Family Center on Technology and Disability

January 2011
Issue 115

Technology Voices

An OT's Panoramic Perspective

As an occupational therapy practitioner, researcher, and professor, Dr. James Lenker occupies a rare vantage point in the assistive technology field. His is a perspective that encompasses a wide range of AT-related issues: device adoption and abandonment, assessment, evaluation, consumer and rehab technology and AT research. It's a panoramic perspective with a view of the horizon in every direction and a lens on changes that are remaking the AT landscape.

As an assistant professor of rehabilitation science at the University at Buffalo, one of the research linchpins of the State University of New York (SUNY) system, and director of the university's advanced graduate certificate program in assistive technology, Dr. Lenker's activities and research efforts impact most aspects of the AT field. A trained mechanical engineer, with an engineer's problem-solving bent, his career has been dedicated to the application of his engineering and OT skills and his researcher's curiosity on behalf of children and adults with disabilities. In doing so he is fulfilling his life's ambition: to make a difference in the lives of individuals and their families, as well as his OT students.

James Lenker, Ph.D. Speaks

From the outset Dr. Lenker has not been reluctant to change course in his search for the most appropriate skills to help him realize his dream. "I studied mechanical engineering as an undergrad and earned a Masters degree in it right away without really knowing what career I wanted to pursue," he recalls. "I didn't have any family members or friends of family who were engineers, so I lacked the insight that one can get from having a relative or friend in a field where that individual can be observed and one can conclude, 'I want to do what he or she does.'"

Engineering seemed a natural avocation for Dr. Lenker, he says, "because I was very strong in math and science. Engineering seemed to be a profession in which I could apply those strengths. Like many undergrad students, however, I would eventually learn that one's late teens and early 20s are not a time when we are predisposed toward reflection on the appropriateness of a career path."

Dr. Lenker remembers that he was beset "by a vague sense of incompleteness, of being unfulfilled with my course of study but I believed that that sense would improve once I left school and was in the field." However, he notes, "my course of study never resonated for me. Too quickly I earned a Masters degree while still uncertain about what I wanted to know and to do."

His Masters in mechanical engineering from the University of California-Davis in hand, Dr. Lenker explored work options in Sacramento. "While I was networking, it was suggested to me that I ought to check out the assistive device center at Sacramento State. At the time, Al Cook was directing that center."

Albert Cook has since moved on to become professor of speech pathology and audiology and dean of the rehabilitation medicine faculty at the University of Alberta. Dr. Cook has worked with interdisciplinary teams to develop assistive devices and to assess the effectiveness of technology being used by persons with disabilities, but is most well-known for co-authoring, with Susan Hussey, the preeminent textbook in AT, *Cook and Hussey's Assistive Technologies: Principles and Practice* (Mosby, 3rd Edition, 2007).

"By that time I'd determined that for my life's work, whatever it turned out to be, I wanted to make a positive difference in people's lives." Back then, in the late 1980s, he recalls, most available engineering openings in California were in defense-related industries. "Those industries certainly serve an important societal function, but they were not industries that fit my aspirations. All along I had this nagging feeling that I wanted to do something which enabled me to see the difference I was making immediately and in which I was not dissociated from the end-user and the potential beneficiary of my work."

He made an appointment to meet with Dr. Cook and Susan Hussey, who would not publish the first edition of their groundbreaking AT book for another 10 years. "I was struck by how engaged they were in their work, how much it seemed to matter to them and how much they seemed to enjoy it. For the first time I could say, 'I really want to do what they're doing.'"

There were no openings at Dr. Cook's Sacramento State AT device center, "but Al and Sue recommended that I visit some Bay Area AT centers." During the ensuing weeks Dr. Lenker visited the children's hospital at Stanford that was conducting AT and re-

habilitation engineering research as well as the Palo Alto Veteran's Administration medical center where similar research and development was underway, and a rehab engineering center in San Francisco that specializes in low vision and blindness.
During those informational visits, he says, "I experienced the same emotion as with Dr. Cook and Susan Hussey: The work was very compelling and I knew that the researchers and practitioners were people I'd enjoy working with. That's when the light bulb went on. I had to figure out a way to gain entrance into this field."

As he networked, "I heard repeatedly that there was a niche in this field for engineers who could contribute to ongoing research and to the day-to-day provision and service delivery of AT."

He joined RESNA and paid his way to a RESNA conference. Six months later, through connections made at that conference, he applied for two jobs. "One was at Buffalo. I moved here with almost no experience in the field, but Buffalo was willing to take a chance on me. They needed someone to do some teaching and to work on several AT-related grants the school had just been awarded. That's how I got my start."

Since then, Dr. Lenker says, "my position has evolved. After working for four years here, I realized that if I was going to remain in the field, which I wanted to do, it would be helpful if I acquired OT credentials. I coveted the expertise and knowledge base that my OT colleagues had and decided that in order to legitimize my place in the field I'd have to return to school to study occupational therapy." He earned a second BS degree, in occupational therapy.

