

Theme Editors' Introduction

TECHNOLOGY AND DYSLEXIA—PART 1

by David H. Rose, Sam Catherine Johnston, and Amy E. Vanden Boogart

This is the first of two special issues on technology in education for *Perspectives on Language and Literacy*. Together, the two issues will cover a fairly broad landscape where dyslexia and technology intersect. But it is a landscape that is very difficult to capture at this particular moment in time—beneath its surface are dynamic and disruptive forces that are rapidly reshaping its fundamental “geology.”

A brief history of the present two-volume collection reflects those dynamic forces at work. In the beginning, IDA proposed one special issue of *Perspectives* and asked us to serve as editors. After several months of discussion among the three of us, along with colleagues in the field, it became clear that this rich and expanding landscape of material was too much for one issue. When they became aware of the breadth and depth of the landscape to address, IDA graciously extended our geography—we could encompass the complete contents of two issues rather than one. That is the first sign of the underlying dynamics—a rapidly expanding landscape to cover.

But there is a second seismic shift evident in recognizing the boundaries of the two issues. Our original conception was for two issues that were quite distinct in the themes they addressed. The first issue would focus on Assistive Technology (AT). In that issue, we would present articles that centered on the individual *student*—examining the power of new technologies to assist individuals with dyslexia in overcoming barriers in their environment. The second issue was to focus instead on the learning *environment*—examining the power of new technologies to reduce barriers in the learning environment for students with dyslexia from the outset (what is often called Universal Design for Learning, UDL).

As we began to receive articles for the first issue it became clear that this distinction—once fairly clear-cut—was no longer sharply divided. This blurring of the line between AT and UDL reflects an underlying shift in the implementation of technology within this field: the contours that once separated AT and UDL are dynamically changing. Many technologies that were formerly implemented as AT have now been incorporated into UDL implementations. UDL approaches to education now more routinely incorporate and integrate the advances of AT. In the articles presented in these two issues the complementary nature of UDL and AT—previously articulated *in principle* (e.g., Rose, Hasselbring, & Zabala)—are now being implemented *in reality*. As a result, the separation between our first and second issues is significantly less clear: the landscapes that once seemed very separate are increasingly merging in practice (a good thing!).

There is a third seismic shift evident in these two issues. At the outset, the concept for these issues implicitly assumed that their actual publication would adopt the printed format of *Perspectives*. Over the last several years, however, the explosive forces of digital publishing, e-books, web-books,

user-centered design, and many other evolving technologies too numerous to list, have so changed the landscape that the printed format no longer seems foundational or adequate, but merely habitual—one option among many. Moreover, the nature of the articles we are gathering cry out for a more flexible set of options than print would allow. As a result, for the first time we are publishing some of the articles not only in print, but also in multiple enhanced UDL versions. UDL allows us to demonstrate, rather than merely describe, the fundamental changes in the learning landscape as it is increasingly experienced by dyslexic learners.

With the changing geology behind us, we would like to re-introduce the content of the first issue. Although its content will inevitably interweave with the content of the second issue, for the reasons described above, this issue will emphasize the AT contributions to the new landscape. For the reader unfamiliar with some of the terms that will recur throughout these issues, we would like to provide some background.

What is Assistive Technology?

Zabala (2010) describes AT as devices and services that enhance abilities and reduce barriers to achievement. She emphasizes that AT decisions need to be related to the function AT helps an individual to perform rather than to a specific disability, and, that its use extends across disability groups, across settings, and across time (Zabala, 2010). Temple and DeCoste in their articles in this issue underscore the importance of AT for learners with disabilities in classroom settings. Temple indicates that AT is used by a student with a disability to complete a learning task independently and at an expected performance level. Importantly, without AT, the student would be unable to perform the task independently or proficiently. Both authors reference the Individuals with Disabilities Education Act (IDEA) requirement that districts ensure AT is provided when needed and that consideration of AT be part of each Individualized Education Program (IEP) planning process.

What is Universal Design for Learning?

