall 2005. The first discussion occurred at the June 2005 Instructional Technology Symposium. Notes and a summary from the meeting is posted at: http://www.pen.ntid.rit.edu/ewc/atc/Summary_of_AT_Discussion_6-28-05.pdf



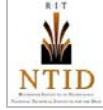
Center on Access Technology:
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Agenda

- | | |
|--------------|---|
| 1:30-1:45 pm | Welcome by T. Alan Hurwitz and James DeCaro
Purpose, goals and outcomes for the meeting and brief review of “state of the art” |
| 1:45-2:45 pm | Discussion Topic: Products, Services and Outcomes of an Access Technology Center |
| 2:45-3:00 pm | Break |
| 3:00-3:45 pm | Discussion Topic: Development and Evaluation of an Access Technology Center |
| 3:45-4:00 pm | Summary / Next Steps |



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For Students Who Are Deaf or Hard-of-Hearing

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October 28, 2005
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NTID LBJ Building 60 Room 2590

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Center on Access Technology: For Students Who Are Deaf or Hard-of-Hearing

An NTID/RIT Center of Excellence

October 28, 2005 Discussion Group Summary Notes NAG Focus Group

What types of products and services do you think a center should provide? What products and services would be most helpful to the constituents that you serve? What products and services would make their lives and jobs easier as they focus on access to education, access to employment?

- **Product rating system / Underwriter's laboratory for assessing applications, technology for interfacing and compatibility purposes**
 - An idea of what products are available. A rating system to determine which products work best in certain situations. Almost like a "Consumer Reports" by and for people who are deaf and hard of hearing. Also, having guidelines for making purchasing decisions. Our members spend a lot of time working out the glitches and trying to see if various pieces of technology are compatible with each other. For example, the cell phone being compatible with the hearing aid or the Cochlear implant. There is a lot of discussion about which cell phone to buy.

- **Create real state-of-the-art classroom for use / Use as a real model / Universal access / Design considerations for learning environments for access / Wireless and affects of changing technology on classroom setup**
 - An assistive technology program should not only have a state-of-the-art laboratory, but also state-of-the-art classrooms to be used as models (1 or 2 classrooms). You need to be able to demonstrate a picture and say that this is the state-of-the-art universal access classroom; a symbol or something that you can point to that is tangible – an actual classroom in use. Need to be able to show a goal to use as a real model. Should be universal access.
 - The classroom structure/set up is very important. The color of the walls, the size of the screen, etc. impacts the ability to learn. Blue background has been proven to be a color that's good. A screen too large takes away from the lecture. Need to balance the elements in the room. Smart classrooms at Gallaudet University and classroom setup at Virginia Tech are impressive. Classrooms and labs need some kind of flexibility built into the design for change and advances in technology. The key to the future is wireless.

- Technology is progressing at a very fast rate. We need to look at wireless. Recognize that in 5 years the technology is going to be different, the laptops smaller, the technology carried in their person, etc. Things to consider when designing classrooms.
 - And everything will be mobile.
- **Trend towards Web-based distance learning may affect the structure of the classroom / Access and delivery considerations**
 - This could also relate to a growing trend of distance learning via Internet in terms of professors giving speeches online, web-based training. This trend may affect the classroom setting in 5 years in that a course may be taught in part in the classroom, web-based, and other. Then you have access and delivery considerations relative to the deaf and hard of hearing and others with disabilities.
- **Problem of having to look at multiple things at one time / The need to combine to one screen and have the consumer have a choice of the type of access / Redundancy is critical / Considering different literacy levels**
 - The problem I face when I attend computer workshops is that I need three sets of eyes. One set for my own computer, one set for the screen, and one set of eyes for the interpreter. I am looking at the presenter, I am looking at the interpreter, at my screen, and at the screen at the front of the room. I want to be involved in the discussion and ask questions, but it requires three sets of eyes in order to keep track of everything and in order to get my question in at the appropriate time.
 - I am wondering if the technology will reach a point where it's person centric rather than classroom centric. And it's simply a very simple setting in the classroom. And the assumption is that each individual has this enormous information processing capability through the technology and all you need to worry about is the interface so that the translator can work with all the devices properly. It will be wireless. Information intensive in a small package.
 - I am wondering if it is possible that the device itself is maybe a smaller version of those large screen TVs – over here is the instructor on video, over here is a Captionist, over here is an interpreter, here is another kind of access need, and that all gets reduced so that the person has it in front of them and picks what they want, or all.
 - Or have somebody speaking and signing and then have closed captioning underneath that person in the same view. Instead of two multiple screens or a split screen, and all in one picture. It's easier on the eyes that way.
 - Redundancy of information is critical.
 - Some things are access for some of us, but does it mean it's access for all of us? And often times if we are talking about access, we are talking about text. That's not access for

all of us. There are many who don't have the literacy skills to take advantage of those technologies. We said 20 years ago that captioning resolved the problem, well it hasn't.

- We need to separate access to information from learning. Incidental learning is important, but it's not the same thing as access. It's different for different people. Different language skills, ways of communicating.
- To really use the technology that you are talking about, you have to have a specific level of sophistication.
- Depends on the type of technology. Some technology is easy, you just turn it on.
- The key word is customization. Not multiple screens playing everything at once, because that would be information overload, but the ability to choose the type of access services.

Jim's input: Whatever business plan or model we put together should be person-centric. As we address technology, the technology should be designed to address individualized needs and that they have the choice in that determination.

- **Utilizing information – having access to information is not enough**

- Another point, just because you have access to information doesn't mean that you are learning from it. You can have information, but what do we do with that information?

Jim's input: This is where we see a center for access technology interfacing with our research departments that are focusing on issues of teaching and learning and information processing. Technology is one thing, how you utilize the information is another.

