For the past eight years I have conducted an annual review of the special education technology literature. Essentially, I scan the contents of 31 journals and capture each article that I believe is relevant to special education technology professionals. The resulting corpus of articles becomes the basis of an analysis that I prepare to answer the question, “What have we learned lately?”

The value of having this data set at my fingertips has been personally rewarding and an investment in my professional productivity. While I have published the results of my first five reviews for 1999-2003 in The Journal of Special Education Technology, it has been difficult to keep this annual project on a time schedule that synchronizes with the journal’s publication schedule. The length of the article has also become an issue since the review covers more than 200 articles. Hence, I have begun to explore other options for disseminating the results of the annual review.

One example of the new formats I have been exploring involves creating thematic analysis of the yearly literature. In this column I discuss the results of a thematic analysis of the 2006 special education technology literature. The question that guided this investigation, “What did we learn about special education technology research methods in 2006?” While some articles may be discussed in more than one section, my goal is to provide a brief commentary on each of the articles that illustrate the application of research methods in our discipline. The intent is to assist both researchers and practitioners in locating specific articles of interest.

Procedures

Search Procedures

The methodology known as the comprehensive one-year research synthesis approach (Edyburn, 2000) was utilized to for the review of the literature to define the body of knowledge that was published in 2006. For this paper, I report on the literature from 2006 contained in a subsection of the knowledge base that represent the core knowledge base of special education technology (Assistive Technology, Closing the Gap, Journal of Special Education Technology, and Special Education Technology Practice).

Selection Procedures

The author reviewed each journal issue by browsing the table of contents to identify article titles potentially of interest to researchers and practitioners in the field of special education technology. As necessary, individual articles were scanned to ascertain their relevance. Announcements, editorials, and product reviews were not counted nor were
articles that focused primarily on medical or rehabilitation applications of technology.

An article was judged to be relevant if it expressly mentioned technology (assistive, instructional, or educational) and individuals with disabilities in contexts associated with schooling or learning. This could include articles addressing student or teacher use of technology in special education, assistive technology, instructional technology, how-to articles, resources guides, policy or legal issues. Articles were also considered relevant if, despite not explicitly addressing individuals with disabilities, they served to inform the design, acquisition, implementation, or evaluation of educational technologies, media, materials, or methods. Again, announcements, editorials, and product reviews were not counted nor were articles that focused primarily on medical or rehabilitation applications of technology. Obviously, there is an element of judgment in this decision-making. However, given the function of the synthesis to serve as an early-alert system, an effort was made to err on the side of including all articles of potential interest to professionals working in the discipline.

Analysis Procedures

To address the research question concerning what was learned in 2006, the results of the search were assembled into a master bibliography and then sorted alphabetically by author’s last name. Content analysis procedures were used to code of each article according to its type (development, essay, policy, practice, research, theory, etc.). One descriptor was used to describe its disability focus, if a specific disability was addressed in the article. If appropriate, one descriptor was assigned for grade/age level, and one descriptor for curriculum area. Finally, one-to-three topic descriptors were assigned to describe the focus of the work.

For this analysis, articles that featured a description of research methods were extracted from the larger 2006 data set. In the following section I provide a thematic analysis of articles that involved research methods (n=31) and highlight what I believe are important contributions of the recent additions to the knowledge base.

Research Highlights of the 2006 Special Education Technology Literature

In my opinion, one of the most significant works appearing in the 2006 literature was a comprehensive review of the assistive technology literature (Alper & Raharinirina, 2006). This work will be a valuable resource for researchers and practitioners alike and should be required reading for anyone interested in the evidence base supporting assistive technology. This analysis provides an insightful view of the type of research designs used in assistive technology as well as the types of assessment, interventions, support, and family involvement that were provided in studies.

Advances in the area of theoretical frameworks were noted in two areas. Edyburn (2006a) advanced a rationale and definition of cognitive prostheses. He argues that assistive technology for cognitive impairments is an under-represented form of assistive technology with particular relevance for students with mild disabilities. Molenbroek and de Bruin (2006) describe fundamental issues concerning
anthropometry, the study of human differences, and the shortcomings that result when designers use standardized data sets regarding human abilities. The impact of these international design standards is that they provide a false sense of understanding about the full array of human diversity, particularly relative to assumptions about individuals with disabilities. They describe a process for collecting disability data that can directly impact designs for differences in ways that facilitate the development of universal access restrooms.