UDL derives in part from the concept of *universal design* in architecture, where the goal is to engineer products, buildings, or environments so that they are accessible for the widest possible range of users, regardless of age or abilities. Virtually all architects in the U.S. now create public buildings that are designed from the outset to reduce or eliminate architectural barriers by considering the needs of diverse people. This practice is now recognized as significantly more cost-effective and equitable than trying to retrofit buildings later or providing customized accommodations to individuals who are unable to navigate poorly designed structures. While originally conceived to meet the needs of individuals with disabilities,

Continued on page 8

universal designs actually make buildings that are more useful and functional for everyone. UDL is one part of the overall movement toward universal design that focuses on the special demands and purposes of learning environments. As such, the framework and guidelines for UDL are not derived from the principles for architecture. Instead, they are based on research and practice from multiple domains within the learning sciences—education, developmental psychology, cognitive science, and cognitive neuroscience. The research in those fields guides both the scope of the pedagogy that UDL addresses (i.e., the critical elements of teaching and learning) and the range of the individuals that UDL addresses (i.e., the critical elements of individual differences). At its simplest, the scope of UDL is based entirely on three principles:

1. Provide Multiple Means of Representation
2. Provide Multiple Means of Action and Expression
3. Provide Multiple Means of Engagement

The National Center on UDL (www.udlcenter.org) offers further information on these three principles.

How do UDL and AT relate in the changing landscape of education?

Consider an analogy from medicine, the treatment of black lung disease. Two very different kinds of treatments are important. The first recognizes the disease as a medical condition afflicting the individual—immediate and sustained individual medical treatment is required. The second recognizes the disease as a public health problem—it has been inordinately prevalent, even epidemic, among coal miners. To reduce the incidence of black lung disease requires not only the treatment of afflicted *miners*, but also the treatment of afflicted *mines*. To treat black lung disease adequately, both approaches are essential: corrective measures that focus on the health of individual miners and corrective measures that focus on the health and toxicity of the environment. Failing to address both parts of the equation will ensure that more and more miners are debilitated.

Traditionally, the use of AT for students with dyslexia has been comparable to primary medicine: practitioners focus on the needs of individual learners and fashion a customized intervention with specialized tools and techniques. In traditional classrooms where printed materials, such as textbooks, dominate instruction, students with dyslexia have *print disabilities* (a new term) and need specialized treatment and tools to ameliorate their disabilities. AT serves to provide the tools and techniques that teachers and students can use to bridge the gap between the ways in which these students learn effectively, and the limited media, materials, methods, and assessments chosen as the curriculum.

As digital technology becomes common in classrooms, its use enriches the media, materials, methods, and assessments that constitute the curriculum, providing many options that were unavailable previously. In digital classrooms, especially those that adopt principles of UDL in their teaching, there are

fewer barriers to learning for any student, including those with dyslexia. In these new environments AT complements UDL in the same way that individual medicine complements public health (and vice versa): there are enabling tools and “good medicine” for individuals, and there is also less toxicity in the environment, wider opportunities for success, and better “air” to breathe for everyone.

Introducing the First Issue

With all of this as background, we wish now to introduce the content of the first issue. The authors in this issue, all pre-eminent in the field of AT, were asked to focus on the contemporary role and significance of AT for students with dyslexia. It is a sign of the dynamic changes in the field, however, that each of them went beyond our initial charge to illustrate the complementary roles of AT and UDL in an overall technology approach to dyslexia.

Within that landscape, there are several different themes that run through these articles. We would like to highlight several of those themes as a way of introducing the individual articles. (Readers already familiar with the field of AT will note the strong, and intentional, parallel with Joy Zabala’s SETT framework (Zabala, 2005) for the implementation of AT, to which we are indebted.)