- **Future directioning / Emerging technologies / Availability of interpreters / Human contact essential**

- Is there a technology that takes Sign Language to text? (Not yet) It would be interesting to see how that would play out.
- This is really not about a product, but an impact of a product – interpreters. Are we paying attention to how many interpreters are available? Are there enough interpreters to meet the needs? Are people being attracted to that field? Are they keeping up with skills? Are they qualified? They really give that human touch to access. I am really not satisfied with just captioning. Interpreters really impact products.
- Agreed that personal contact is essential. The whole OnStar call center is built around personal contact. It could be automated.
- I agree the value of human contact and human touch is very important. I think we also need to talk about the role of technology in providing the interpreting services. We may not have enough warm bodies in the community, but the idea of remote interpreting

- services through technology goes back to Don's point about the different options on a screen, a split screen or several screens, or several options to choose. They could go total captioning, interpreting and captioning, etc. It's a more personalized approach to meet individualized needs. Making sure we have the playing field equalized for all students regardless of their communication needs.
- In Europe they have G3 technology. Cell phones use it. When will it happen in the US? It's going to cost a lot to have 3D technology because the country is so big, but G3 technology will really make an impact on the technology available for use.
 - G3 is already used in Sweden and other countries and now they are working on G4. G3 as video capabilities.
 - Relative to captioning, there is the question of verbatim. There are really no good options for broadcast captioning, but in a controlled environment (computerized, high-tech environment), it might be possible to use that to help solve that language differential between the consumer who can use verbatim and understand it and wants it and the consumer who requires something simpler. Perhaps highlighting words that may have a higher language level so that if the consumer doesn't understand, he/she could touch the screen and a substitute word pops up, or a definition appears.
 - In 1968 I gathered together the leading scientists in automatic speech recognition because I thought if we could convert professors speech to text in the classrooms we would have half the battle won. They said in 10 years, 10 years passed, no ASR. Another 10 years, no ASR. Do you anticipate the incorporation of this technology? At the time of silent movies, all of us were on par. When talking movies came, we became an acoustically-biased society. What we have now is the alphanumeric keyboard, which puts deaf and hearing on a level playing field, but is that forever?
- **Interface component / Technology interfacing to assist with the total life experience in and outside of the classroom / Communication with friends and family / Help with homework / Incidental learning**
 - Think of products not just in terms of education within the classroom. Total integrated experience of education and life may be beneficial. Access to their classmates, their friends, their parents, their teachers outside of the classroom. Access to information to help with their homework. All very important.
 - Our deaf and hard-of-hearing students are using multiple pieces of technology and will be going forward. I think that interface component is very critical. Making sure that everything is compatible. Unfortunately companies aren't talking to each other as often as they should be. Perhaps that's another outgrowth of this effort, to get some standards or ways of making the technology compatible for individuals who are deaf and hard of hearing.
 - The young love their technology. Literally have many pockets to carry different pieces of technology. It would be wonderful to interface them all (iPod, cell phone, SideKick, pager) or put them into one handheld device.

- That single device is almost here. You can see it with the iPod nano. To what extent do you involve your students in this project? You have a living laboratory right here at NTID. Maybe they are the ones that should be designing these products, bringing in their full life experiences. Lets say in five years you have a device that does all of this stuff, how would you integrate that into your life as a student 24/7 kind of a thought process?
- Like the iPod nano, the technology must be easy to use, friendly for those that are technology savvy and those of us who are not.
- Confronted with the whole issue of language, incidental learning. It's to the benefit of the deaf youngster to get all of these different kinds of information because it will give him/her a better understanding of the language and use of the language. We benefit significantly from things that we hear that are none of our business, while walking down the street, we hear people. That's how people keep up with current events or how they get new ideas. They are stimulated from incidental learning, and it is learning. Exposing them to learning, that is the label that I would use.

- **Observing and considering the total customer experience**

- As we look at design and innovation at General Motors, one of the most important tools is what we call the customer experience – going out and observing the customer experience, observing intensely, almost living with people for a period of time to get a true sense. Also it is extremely important to consider where technology is headed? Adaptability and to be able to upgrade. It's difficult to get a read on where the technology road map is headed. Consider how does that interact with the total customer experience? That might give you some valuable insights.
- In a classroom-centric model I am concerned that so much learned is now outside of the classroom. I would really look at the experience of this student in terms of their entire life requirements for technology and then answer “how do you interface with that?” As opposed to tailoring the student to the classroom.

-
- **Adapting available technology**

- OnStar System is a communication system in vehicles. A person speaks to a person at a call center when he/she is lost, or has had an accident, etc., typically under tense circumstances. Concern was expressed regarding the system and the deaf. Right now they use pagers and email to rectify this problem.
- There is currently an engineer at GM who is deaf leading the project to solve the OnStar interface issue. Right now he has been able to find a way to get it linked up with the telecommunications device for the deaf, which is a step forward. Another aspect of this is aging customers. People don't hear one way, they hear in a variety of ways and they have all different levels of hearing. And, if we are going to build the OnStar brand around the assumption that people can hear we have to deal with a very noisy environment inside of a car and try to find a way to tailor the ability of the system to match up with the ability of people to hear.
- Maybe you can adapt that technology to help students find their way to class.

Jim's input: 1) There is an information clearing house product line – an assessment and recommending kind of clearing house of available technology. 2) Then a technology interfacing kind of product line. 3) And, then finally because of the rapid changing nature of technology, future directioning and customer experience, bringing those two together in kind of a forward-looking product line. Here's what's available. Here's what it is. And, here is what you can do with it whether it's classroom design or using different technologies. Also, we would be assessing things that are new to the market and providing recommendations regarding their application. Interfacing the variety of different technologies that are available to optimize access. Those all with given technologies that exist. But then future directioning, looking down the road, what's coming that will make those, in effect, obsolete and start with how customer interfaces.