Dr. Lenker did not intend to return to UB as faculty, he says, but the school offered me a position which required me to develop the AT certificate program. To me, this was a once-in-a-lifetime opportunity to create my own program from scratch, which I did."
One of the classes he created for that program focused on outcomes measurement. "In creating that class and teaching it I realized that there was a real need for researchers in that area, that there was no research capability in certain key areas of outcomes research. I decided to earn a Ph.D. so that I could conduct research to demonstrate that AT was beneficial and also solidify my faculty position in the university setting."

His objective, he notes, "was to justify the efficacy of AT for funding purposes, to justify not only the devices and software but also to justify the service that we provide. Funding is probably one of the most significant challenges consumers face in acquiring AT, whether it's kids and families looking to acquire AT for use in schools, adults trying to get their wheelchairs funded through Medicare or Medicaid, or older adults looking to fund AT devices in skilled nursing facilities."

There are different challenges in each of those three funding domains, he points out, "but the challenges are major – and one of the biggest is the lack of research evidence that demonstrates the effectiveness of AT in everyday life situations. There is an abundance of anecdotal evidence, but not enough that has been gathered in rigorous research studies."

Supporting our interview with Dr. Lenker are resources related to device adoption and abandonment, assessment, evaluation, consumer and rehab technology and AT research. We also feature members of our Knowledge Net-work. We invite you to contact these mem¬bers for further information. Please share this newsletter with other organizations, families and professionals who may benefit from it. We invite you to visit us at http://www.fctd.info. We welcome feedback, new members and all who contribute to our growing knowledge base.

The AT Match-Up Challenge: "Is the Child Better Off with or without the Device?

An Interview with James Lenker, Ph.D., Assistant Professor of Rehabilitation Science; Program Director, Advanced Graduate Degree in Assistive and Rehabilitation Technology, University at Buffalo/State University of New York (SUNY); Occupational Therapist.

James Lenker, Ph.D.

For Dr. Lenker, the desire to gauge AT effectiveness and measure outcomes has driven his research efforts across the AT field. According to Dr. Lenker, identification of the key elements in a sound evaluation of an assistive technology device, i.e. the measurement of a child's success with a device, begins with a question: Is the child better off with or without the device?

"Children are better off with it if they are using the device and enjoy using it and are productive with it in terms of making progress toward achieving their IEP goals, or their medical needs if receiving a mobility aid or communication device," states Dr. Lenker. "And device productivity can vary with the task at hand."

Making the Match: "There's No Pause Button"

"There's no 'pause' button that can be pushed to stop a child's development at the time when we're trying to identify an appropriate AT device," Dr. Lenker points out. "Kids change so quickly; sometimes their physical, cognitive, and social skills change so much that the technology can't keep pace."

Long-term anticipation of children's needs, therefore, is one of the key elements in AT matchmaking, he notes. "The art in this process lies in the ability to anticipate not only what children need today but also what they'll require six months, a year or two years ahead. Accurate anticipation requires a sense of what activities are motivating for a child, as well as their own "gadget tolerance". For example, will they embrace using a special keyboard or software to help with their writing, or will they perceive it to be a hassle?

Disentanglement: "Our Challenge in the Field"

Productivity with AT, he explains, can be ascertained in part by asking the following questions:

- Is the child more engaged in school tasks with or without the AT?
- Does the child spend more time on school tasks with or without the AT?
- Does the child produce greater quantities – or a greater quality -- of work using AT?
- Are the child's test scores improving? Standardized test scores are one measure of improvement, but are the child's in-class test scores improving from marking period to marking period?

"Those are the indicators families and others should look for," he says. In some cases, however, an accurate reading of those indicators may be muddied, he cautions. "Children are physically and cognitively maturing, whether or not they have AT. One of our research challenges is to disentangle the benefits resulting from device use from the changes occurring naturally with the maturation process"

Stretching Limitations: "Aim High"

Although sensitive to the degree of difficulty children experience while attempting to learn to manipulate an assistive device and to a child's physi-

cal and cognitive limitations, Dr. Lenker believes in stretching those limitations when possible.

Often, however, he emphasizes, "some individuals do not wish to be pushed that far. It's better to start with small achievable goals in order for people to experience some success for themselves, which enhances their motivation, and also develops their confidence in me -- that I have some value and that I'll do my best to steer them in the right direction." The confidence factor cannot be underestimated, he says. "Confidence is half the battle in any endeavor in this field. It's important in the mentoring process, in which I'm engaged as a faculty member. I view the mentor-mentee interaction as no different than so many interactions in life, when individuals place their future in a mentor's hands, or when their future is potentially impacted by what a mentor says and does. Confidence in the judgment of a mentor or a practitioner is a must."

