



MOVING TOWARD SOLUTIONS

ASSISTIVE & LEARNING TECHNOLOGY FOR ALL STUDENTS

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Moving Toward Solutions

Assistive & Learning Technology for All Students

Executive Summary

The Individuals with Disabilities Education Improvement Act (IDEA) of 2004 and the No Child Left Behind Act (NCLB) of 2002 mandate that all students, including those with disabilities, be taught to the same high standards and hold schools accountable for their achievement. However, for the nearly 7 million students with special needs, taking full advantage of their rights to a high quality education requires support to learn in ways that meet their educational needs.

Assistive and learning technology offers great promise for these students. The tremendous advances in technology in the past decade have led to the development of speech synthesis and recognition technology, interactive software, and miniaturization and portability that help these students achieve and thrive. The promise and potential for the field has never been greater. The question remains: *What will it take for assistive and learning technology to be considered a critical component of education to help more students learn, achieve, and reach their potential?*

The National Center for Technology Innovation (NCTI), an initiative funded by the U.S. Department of Education's Office of Special Education Programs to foster technology innovation and collaboration, posed this critical question in a series of forums conducted from the fall of 2004 to the spring of 2005. NCTI convened a diverse group of stakeholders who had never before been brought together—researchers, developers, manufacturers, and policymakers—to explore the promise of the assistive and learning technology field and commercial sector, identify the barriers that currently inhibit the adoption and use of assistive and learning technology, and identify ways to overcome these challenges.

In broad ranging discussions and surveys over several years, NCTI identified major gaps in communication among

stakeholder groups as a serious barrier to collaboration, ultimately affecting the development of high quality tools for students with special needs. As an information broker, NCTI saw that the time was right to spark dialogue and discussion, identify key trends and tensions, and strengthen existing networks among diverse groups to facilitate greater collaboration.

The forums revealed the dedication of many key leaders and groups that has contributed to and sustained the field. The forums also uncovered a range of complex external and internal factors that are converging to affect the research, development, purchase, and implementation of assistive and learning technology throughout the nation's schools.

Assistive and learning technology has the potential to grow into a significantly larger share of the education market and

to serve more students more effectively if the field addresses the current challenges identified in these discussions. This report provides a prismatic look at the dynamic field of education and business professionals focused on technologies to meet special learning needs. It highlights the individual perspectives of stakeholder groups and provides a unique synthesis. Through its work, NCTI seeks to improve understanding of opportunities within reach, promote collaboration, and encourage the development of technologies and implementation approaches that will create higher expectations for students with special needs and enable them to succeed.





“...special education delivery now happens more often in the general education classroom, not in segregated special needs classrooms; AT has proved to be instrumental in making the general education curriculum accessible to students with special needs.”

The Time is Now: Making the Most of Convergence

Assistive technology (AT) has been available for more than 20 years. Educators, researchers, developers, and manufacturers have been using computers and other technologies to create tools to help students with special needs learn. Yet the AT field has not been fully recognized as a discipline with identifiable work in scholarship, practice, and the marketplace.

A number of trends are converging to create new opportunities for students and the field. First, special education delivery now happens more often in the general education classroom, not in segregated special needs classrooms; AT has proved to be instrumental in making the general education curriculum accessible to students with special needs. Second, school administrators are paying close attention to these students because current reporting mandates mean the achievement of such students now plays a critical role in the success of the entire school system. The third factor is the

stunning innovation of technology; it has become easier to use and customize, more powerful and robust, and available at lower costs, making it attractive as part of a schoolwide solution.

The convergence of these factors is unprecedented. Assistive and learning technology has caught the attention of school administrators and technology coordinators who are under pressure to increase achievement levels of all students, balance tightening budgets, and support staff who are dealing with increasing diversity in the classroom. For the field to fully harness the momentum, however, it must resolve to address core challenges and respond with consensus to the opportunities.

Key Findings From the NCTI Dialogue Forums

Moving Toward Solutions is gleaned from a comprehensive analysis of more than 13 hours of forum transcripts. It synthesizes the perspectives of a broad range of stakeholder groups. By releasing this report, we hope to articulate more precisely those areas in which collaboration and dialogue among stakeholders will be most productive.

BUILDING LEADERSHIP CAPACITY FOR IMPLEMENTATION

Inadequate teacher preparation, low awareness, and gaps in leadership at all levels of the education system undermine the implementation of assistive and learning technology. Few incentives or enforcement mechanisms of existing credentialing standards create a weak link in the preparation of new teachers and administrators. Although some training is available through statewide organizations and other providers, the capacity of these organizations is limited to address the waves of underprepared professionals throughout the system.

Recommendation: Developing leadership to use and integrate technology in general and special education is critical. The teacher preparation programs and accrediting bodies must raise expectations and accountability to ensure that professionals have the necessary skills to ensure effective integration of assistive and learning technology. This can only happen when a powerful vocal coalition of leaders, researchers, parents, and others educate policymakers and the accrediting boards to consider assistive and learning technology as essential to student achievement.

IDENTIFYING AND LEVERAGING EXISTING NETWORKS AND RESOURCES

The assistive and learning technology field lacks a recognized independent

advocate, information broker, and unifying voice. The needs of the assistive and learning technology field—research, development, funding, implementation, and marketplace—are not well articulated and publicized. Other related agencies, organizations, and consumers cannot identify a source of reliable and objective information about the field or envision how their resources could be brought to bear on identified needs. The lack of a reliable source of objective information on product development standards and product effectiveness leads to duplication of effort and precludes consumers from becoming informed.

Recommendation: A visible and independent information broker is required to raise awareness of the field and consumer needs, scan technology developments to identify opportunities for collaboration and commercialization, and host reliable product reviews. A broker can serve as a resource to the field, coordinating with existing advocacy networks and circulating information back to stakeholder groups. Such a broker should be funded independently of a particular stakeholder group.

“A visible and independent information broker is required to raise awareness of the field and consumer needs, scan technology developments to identify opportunities for collaboration and commercialization, and host reliable product reviews.”



Further innovation will depend on shared knowledge of the designs and features that students need most and the level of technical expertise that is required to implement products in natural settings such as classrooms.

ADDRESSING THE PACE OF INNOVATION VS. IMPLEMENTATION

Developers offer a host of innovative, feature-rich products, but offerings may be too complex for classroom adoption. The relentless pace of technology innovation provides increasing possibilities for new features and affordability of innovative applications and devices. The realities of using assistive and learning technology in schools, however, do not necessarily support these potentials, and increasingly complex products threaten to discourage implementation.

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Recommendation: Further innovation will depend on shared knowledge of the designs and features that students need most and the level of technical expertise that is required to implement products in natural settings such as classrooms. This knowledge base would be informed by research and continued dialogue across stakeholder groups and should be tightly aligned with the actions taken on other key findings.

BALANCING UNIVERSAL DESIGN AND ASSISTIVE TECHNOLOGY

Consumer products and base technologies are increasingly incorporating accessibility and universal design features. The potential exists for innovative applications to be developed as part of mainstream educational and consumer products, opening new markets. Stakeholders are concerned, however, that purchasers with a naïve understanding of universal design will overlook customized

technologies that are vital to meeting the learning needs of millions of students.

Recommendation: The message about the complementary nature of universal design and AT must be communicated clearly and continue to be refined to address new developments and technologies. Again, there is a need for an independent information broker to provide impartial information and technical assistance on this topic for developers, practitioners, and school leaders. The needs of students for specific accommodations must not be lost in the debate between universal design and AT.

DEVELOPING A RESEARCH AGENDA TO INFORM POLICY AND PRACTICE

All stakeholder groups expressed concern about the growing pressure to address the mandate for evidence-based research and product adoption. Stakeholders, however, have not reached a consensus about a common core of objectives. The existing research base is insufficient to meet this mandate, and stakeholder groups vary significantly in their capacity to engage in such research. Additionally, product development cycles, which tend to last 6 to 9 months, are at odds with funding and research cycles, which are much longer, often lasting 2 to 5 years.