- **Maintain list of innovations, wish list / Interact with manufacturers during design process as opposed to retro-fitting**

- One of the services that the center may want to provide is to maintain a list of innovations that are required...a list of things that we need to know that we don't know how to do yet.
- If you are going to design products, you need to know why you are doing it. There are certain assumptions underlying. I am wondering how universal that is among the technology being discussed today. Is there a production facility? Is there a production aspect or is it just gathering and relaying information?

- **Scheduling / Having the resources to meet demand**

- There are a lot of reasons to look at remote delivery that tie to the concept of total life experience. I think there are still a lot of pieces missing. In this room we have a lot of mics, someone controlling the audio, a Captionist. A lot related to portability, the individual having the power to go with the communication need. One of the big barriers

in scheduling. With VRS you have instant access. Nothing like that is available for the deaf consumers with interpreting, so the possibilities of improving an order of magnitude and the quality of service if we can make it remote is great, but there are parts to be built like audio and getting the information in and out of the room.

- **Does technology enhance learning?**

- The purpose of this entire discussion seems to be enhance learning ability or the student's ability to learn will have access. They are really not the same, learning and access. Is something broken now that we're trying to fix? Do we really believe that these improvements are going to change students' learning abilities and replace basic reading and writing? Don't forget the basic learning functions.
- I believe we are here to get as many options that we can to maximize our learning abilities.
- Do you feel that your learning capacity has improved since the technology has advanced or are you becoming more independent because of technology?
- More independent for the most part. I'm feeling technology overload at this point, but I do see the benefits of technology because I am able to work anywhere that I go.
- How does that fit for students? How are we going to enhance student learning here via technology at this institution?
- What I am seeing in the learning environment here at RIT with the increased use of technology is in reality putting more pressure on students to develop their writing and reading skills. They have to respond to text, so it's really forcing an increased development of their writing and reading skills. Literacy. The other key critical factor for success of our students is the ability to fully participate with peers, which includes all of the hearing students as well, and this is true in the workplace. The technology has to help the hearing people communicate fully with the deaf and hard of hearing.

Jim's input: The whole purpose is that we want to provide deaf students multiple variety of ways of accessing information, to optimize their capability to learn. The question that we are asking is how can technology support and aid that. The center will provide multiple opportunities to access information. The same information that hearing people have other avenues to access. The technology is there to support that activity.

- **Possible partnerships**

- General Motors does a lot of studies on what people are watching when they are driving. There are an awful lot of driving distractions (similar to the a classroom environment). Perhaps studies could help address the issue of what to focus on in the classroom.

- **Additional focus group discussions**

- I hope you will have a group discussion with the deaf-blind students as well. Not just students, but older adults. People who know more about technology.

Jim's input: We need to be clear about the audience. K-5 is very different than junior high and high school and university. The other issue had to focus on practicality. For example, real life applications so that we are not just spinning off with these elaborate theoretical designs. There is a real environment that we are attempting to focus on that we not lose sight of that.

What are the technologies that you see currently or that you envision on the horizon, or that you can imagine that we should be thinking about and looking at with this kind of a center?

- **Concern involving reception of information**

- A concern of mine involves the reception of information by deaf and hard-of-hearing people and I wanted to make sure that the products that we need to develop need to consider the other end...where the source of the information is coming from. Sometimes it comes from the deaf and hard-of-hearing people without speech capability. Sometimes at RIT that comes from faculty that can't speak good English because of their nationality or whatever. Some people think they speak good English but don't.

- **Speech Recognition**

- ASR or just SR because there's a question of whether all speech recognition is automatic or assisted. Kept hearing in 20 years it will be automatic. It never got closer than 20 years from now. I know that NTID was working on speech recognition for classroom usage for quite a few years. The question is how do you get there? Independent speech recognition where it's basically just automatic. You put a microphone or something and the audio feeds into a computer and the audio creates the text. There is also the voice writers now, the person who is essentially a parrot where they're listening, and however many voices have to be condense or represented in text, the computer only has to understand one voice. The last model, the voice writer is starting to show promise. There are companies out there that are selling independent speech recognition systems and claiming very high degrees of accuracy, but what has not happened is that quantum leap. It has taken 25 years or more to get from almost no independent speech recognition capability to one that produces about 75-85% accuracy at regular rates of speed, but it's slowing down – not speeding up. 85% doesn't get you there. 15 words out of every 100 being wrong or missing is not providing access. So the question is how to get passed this? What is the point we have to get to? Is it 95% before reasonable access is provided? Is that going to take 10 more years? In my opinion, relying on independent speech recognition is almost as illusive today as it was at NTID 27 years ago.
- Semantics has been the hang up. It's the meaning of these different sounds what the computer is not able to do.
- We have a product we sell called Caption telephone. The abbreviation is Cap Tel. It's used as a voice recognition system. We are learning that our vendor can provide 98% accuracy with that voice recognition, understanding that it's a controlled environment. It's not ready for the general public. It's a lot of money involved to develop this product. I think we forget to talk about the cost itself and that it could be prohibitive at some point.

- **Adaption / Adoption / Assessment**

- I am reminded of NASA many years ago. They were trying to figure out how astronauts could use a pen in space and spent thousands of dollars in research. The Russians used a pencil as a solution. I am wondering if there's some technology out there that currently exists that we can adapt. One issue in the long term is keeping ahead of the curve. What is the next technology, but there may be existing technology that we already have that

may not be used for this purpose. For example, how do deaf couples monitor their children when they are sleeping?

- Partnership with MIT.
- I think that we tend to make technology overcomplicated, when it is supposed to make our lives less complicated.

Jim's input: I think we need to look at technologies in terms of adaption and adoption and assessment and working with manufacturers to give them a wish list of things as opposed to research and development. There may be some research and development at an applied level like interfacing. We just don't have the horsepower to mess around with automatic speech recognition. It's that simple. Perhaps MIT.