The literature features several well-designed research studies that provide excellent models of how to conduct high-quality research. Anderson and Lignugaris/Kraft (2006) examined the efficacy of video cases on the problem solving skills of preservice teachers. Lancaster, Lancaster, Schumaker, and Deshler (2006) studied the impact of a multimedia approach to teaching students with high incidence disabilities how to improve their test taking abilities. Twyman and Tindal (2006) reported on their research to create a computer-adaptive history text to enhance the comprehension and problem solving of students with disabilities. These studies are impressive contributions to the evidence base of our field.

The 2006 literature contains several articles that illustrate enhanced methodologies for collecting and using data. One study provides evidence about a new method for collecting AAC data to eliminate the noise in performance data that is caused by user pauses that unduly influence efficacy calculations (Smith, Higginbotham, Lesher, Moulton, & Mathy, 2006). Susi and Laskarzewski (2006) describe a new data collection product that allows assistive technology teams to collect baseline and ongoing data to document the functional performance of assistive technology users. Edyburn (2006b) reports on how extant data that can be accessed and analyzed to answer questions about student achievement.

The literature also features three studies that describe development and validation efforts associated with the creation of new assessment instruments. Fleming, Kearns, Dethloff, Lewis, and Dolan (2006) describe the development and validation of a 143-item instrument designed to assess assistive technology users’ readiness to participate in online high-stakes assessments. Ruffino, Mistrett, Tōmita, and Hajare (2006) describe the development and validation of an instrument designed to measure the universal design qualities of a play environment/experience. Silverman and Smith (2006) detail their validation efforts to create a modified version of the School Function Assessment known as the School Function Assessment-AT in order to obtain improved pre-post data about an elementary school student’s use of assistive technology in school environments.

The literature features a variety of research methods have applied to their research questions. For example, survey research methods were used to provide a snapshot of the types of funding sources families utilize to acquire assistive technology (Carlson & Ehrlich, 2006) and how early childhood teachers perceive the value of an assistive technology toolkit (Judge, 2006). Design research is increasingly used to gather efficacy data about key features of assistive technology products such as static vs. dynamic design of AAC devices (Dudek, Beck, & Thompson, 2006) and how to catalog data
about the range of needs experienced by individuals with disabilities (Molenbroek, & de Bruin, 2006). One example of action research is presented in the literature that explores computerized text reading software on student achievement as measured in large scale assessment (Dimmitt, Hodapp, Judas, Munn, & Rachow, 2006).

The profession is concerned about obtaining evidence about assistive technology outcomes. This concern is represented in the literature in several studies that report program evaluation research that focus on a specific commercial product. Chernek (2006) describes the result of a study that examined the efficacy of Simon Sounds It Out. Duerstock (2006) documents how a specially designed accessible microscope workstation helps individuals with mobility impairments. Hutinger, Bell, Daytner, and Johanson (2006) report on the program outcomes of a technology enhanced program designed to facilitate the development of emergent literacy. Penrod, Bauder, Simmons, Belcher, and Corley (2006) report on user efficacy of a blind mobility tool, known as the UltraCane, as subjects navigated a simulated obstacle course.

Several studies demonstrate the field’s interest in gathering evidence about the efficacy of assistive technology. Anson, Moist, Przywara, Wells, Saylor, and Maxime (2006) explore differences in user performance between handwriting, word processing, and word prediction conditions. Mirenda, Turoldo, and McAvoy (2006) studied four students with physical disabilities to understand the impact of word prediction on their performance. Lance, McPhillips, Mulhern, and Wylie (2006) conducted a study with secondary students to assess the efficacy of a series of assistive technology tool on the literacy development of secondary students. Ely, Emerson, Maggiore, Rothberg, O’Connell, and Hudson (2006) describe the impact of an innovative methodology or providing specialized text descriptions to blind users. Edyburn (2006c) describes a methodology that can be utilized to measure the efficacy of assistive and instructional technology.