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Recommendation: Research agendas must be articulated that can address outcomes necessary for the aggregation of achievement and functionality data. Such accountability data are essential to influence policy and funding mechanisms, maintain the field's credibility, and support future product development. Articulating these agendas will require an investment of funds, time, and intellect to propose realistic and robust quality indicators, methods, and reporting mechanisms. This must be done in collaboration with policymakers to ensure federal support.





“A deliberate and thoughtful campaign must harness the power of interested parties to ensure that assistive and learning technology is considered part of school reform efforts.”

Implications

The assistive and learning technology field is at a “tipping point.”^[1] This is defined in large measure by policy mandates changing the education landscape and the pace of innovation changing the technology landscape. Not seizing this opportunity to share the potential of assistive and learning technology as a powerful part of an achievement solution would consign the field to the margins of the education reform effort.

Turning these recommendations into action will require additional dialogue, to be sure, but discussions alone will not accomplish the necessary changes. A deliberate and thoughtful campaign must harness the power of interested parties to ensure that assistive and learning technology is considered part of school

reform efforts. Like the enormous concerted effort of parents in the past century, which moved the needs of students with disabilities to the forefront of policy and practice, a coalition of inspired champions must work together to inform policymakers and educational institutions to address these recommendations.

The strength of the field lies in the great intellectual and passionate investment of inventors, entrepreneurs, policymakers, trainers, practitioners, and consumers who have brought the field to the present. NCTI is committed to pursuing the key findings and recommendations in this report with stakeholders and related groups through fostering collaboration and coordination of efforts. The time is now to invest in the convergence of

opportunities and to leverage that investment toward future growth and visibility. Realizing the potential of assistive and learning technology will enable more students to fully claim their rights to fulfill their academic and social potential.

[1] Gladwell, M. (2000). *The Tipping Point: How little things can make a big difference*. New York: Little, Brown & Company. The key premise is that movements and ideas, like tall objects, often have tipping points; once they hit that precise point, significant rapid change will result.

Background

The Individuals with Disabilities Education Improvement Act (IDEA) of 2004 and the No Child Left Behind Act (NCLB) of 2002 mandate that all students, including those with disabilities, be taught to the same high standards and hold schools accountable for their achievement. However, for the nearly 7 million students with special needs, taking full advantage of their rights to a high quality education requires support to learn in ways that meet their educational needs.

Assistive and learning technology offers great promise for these students. The tremendous advances in technology in the past decade have led to the development of speech synthesis and recognition technology, interactive software, and miniaturization and portability that help these students achieve and thrive. The promise and potential for the field has never been greater. The question remains:

“What will it take for assistive and learning technology to be considered a critical component of education to help more children learn, achieve, and reach their potential?”

NATIONAL CENTER FOR TECHNOLOGY INNOVATION

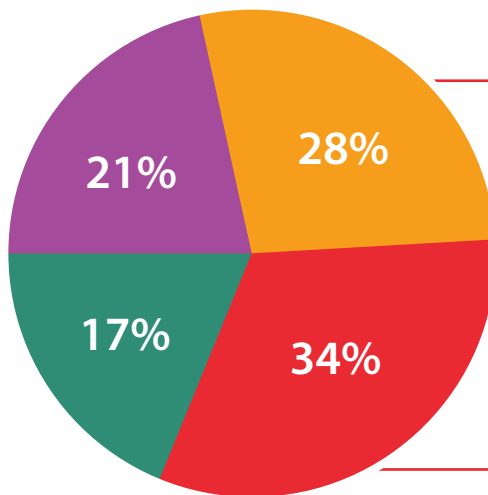
The National Center for Technology Innovation (NCTI) is an unprecedented program funded by the U.S. Department of Education’s Office of Special Education Programs to advance learning opportunities for individuals with disabilities by fostering technology innovation. Serving as a nerve center for diverse stakeholders, including developers, manufacturers, producers, and researchers, NCTI seeks to broaden and enrich the field by providing resources and promoting partnerships for the development of tools and resources.

NCTI posed this critical question in a series of forums conducted from the fall of 2004 to the spring of 2005. NCTI con-

vened a diverse group of stakeholders—researchers, developers, manufacturers, and policymakers—who had never before been brought together to explore the promise of the assistive and learning technology field and commercial sector, identify the barriers that currently inhibit the adoption and use of assistive and learning technology, and identify ways to overcome these challenges.

THE MOVING TOWARD SOLUTIONS PROJECT

In broad ranging discussions and surveys over several years, NCTI identified major gaps in communication among stakeholder groups as a serious barrier to collaboration, ultimately affecting the development of high quality tools for students with special needs. As an information broker, NCTI saw that the time was right



ogy throughout the nation’s schools, including:

- Inadequate awareness, preparation, and leadership at all levels of the education system;
- An environment facing intense shifts in educational policy where tensions between individual student and group needs compete for attention;
- The introduction of federal legislation requiring data supporting the effectiveness of products marketed for use in the classroom; and
- An environment that supports the rapid development of complex, feature-rich products and applications but lacks a broad consumer-friendly education program to support implementation.

Assistive and learning technology has the potential to grow into a significantly

Forum Participants



to spark dialogue and discussion, identify key trends and tensions, and strengthen existing networks among diverse groups to facilitate greater collaboration.

The forums revealed the dedication of many key leaders and groups that has contributed to and sustained the field. The forums also uncovered a range of complex external and internal factors that are converging to affect the research, development, purchase, and implementation of assistive and learning technol-

ogy throughout the nation’s schools, including: larger share of the education market and to serve more students more effectively if the field addresses the current challenges identified in these discussions. This report provides a prismatic look at the dynamic field of education and business professionals focused on technologies to meet special learning needs. It highlights the individual perspectives of stakeholder groups and provides a unique synthesis. Through its work, NCTI seeks to improve understanding of opportuni-

ties within reach, promote collaboration, and encourage the development of technologies and implementation approaches that will create higher expectations for students with special needs and enable them to succeed.

THE TIME IS NOW: MAKING THE MOST OF CONVERGENCE

Assistive technology (AT) has been available for more than 20 years. Educators, researchers, developers, and manufacturers have been using computers and other technologies to create tools to help students with special needs learn. Yet the AT field has not been fully recognized as a discipline with identifiable work in scholarship, practice, and the marketplace.

A number of trends are converging to create new opportunities for students and the field. First, special education delivery now happens more often in the general education classroom, not in segregated special needs classrooms; AT has proved to be instrumental in making the general education curriculum accessible to students with special needs. Second, school administrators are paying close attention to these students because current reporting mandates mean the achievement of such students now plays a critical role in the success of the entire school system. The third factor is the stunning innovation of technology; it has become easier to use and customize, more powerful and robust, and available at lower costs, making it attractive as part of a schoolwide solution.

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room. For the field to fully harness the momentum, however, it must resolve to address core challenges and respond with consensus to the opportunities.