Jim's input: I find myself thinking about adaption and adoption of available technology because the mass market drives that technology. Deafness is not going to drive a technology. It may drive certain technologies like Cochlear implants, but not the mass market. We need to find innovative ways to use what's on the market. That's adoption. And then maybe adapting some things like teaching people how to use it, so there is a training component involved in it. Then looking down the future, what might be coming, or what we might like to have coming. Then attempt to influence the development in some ways of some of the more innovative industries.

Alan's input: If we boil this down we might come with five important principles. 1) redundant information; 2) ease of use or practical; 3) affordability; 4) portability; 5) universal access. So if we are thinking about evaluating or assessing the product for adaptability and adoptability, I'm getting five components. Added 6) adaptability.

Thinking about anything that we would like to have. Sometimes the ridiculous ideas turn out to be very interesting.

- **Spoken words appear on screen similar to a text message**

- My dream, although I love interpreters, I resent going through an interpreter's voice. I would rather it be my own. I would like to be able to have my words go across the screen like an opera. It's here, but it's not used for the classroom. It's not used. But I would love that because these are my words. And I think it's affordable. (I don't want it to talk for me, just the words show up. Just show the text message of what I'm saying.)
- Your Sidekick could be somehow compatible with a system that could allow you to do that. I think there is potential there.
- You are talking about a talking machine. I mean, it's not going to match your personality, your character, the tone of your voice. I think it's a good idea.

Jim's input: Why not? Why can't a Sidekick do that? Why can't you have the opportunity to sit down with people and talk about your personality and working together

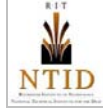
you select the voice you would like to have that represents you and the Sidekick voice becomes Marilyn's.

- **Archive lectures via videotape / Caption as indexing system**

- In today's technology world, why don't professors want their lectures videotaped? Develop archives of lectures so the deaf or hard-of-hearing could refer back to them if needed. Obviously, there are some bugs, because you don't want students skipping classes and listening to the lectures, etc.
- The Realtime captioning could be added as an indexing system so you just bring it all home on your small little handheld TiVo, your whole 4-year experience would be Tivoed. You could search for whatever whenever.
- Sidekicks and the Internet could be dangerous. Students could say anything behind your back. Put your evaluation ratings on the board.

- **Access options currently available**

- In the early 1980s I was limited to which courses to take based on which ones had interpreters available. The power was in the institute. I would like to migrate the power to the student where they can go in the classroom and pick C-Print or video or automatic speech recognition – they have options. They choose the option.
- The oral deaf adults using oral interpreters, and another deaf person wanting a Sign Language interpreter. Right now at NTID you are required to pick one, either oral or Sign Language, is that true?
- We meet all the needs with one interpreter, yes. The interpreter will sign in a way and maybe move their lips the same, but we don't provide separate services.
- But one C-Print, one interpreter, that's their choice.
- It's limited to needs. If there is an individual in the class who doesn't understand Sign Language, then they need C-Print.
- Yesterday some of the students were complaining about having to make a choice.



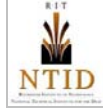
Center on Access Technology:
For Students Who Are Deaf or Hard-of-Hearing
An NTID/RIT Center of Excellence

November 8, 2005
RIT/NTID Focus Group

NTID LBJ Building 60 Room 2590

Agenda

- | | |
|----------------|--|
| 8:30–9:00 am | Continental Breakfast
Welcome by T. Alan Hurwitz and James DeCaro
Purpose, goals and outcomes for the meeting and brief review of “state of the art” |
| 9:00–10:30 am | Discussion Topic: Products, Services and Outcomes of an Access Technology Center |
| 10:30–10:45 am | Break |
| 10:45–12:00 am | Discussion Topic: Research, Development and Evaluation of an Access Technology Center |
| 12:00–1:00 pm | Lunch Review of Discussion: Products, Outcomes, Summary / Next Steps |



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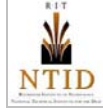
Purpose of Meeting

NTID is contemplating the establishment of a *Center on Access Technology for Students Who Are Deaf or Hard-of-Hearing*. To that end, a business plan is being developed for consideration by NTID and RIT administration. Action steps to develop the business plan can be found at <http://www.pen.ntid.rit.edu/ewc/atc/steps.pdf>.

The goal of the center will be to provide leadership and support for those RIT/NTID individuals developing, implementing and evaluating technologies as they pertain to enhancing the educational experience of persons who are deaf or hard of hearing.

We would like to obtain the thoughts of experts on general and specific technologies you believe have the potential for positively impacting “access to education” for students who are deaf.

This meeting is one of several planned for the Fall 2005. The first discussion occurred at the June 2005 Instructional Technology Symposium. Notes and a summary from the meeting is posted at: http://www.pen.ntid.rit.edu/ewc/atc/Summary_of_AT_Discussion_6-28-05.pdf



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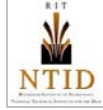
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What types of products and services do you think a center should provide? What products and services would be most helpful to the constituents that you serve? What products and services would make their lives and jobs easier as they focus on access to education, access to employment?

- **Finding the center's niche / Types of technology/applications to focus on / Universal design with assistance / Thinking big**
 - Would you want to set up with other companies? Provide contracting services like CSD? Technical outreach? Or only research and development? What do you want to do? What ever you do, realize it will require significant resources.
 - Not helping the students by providing them with all services, that's not the real world. Take advantage of the iPod. Focus on captioning and voice recognition. The simple ways to make lives better, easier.
 - Would want to work with remote interpreting.
 - Experiencing difficulty in distance collaboration regarding infrastructure technology and what we can afford. Limitation is not the problem. I encourage you to think big.
 - An application should apply across a variety of settings. Not just about access for the deaf, but include other populations. This will give you the opportunity to fund through something bigger.
 - It's very important to provide assistance with universal design.
 - It's important to focus on the younger deaf children that are lost in the mix, alone in a school district. If given a chance to access technology at a younger age, they could be brilliant and NTID would be foremost in their minds when come they are ready to make a decision on where to go to college.