Research on assistive technology service delivery models and procedures are rarely found in the literature. A groundbreaking study by Wilcox, Dugan, and Guimond (2006) found a significant disconnect between quality indicators for early childhood education and the experience of parents relative to assistive technology services they received. While focused at the preschool level, this study may have implications for all levels of education and justifies additional research on assistive technology service delivery. A study on the perspectives or parents and young children and early literacy experiences with assistive technology (Jeffs, Behrmann, & Bannan-Ritland, 2006) illustrates the importance of ongoing data collection to assess the efficacy of assistive technology service delivery systems.

Research on web accessibility was the focus of one study that found that most school web sites are not compliant with accessibility standards (Wells & Barron, 2006). These findings are congruent with previous research findings that have examined the accessibility of state department home pages and higher education departments of special education. As a result, much more education and training is urgently needed to ensure that the practice of web accessibility conforms with federal law.
Finally, it is noteworthy to observe the emergence of universal design research. As mentioned earlier, Fleming, Kearns, Dethloff, Lewis, and Dolan (2006) created an assessment for assistive technology and universal design high-stakes testing. Molenbroek and de Bruin (2006) advance a model for collecting disability diversity data that will inform accessible design rather than relying on standard anthropometry tables. Ruffino, Mistrett, Tomita, and Hajare (2006) describe the development of an instrument to assess the universal design of play.

Observations

This column provides one of the first analyses of the research methods used in special education technology. The scale, scope, and diversity of the research profiled here reveals encouraging developments in our research methods knowledge base. In this section, I offer several observations to be considered by both producers of research (e.g., researchers, editors) and consumers of research.

Given the importance of building the research evidence base, one of the key criteria for a study to be deemed high-quality centers on the issue of peer review. As a result, it is disconcerting to observe an increase in the number of articles purported reporting research evidence in non-referreed publications (Chernek, 2006; Dimmitt, Hodapp, Judas, Munn, & Rachow, 2006; Fleming, Kearns, Dethloff, Lewis, & Dolan, 2006).

A second area of concern focuses on the use of nonhandicapped subjects to demonstrate the efficacy of assistive technology (Dudek, Beck, & Thompson, 2006; Penrod, Bauder, Simmons, Belcher, and Corley, 2006). While some types of studies may yield comparative data that can be used to benchmark the performance of individuals with disabilities with their nonhandicapped peers, authors and journal editors should be wary of studies that focus on demonstrating the efficacy of assistive technology without involving the intended users.

Alper and Raharinirina (2006) draw attention to the need for researchers to provide additional information about the type and severity of the disabilities in their studies to understand more about the role of the assistive technology outcomes. In addition, there is little evidence that assistive technology assessments are given prior to beginning the interventions. Left unresolved, these basic research issues will limit the application of the research findings.

Given the minimal number of commonly accepted data collection tools, researchers and editors should be encouraged to include research protocols and data collection instruments as appendices in published articles. Several notable examples of this principle are found in the literature this past year (Boon, Burke, Fore, & Spencer, 2006; Fleming, Kearns, Dethloff, Lewis, & Dolan, 2006; Ruffino, Mistrett, Tomita, & Hajare, 2006; Silverman & Smith, 2006). In addition, it is important to provide screen prints of non-commercially available software and web-sites in addition to the URL so that other researchers can carefully review the materials. Related, authors should be encouraged to mention whether or not specially designed materials will be made available to other researchers interested in conducting replication research.
Concluding Thoughts

The purpose of this specialized review was to summarize the 2006 special education technology literature in order to understand what was learned relative to research methods. Clearly the literature is growing in ways that deserved to be mined. However, the 2003 reorganization of ERIC continues to leave a major gap in the tools the profession needs to utilize the knowledge base. As a result, I believe the profession must take responsibility for developing tools and techniques that enable the profession to exploit the emerging knowledge base.

The process of preparing this report has been personally encouraging. I am pleased to see the development of the field relative to our research methods. Nonetheless, much more work remains to improve the quality of the methodology the discipline applies to the research problems at hand (Gersten & Edyburn, 2007).

References