After all, Dr. Lenker points out, "we are creatures of habit. As one of the professors in my Ph.D. program said recently, 'In the ergonomics world we're trying to persuade people to change their behavior in some fashion. And humans always resist change.' That sentiment is very applicable to the OT world and to the AT field as well; we are constantly recommending that individuals perform a task differently. Even if it's for their potential betterment, we as practitioners have to appreciate that there will be a natural resistance to it."

Device Abandonment: Not a Black and White Issue

Abandonment of AT devices has been discussed in the field for many years. According to Dr. Lenker, "'abandonment' is a very black and white term that refers to an issue that is anything but clear cut." Certainly, he admits, there are a "fair percentage" of devices that go unused and are ultimately discarded. "But there are many devices that are underutilized, which is not necessarily a negative, because sometimes, despite everyone's best judgment, an AT device, like a consumer product, just doesn't fit."

Lack of motivation, says Dr. Lenker, is often a major factor in device abandonment. "Some consumers at their core are not truly motivated to utilize a recommended device, often agreeing to its acquisition and trial but lacking the motivation to master its use. Abandonment soon follows."

Motivation, when it exists, he says, is two-fold: 1) the motivation to achieve the goal; and 2) the motivation to utilize the AT to achieve that goal. For some individuals, Dr. Lenker explains, the motivation to achieve a goal "might be somewhat soft, which undermines the use of technology." In other cases the motivation to achieve the goal is strong but the technology is inappropriate for the designated task.

What Can Families Do?

What can families and teachers – and the end-users – do to help blunt device abandonment and enhance motivation? "Families should take very careful stock of their commitment to achieving a given objective, and of how strongly they feel that assistive devices are the way to achieve that goal. No one's decision-making is perfect; none of us is equipped with a crystal ball," Dr. Lenker remarks.

AT professionals, he advises, should strive to provide families with options but assign much of the decision-making responsibility to families. "Most disability professionals bend over backwards to try and give consumers the opportunity to make their own choices."

In some situations, however, that is not the case. "As professionals we are sometimes put in a position where we really need to make a recommendation – wheelchair mobility and seating are good examples – based on what we believe is in an individual's best medical and functional interest. In such cases it is incumbent on us to be a little more assertive in explaining to consumers why we believe a particular course of action is the most appropriate."

At the same time, he cautions, "it's important for us to heed consumers' past experience, if any, with the devices we recommend." For example, he says, consumers may have already experimented with a certain seat cushion or a postural support and decided against its further use.

When to Admit Defeat – or Change the Approach

Sometimes devices are not effective for specific individuals. For AT professionals the question becomes, When do I concede defeat and move on?

"It's always a tough dilemma," Dr. Lenker admits. "Fortunately, there's almost always a clear and tangible reason why equipment or software is not working out. Before admitting defeat perhaps a potential modification in the technology that may improve its potential for utilization ought to be explored in order to improve the match with the consumer."

For Dr. Lenker, this is when his engineering training becomes especially useful.

"It's problem-solving. That's when I can bring some of my engineering background to bear, not so much on the technical side of a problem but on the approach.

Also important, he emphasizes, is "to re-assess with the consumer how much they really want and need a particular device solution to work out." In some cases, he adds, "the device may be the individual's lone option and that option must work out at all costs. In other cases, however, there are other solutions that can be considered."

It's sometimes important, he explains, "to grant individuals permission to admit that although they are trying hard to achieve compatibility with a device it's OK if that compatibility doesn't come about; they're not failures if they are unable to make it work and there are often alternatives."

Try Before You Buy!

Should changes be made in the AT assessment or evaluation processes in the hope of reducing the rate of device abandonment, or maximizing utilization? Does the solution lie in the processes or instead in the negotiations between professionals and the individuals a recommended device is intended to help?

Trial usage of devices, Dr. Lenker states, remains the most effective method of AT assessment.

In-school therapists have an assessment advantage, he points out, "because they possess the opportunity to see and work with the children on a regular basis." Through repeated exposure, he adds, "an OT can obtain a better sense of what might work, and there's more of an opportunity for trial and error. It's through trial and error that we can sometimes learn the most."

In a hospital setting, "there is sometimes less opportunity for extended trial usage of equipment.

Sometimes opportunities exist for trials with more expensive equipment, such as power wheelchairs and customized seating systems where an individual's postural support needs are unique and relatively complicated." Often, though, it becomes difficult to arrange for a trial usage period that extends beyond an hour-long assessment.

Sometimes the challenge for practitioners and end-users, he remarks, "is predicting how the trial use experience will translate into everyday long-term usage. The typical therapist works hard to provide a trial usage period, although it may be very limited."

How Families Can Encourage Device Adoption and Use

Families, Dr. Lenker advises, "can learn so much by reaching out to others in similar situations." In this regard, Dr. Lenker recommends two self-education strategies for families:

1. Peer education, through parent networks, for example, can be invaluable. "Younger or even older adults can learn much from the experiences of peers with similar needs."
2. Internet-based research, including blogs and online discussion groups, can reveal much about device performance. "Information in video format is readily available online via YouTube, where there are many videos featuring individuals with disabilities demonstrating usage of AT devices."