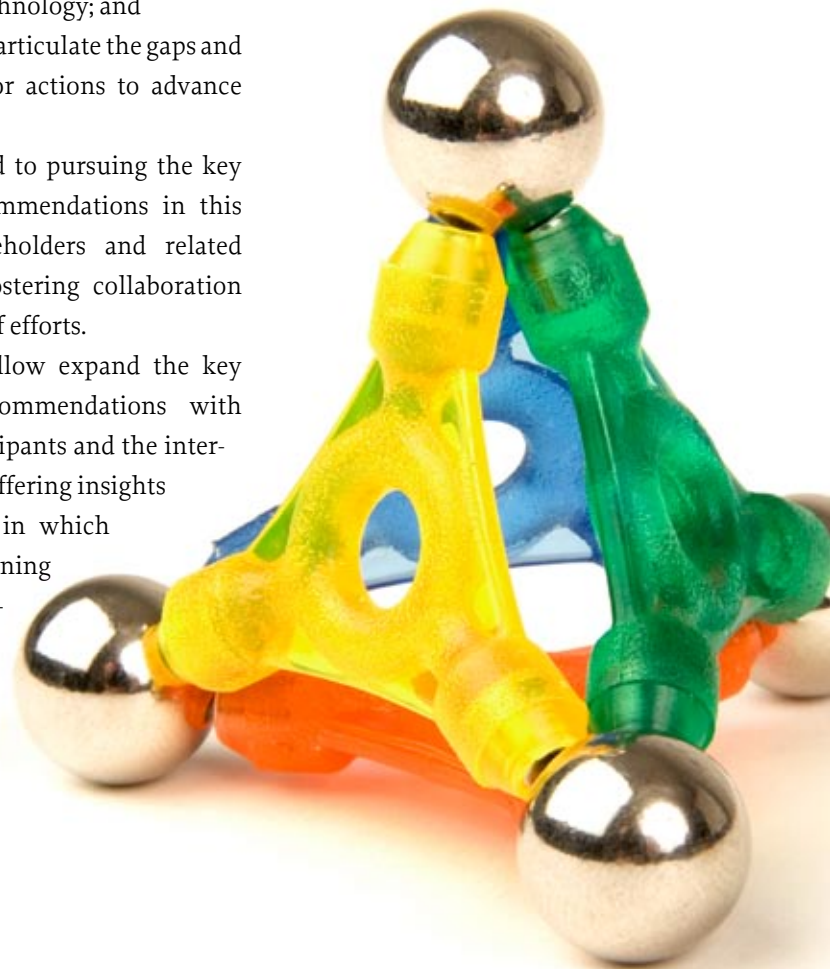
MAXIMIZING THE MOMENTUM

By releasing the Moving Toward Solutions report, we hope to articulate more precisely those areas in which collaboration and dialogue among stakeholders will be most productive. This report is intended to be used by stakeholders invested in the work of awareness building, implementing, and innovating in the field of assistive and learning technology as:

- A window into alternative perspectives on shared challenges and strengths;
- Common ground from which stakeholder groups can identify next steps;
- A means to educate leaders and policymakers about the potential of assistive and learning technology; and
- A framework to articulate the gaps and opportunities for actions to advance the field.

NCTI is committed to pursuing the key findings and recommendations in this report with stakeholders and related groups through fostering collaboration and coordination of efforts.

Sections that follow expand the key findings and recommendations with voices of the participants and the interpretive synthesis, offering insights into the contexts in which assistive and learning technology is developed, studied, and implemented.





Building Leadership Capacity for Implementation

Inadequate teacher preparation, low awareness, and gaps in leadership at all levels of the education system undermine the implementation of assistive and learning technology.

KEY FINDING

Inadequate teacher preparation, low awareness, and gaps in leadership at all levels of the education system undermine the implementation of assistive and learning technology. Few incentives or enforcement mechanisms of existing credentialing standards create a weak link in the preparation of new teachers and administrators. Although some training is available through statewide organizations and other providers, the capacity of these organizations is limited to address the waves of underprepared professionals throughout the system.

RECOMMENDATION

Developing leadership to use and integrate technology in general and special education is critical. The teacher preparation programs and accrediting bodies must raise expectations and accountability to ensure that professionals have the necessary skills to ensure effective integration of assistive and learning technology. This can happen only when a powerful vocal coalition of leaders, researchers, parents, and others educate policymakers and the accrediting boards to consider assistive and learning technology as essential to student achievement.

WHAT THE PARTICIPANTS SAID

Teacher awareness and preparedness are inadequate, according to those that work with teachers, students, and schools.

Teacher preparation programs for all teachers, including those in general education, are critical links in the development of a knowledgeable and capable workforce. However, trainers observed that schools are graduating teachers who lack the knowledge of how to integrate instructional, much less assistive technologies into their practice. One long-time state-based trainer asked:



“Where are the accrediting bodies? We’re all just dancing as fast as we can out here in the school districts trying to make up for the fact that the new graduates don’t know what they need to know.”

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State-level trainers regard their statewide system of delivering information and training as inadequate to the needs throughout districts in their state. In fact, statewide trainers from a state generally recognized as a leader in AT awareness emphasized the range of in-service training models they have tried over the years and came to the following conclusion:

“Where are the accrediting bodies? We’re all just dancing as fast as we can out here in the school districts trying to make up for the fact that the new graduates don’t know what they need to know.”

“It’s continuing to find the champion and the champion could be in a totally different role in every single school.”

“For the last 10 years, we have focused on developing teams in many of our school districts. We have done it [all]: train the trainer...online...we have the universities... all supporting training programs within the college level which have been quite successful. But it still comes [down] to [no one], that teachers will say there is nobody that knows about [AT]...So as far as I see it, we have some experts... and then we still have a lot of gaps where there are folks that still don’t get it.”

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All teachers need access to in-service professional development. With more students with disabilities being educated in general education classes with the general curriculum, more teachers find themselves responsible for delivering instruction with assistive and learning technology. Special educators are also struggling to implement new technologies and more rigorous curriculum materials and collaborate with classroom teachers to do the same. Researchers and practitioners who regularly train teachers lamented the fragmented and unsystematic way in which the in-service professional development system functioned.

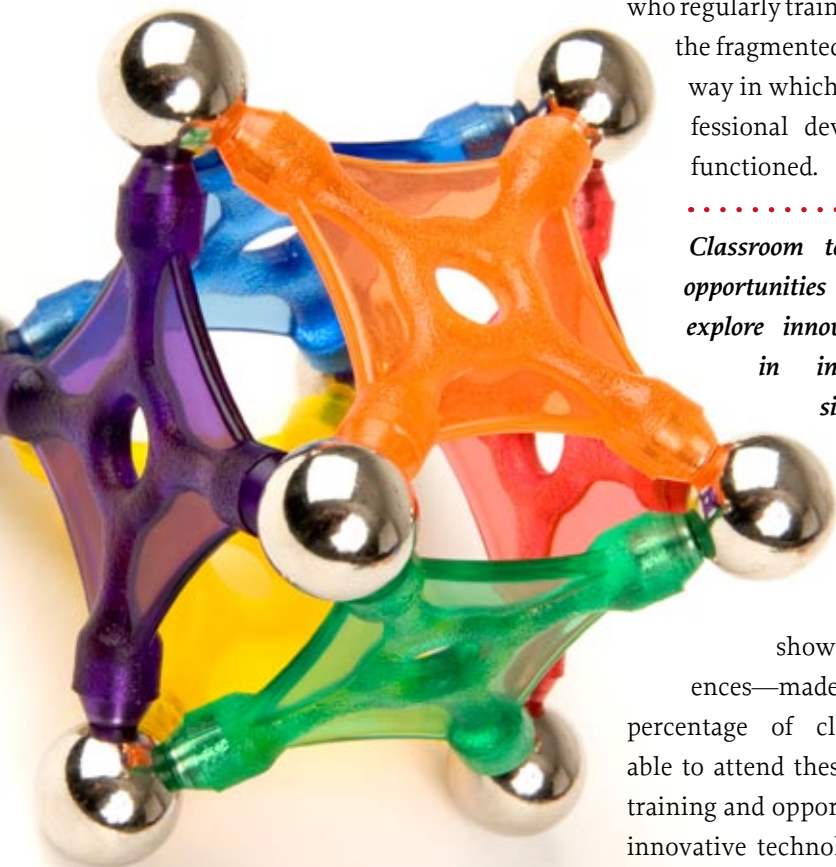
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Classroom teachers have few opportunities to learn about and explore innovative technologies in interactive, professional settings. Participants at the NCTI expert forums—which were held at trade shows and conferences—made note of the low percentage of classroom teachers able to attend these events. Bringing training and opportunities to explore innovative technologies to local dis-

tricts often meant inviting vendors to do demonstrations, which was seen as problematic by both the practitioner and vendor communities for the biases and lack of objectivity—real or perceived—that tainted the experience.