- **Importance of technology/applications being easy to use / Identify functioning levels**

- There is also the issue of teachers not adopting the new technology. It not being successful, too complicated to use, taking too long to learn. Need to find ways for the technology to work simply, easily. Observe teachers or anyone in order to make it easier to learn and then provide the critical support.
 - Students need to know how to utilize products, to make that independent leap, to extend learning beyond the classroom.
 - This group of students takes advantage of technology, all students don't. They are fascinated by the coolness factor.
 - We have the crème de la crème of deaf. Need to think about others as well.
 - It's important to identify grade levels, but also functioning levels. Who they will be best used with.
- **Need for assessment tools / What technology is available and which ones are most useful / Clearinghouse type service**
 - What we are lacking are assessment tools, which would be very beneficial. Not knowing what is appropriate, what works best, what is compatible. The businesses are just trying to sell their products. We need better evaluation tools. Similar to either a clearinghouse or providing better assessment tools. How to tools, which are largely not available.
 - With K-12 population, trying to decide what is appropriate for deaf is non-existent. There are no guidelines. What should be provided? What is the process? There are so many technologies emerging. Providing guidelines is an open area.
 - I also think you need a strategy to keep up with all the technology that is evolving. That's very important.
 - There is a need for technology assessment. There is nothing for the K-12 grades. Even if they have technology, there is no mechanism for set up.

Jim's input: Two categories that I'm hearing: what is there and what is on the horizon. Including an underwriter's lab testing on what technology is useful.

- **Use RIT/NTID as a test bed / Playground to observe technology in use**
 - Abstract product of using RIT/NTID...let us have cracks at leverage. Bring technology here to test.
 - Access technology that isn't accessible because there is no money. Universal design wherever, whenever. Start with a dream in a small area. Take advantage of RIT campus and use iPod type technology. You did that here mentality. Do something unique here. Companies will be interested and will fund.

- One grant we have – key stroke capture software. to see what they are doing with it – observing.

Jim's input: Partnerships and playgrounds. Idea of the possibility of a playbox. Come and break them. Play until they break and observe. Goes back to being able to make a choice and having control.

- **Future directioning / Emerging technologies / Strategies in place to continue to address needs while dealing with the challenge of the fast rate of change**

- Challenge being that technology changes every 3-4 months and will be constantly changing all the way through those transitions.
- There are different layers of technology. Some change at a faster rate that needs change, but the higher layers might be longer lasting, for example mobility. Replaceable parts, basically the same technology... we are still sitting at terminals.
- Research needs to focus on target population – how technology addresses needs, tracking changes in technology, and which technology still addresses these needs. Teachers, parents, and users need that information.
- Technology turns over so often that it's important to have business relations. The needs of the deaf are timeless – they don't change – there are no deadlines. With technology there are deadlines. You have to be timely or you won't be able to keep up.
- People have needs, different level of needs. The ultimate dream equipment meets all of those needs. Technology is not there yet. As technology progresses, we will work up to that level.
- If you spend so much time in research, the technology will be passé. As technology gets old at RIT or at the industry level, still ahead of many places out there in the US.

Jim's input: My concern is that the next generation has already been replaced. Want to be thoughtful and systematic, but need to be quick.

- **Problem of having to look at multiple things at one time / The need to combine to one screen and have the consumer have a choice of the type of access / Redundancy is critical**

- There are issues of deaf in multimedia classrooms. Deaf students are not able to look at multiple sources of information. They need to make access choices. Each controllable. Come up with multiple ways to provide support.

Jim's input: Interfacing and student/learner control over platform.

- **Associated problems with providing choice to the type of access**

- Yes, but what students want isn't always what helps them learn best. Right now we are limited by resources.
- Think about how these changes affect the teachers in the classrooms. In college, many professors don't even allow laptops because students make bad choices, play games, etc.

- **Collaborating with businesses / Broker to bring technology in**

- Keep in mind the social implications of technology – out of the classroom. Echoing business collaborations. There are lots of companies who would want to work with NTID. I would encourage that effort and seek out those groups.
- Perhaps a company contracted.
- Get involved with industries in establishing certain standards they have to meet at the front end. Help establish baseline for access technology.

- **Provide training**

- The center would be a wonderful resource for interpreters in the K-12 community. Have the center provide training for interpreters or even remote interpreting. Wonderful resource.
- Even training teachers of deaf.

Jim's input: Generalize – training in general.

- **Taking into consideration the appeal factor / How else the technology could be used**

- While developing technologies, think about where they can be used elsewhere. Think about as selling point.
- Think about appeal factor. Think more broadly, even though deaf would be the main group.
- The cool factor – run into that often. They like it for a month, but will it be useful after a month. Need to look beyond.

- **Learning outside the classroom / Technology to help with transitions in life**

- A lot of learning happens outside of the classroom.
- Keep in mind the level of functioning for K-12. How each student will transition. How technology will help them during those various transitions in life.

- **Offering curriculum material**

- One idea relates. Offering curriculum material. Ability to pull out a module as a resource for access material.

- **Developing an independent learner**

- One area is how to make the learner an independent learner. Many in the target population don't know how to maximize technology/information. They are wasting a lot of important resources. It's a unique issue – how to teach to independently learn beyond the classroom.

What are your suggestions for enhancing collaboration across the university?

- **Collaboration experiences / Challenges**

- There's no single answer. I work with people from six departments representing three different colleges. Some are there for the money, some out of concern for the students, some because of the wow factor, and some junior faculty trying to score points. Four different reasons, but all work.
- The support at the college level can be challenging. Sometimes not always politically appropriate. Often out of our hands.
- Is there an office within RIT that facilitates collaboration?
- The grants office thinks they do this to some extent, but collaboration cannot be forced, but you can put out the carrot. Forced won't work. See not all showed today.
- Competitive environment sometimes exists within colleges. What's in it for me mentality? Don't want to add to workload.
- The people that are in it for the money are a waste of my time. They leave me holding the bag. You need people to give a little time. I don't think it's about the money.

