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

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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.

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 physical 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:

- 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.”
- 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 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 potential 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 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.](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 alternative 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 software 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?”