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School district administrators generally lack awareness and understanding of AT or hold misinformed attitudes about the cost, effectiveness, or reliability of solutions. Participants across stakeholder groups recounted stories of administrators and curriculum directors as uninformed gatekeepers, espousing opinions such as, “We don’t need [AT] anymore, it’s just built into Windows.” The understanding of the issues revealed in such comments is both disheartening and illuminating to AT experts and represents a major barrier to improved implementation and wider markets.

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Knowledgeable champions can make a difference but they may be difficult to identify. Where effective implementation and integration of assistive and learning technology was happening, participants pointed to the involvement of informed administrators and school leaders. The location and title of the leader was less important, however, than a deep level of understanding of technology and how it could be used to support learning. As one vendor commented, “It’s continuing to find the champion and the champion could be in a totally different role in every single school.” Finding that person is critical, as a researcher at the same table commented, “I have much more success working with schools when I can locate those key people and work with them.” Participants, though, went on to express frustration at the energy and time they had to expend in locating those champions or key people in each district they contacted.

In the final analysis, effective implementation is about the leadership to



increase the awareness, use, and impact of assistive and learning technology for student achievement. Leaders at every level of the educational system are critical to wider adoption and more thoughtful implementation.

Leadership can be nurtured in the field by strengthening recognized certification and incentive programs. As has been shown in other education reform efforts, career ladders of expertise are created in response to concerted efforts of professionals and families to educate policymakers and accrediting boards. In turn, funding and certifying bodies influence teacher training programs and schools through the enforcement of standards, recognition of expertise, and development of federal policy.

“Leaders at every level of the educational system are critical to wider adoption and more thoughtful implementation.”





Identifying and Leveraging Existing Networks & Resources

The assistive and learning technology field lacks a recognized independent advocate, information broker, and unifying voice.

KEY FINDING

The assistive and learning technology field lacks a recognized independent advocate, information broker, and unifying voice. The needs of the assistive and learning technology field—research, development, funding, implementation, and marketplace—are not well articulated and publicized. Other related agencies, organizations, and consumers cannot identify a source of reliable and objective information about the field or envision how their resources could be brought to bear on identified needs. The lack of a reliable source of objective information on product development standards and product effectiveness leads to duplication of effort and precludes consumers from becoming informed.

RECOMMENDATION

A visible and independent information broker is required to raise awareness of the field and consumer needs, scan technology developments to identify opportunities for collaboration and commercialization, and host reliable product reviews. A broker can serve as a resource to the field, coordinating with existing advocacy networks and circulating information back to stakeholder groups. Such a broker should be funded independently of a particular stakeholder group.

WHAT THE PARTICIPANTS SAID

Innovation, as a bigger and more complex notion than coming up with an idea or product, is a multidisciplinary activity requiring collaboration. One federal agency representative made the point that innovation does not just mean “new”:

“I think there is a need for somebody out there to be articulate about what the needs are, facilitating communication...And then what happens is, gradually over a period of time, the field builds momentum. It becomes



Section 508

Section 508 of the Rehabilitation Act requires that when Federal agencies develop, procure, maintain, or use electronic and information technology, they shall ensure that this technology allows:

- Federal employees with disabilities to have access to and use of information and data that is comparable to that by Federal employees who are not individuals with disabilities, unless an undue burden would be imposed on the agency, and
- Individuals with disabilities, who are members of the public seeking information or services from a Federal agency, to have access to and use of information and data that is comparable to that provided to the public who are not individuals with disabilities.

Section 508 of the Rehabilitation Act (29 U.S.C. 794d), as amended by the Workforce Investment Act of 1998 (P.L. 105-220), August 7, 1998; Retrieved from www.section508.gov

a field, it attracts researchers, it attracts people — commercial companies... ‘Hey,’ they say, ‘...that’s a market niche we can play into.’”

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Technology transfer is not just a matter of building markets, but also of matching existing solutions with users. Significant untapped potential lies in technologies and solutions that have been developed, though not adequately applied, adapted to unfulfilled user needs, or combined with other existing solutions in order to be positioned in a useful way. One participant integrated the need for research with the need to explore existing solutions:

“Are there studies that we can leverage to help us focus and shape development at specific points as a big company, as a mid-size company, as a small company to help us meet the needs of students with disabilities in a more targeted way? Are there ways that we can look at existing tools and twist them around to do things that we hadn’t thought about? Out of that I think you’ll see [business] relationships emerge naturally...”

Federal agency representatives also expressed frustration at a lack of a process to identify and match existing research and prototypes to applicable solutions. Their perspective on government funded research led them to believe that little is being brought to market and applied. This perspective is expressed in the following exchange:

“There’s [an] enormous amount of technology and capability out there that could be applied to the user community’s needs and it’s just not coming together.”

“One of the difficulties with this whole area of assistive technology is nobody seems to have really come up with a good way of

articulating what the specific technology challenges are in the AT community, both in terms of physical handicaps or learning handicaps...not in terms of AT research, but in terms of just what the technical challenges are...there’s a wealth of solutions sitting in other agencies, investments, and technology, but they don’t know that there’s a fit here...you can’t reach over to other agencies to cooperate with because they don’t know how.”

“That’s really what’s missing here. Not so much new science...but there’s a lot of capability out there—it just needs to be applied... and it’s not simple...it’s that brokering role and boundary-spanning role that I think is really, really important.”

This stakeholder group was eager to see processes put in place to address the gaps they identified: lack of clearly articulated needs; lack of an independent, clear voice to advocate for the AT field; and the lack of reliable, impartial information about what resources and needs exist for use and further development—for both industry and consumers.

.....
Across stakeholder groups, participants said that policy—with accompanying regulations and standards—could be a positive market and social marketing force.

The lesson of how policy can lead to the raising of awareness and opening of new markets and possibilities, evidenced by Section 508 of the Rehabilitation Act and the regulations and training that accompanied its passage in 2000, was still fresh in participants’ memory. Participants reflected on the lessons embedded in the Section 508 experience as including:

- The language of policy and regulations needing to be open enough to accommodate innovation;
- The need for a proactive arbiter on the regulation—a lead organization that identifies and serves as a resource for

disseminating best practices in meeting regulations; and

- Proactive involvement of vendors, developers, and implementers in setting policy language.

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Current standards provide little guidance for product development and innovation.

While Section 508 and the Telecommunications Act (1996) were considered successes of their times, issues of applicability of the policies and regulations have been raised since their passage. Participants who are technology innovators and developers acknowledged that “standards are really a base level,” setting the stage for more universally designed products but providing only minimal guidance for innovation. A Web developer summed up his frustrations:

“It’s very hard sometimes to mandate or direct policies about [accessibility]. Section 508 is a good example. It’s written for specific technologies in a very specific way. As those technologies change, then there are a lot of question marks about its applicability...it’s hard to have those policies and legislation that are technology specific to a level of accessibility and still having them be effective in the long run.”

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The time is now for a policy discussion on accessibility and interoperability to address development realities.

Policy-makers welcomed the consensus- and community-building process of standards development, for example saying:

“[When] the development of standards can be funded, bringing together all of the relevant players, [then] it’s a standard that people will buy into and make sense. Training on the use of the standards is also important...preferably [offered for] free.”

“There’s [an] enormous amount of technology and capability out there that could be applied to the user community’s needs and it’s just not coming together.”



Vendors, developers, and implementers wanted to be in a position to be part of any discussions taking place about new standards and regulations but found few existing effective channels for voicing their policy concerns. Meanwhile, innovation is curtailed in the anticipation of new standards that may impact research and development.