Jim's input: Need to demonstrate success by bringing in money, which is okay. I understand that. Interest will follow. Money gets you the time. I'm talking real money.

- **Clear communication / Focus group with college representatives**

- Best thing to do is to establish a focus group with representatives from all colleges and talk to them. Recap objectives, the nature of the center and let them know what you would like to accomplish.
- Communicate what they can do. Make sure it is reasonable – what's reasonable to ask of someone. What is needed and what they could do, do not always match what's expected.

- **Attracting interest through recognition and targeting new faculty**

- The great institutes make the transition. Look at the new faculty to get involved. Bill as a program of scholarship. Thinking in new box. Takes people knowing not money.
- What are the kinds of activities that would attract interest?

- Recognition. This is what we do when we do this on our own. Can do this here. That's the benefit of collaboration.

Jim's input: The center becomes facilitator. Work can be done anywhere. We have some contacts, we will work with you. We will be the broker. People can stay in their colleges It's about connecting people to the right people.

- **Changing the mindset / Center as a change agent**

- Should the center operate at the RIT or NTID level?

Jim's input: Could grow into that, but it has to start some place. It depends on the receptivity. How we portray and paint the picture.

- It's important to keep in mind why. We have a responsibility to our deaf students. This is not part of RIT's vision. We are the one that is going to make it happen – searching new ideas for students.
- Need to change the mindset. All students are RIT students, some are supported by NTID.
- NTID is RIT everywhere on campus.
- Need to change the perception.
- We need to move forward.

Jim's input: Utilize this vehicle mainstreaming deafness so it doesn't exist in just certain buildings. Think of center as a change agent – a university wide change agent. Not sure we have had many successful collaborations, on the whole. It's a show me, not just tell me, attitude. Actions not words will be the only way.

What are the technologies that you see currently or that you envision on the horizon, or that you can imagine that we should be thinking about and looking at with this kind of a center?

- **Cell phone expanded beyond voice-to-voice communication / Addressing compatibility issues**

- Wireless, telephone technology and adapting to deaf and hard of hearing, be part of that.
- Cell phones are used for more than just voice-to-voice communication. A lot of information is provided. For example, they could call a math site for math tips that are available for the deaf.
- Idea of exchanging information via cell. Lack of compatibility huge!
- Homework Hotline type of assistance is not available for the deaf. It would be wonderful if that type of help was available via cell phone or PDA.

- **Development of wireless standards**

- Need to develop wireless standards. It would be nice to see us get involved in that.

- **Cheaper/affordable technology and computers available to all**

- Making basic cheap computer that all can afford.
- New technology versus adapting technology and making technology cheaper. For example giving children, which English is not their first language, a pager for safety reasons.

- **Widespread sharing of ideas and information through websites, bulletin boards, etc.**

- Making a bulletin board or website available that students can post cool things, study tips, etc. Would also be able to promote free software.

Jim's input: That ties into the clearinghouse concept of sharing ideas.

- We have it – thousands of links. We just don't promote it enough.
- Suggest incorporating pop-up advertising and blogs.
- Don't just use the web to publicize. Invite using other methods as well.
- If you provide a clearinghouse, make sure you index well. People just don't have the time to sort through.

- **Access technology for software on the web**

- Access to the web for the deaf is a concern. AOL Video Clips, less than 5% are captioned. Video clips are a growing trend. Need technology to access this.
- There is a lot of growth online meeting software needs. Breeze – no way to feed captioning software.
- Growing need to access open university courses, online instruction.
- Dragon fits perfect with AOL Instant Messenger.

- **Speech-to-text technology**

- Speech-to-text access will work as well as it would be helpful.

What are the problems with current technology?

- **Seeking the assistance of businesses that might know more than us / Research / Brainstorm / Observe / Meeting needs / Use multiple methods to make decisions**

- We don't know everything. Some businesses know better than us. We are behind the times.
- Sometimes learners don't know. Need to focus on the technology and not solely on learner feedback. It's for their benefit. Important to put together a good approach database (that includes learner information).
- Research is necessary. Technology becomes obsolete very quickly. Have to have a timeline or we'll be behind the times.
- True, but you can still continue to gather information. Research informing technology.
- Brainstorming in sync. Speed up variables on how to build database. Maintain commitment. Maintain good science.
- An incubator business partner lab here. Haven't looked into it heavily. Mic Statler would be helpful.
He could provide advice and assistance to effort
- Access technology center somehow a figure mechanism. Here are needs, given needs and changes...if could have done this type feedback. Need to have mechanism in place to keep ideas coming.
- Or we do that (maintain blog) and marry with the center.
- Traditionally, adapting technology to people. Need to change that.

Jim's input: Where do we have listing of needs? Need blog. Available to anyone. Evolve as people interact. Intention is not to duplicate. Tie into Marc and research.

- **Sending our engineers and researchers out to companies**

- Let's send RIT engineers and researchers to companies to make technology accessible from the beginning. Offer expertise to outside instead of bringing technology here.
- Pay off would be phenomenal. Financial constrictions.

- **Need for social interaction through technology**

- Social interaction important. Mainstream deaf with interpreting support are still isolated. Some way technology support would provide more interaction. Two years ago deaf students started utilizing email as a means of communicating with their family members.

Need to think of other ways, advantages to get deaf and hard of hearing to get to know each other better.

