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Research Report

A Survey of Assistive Technology and Teacher Preparation Programs for Individuals with Visual Impairments

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Parker et al. (1990) reported that teachers of students with visual impairments and deaf-blindness had poor or nonexistent knowledge of specific areas of assistive technology, and a study by Mack, Koenig, and Ashcroft (1990) on computer training of students with visual impairments concluded that teacher education programs have an obligation to train teachers in the necessary knowledge, skills, and motivation to provide a bridge between students and technology. A recurring theme of the four studies of the assistive-technology knowledge of teachers of students with visual impairments that have been conducted since 1990 (Abner & Lahm, 2002; Candela, 2003; Edwards & Lewis, 1998; Kapperman, Sticken, & Heinze, 2002) has been that teachers of students with visual impairments are not prepared to use assistive technology and to teach students how to use it.

As a result of these studies, there have been numerous professional calls for the inclusion of assistive technology in teacher preparation programs for teachers of individuals with visual impairments. The Division on Visual Impairments (DVI) of the Council for Exceptional Children (CEC) holds the position that assistive technology must be incorporated into all teacher preparation programs (Erin, Holbrook, Sanspree, & Swallow, n.d.). The CEC Knowledge and Skill Base for All Entry-Level Special Education Teachers of Students with Visual Impairments, entitled "What Every Educator Should Know" (2003), includes at least 10 standards that are directly related to the use of assistive

technology. Thus, universities must integrate assistive technology into their teacher preparation programs by training prospective teachers of students with visual impairments how to use and operate various assistive technology devices, as well as the best practices for instruction.

The purpose of the study reported here was to survey universities that have teacher-preparation programs for teaching students with visual impairments and deaf-blindness to determine how assistive technology training is integrated into the programs' curricula. The survey investigated how the knowledge of assistive technology is addressed (whether in specific courses or by embedding the content throughout the program), what content areas are discussed, and to what extent specific assistive technologies are addressed throughout the program.

METHOD

Participants

The participants were faculty members of the 38 university programs in North America that train teachers of students with visual impairments (34 in the United States and 4 in Canada). The program directors were contacted via e-mail, based on the contact database maintained by the National Center on Low-Incidence Disabilities of the University of Northern Colorado. They were asked to have only one person from each university respond. A follow-up e-mail message was sent one week after the original e-mail message. The participants who did not respond one week after the second e-mail message were contacted via telephone. This process was used to obtain as high a response rate as possible.

Procedures

The survey was conducted online using a survey tool called Select Survey ASP, which is housed on the server of Texas Tech University's College of Education. The participants were e-mailed a link that took them to a web site that described the survey and

asked for their consent to participate. If they chose to participate, they were given a direct link to the survey. The online survey, composed primarily of check boxes and comment fields, consisted of 15 questions. The survey was accessible to users of screen-reading and screen-magnification technology. It was online for two months to provide ample time for the participants to respond. Once the online survey was closed, the data were exported to SPSS for analysis. (SPSS stands for Statistical Package for the Social Sciences, a computer program used for statistical analysis.)

RESULTS

Standard descriptive statistics were calculated using SPSS frequencies. Thirty universities responded to the survey, for a response rate 79%--82% of the U.S. programs and 50% of the Canadian programs that were contacted. The participants were asked to describe how assistive technology was addressed in their respective programs for preparing educators of students with visual impairments. Of the 18 programs that offered specific assistive technology courses, 3 offered "generic or multidisciplinary assistive technology courses" and 15 provided a "specific assistive technology course for [teachers of] individuals with visual impairments." The other 12 universities either embedded assistive technology in a course as a unit (6 programs) or integrated assistive technology throughout the program (6 programs). The 12 universities that currently do not offer an assistive technology course were asked if there was a possibility that they would develop such a course in the future; 6 answered yes, and 6 answered no.