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The dearth of reliable product reviews in general was identified as a roadblock to market growth and innovation and a barrier to implementation. One participant observed:

“I think a lot of new technology does not necessarily get to the...AT arena because the bill payers don’t know whether the product is any better than anything else. It’s just different, it’s packaged differently...but they don’t really have any baseline....”

A relatively new developer added his frustration that there is no cost data on which to base product comparisons, making market-driven competition ineffective.

School-based practitioners are at a particular disadvantage given the lack

of objective and reliable product reviews and supporting information. Teachers and other school personnel generally lack access to trade shows and exhibit halls where products can be compared and to evaluation and research sessions where companies demonstrate key product functions. The lack of reliable published evaluations of research conducted with current technologies leaves consumers from government procurement officers to school-based purchasers struggling to conduct their own reviews in order to make purchasing decisions, resulting in needless duplication of effort. The lack of objective reviews means that even AT specialists at consumer organizations cannot be assumed to be up-to-date with emerging and innovative technologies. Participants often referred to the model provided by Consumer Reports as a goal, stressing the external and rigorous testing and rapid results that stakeholders were seeking for themselves and for other consumers.

Federal agency representatives realized putting such a brokering process in place is “a pretty nonlinear process” that required some neutral, convening agency or information dissemination

mechanism to host “a certain amount of knocking together of people and ideas.” Ultimately, bringing more networks and ideas to bear on the potential of assistive and learning technology for students would strengthen the field by compelling stakeholders to articulate their perspectives and to offer alternative solutions for consideration.

Interoperability
Interoperability refers to the ability of assistive technology and electronic and information technologies from multiple vendors and manufacturers to exchange and use information in a functional manner.
Retrieved from www.ittatc.org



Addressing the Pace of Innovation vs. Implementation

Developers offer a host of innovative, feature-rich products, but offerings may be too complex for classroom adoption.

KEY FINDING

Developers offer a host of innovative, feature-rich products, but offerings may be too complex for classroom adoption. The relentless pace of technology innovation provides increasing possibilities for new features and affordability of innovative applications and devices. The realities of using assistive and learning technology in schools, however, do not necessarily support these potentials, and increasingly complex products threaten to discourage implementation.

RECOMMENDATION

Further innovation will depend on shared knowledge of the designs and features that students need most and the level of technical expertise that is required to implement products in natural settings such as classrooms. This knowledge base would be informed by research and continued dialogue across stakeholder groups and should be tightly aligned with the actions taken on other key findings.

WHAT THE PARTICIPANTS SAID

There is a widespread recognition among developers, policymakers, and practitioners that innovation threatens to outpace implementation. Developers, policymakers, and AT practitioners cite product complexity as a major factor in the lack of effective implementation and integration of assistive and learning technology into educational processes and suggest that innovation has substantially led implementation.

.....
“We are all trying to serve the most people possible.” This sentiment, expressed by both researchers/practitioners as well as vendors/developers, lies at the core of the business of assistive and learning technology in educational settings. It also encompasses an intriguing dilemma explored in the expert forum events. Researchers and practitioners are facing



growing caseloads, shrinking budgets, and the practical limitations of implementation. Vendors and developers are striving to widen their market reach and meet the needs of all the users of their tool. In education settings where budgets are extremely tight and shifting delivery mechanisms challenge the traditional focus on the individual user of AT, meeting maximum needs with a single technology purchase is often the only way to justify the cost of new equipment or software.

.....
The need for simple solutions for classroom use is at odds with market trends toward creating bundled applications and feature-

rich products. Researchers and practitioners are looking for the simplest solution that can be implemented effectively. Vendors and developers are looking to bundle applications and features that seem widely useful and marketable. Decision makers of purchasing and adoption look for and request class- or caseload-wide solutions. The result is the dilemma of bundled and feature-rich products that (a) cannot easily—or even fully—be implemented by minimally trained teachers and providers and (b) may not truly meet the needs of any one user.

The following exchange illustrates the dilemma:

Researcher: “Products are very complex, which may result in reliance on the experts for ongoing training, technical systems, support, etc. It’s almost as though it’s a self-perpetuating system. And we’re not getting at that broad base of practitioners who need to have minimum level of competency and comfort levels with AT. Do you hear many of the vendors talking about the phenomenon?”

Vendor: “So there is a term that a couple of us...have started using called ‘product bloat.’ We’re trying to include so many features, and what we’re in fact doing is overwhelming the people that we want to have using the product with students.”

NCTI: “Why do you think companies are adding more features?”

Vendor: “To try and remain competitive... and then also to be responsive to our customers.”

Teacher Educator: “Don’t you think that the product is trying to serve the most people without being specifically tailored to one group?”

Vendor: “Absolutely, but isn’t that what we all are trying to do?”

Teacher Educator: “Vendors want all the bells and whistles, or they are told in order to be competitive they need all of that. And I would rather say, no, we need a product that could be easily used in order to get certain things done that are necessary for that child to compete within the school, within the community, within jobs.”

.....
Participants cited overly complex products as limiting the adoption of and competence with technology integration among practitioners. Additionally, the trend may pose risks to usability that will lead ultimately to abandonment if purchased, which has a direct impact on future sales. Successfully managing the trend will require additional familiarity and awareness on the part of purchasers to begin to ask for and appreciate more straightforward, robust solutions and a “more considered approach,” as one vendor put it, on the part of engineers and developers in responding to the consumer requests.

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To propel innovation to new levels, more sophistication is required in understanding “how” and “for whom” and “under what task conditions” specific assistive features can be used to support learning. Development is more focused on user interface design and improved quality of the functionality than on new functionality. In the development and engineering of knowledge bases, however, a research base is needed on how to provide differentiation and customization of features that will enhance performance for particular users in particular contexts.

One participant stated that innovators’ need to know more about user requirements and situations of use, recognizing the market realities if products are off the mark:

“Usually technology development is completed by researchers in a laboratory, not really in contact with those who should use it. So it’s driven by technology development and not by the circumstantial concerns or wishes of those who would like to have [this type] of technology. This creates a difficulty at the end with the marketing. There are a lot of things developed that have practically no use...only during the last [few] years there has been more a concern about [consumer input to design] and how you can connect the research discussion with the users.”

A developer saw the need for access to existing research on learning for students with disabilities:

“I’m very interested in knowing and looking to a group like NCTI with a background in research [to understand] best practices. The expertise that we see within K–12 is an understanding of practice and theory of working with children with cognitive disabilities that is completely absent from the... conversation around accessibility standards...That knowledge needs to be transferred...into the standards of development so we can take advantage of that expertise in other domains.”

Further concerns about the role of users in design related to a perceived generation gap were expressed by an educational researcher:

“Another issue for us is the whole notion of millennial students. We’ve got a whole generation of students who have been born since 1978 or ‘80 for whom technology is viewed and used very differently from the practitioners who are working with them. We don’t understand their use patterns and their needs...If we don’t understand how they are using technology and what their preferences are, we can’t really deliver the curriculum as effectively as we might.”

.....

While the value of a specific technological feature for a disability-related need may be reasonably well-defined, applying assistive and learning technology broadly to existing practices, skill development, circumstances, and situations is less well understood. Representative statements about integration included the following statements from a vendor of individualized AT, a vendor of marketwide software, and a researcher:

“People have a very hard time even considering assistive technology in education. You have a lot of, ‘Oh, AT, I don’t know what that is and so I don’t think anybody needs it,’ rather than really thinking about what they need to be able to do and then look at tools that may include devices that actually can make that happen.”

“There are not that many people who truly understand assistive technology and integrating it with the curriculum. Somehow we have got to get that word out to educators. Whether it’s in preservice or at the graduate school level, there just isn’t a firm grasp of integrating technology in the minds of many people that are in our schools today. I see that as just a tremendous problem.”