- Interaction through technology. Japan and Korea way far ahead. Cell video capability. Sign over the cell phones. Capability for redundancy: audio, visual, and tactile. That kind of technology is not available in the US.
- More innovation with spontaneous communication through deaf and hearing Sidekicks and cell phones without mediation.
- It's here – V-logs, but only here for people who can afford it.

- **Giving students a choice of access technology / Multiple avenues on many platforms / Redundancy**

- The challenge is multiple things to look at. Suggest super imposing desired image on top.
- When listening to an interpreter, the information is not retained (with those that learn sign language late). It's necessary to refer back to the text – better with print.

Jim's input: Need to be able to choose and capture how it's being utilized. Portable multiple platforms.

- **Associated problems with providing choice to the type of access**

- Great choices, but does not demonstrate an improvement in learning.
- C-Print and interpreting did more poorly (when students had a choice). Students couldn't make a choice. There are dangers associated with have choices.

- **Assessing technology is paramount**

- How do you assess? Technology without good science is ridiculous. Can't let that drop.
- IT people think of a cool idea, develop it, and put it on the market. They know it is successful if it sells. That's their measurement.
- I understand. Science being a partnership with research.

- **Use RIT/NTID as a test bed / Playground to observe technology in use**

- Sandbox idea, added benefit of student not having to pay \$40.

- **Clear communications as an "idea" center**

- Center may be perceived as an actual place. In reality it is an “idea” center. Need to be upfront and clear with that.

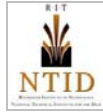
- **Lack of assistance/ease of use**
 - The challenge is not knowing how to use the technology. It must be easy to use.

- **Making sure resource services offered are available**
 - When you offer more services, people expect these services. Make sure you have adequate resources to be able to do the things you say you can do.

- **Summary**
 - It’s not a simple question with a simple answer.

Jim’s input: Technology focus, action oriented, positive influence. Product/industry oriented. Find models and learn as we move forward. Not a scientific center.

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December 14, 2005

RIT/NTID Student Focus Group

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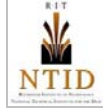
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Center on Access Technology:
For Students Who Are Deaf or Hard-of-Hearing
An NTID/RIT Center of Excellence

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RIT/NTID Student Focus Group
NTID LBJ Building 60 Room 2590

What types of products and services do you envision in the future for access? What new or modified technology would be most appropriate to help you as students improve access in all parts of your life?

- **Wireless and remote access technology throughout campus**

- There is a wireless connection problem in the residential area of campus. More wireless access is needed for all kinds of technology throughout the campus including the tunnels.
- Going back to access throughout campus. It would be nice to have access within JAVA (coffee shop).

Jim's input: More remote access technology services around campus. Exposure to hearing areas as well. Not only access on campus, but remote access, from anywhere.

- **Need for multiple access technology in one environment / Provide choices**

- A luxury would be to have interpreting available during class lectures and then C-Print available after. You need both. You need multiple kinds of access available in one environment. I would like to be able to use C-Print without having to give a reason. Would like the ability to choose. Some discrimination exists now.
- It is essential to have different access technology available. A lot of times the interpreter misses things. It is bad for other deaf. They are not getting all of the information.

- **Challenges associated with electronic note taking: lack of compatibility with C-Print (lack of diagrams, clarity during conversion, etc.), delay in receiving notes, no standard feedback mechanism, lack of choice in note options**

- I am involved in electronic note taking at the request of several of my professors. My notes are in color with diagrams. However, when I export to C-Print services the output quality is terrible. There is a need to share compatibility for note taking. There needs to

be a feedback section that students can provide information on certain parts requesting that the notes be clearer.

- The C-Print notes are sloppy looking. You cannot fully understand the notes. They lose their clarity.
- Improve standards and training connected with the technology.
- I would like to have different note taking online options. For example, I might want to look at notes from two different classes simultaneously... one class in-depth notes and the other just a summary.
- There is a problem regarding the delay in receiving notes. Notes aren't accessible until the next day, one day late. This is not ideal especially when studying for tests or during finals. Need for quicker access, real time access.
- Like to have more open lines of communication with whom I'm taking notes for. It took a couple of classes for me to receive feedback for change in style. As a result of the feedback, I had a better understanding of their needs, but it took several classes. Instant messaging would work well or the opportunity to meet with students at the beginning of the quarter would be helpful.

Jim's input: Current technology that is on the market that provides these services (e.g., One Note). Being forced to drown down to old way of note taking. Same quality needed as seen on the screen. Need technology that provides words and graphics. Generally speaking, more user choice, more flexibility in choice, more control. Technology solutions that make it easier between hearing and deaf, particularly with regards to feedback.

- **Utilizing existing technology in the classroom**

- Touch screen technology already exists. Would like to be able to walk into a classroom and have a SMARTBOARD type technology already there on the board ready to go, replacing the standard lecture type format.
- There are different approaches to teaching. Hands-on experience works best. I grew up with computers and technology. I would like to see more technology used. For me, a laptop makes it easier for me to learn versus looking at overheads.
- VRS – hearing departments use as well. More use of video phones. More remote kinds of access is needed. Would like to be able to see the teacher on the screen.
- Students have different problems. Some can't see far, some can't get the print out, some can't see the board fully, the diagrams aren't shown in the notes. Close vision technology would be the answer.

- **Need to improve communications with teachers**

- AIM – would like the ability to instant message the teacher and not always have to depend on someone else.
- There are contact issues/problems – limited office hours. Technology could improve communication with teachers.

- **Need to improve communications with the deaf and students in general**

- To increase access and communication for both hearing and deaf, I would suggest incorporating the red digital pixel signs throughout the campus. In many, many areas.
- Freshman, in general, do not know about the different types of access services or policies that are available to them. It would be nice if a brochure were available that explains a student's rights (e.g., a right to an interpreter, etc.). A "how to" brochure.

Jim's input: Maybe the center can provide information about access services and how to use them, similar to a clearinghouse.