First, individuals matter. In her article on reading and AT (“Reading and Assistive Technology: Why the Reader’s Profile Matters”), Erickson describes research with elementary and middle school students who have reading difficulties to illustrate how learner variability (in addition to the requirements of the learning tasks) needs to be carefully examined before deciding on AT. The study examined the strengths and weaknesses of each of the students in the sub-skills of reading (i.e., word identification, listening comprehension, and silent reading comprehension) and found that Text to Speech (TTS) for accessing electronic text was helpful for students with specific profiles of strengths and weaknesses in these sub-skills when they were presented with certain reading tasks. In other cases, where students had a different profile of strengths and weaknesses, TTS actually interfered with the reading task. Erickson’s article reminds us of the larger issue: to optimize the impact of AT will require paying close attention to the student, and especially to the individual differences among students.

Temple (“Executive Function Skills and Assistive Technology”) buttresses that same point by focusing on one particularly under-attended characteristic of many students with dyslexia—difficulties with executive function. Many reading programs treat students with dyslexia as a relatively homogeneous group, focusing on the same rudimentary, entry-level skills, such as phonics or building fluency, for all of the students. Temple’s article instead focuses on the role of technology in addressing some of the specific higher-order skills of reading that are actually fundamental for adolescent readers. For some students with dyslexia, the programs and apps she recommends to support executive functioning will be an essential element of their arsenal moving forward. Not to attend to the individual

differences in what students need, especially among those with dyslexia, is to miss the individualizing power of AT.

Second, environments matter. DeCoste's article ("The Changing Roles of Assistive Technology Teams in Public School Settings") describes how one public school district has moved from a model of providing AT to single users through a referral process administered by an expert, to a capacity-building approach for the whole district. This capacity-building approach still meets the needs of individual students, but focuses on building the capacity of the school and system to use AT to meet the needs of a broad range of students. The district DeCoste profiles uses two primary frameworks to support collaborative decision-making around AT, the SETT framework (Zabala, 2010) and the Universal Design for Learning framework (Meyer, Rose & Gordon, 2013). Importantly, this combined approach leads to broader adoption of AT and less stigma for the students using AT. DeCoste's article captures the evolutionary role of AT (i.e., encompassing both medical treatment and public health approaches) within the context of a single, large school district—without a supportive environment, the power of AT is radically diminished.

Third, tasks matter. Two articles emphasize the importance of carefully attending to the content-specific demands of different domains and different levels of learning when making AT choices. Okolo and Kopke ("Disciplinary Literacy and Technology for Students with Learning Disabilities") specifically illustrate how important it is to consider the difference between different domains of inquiry or learning. They illustrate how AT use should differ in science and history teaching. The former is focused on discovery and hypothesis testing to understand core principles that explain nature; whereas, the latter is interpretive and designed to understand the roles of different stakeholders and factors that contribute to a set of circumstances over time. The authors show how different disciplines require different orientations to learning (and literacy), and, therefore, they also often require not only different AT, but also different approaches to using the same AT.

Similarly, Edyburn's article ("Assistive Technology and Writing") illustrates how important it is to recognize the different levels of instruction that emerge within a single domain. Within the domain of writing, he shows that AT can, and must, be used differentially to support a wide range of skills that extend from the physical act of putting pen to paper (e.g., TTS, keyboarding), all the way to the metacognitive processes of turning one's thinking into something that others can see. In this article, Edyburn focuses on three "higher level" processes that are especially challenging for learners with learning disabilities, namely, learning to engage in writing regularly, planning to write, and preparing a first draft. In his article he provides research and associated web 2.0 tools to help educators think about AT choices for these metacognitive writing tasks, while also making the key point that careful attention to the goals and demands of the intended task matters.

Fourth, technology matters. By definition, AT depends upon the use of modern technologies. Optimizing AT requires recognizing the relative affordances of new and emerging technologies in the marketplace and matching them with specific students, environments, and tasks. Winters and Cheesman

("Mobile Instructional and Assistive Technology for Literacy"), in particular, discuss the affordances of newer mobile technologies (in particular, the iPad and iPhone) for both instructional technology and AT. These new affordances change the landscape of learning significantly in many ways: anytime-anywhere use, capacity to sync data, AT within a single device (i.e., no external keyboard), and continually evolving apps that can be updated easily. While extolling the virtues of mobile, the authors call for criteria for evaluating mobile apps including content validated by research, presence of appropriate scaffolds and timely feedback, professional sound and images, and intuitive and user-friendly interfaces. Every author in this issue advances one or more strategies for vetting AT, which is critical given the volume of products that exist, the pace with which they change, and the democratization of the decision-making process around AT to support learning.