“I picked up eight or nine textbooks in pre-school education the other day [at the trade show] and just flipped through the index to see if technology was listed. No mention of technology, either instructional or assistive...It demonstrated the lack of competencies that we have, the knowledge base, in many disciplines. We have just got a lot of work to do.”

.....

As technologies are implemented for a wider range of students in more settings, the interoperability of the software applications is challenged. Not only are school technology networks usually set at very secure settings, discouraging customiza-

tion and activation of special features, but coordinators and technicians are rarely educators who work directly with the students. This shift from educators or service providers customizing AT on a single machine or device to district technicians who require direction on student needs has complicated implementation efforts. Practitioners discussed the issues in the following exchange:

“Another thing I think that’s going to impact us is more and more and more network systems, and we’re not ready...there [are] still all kinds of technology glitches when you get into networking for a kid who needs special features...”

“...And it takes...the control from the people who are applying it with children, whether it’s a general education task or an assistive technology task...the person who controls the technology...may or may not be a teacher, may or may not understand the application.”

Although these changes in some instances resulted in more people in the schools and districts becoming aware of assistive and learning technology and engaged in implementation, the changes could also heighten frustration levels. “It just gets more complicated,” summed up one state-level trainer of the widening awareness and training challenges facing the field.

What is especially needed is a shared understanding of user adoption, adaptation, and needs, not only in the classroom but also in natural, everyday settings. Collaborative implementation efforts and publicly accessible user case studies would add greatly to a knowledge base that points to what is most critical for students, teachers, and product development.

“There are not that many people who truly understand assistive technology and integrating it with the curriculum. Somehow we have got to get that word out to educators.”



Balancing Universal Design & Assistive Technology

Consumer products and base technologies are increasingly incorporating accessibility and universal design features.

KEY FINDING

Consumer products and base technologies are increasingly incorporating accessibility and universal design features. The potential exists for innovative applications to be developed as part of mainstream educational and consumer products, opening new markets. Stakeholders are concerned, however, that purchasers with a naïve understanding of universal design will overlook customized technologies that are vital to meeting the learning needs of millions of students.

RECOMMENDATION

The message about the complementary nature of universal design and AT must be communicated clearly and continue to be refined to address new developments and technologies. Again, there is a need for an independent information broker to provide impartial information and technical assistance on this topic for developers, practitioners, and school leaders. The needs of students for specific accommodations must not be lost in the debate between universal design and AT.

WHAT THE PARTICIPANTS SAID

There is enthusiastic support for universal design concepts across stakeholder groups.

Expert forum participants regarded the relatively recent universal design concept as having positive impacts in many environments and strongly embraced the potential of the movement. Practitioners saw increasingly accessible and universally designed technologies making positive differences for students with and without diagnosed disabilities. From the postsecondary environment, one participant identified the increased independence of students with disabilities:

“What we’re really trying to focus on is universal accessibility...removing much of [the] need for...expensive and untimely accommodations.”



Universal Design

The term ‘universal design’ means a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies.

The Assistive Technology Act of 1998, Pub. L. 105-394, S.2432;
Retrieved from www.section508.gov/docs/AT1998.html

Many told stories of students who were served by simple customizations, such as increased font size, different background colors, or text readers. These kinds of solutions had made major inroads into this stakeholder group's efforts to raise awareness of the potential of technology to assist in the learning environment.

.....
Developers of assistive and learning technology credit accessible and universally designed base technologies, or operating systems, with their ability to continue to innovate and stay current.

fully by many consumers, including school and district technology coordinators and administrators. Participants worried that simplistic and optimistic views of universally designed technologies would overshadow the complex reality of individual needs.

“The standard products are clearly adding more and more features to make some of the need for specialized separate things limited. But that primarily affects our kids whose main struggle is reading and writing. I don't see that happening for kids who need...other tools.”

Universal Design Questions and Responses

Questions posed to AT businesses:	YES	NO	no response
	Firms / %	Firms / %	Firms / %
Consider those aging with disabilities?	280 / 77.9%	65 / 18.2%	14 / 3.9%
Consider those with multiple disabilities?	240 / 66.8%	89 / 24.9%	30 / 8.4%
Explore applications for those without disabilities?	209 / 58.4%	138 / 38.3%	12 / 3.4%
Interested in learning more about universal design?	224 / 62.3%	107 / 29.9%	28 / 7.8%

Source: U.S. Department of Commerce/BIS AT Survey (2003) – Retrieved from: www.icdr.us/atreportweb/index.htm#toc

“A lot of small companies are...depending upon big companies...to provide base-level technologies such that we don't have to do it...And that is a big, big relief, because if we had to try to do that, there's no way we could invent a lot of the technologies now.... So all of us just start from the base technology and step ahead.”

“You can't just go buy Windows laptops because it has built-in accessibility and call it AT.”

“Everyone wants a quick and dirty answer...[if] the new operating system's going to have it all...wonderful, [then] I don't have to think about it.”

.....
Participants emphasized the need to educate the broader educational field as well as the public about the continued need for AT for students with unique needs. There was concern that the concepts of universal design and AT were not being grasped

“The people...who are actually making decisions and thinking about what students need for learning, what individuals need for living and for all of the pieces that go along with that, [are] not seeing the totality

of what's available and what we brought to bear to help someone be successful and achieve.”

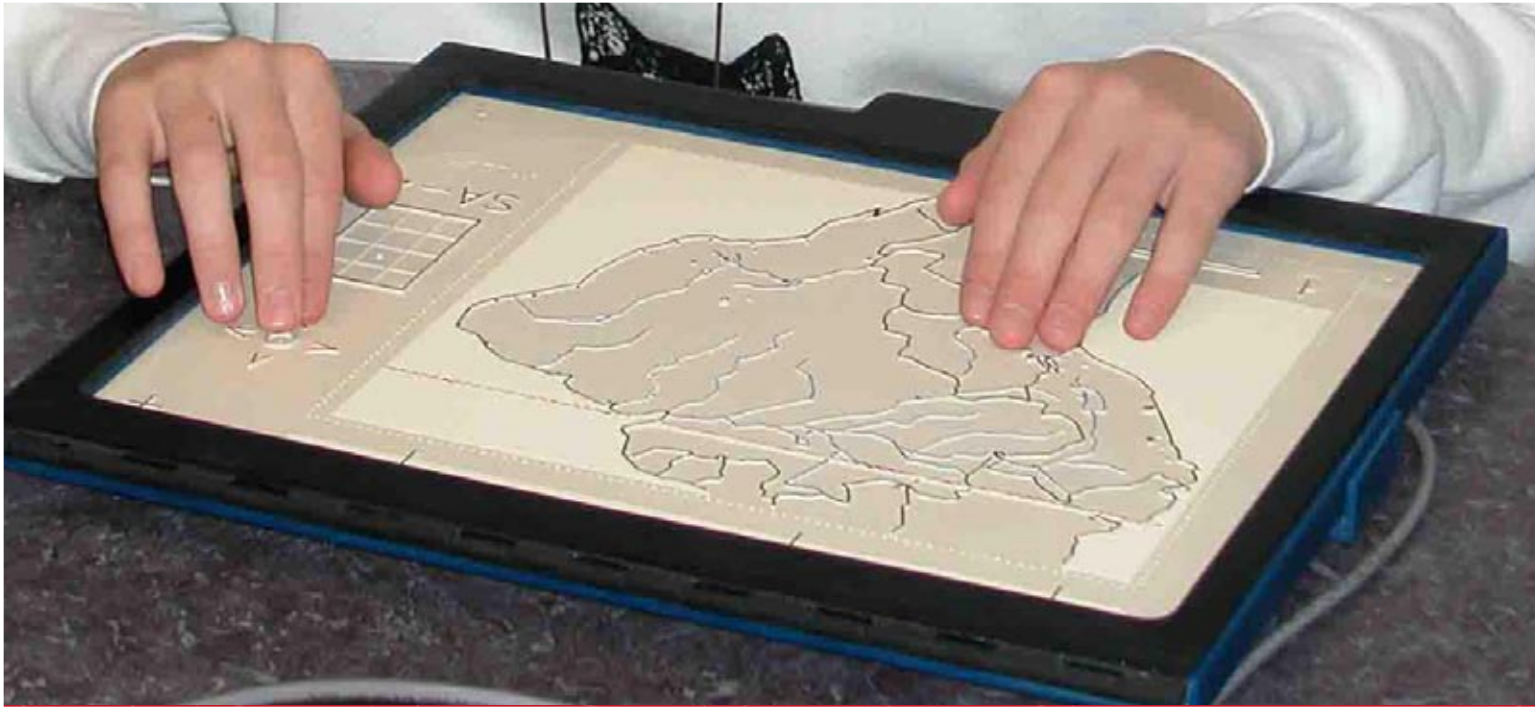
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To communicate the new mindset required to understand the use and utility of both universal design and assistive technology as a learning solution poses an intense challenge—even to leaders in the field.