The universities were also asked what assistive technology competencies were covered in their respective programs. The competencies used in the survey were developed from those developed for programs that specialize in preparing teachers of students with learning disabilities (Bryant, Erin, Lock, Allan, & Resta, 1998). The results are reported in Table 1. The last section of the survey asked the participants to determine what level of knowledge they perceived their students had after they completed

the university programs. Four categories of assistive technology devices were explored: low vision devices, braille output devices, access-to-curriculum devices, and independent living devices. A list of common assistive technology devices for individuals with disabilities was provided, and the participants were asked to select from among the following technology-awareness levels: nonuse, awareness, proficient, or advanced (Hall, Loucks, Rutherford, & Newlove, 1975). *Nonuse* was defined as "no knowledge--this assistive technology is not covered in the program." *Awareness* was defined as "limited knowledge--aware but needs more skills; this assistive technology is talked about in part of a class, and a picture is possibly provided." *Proficient* was defined as "skilled but needs to expand; some hands-on or applications practice in class or in assignments." *Advanced* was defined as "expert in the use of this assistive technology; could teach the use of this AT to others." Since it was impossible to create an exhaustive list, a text box for each section was included to describe any other specific devices that were taught in the courses. The results of this section are reported in Table 2.

DISCUSSION

Although there were several limitations in this study, the results have important implications and raise questions for future research. The finding that half the universities have a specific assistive technology course that offers instruction in such technology designed for individuals with visual impairments is evidence of its importance. Of the 12 universities that either embed or integrate assistive technology into their programs, 6 responded that there was a possibility that a course on assistive technology would be created in the future. These findings demonstrate that assistive technology has become an important facet of programs that train teachers of students with visual impairments.

There was strong agreement on the competencies that were presented. However, it must be stressed that these competencies are broad and have been incorporated into the CEC standards and

objectives. It is apparent that each university program is teaching different assistive technologies and at different levels. For example, the programs teach the abacus at different technology-awareness levels; 27% teach at the "awareness" level, 33% teach at the "proficient" level, and 40% teach at the "advanced" level. Yet, many professionals in the field would contend that the abacus is a vital technology for individuals with visual impairments to learn.

The survey had five major limitations. First, only 30 of the 38 programs in United States and Canada responded to the survey. Even though 79% of the university programs responded, the survey would have been strengthened by a higher response rate. Second, only 4 university programs in Canada were contacted, and only 2 responded. Third, the participants were given the opportunity to select only one type of delivery of an assistive technology component of their programs. Many of the programs may have offered an assistive technology course in addition to embedded or integrated assistive technology throughout their programs. Fourth, the competencies provided were broad and thus did not provide valuable information about what standards are being used to teach assistive technology. Last, some participants thought that having only four levels of competence was limiting and that there needed to be levels between awareness and proficient and between proficient and advanced.

Even with the limitations, the implications of this study are rooted in the disparity of teaching levels and topics. There are apparent differences in the teaching levels of specific assistive technologies, such as accessible personal digital assistants (braille notetakers), braille embossers, and telescopes. Most of the assistive technologies included in the survey presented here were taught at least at the "awareness" level; however, it is evident that there is no agreement on what assistive devices are critical for teachers of students with visual impairments to be able to use at the higher technology-awareness levels as defined in this report.

The results raise questions for future research within the field of education for individuals with visual impairments. First, it is apparent that professional competencies and standards for assistive technology for teachers of students with visual impairments need to be developed. University programs need a framework to guide the integration of assistive technology into their programs. Second, no questions were included in the survey presented here about resources for acquiring and maintaining assistive technology. Thus, research needs to determine if there is a correlation between resources (federal, state, or local) and assistive technology training levels. Third, the survey needs to be replicated to determine if there have been any changes in the types and level of instruction in assistive technology. Fourth, future studies need to determine if teacher preparation programs are teaching instructional strategies for teaching technology to students with visual impairments or just teaching how to use specific technologies. Last, the survey needs to be replicated in other countries to determine where the United States and Canada rank among industrialized nations in this regard.

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