- **Need for a better interpreting request system / Real time interpreter communication needed**

- Also, there is a need for real time communication with requesting interpreters. Interpreters are not available on short-term notice, advance notice is needed. Would like to know in advance if an interpreter will be at an event or it is a waste of my time.
- If you can't get an interpreter for an event, you should be able to watch it captioned on TV.
- The request for an interpreter is difficult. It's hard to find on the Web site. It is not easy to just click on a button. You need to be familiar with the Web site.

- **Need for universal access / 3G technology / Bringing the latest technology to the USA**

- I work at the photo cage in Building 7. There is a need for some kind of technology, mobile device to communicate with other stations. I am not able to be independent because I can't hear on the walkie-talkie to communicate with other co-workers.
- Voice-to-print technology (working on it), text-to-voice (already here). Also working on sign-to-voice. All ways to communicate with hearing.
- Talking universal access.
- Other countries, Korea and Japan, have visual communications. We are more verbal. Even Egypt has video phones. It would be nice to see universal access and leading technology here in the US. It's important to concentrate of visual communication.

- Would like a walkie-talkie type of device that deaf could take advantage of. I can speak. I would like to take advantage of my speech. Feel not able to use what I have. Would like a device that gives me the opportunity to use voice, and I can also see written language.
- CAPTEL (captioned telephone) for regular telephones, not cell phones.

Jim's input: 3G technology in Korea. Korea Telecom wants to work with us. General principal is that the center can become a center that looks around for the latest technology and brings it to the USA.

- **Technology needs to be simple, user-friendly**

- I'm not a big fan of technology. Need technology that is less complicated and easy to access, user-friendly. Think simple.

- **Essential to develop relationships with developers before production**

- NTID needs to have a dialogue, develop relationships with developers, to add features so there are no missed opportunities.

Jim's input: This technology access center needs to have good relations with developers before production.

- **Appropriate design of classroom is essential**

- Regarding classroom setup...it doesn't make sense to always have to turn your head to look at whoever is talking/signing.

- **Ability to purchase textbooks online**

- It would be cool to be able to purchase textbooks online (instead of at the bookstore).

Jim's input: Ability to access these services online, so you don't have to wait in line.

Think, dream about the perfect environment regarding access to instruction. What does the future look like?

- **Universal device that incorporates all access communication methods / Available to all students / Device would hold classroom notes, schedules, etc.**

- Use of Sidekick or pocket PC. RIT would provide all students with this device that would incorporate message services, notes sent right there, etc.
- Have whatever the teacher says uploaded to a PDA – when you come into the classroom – information all in one device. Very simple.
- Mandatory. Everyone would have to have it.
- A device that has all communication methods including sign, voice, captioning.
- A device that is aware of where you are. For example, if you walk into a particular classroom, it knows to make those class notes available. It will also make you aware of other deaf students with the same device in the classroom for communication purposes.
- At North Carolina at Chapel Hill they give out PCs to students. Make RIT a 5 star resort, eliminate the retention problem.

Jim's input: Perhaps included in the cost of tuition. Universal communication device: notes, video, scheduling, etc. Portable, simple, and universal. Everyone would have it.

- **Providing students with choices / Multiple access technology in one environment**

- I am a cross register student. I would like the teachers to be able to both speak and sign.
- Sign projection on the teacher's chest.
- Provide captioning for those teachers who do not know how to sign.
- Provide TVs on tables for closed captioning or CART so the student is able to look at the teacher and captioning. They aren't missing anything.

Jim's input: Maybe use technology to overcome those teachers who refuse to learn sign language. Accessible digital learning.

- **Sound/Voice activated technology**

- Provide camera in the front of the classroom so whoever is speaking the camera automatically scans to that person, so you don't have to keep turning your head away from the interpreter.
- Provide a camera on the SMARTBOARD with a red arrow that points to the person talking so the interpreter can continue signing and doesn't have to stop to point the person out.

Jim's input: Sound/voice activated technology.

- **Electronic textbooks**

- Ability to read all textbook electronically online, so you don't have to buy them.
- Books 24/7 provides this service.
- Safari 2 also provides a lot, not all, but a lot of the O'Reilly textbooks online.
- Some textbooks are also available via disk.

- **Transport system / Physical virtual access**

- Physical virtual access. Ability to transport to Louvre in Paris.
- Install this transport system between buildings so we don't have to walk out in the snow.
- Chair lift to class.
- Jetsons type transportation.

- **Communication screen with all access communication methods**

- Within the Student Development Center, set up a huge screen, post everything on there. Include all access communication methods: voice, sign, caption.

- **Robotic / Hologram interpreters**

- Robotic interpreters.

Jim's input: Holograms.

- **Making better use of existing technology (e.g., SMARTBOARD)**

- Make better use of SMARTBOARD technology – ability to download diagrams to notes is available now.

Jim's input: Utilizing instructional classroom technology that is already available.

- **Ability to instant message teachers**

- Instead of contacting teachers through email. Contact teachers in real time through instant messaging.

- **PDA in glasses**
 - Heads-up display in my glasses – PDA in my glasses.

- **Remote access to RIT from anywhere (even outside of campus)**
 - Remote access to RIT classes no matter where you are, even in the car.

- **Biodome**
 - Biodome. Be able to control the weather, etc.

- **Holodeck**
 - On campus, Star Trek Holodeck type room. Real time, anytime.

- **International robot**
 - International robot.

- **Share best practices with other universities / MIT projects**
 - Compare with other universities their best practices. Share development ideas.
 - Project at MIT called Mithro puts computers in wearable pieces of equipment. For example, GPS – dumb down version to a tour group.

Bill's input: Other projects at MIT include glasses that identify different things in the room, cheap laptop for \$100 for third world countries. We may connect with them soon to make sure there is opportunity for the deaf. Voice recognition word-for-word transcript, summarization for quick review, which was discussed earlier.

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