Participants looked to the large, more visible companies for help with clear awareness messages about accessibility for the general public and the aging population. They also held expectations that large companies would continue to improve the accessibility of their products in new releases and updates to software applications. The fast-paced reality of innovation, meanwhile, presents smaller scale developers with an unstable future for specialized solutions as more accessibility features are included in consumer technologies.

Policymakers also clearly felt the burden of clarifying and amplifying the message of the complementary nature of accessibility and accommodations in their roles as spokespersons. However, the lack of a unifying voice on implementation and development implications was identified as an impediment to their efforts.

“A lot of small companies are depending upon big companies to provide base-level technologies...”





Developing a Research Agenda to Inform Policy & Practice

All stakeholder groups expressed concern about the growing pressure to address the mandate for evidence-based research and product adoption.

KEY FINDING

All stakeholder groups expressed concern about the growing pressure to address the mandate for evidence-based research and product adoption. Stakeholders, however, have not reached a consensus about a common core of objectives. The existing research base is insufficient to meet this mandate, and stakeholder groups vary significantly in their capacity to engage in such research. Additionally, product development cycles, which tend to last 6 to 9 months, are at odds with funding and research cycles, which are much longer, often lasting 2 to 5 years.

RECOMMENDATION

Research agendas must be articulated to address outcomes necessary for the aggregation of achievement and functionality data. Such accountability data are essential to influence policy and funding mechanisms, maintain the field's credibility, and support future product development. Articulating this agenda will require an investment of funds, time, and intellect to propose realistic and robust quality indicators, methods, and reporting mechanisms. This must be done in collaboration with policymakers to ensure federal support.

WHAT THE PARTICIPANTS SAID

Stakeholder groups lack consensus about what the common core of outcomes should be. Researchers, practitioners, developers, and vendors all expressed frustration with a lack of clear leadership and direction in setting a common core of outcomes for research in assistive and learning technology. While there was frustration about the leadership gap, there was not a consensus across the participants about what the common core of outcomes should be.

“We have three federally funded projects... all approaching the issue of outcomes from



different perspectives, and we have yet to have any clear recommendations that can guide vendors as well as practitioners in the field. It leaves all of us to explore our own outcomes that seem to be meaningful to school districts and the stakeholders that we're working with. And without that direction, we are all going to be floundering around a bit.”

Speakers tended to conceptualize outcomes based on their own perspectives as stakeholders. Vendors suggested outcomes that would reflect the fullest impact of their products. Practitioners suggested outcomes that would most expediently fulfill school-based require-

“Research projects are just too long term for product development cycles to have that fast turn-around if you need to make it truly applicable to customer needs.”

ments or serve as advocacy support. Researchers were drawn to the challenge presented by the current policy of the U.S. Department of Education to engage in more rigorous and experimental research designs.

Regulatory stipulations within NCLB have affected businesses’ approaches to planning. Participants said federal mandates requiring schools to base purchases and adoptions on research evidence had significantly increased the reach of educational policy deep into their research and development, long range forecasting, and marketing plans. Responding to this stipulation required significant reevaluation, and in some cases, reorganization of those plans.

Participants recognized that the shift to a more evidence-based model of research and proof of evidence has major implications for the types of data that vendors and implementers can present to support product or purchasing decisions. Researchers are also feeling pressed to realign their research designs and funding applications in response to the policy.

Stakeholders vary in their attitudes and responses to educational policy shifts. After 3 years of enactment, NCLB policies still meet resistance, but mainly, participants’ responses to questions about how they were responding to the policy implications reflected constructive planning. “I think of it...not as a necessity... [but as] an opportunity,” one vendor said, saying that it had given their company an opportunity to showcase the quality of their products. The speaker elaborated that the data collection features embedded by the developers in the device line for years were now being more fully embraced and implemented by practitioners. Although originally added as a means for service providers and educators to monitor

student progress and therapy effectiveness, these features were now serving as efficacy evidence during purchasing decisions.

Companies that market to higher incidence populations, where the purchasing decisions involve school and district committees, were struggling to envision, fund, and enact effectiveness studies that would produce sufficient evidence.

“We are looking for many more research projects, more than what are currently available...[and] of course we need to get started today in order to get any definitive [long term] research as soon as we can.”

There is considerable concern that research results may be hard to interpret, as product iterations shipped may be significantly different from those investigated. Researchers and developers wanting to apply existing technologies in innovative ways and to new populations were similarly stymied by the lack of existing research to justify the crossover application.

To develop products on a fast track, there is a need to gather data more quickly than a formal study can produce. Real-world market development, release, and re-development cycles were cited at a typical 6 months for software and 12 to 18 months for hardware. Speaking of the immediacy of the market, trade shows, and feedback from actual customers, one seasoned developer relayed:

“You put it on the market, you let them have it for a month, then you go visit and watch them, and you can immediately get that feedback. And if it doesn’t make it, then you can immediately revise or fix the problems and roll on. Research projects are just too long term for product development



cycles to have that fast turn-around if you need to make it truly applicable to customer needs.”

Participants observed that rigorous academic research can often take years before findings are published and available for discussion.

Marketability and general user requirements are more useful to innovators than long-term demonstrations of clinical efficacy or the testing of multiple possible versions. Much of the innovation process is based on internal visioning and extrapolation based on fast environmental and market scans made possible in large measure by trade shows. Externalization in the development process often does not occur until after the innovation and product development process has occurred and the product is marketed. As companies mature, trade shows can bring valuable formative feedback from users about a developer’s own products and those of competitors. The feedback fuels iterative innovation for products that have survived initial introduction. This established pattern, however, is being challenged in the educational market

by the policy requirements embedded in NCLB to show evidence of effectiveness.

Stakeholder groups did not appear to share the same definition of “research.” Through all the dialogues about research, it seemed as though vendors and developers were having a parallel but disconnected discussion to researchers and practitioners about research. Only rarely did the definitions of research overlap or did vendors and developers cross over to the conversation going on among researchers, policymakers, and teacher educators.

For the commercial side of the field, what research most often meant was:

- Whether the prototype or product actually functioned as envisioned;
- Whether there was a market for the product; and
- Feedback from users and trainers of the product, gathered at trade shows and from technical support requests.

One vendor’s comment about the company’s approach to providing research-based evidence highlights these differing definitions:

“We’ll pick new products and then see how well they do in the marketplace and then,

as fast as we can, try to get the research to back that up so that customers can use [existing] funding sources.”

This statement shows that his company is using educational research mainly as a backup marketing tool, not as a driver for innovation or revision.

Building consensus about outcomes, despite the frustrations or differing views, was an issue of urgency for participants from all stakeholder groups. Without significant aggregated outcome measures, the field has little leverage to draw the attention of administrators, funders, or policymakers. Setting and supporting research agendas that can influence policy requires consensus-building activities and an initial investment by individuals and professional organizations.