"Families who gather such knowledge on their own will contribute positively to the assessment process with their children's therapist or special educator, in some cases unearthing a device or approach not previously considered, he notes.

An added benefit of family self-education, he remarks, "is that the process of information-seeking on one's own engenders an engagement in the process and a commitment to finding a solution."

The Role of Teachers in Assessment and Evaluation: Jugglers

The role of teachers in the AT assessment and evaluation process differs markedly from the roles of families and practitioners, Dr. Lenker points out. "Teachers are expected to have a role in the success of technology that they did not recommend or about which they may know little. For example, say a student is using computer software to help her write an essay; her teacher has to understand the benefits of that software and become proficient enough in its use to help the student maximize the software's benefits.

"This is a tall order for teachers who are already burdened by current responsibilities. And, while teachers are investing time and effort to help one student in their class they must also shepherd the other 24 children in the class for which they are also accountable."

Teacher reluctance, in some cases, to master modern technology is also a hindrance, Dr. Lenker asserts, "but that roadblock is already diminishing as many teachers adopt technology not only in their schools but in their personal lives. Although much of the technology acceptance among teachers could be attributed to technology-savvy younger teachers, many veteran teachers in their 50s and 60s have embraced technology and have achieved a high proficiency level with it."

The proliferation and general acceptance of smartphones, cellphones, web access and email among all

age groups, he says, "has elevated the technology expertise and literacy of so many people, teachers included, which has a beneficial effect on a child who is using an AAC device or perhaps is using a power wheelchair or assistive software. As a culture, as a society, we're being conditioned to having gadgets around us all the time that have various software interfaces.

"This larger societal revolution that has taken place should help classroom teachers to be less stressed about working with a child who's using technology. It's good for the child as well, because these kids are now more a part of the social landscape which consists of children who carry their technology with them everywhere. Increasingly kids with disabilities are using the same technology as their peers without disabilities. The only difference in the respective technologies lies in application."
As an example, he points to "some interesting threads in recent RESNA and OT listservs" about software applications for the iPad (http://www.apple.com/ipad/features/) that support augmentative communication, and applications that aid children with their handwriting.

Technology Convergence: "Our World Has Become Flatter"

The widespread convergence of assistive and consumer technology was unimaginable only a few years ago when AT consisted of unique devices created for a specialized market. Increasingly, however, consumer devices such as smartphones, cellphones, PDAs, iPods netbooks and now iPads and broadly available software are often employed as assistive devices. For the AT field, according to Dr, Lenker, the convergence of technologies presents opportunities – and challenges – in terms of its impact on assessment, device acquisition, use in schools and homes, training, adoption and abandonment.

The convergence challenge for the AT field is in keeping up with the technology; the opportunity is the relatively low cost associated with consumer technology applications compared with dedicated AT devices that are often far more expensive.

"This means we need to remain abreast of the hardware platforms while also keeping pace with emerging applications, especially with the explosion of smartphone applications, not only for the iPhone, iPod Touch, and iPad, but also the other smartphones like BlackBerry and Droid."

New software applications, he continues, are appearing daily and are not produced only by large companies. In a break from tradition, small companies are very active apps producers. "That's an exciting development because historically the field has relied on a small cadre of companies to make advances. With smaller software developers now in the mix, we often hear about their new products through listserv discussion groups and other new media. Our world has become flatter."

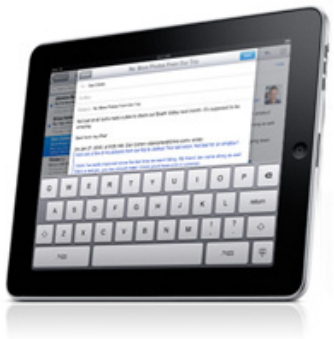
For practitioners, the challenge of keeping up, he adds, "makes us increasingly reliant on consumers to know about new applications, on fellow practitioners to inform us of new apps they've discovered and about their experiences with those apps. There is an increase in information traffic of this sort on professional listservs."

So many of us now have PDAs of our own, for which the applications are not overly expensive; we can spend $20-$50 – either out-of-pocket or through our employers -- to purchase an app with the po-

tential to meet many client needs, and try it out. It's much easier to convince employers of the necessity to pay for an application in the $20-$50 range than it was to persuade them to buy a device for $500-$5,000."

Consumer Tech Changes the Assessment Process: Casting a Wider Net

The challenges and opportunities inherent in the increasing use of consumer technology for AT purposes somewhat alters the consideration of AT, Dr. Lenker insists, "because we can now cast a wider net."



The potential exists for children with disabilities to appear much cooler when using, for example, iPad-based augmentative communication software than their predecessors who used augmentative communication devices based on what might have been perceived by peers as funny-looking portable computers."

The current wave of technology, he adds, possesses the potential to help users feel less socially isolated, which in turn will make device adoption and utilization more likely. "This is a phenomenon that we'll be in a better position to appraise 10 years from now as far as the extent to which it has actually occurred," Dr. Lenker predicts.