As all of these articles show, the new media and technology landscape of which AT is a part will surface new opportunities in classroom learning for students with dyslexia. A richer approach to materials, media, methods, and assessments broadens what literacy means and what skills it demands of learners. Yet, as these articles also show, optimizing the power of new technologies will also require educators, researchers, and technology specialists to carefully consider what new barriers may arise for students with dyslexia as they navigate this richer environment. We hope that this special issue, and the one to follow, will contribute some of the knowledge teachers and students need to successfully navigate this new landscape.

Reference

Zabala, J. (2005, February/March). Ready, SETT, Go: Getting started with the SETT framework. *Closing the Gap*, 23(6), 1-3.

David H. Rose, Ed.D., is a developmental neuropsychologist and educator whose primary focus is on the development of new technologies for learning. In 1984, Dr. Rose co-founded CAST, a not-for-profit research and development organization whose mission is to improve education, for all learners, through innovative uses of modern multimedia technology and contemporary research in the cognitive neurosciences. That work has grown into the field called Universal Design for Learning which now influences educational policy and practice throughout the United States and beyond. Dr. Rose also teaches at Harvard's Graduate School of Education where he has been on the faculty for almost 30 years.

Dr. Rose is the co-author of several scholarly books, numerous award-winning educational technologies, and dozens of chapters and research journal articles. He has been the principal investigator on large grants from the National Science Foundation, the U.S. Department of Education, and many national foundations. In the policy arena, he was one of the authors of the recent National Educational Technology Plan, has testified before the U.S. Senate, and helped to lead the development of the National Instructional Materials Accessibility Standard. Dr. Rose has won many awards,

Continued on page 10

including recently being honored at the White House as a "Champion of Change." Dr. Rose holds a B.A. in psychology from Harvard College, a master's in teaching from Reed College, and a doctorate from the Harvard Graduate School of Education.

Sam Catherine Johnston, Ed.D., is a research scientist at CAST with expertise in peer-based learning models, distance and blended education and program evaluation. Her primary research focus has been on the use of technology-mediated peer-based learning to transfer knowledge and foster behavior change among interdisciplinary groups of professionals and para-professionals working in various fields including mental health care, education, criminal justice, and human services. At CAST Dr. Johnston directs a Bill and Melinda Gates Funded project to improve the capacity of community colleges to develop high quality Open Educational Resources (OERs) that utilize the principles of Universal Design for Learning to ensure all learners can benefit from OERs. Dr. Johnston also works as a researcher on a national center that examines the experiences of K-12 students with disabilities in online and blended learning courses and programs. Before joining CAST, Dr. Johnston

was a Senior Associate and Distance Educator at the Center for Social Innovation (c4si), leading the company's online learning strategy.

Amy E. Vanden Boogart, M.Ed., is the Curriculum Specialist for Community Academy Public Charter Schools, where she manages the alignment of the curriculum of four elementary schools to the Common Core State Standards. Her primary responsibilities are the rollout of the curriculum and the ongoing training of teachers, coaches, and principals on effective curriculum implementation and literacy instruction. Amy has also worked as a reading and language arts curriculum designer and assessment writer, and she is a former elementary teacher. In addition, she is an adjunct professor teaching a course on children's reading development for the Special Education and Disability Studies department at George Washington University. Amy is a doctoral candidate in Curriculum & Instruction at George Washington University, where her research interests include upper elementary teacher knowledge for and beliefs about teaching reading, professional development for reading teachers, and how iPads and other emerging technologies can benefit reading instruction.

64TH ANNUAL CONFERENCE FOR PROFESSIONALS

2ND ANNUAL CONFERENCE FOR FAMILIES

IDA would like to thank the following for their generous support of the 64th Annual Conference for Professionals and 2nd Annual Conference for Families

Sponsors as of October 2013



Rescue The Students Now