Implications

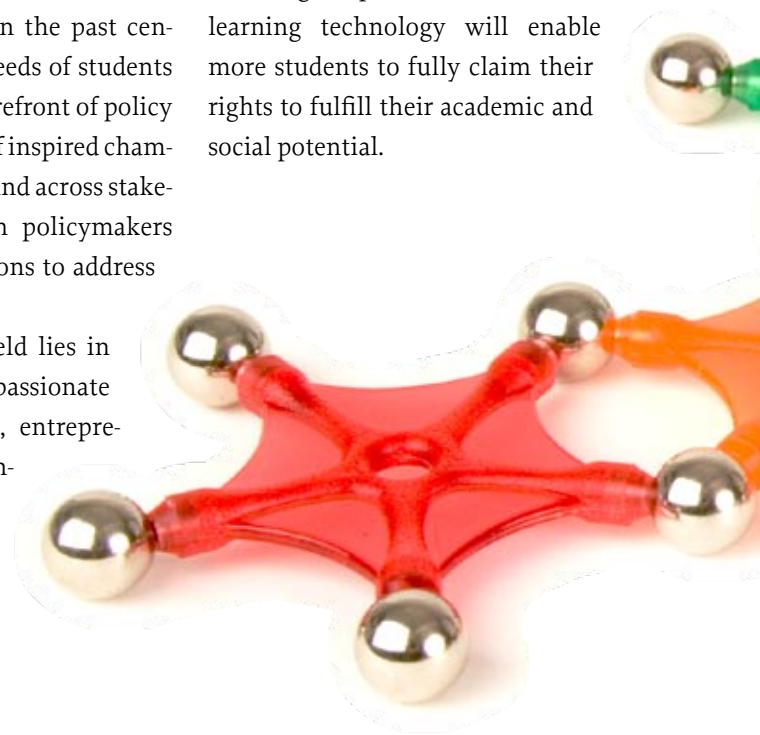
The assistive and learning technology field is at a “tipping point,”^[1] defined in large measure by policy mandates changing the education landscape and the pace of innovation changing the technology landscape. Not seizing this opportunity to share the potential of assistive and learning technology as a powerful part of an achievement solution would consign the field to the margins of the education reform effort.

The five key findings and recommendations in the report are drawn from the voices and experiences of thought leaders in the field of assistive and learning technology. From leadership development to research outcomes and from the pace of innovation to the potential of universal design, these voices identify critical opportunities. Bringing diverse perspectives together through these types of forums and the analysis conducted in this report offer an opportunity for the field to move toward collaborative solutions that benefit all students. Each stakeholder group, meanwhile, has a unique role to play to ensure the implementation of these recommendations.

Taking action on these recommendations will require additional dialogue, to be sure, but discussions alone will not accomplish the necessary changes. A deliberate and thoughtful campaign must harness the power of interested parties to ensure that assistive and learning technology is considered part of school reform efforts. Like the enormous concerted effort of parents in the past century, which moved the needs of students with disabilities to the forefront of policy and practice, a coalition of inspired champions must work within and across stakeholder groups to inform policymakers and educational institutions to address these recommendations.

The strength of the field lies in the great intellectual and passionate investment of inventors, entrepreneurs, policymakers, trainers, practitioners, and consumers who have brought the field to the

present. NCTI is committed to pursuing the key findings and recommendations in this report with stakeholders and related groups through fostering collaboration and coordination of efforts. The time is now to invest in the convergence of opportunities and to leverage that investment toward future growth and visibility. Realizing the potential of assistive and learning technology will enable more students to fully claim their rights to fulfill their academic and social potential.



BUILDING LEADERSHIP CAPACITY FOR IMPLEMENTATION

Those who receive credentials to work in the schools require preparation that qualifies them to implement assistive and learning technology in the classroom. It is crucial that those involved in preparing these educators raise expectations and standards to ensure that, at a minimum, teachers have an understanding about assistive and learning technology prior to entering the classroom. Taking action within the education profession includes changing the policy landscape toward teacher preparation, incentives, and recognition with a concerted, national effort to impact legislative and regulatory language.

IDENTIFYING AND LEVERAGING EXISTING NETWORKS & RESOURCES

Agencies, associations, and professional groups with a stake in the visibility and use of assistive and learning technology must collectively advocate for an overarching, independently funded information broker. A broker could represent the interests of the field to policymakers, the general public, and consumers in a voice that is recognized as unbiased and perceived as advancing the implementation of assistive and learning technology for all students.

[1] Gladwell, M. (2000). *The Tipping Point: How little things can make a big difference*. New York: Little, Brown & Company. The key premise is that movements and ideas, like tall objects, often have tipping points; once they hit that precise point, significant rapid change will result.



ADDRESSING THE PACE OF INNOVATION VS. IMPLEMENTATION

Manufacturers, developers, and vendors need to reach out to users and implementers in order to learn more about how their products are being used on a routine basis in natural settings, like schools and homes. Innovators can begin by contributing to a bank of user case studies that broaden the knowledge base about user adoption, adaptation, and requirements and by vigorously incorporating user feedback into product development cycles.

BALANCING UNIVERSAL DESIGN AND ASSISTIVE TECHNOLOGY

Practitioners and trainers dedicated to awareness building and training of in-service school personnel must fully grasp and be able to communicate the complementary nature of universal design and assistive technology. It is critical that these trainers and advocates help their constituents explore and implement schoolwide solutions that serve the diverse needs and strengths of all students. It is equally critical that new technologies are built to universal design and accessibility standards to support this effort.

DEVELOPING A RESEARCH AGENDA TO INFORM POLICY & PRACTICE

Researchers bear the obvious responsibility to focus on a more robust agenda of outcomes that can yield significant data to inform policy and practice. A critical goal for the field is to move beyond research distinctions internal to the field toward the identification of outcome measures that can be aggregated. This means providing visible support for product development that focuses on user needs and learning environments and, in tandem, will require collaboration with and among manufacturers and engineers.

Addendum: Methodology

Nine expert forums were scheduled at eight trade shows and conferences between October, 2004, and April, 2005. Experts attending the shows and conferences were invited to participate in the forums, and guiding questions were provided in advance. In total, 44 experts participated in over 13 hours of dialogue. The participants represented a wide spectrum of expertise in the assistive and learning technology field, including researchers, practitioners or service providers, policymakers, and vendors or manufacturers. Many forums hosted participants from a single stakeholder group; others hosted a variety of stakeholder groups.

All of the expert forums were transcribed and videotaped. An inductive thematic analysis was conducted across these data sources, identifying broad and specific themes and subthemes. Transcripts were coded independently by three coders, and differences were resolved through discussions. A second-

ary analysis was performed on four transcripts of dialogues that involved homogeneous stakeholder groups to reveal strengths and weaknesses of the group in significant depth. The qualitative software program Atlas.Ti was used for thematic coding and queries and to identify anchoring quotations.

Themes that were particularly illustrative of consensus or miscommunication between stakeholder groups were explored in the analysis and writing. These themes were identified as important opportunities to clarify stakeholder perspectives, juxtapose perspectives, or show consensus among groups who rarely meet. The dialogues were moderated by Tracy Gray, Director of NCTI, or Sousan Arafeh, then Deputy Director of NCTI. Other NCTI staff involved included Heidi Silver-Pacuilla, Michael Smith-Welch, Mindee O’Cummings, and Tina Diamond.

Drafts of the report were shared with reviewers who were cognizant of NCTI’s mission and the dialogue project. Their feedback helped shape the interpretations of the key findings and hone the implications and recommendations.



Dialogue Events Participants

We greatly appreciate the time and thought shared so generously by our participants:

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Chauncy Rucker, Publisher, The ConnSENSE Bulletin

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