Parallel Interventions and AT

At the University at Buffalo, Dr. Lenker emphasizes to his OT students that there are parallel interventions that can often achieve the similar functional objectives as assistive technology. He exposes the students to the teachings of one of his AT mentors, Dr. Roger O. Smith (http://www4.uwm.edu/chs/faculty_staff/r_smith.cfm) at the University of Wisconsin-Milwaukee who writes often about parallel – or concurrent -- interventions. (The transcript of a 2002 FCTD online discussion of AT outcomes moderated by Dr. Smith can be read at http://www.fctd.info/webboard/webboardTranscript.php?board=101.)

According to Dr. Lenker, Dr. Smith suggests that the following six steps are necessary for therapists to achieve a specific functional goal with a client:

- Change the person by virtue of therapy or restorative therapy in order for the individual to improve his/her capacity level by strengthening mobility and fine motor manipulation, which enhances the individual's innate capacity
- Change the task to make it easier for individuals to break the task into steps
- Change the environment; alter the physical features of an environment or the cultural factors in the environment that would make the environment more supportive of the individual's efforts to achieve a goal. Change the school-based setting by, for example, changing the desk at which a child works by making it higher or lower to better support the child's posture and functional movement capabilities, or by perhaps modifying a bathroom or toilet/shower area
- Use personal assistance -- a teacher or teacher's assistant, a fellow student -- if a task cannot be performed any other way or if assistance can help a child. Getting dressed in the morning is an example. "Sure, a child with disabilities can get dressed independently in, say, 25 minutes," Dr. Lenker points out, "but if the child needs to be especially early it is OK if help is offered and accepted to save time."
- Use AT
- Change an individual's technique in the performance of a task; a child's capacities are the same

but perhaps being taught a different approach to the same task may result in more efficient performance of that task. "This can be applied to changing a keyboard, for example, or alterative shortcuts employed with software to reduce the mouse and emphasize the child's ability to use a keyboard."

In terms of evaluation, Dr. Lenker maintains, "it's important for us to be able to consider all those options simultaneously in a given situation. As much as we place a high value on independence in Western cultures, there may be some tasks for which assistance is easier and beneficial. It's not as if any one of the six options is better than any other in all cases. The idea is to work through the trade-offs on each of the potential options as they relate, at a specific time, to the practitioner's goal for the child."

Current Research: Quantifying Practitioner Services

Dr. Lenker's current AT research focus, he says, "is aimed at developing a better, deeper understanding of what we as practitioners are doing to influence the assessment and evaluation processes by quantifying our services in terms of time and activity, for example, documenting how much time we typically spend on assessments for specific populations; how much time is spent on funding advocacy and how much on training."

With assessments, he says, "the data will provide answers to the following question: Are we able to implement standardized protocols or procedures each time or, out of necessity, do we often improvise? Most practitioners use a standard for their own clinic or their own setting."

The objective, he states, is to define and capture that information in a more routine manner. "Ultimately we need to be able to draw associations between outcomes that individuals with disabilities are experiencing and what we are doing as practitioners that may be influencing that outcome and comparing that information to our own practices and settings, and then compare across settings, between school districts, between rehab centers or between vocational rehab settings."

It's important, he notes, "to gather accurate information from practitioners about the interventions they conduct if the AT outcomes are to be interpreted in a meaningful way."

Historically, he adds, the literature of AT outcomes has failed to describe the practitioner's role. "Many of the studies simply state, for example, 'We looked at the outcomes and impacts for this group of power wheelchair users, or this group of individuals using speech recognition software.' There is no mention of practitioner involvement in the process."

Many AT products, however, "do not perform well out of the box, which means that practitioner involvement was necessary in order for those products to work at all. Users attempting to learn to use AT devices or AT-related software on their own often may use the device suboptimally."

In addition, he continues, "it's logical to assume that practitioners are working with varying levels of expertise, experience and knowledge and there may be outcomes disparities that can be attributed, perhaps, to the input of a practitioner who's a recent grad and new to the field versus a senior practitioner with 10-15 years experience."

Smartphone Data Collection

Interestingly, he says, much of the emphasis in that research is on developing data collection tools for use on smartphones. "I'm using an iPod Touch as a data collection platform. If we can make the soft-

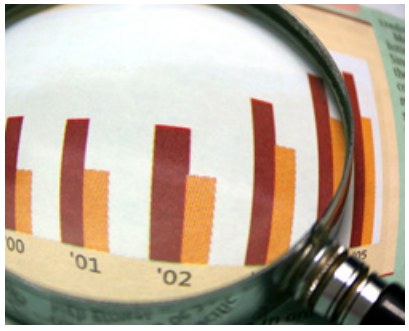
ware compatible with a variety of smartphones, and if we can make certain that the software is always available, it will be easier for practitioners to collect data as a normal part of their day."

Sooner rather than later smartphone data collection technology will be ubiquitous, he asserts. "If the software is effective and not overly onerous in terms of time required for practitioner users to document their own time, maybe this form of data collection will soon become routine."

As researchers, he continues, "we aim to identify the minimum data set that can produce the greatest insight so that practitioners can describe a client encounter or a patient encounter and enter the relevant data via smartphone in less than a minute."

The overarching objective of his research, he says, is to select projects with the maximum potential to interpret long-term outcome, "which is what excites me most about our work."

AT Research: Universal Design of Environments



Another aspect of his research, he explains, focuses on universal design of environments. "We're near completion of a study on accessible transportation and are conducting a study of transit bus features, not only the ramps that enable bus riders to get on and off buses but also the fare collection mechanism and seat layouts.

"Our three-pronged study here at UB employs a full-scale mock-up of a city transit bus in one of our labs. We have five user populations that we're bringing in to evaluate the ramp, fare box and interior seating arrangements: power wheelchair users, manual wheelchair users, power scooter users, adults using ambulation aids such as canes and walkers, and adults with vision impairments who use a mobility cane.

"We're experimenting with two or three set-ups for each participant to learn which is most useful for them. We're doing this across the user groups because not all user groups view a particular ramp, for example, in the same way. They certainly differ on what they like or don't like about various seating arrangements.

"This is a federally funded study. The Transportation Access Board is very interested in our information. Depending on our findings we are in a position to directly affect policy and design guidelines for transit buses, depending on how clear cut the findings are."

Ultimately, he concludes, "we'll know the answer to the same question I ask about children and their AT: Will these individuals be better off with or without the accommodations that we're testing?"

§ § §

Benetech President, Jim Fruchterman, Reports that Bookshare Hits 100,000 Members

Since the beginning of 2009, we've tripled the number of people with disabilities Bookshare is serving with our accessible library of ebooks. For years, our extraordinary cohort of dedicated volunteer scanners has provided Bookshare with most of its new content. This past year, we're getting most of our content directly from top publishers: high-

quality digital content for free. Our volunteers, together with these socially responsible publishers, are making sure that our members have the content they need. We just added 847 books to the collection in one day—that's more than we used to add in a month! All of this means that when people living with a disability such as blindness, severe dyslexia, or a significant physical disability (such as our returning veterans who may have polytrauma) come looking for a specific book they need for education, employment or simple enjoyment, we're much more than likely to have it available for them in an accessible format.

The amazing thing about serving 100,000 students right now is that our commitment to the U.S. Department of Education was to serve 100,000 students by the end of our five-year contract in late 2012. Based on hitting that number two years early, we're now projecting that we could serve perhaps twice as many students, 200,000, by the 2012 milestone date. And the price to the Dept. of Education won't change: we'll do twice as much for the same price. I know that funders aren't used to hearing that from the social sector!

Now that we believe we've really begun to solve the problem of making the text in books accessible for the 1% of the population with a severe print-related disability, we're busy thinking about the next frontier. We just won a $5 million competition that will fund our DIAGRAM R&D center to tackle the problem of image accessibility for people with print disabilities. And we're busy discussing with educators and publishers how we can bring Bookshare-style accessible content to the ten times as many students who could benefit from talking books but don't qualify under the very limited copyright exemption.

RESOURCES

ARTICLES

Merging IT with AT: Assistive Tech Joins the Mainstream

By Sara Stroud

The Journal (September 1, 2010)

The boundary that once separated assistive and consumer technology is fading fast, Ms. Stroud contends, as she points to a growing convergence of the two. The result, she writes, is that students with physical and learning disabilities are gaining increased access to consumer products used by general education students. Those products are often less expensive than more specialized AT and makes students with special needs feel less "apart". The article notes that some of the impetus behind the incorporation of assistive capabilities into consumer technology – for example, the iPad is being tested as an augmentative communications device – derives from an attempt by some tech companies to serve the aging boomer population with devices such as computers that are more accessible, closed captioning, easily adjustable contrast and text size for computer displays and text-to-speech capabilities.

http://thejournal.com/articles/2010/09/01/merging-it-with-at-assistive-tech-joins-the-mainstream.aspx

Assistive Technology Assessment

South Carolina Assistive Technology Program

This fact sheet defines and describes AT assessment and the AT assessment process. The authors suggest that families consider the following factors as they select a professional to help them navigate the process:

- The type of equipment/device requires, i.e. over-the-counter, individually fitted, or prescriptive
- The system's complexity, i.e. single item or com-

plex integrated system
- A family's knowledge level, experience and comfort level with AT
- Requirements of the procurement funding source.

The fact sheet also provides answers to the following questions:
- Who can perform an AT assessment or evaluation?
- Who else can aid families in selecting AT devices or services?
- Are AT pre-acquisition trials possible?
- Who pays for AT assessments?

http://www.sc.edu/scatp/assessment.html

Helping Autistic Children with iOS Devices

By David Winograd

The Unofficial Apple Weblog (August 18, 2010)

The author highlights the research findings of an Australian study entitled iPod Therefore I Can: Enhancing the Learning of Children with Disabilities through Emerging Technologies, which tracks the progress of 10 children on the autism spectrum using iPod Touches. Mr. Winograd spotlights the case of a child who was unable to wash his hands until he was exposed to photos and voiceovers of another boy performing that task. About 60% of the study's goals were achieved, according to Mr. Winograd.

Although the results of this and other studies have been encouraging, the author states, poor motor skills, including poor motor planning, remain a problem for 60%-80% of autistic children, which makes manipulation of the small buttons on an iPod and an iPod Touch difficult. An ongoing study of iPad and iPod Touch use by autistic children appears to indicate that the use of these devices can extend short attention spans, demonstrate understanding and increase interest in experimenting with the iPad when students were previously found to have little interest in technology. The study also found, however, that the iPad is a fragile instrument that can be easily shattered by a child experiencing a violent outburst. Applications for the iPad and iPod Touch fall into the following categories, according to the author: those that help with attention span, those that help with communication and those that help with organization.

http://www.tuaw.com/2010/08/18/helping-autistic-children-with-ios-devices/

The iPad: A Disability Friendly Device?

By Barbara Twardowski

Quest (January 18, 2011)

Written by an individual with muscular degeneration, which caused a decline in gross and fine motor skills of her hands and feet, the article evaluates the pros and cons of the iPad as the device relates to her abilities. However, Ms. Twardowski cautions that iPad technology is not necessarily universally useful for individuals with disabilities and that it cannot replace a laptop computer or a cellphone.

http://quest.mda.org/article/ipad-disability-friendly-device

iPod Therefore I Can: Enhancing the Learning of Children with Intellectual Disabilities through Emerging Technologies

By Dr. Genee Marks and Jay Milne

University of Ballarat (Australia) School of Education (2008)

Originally presented during the 2008 INCITE conference, this paper discusses the results of a 2006 Australian pilot project to use iPods to help children with severe intellectual disabilities meet IEP literacy and social skills goals. The case study demonstrated significant success for many children and pointed to a need for further teacher training and options for a broader research project. http://www.icicte.org/ICICTE%202008%20Proceedings/marks086.pdf

Five Key Trends in Assistive Technology

By Meris Stansbury - eSchool News (Dec. 3, 2009)

According to the author, a survey of 65 academicians, education technology experts and members of professional associations named the following five trends in AT as paramount:

- The convergence of several technological systems into a single platform to perform multiple tasks
- The customizability of technology and the growing acceptance and implementation of Universal Design for Learning
- The full emergence of research- or evidence-based design
- Device portability
- Interoperability of AT so that it can be employed in a variety of settings.

http://www.eschoolnews.com/2009/12/03/five-key-trends-in-assistive-technology/

Assistive Technology Outcomes Measuring Methods

By Lisa Pulsifer - eHow (December 8, 2010)

Ms. Pulsifer describes the following AT outcomes measurement methods:

- Observation provides information on whether a student is maximizing a device's utility. This information is gleaned from responses to the following questions: Is the student using the device to express herself to others? Do others respond accordingly? In what ways does the device help – or hinder – goal realization? Do changes need to be made to enhance usability?
- Data collection focuses on whether a device is used in an appropriate setting, to provide an indicator about when a student should progress from one task to the next and to determine if a device has met the objectives each day
- Interview information reveals whether a device is being used by a student, whether the device is aiding a student in meeting defined goals and if a device can be used in a variety of settings or is limited to one or two.

http://www.ehow.com/list_7464248_assistive-technology-outcome-measuring-methods.html

Assistive Technology Assessment Process

North Dakota Interagency Program for Assistive Technology

This document describes the following nine steps comprising the AT assessment process:

1. Identify the individual's tasks to be accomplished
2. Gather background information
3. Match the individual with equipment features
4. Identify equipment considerations
5. Establish trial use of equipment
6. Reconsider options
7. Develop training plans
8. Identify funding sources
9. Define follow-up activities

http://www.ndipat.org/uploads/resources/385/microsoft-word---assistive-technology-assessment-process.pdf

WEBSITES

AAC TechConnect

This site aims to simplify augmentative communication evaluations via unique tool kits, online resources and workshops. The website spotlights new AAC technology and fee-based subscription services. http://www.aactechconnect.com/

Begin with Me

This Michigan language arts project is directed toward teaching teams to support fifth grade students struggling with writing. The site describes a program that emphasizes technology and training with outcomes applicable to many students, including those without disabilities. Sample pages from training manuals are downloadable from the website. http://beginwithme.weebly.com/

KNOWLEDGE NETWORK MEMBERS

Consortium for AT Outcomes Research (CATOR)

CATOR conducts multiple research projects on AT outcomes and impacts to determine the effectiveness and usefulness of AT and the implications for use or discontinuance of AT devices. The organization's current efforts coalesce around the following research ventures:

- Researching and developing the Assistive Technology Outcomes Profile for Mobility (ATOP/M), an AT outcomes instrument, based on state-of-the-science applications of item response theory (IRT) and computer adaptive testing (CAT), to evaluate the impact on activities, participation, satisfaction and well-being of increased mobility resulting from the use of mobility AT devices
- Developing an Assistive Technology Intervention Specification Instrument (AT-ISI), a tool for systematically quantifying mobility-related AT devices and services
- Development of an instrument to measure the impact of AT on caregivers and to apply the instrument in a single, state-of-the-art study devoted principally to testing the hypothesis that AT can substitute for human help.

http://www.atoutcomes.com/content/view/1/2/

The Advanced Graduate Certificate Program in Assistive and Rehabilitation Technology: State University of New York (SUNY) at Buffalo

Founded in 1997, the program is affiliated with UB's School of Public Health and Health Professions and emphasizes a problem-based approach to learning via classroom projects, community involvement and exposure to current research literature. The program draws expertise from UB's Center for Assistive Technology (http://cat.buffalo.edu/) and from academic disciplines that include architecture, industrial engineering, physical therapy, communicative disorders and sciences and social and preventive medicine. For more information, contact:

The Advanced Graduate Certificate Program in Assistive and Rehabilitation Technology
Department of Rehabilitation Science
University at Buffalo
515 Kimball Tower
Buffalo, NY 14214
Phone: (716) 829-6731
Fax: (716) 829-3217
Email: sphhp-rs@buffalo.edu
http://sphhp.buffalo.edu/rs/at/

Central Coast Assistive Technology Center (CCATC)

CCATC is a technology center that provides AT evaluations, training and education. The center specializes in general AT services, vision and hearing technologies and ergonomics. AT services include one-on-one technology evaluation and training, community outreach, computer access, augmentative communication and home/school/worksite access. For additional information, contact:

Central Coast Assistive Technology Center
P.O. Box 4310
San Luis Obispo, CA 93403
Phone: (805) 549-7420
Fax: (805) 549-7423
Contact: Paul J. Mortola, Director
Email: slomortola@aol.com
http://www.ccatc.org/

T.K. Martin Center for Technology and Disability

Housed at Mississippi State University, the center provides comprehensive, multi-disciplinary AT evaluations. The center's staff includes a specialized team of speech-language pathologists, occupational therapists, special educators, and rehabilitation and biomedical engineers. Facilities at the center include adaptive computer laboratories, de-

sign and fabrication workshops, a vehicle augmentation lab, a seating and mobility center and specialized evaluation rooms. For further information, contact:
T.K. Martin Center for Technology and Disability
326 Corner of Hardy and Morrill Road
Mississippi State, MS 39762
Phone: (662) 325-1028 (662) 325-0520 (TDD)
Fax: (662) 325-0896
Contact: Janie Cirlot, Director
Email: jcirlotnew@tkmartin.msstate.edu
http://www.tkmartin.msstate.edu/

LOGAN

LOGAN provides a range of relevant services for individuals with disabilities and their families. LOGAN Children's Services provides AT-related support to children through age 3 via the following services:

- Evaluation and assessment
- Development teaching
- Occupational therapy
- Physical therapy
- Speech therapy

Additional services for children with disabilities to age 8 include:

- P.L.A.Y. Project
- Seasonal camps
- Specialized classes
- Toy lending library

Services for families include the Sonya Ansari Center for Autism (http://www.ansaricenterforautism.org/), family support groups, a resource library and workshops. For more information, contact:
LOGAN
2505 E. Jefferson Blvd
South Bend, IN 46615
Phone: (574) 289-4831
Fax: (574) 234-2075
Contact: Patrick Pinnick, President
Email: logan@logancenter.org
http://www.logancenter.org/

National Secondary Transition Technical Assistance Center (NSTTAC)

Affiliated with the special education program at the University of North Carolina at Charlotte, NSTTAC helps states support and improve transition planning, services and outcomes for youth with disabilities, and provides technical assistance on scientifically-based research practices. The center also produces methods of assistance for youth with disabilities. For further information, contact:
NSTTAC
Special Ed. & Child Development; UNC Charlotte
9201 University City Blvd.
Charlotte, NC 29223
Phone: (704) 687-8735
Fax: (704) 687-2916
Contact: Catherine Fowler, Project Coordinator
Email: chfowler@uncc.edu
http://www.nsttac.org/

Funding provided by the US Department of Education under grant number H327F080003

Project Officer: Jo Ann McCann
Project Director: Jacqueline Hess
Newslettter Editor: Thomas H. Allen
Design & Distribution: Ana-Maria Gutierrez

Family Center on Technology and Disability
1825 Connecticut Avenue, NW
Washington, DC 20009
Phone 202-884-8068 Fax (202) 884-8441
fctd@aed.org www.fctd.info