

Assistive Technology Use amongst Students with Visual Impairments and Their Teachers

Barriers and Challenges in Special Education

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ASSISTIVE TECHNOLOGIES (AT) enable individuals who are visually impaired to read and write, access information and enhance communication. This study investigated the use of AT by students with visual impairments and their teachers in a special school. While teachers unequivocally recognized the benefits of AT, there were significant gaps and disconnections in AT knowledge and skills amongst teachers. For students, a majority were not using nor had much knowledge of AT. While the school had made some efforts to introduce AT, the experience of students was limited as inconsistencies in use of and access to AT were dependent on teachers' skills and the availability of equipment. Parents, siblings, friends and peers, and other social networks emerged as important sources of influence.

INTRODUCTION

The aim of technology is to improve the lives of human beings. Persons with visual impairments are no different and require the use of assistive technology (AT) to compensate for their vision loss. Some of the high-tech AT used by persons with visual impairments in today's technologically advanced world consist both hardware and software products including screen readers, screen magnifiers, closed-circuit televisions, electronic magnifiers, scanners and optical character readers, portable and refreshable Braille displays, digital and electronic data, digital readers, and accessible cell phones.

No matter the diversity of devices, the power of AT as an enabler in the lives of students with disabilities is unequivocally reported

KEY IMPLICATIONS

- The benefits of AT in enhancing access to information and improving communication for individuals with visual impairments need to be better promoted to students and their teachers.
- Teacher knowledge of AT needs to be more prominently incorporated in pre-service, in-service and professional development special teacher education.
- Curricula for special schools need to introduce instruction in and with AT, where appropriate, for their students.

in the literature (Abner & Lahm, 2002; Alper & Raharinirina, 2006; Mull & Sitlington, 2003; Okolo & Bouck, 2007; Wong & Tan, 2012). Yet the literature reports that students with disabilities and their teachers are underutilizing the AT available to them (Kelly, 2009; Smith, Kelley, Maushak, Griffin-Shirley, & Lan, 2009; Wong & Cohen, 2011).

Alper and Raharinirina (2006), in a comprehensive review of the literature on AT, concluded that individuals with disabilities are not fully benefiting from the use of AT in home, school and community settings. The researchers identified key shortcomings in the awareness, integration and education of professionals of AT in school settings. Other areas of concern included inadequate support and services for training for parents and lack of partnerships and collaboration among teachers, families, service providers and researchers. This is echoed with findings of students with visual impairments in the US. In one study, 60% of students with visual impairments were not benefitting from AT (Kapperman, Sticken, & Heinze, 2002). In another study, the figure was between 59% and 71% of students who were inclined to benefit from AT but did not have the opportunity to use it (Kelly, 2009).

As much of teaching is, and will be delivered through technology, it is imperative that individuals with disabilities, in this case, students with visual impairments, are not left behind as Singapore seeks to “enrich and transform the learning environments of our students and equip them with the critical competencies and dispositions to succeed in a knowledge economy” (Ng, 2008). This study is significant as it is the first study of its kind to investigate the AT use of students with visual impairments and their teachers.

RESEARCH DESIGN

A total of 10 teachers/school leaders and 20 students from a special school were recruited for this project. The primary data sources were drawn from individual semi-structured interview of teachers, school leaders and students. Researchers were allowed into classroom for observations on how teachers were using AT in their delivery of lessons. Classroom observations were transcribed and acted as a form of data triangulation. In order to keep the identities of teachers and students confidential and anonymous,

names of participants and references were removed. Following transcription of interview data, the research team first coded the data independently to identified themes. The emerging themes were subsequently triangulated to eliminate anomalies and confirmation of themes (Miles & Huberman, 1994).

KEY FINDINGS

Teachers of Students with Visual Impairments

While there was unequivocal recognition that AT was a facilitator to access information and to improve quality of life for students with visual impairments, findings indicate that there were significant gaps in AT knowledge and skill amongst the teachers. Where teachers claimed to be comfortable with low and medium technologies, such as talking calculators and hand-held magnifiers, many described themselves as “IT illiterate” when referring to high-tech AT devices such as screen readers and OCR (optical character readers) software. Still others had subjective interpretations to technology. Confusion between AT and ICT (information and communication technology) was noted when using the internet was construed to be using AT in teaching. Despite the gaps, there were individual advocates who championed the incorporation of AT to enhance communication and instruction.

Understanding of AT

Given the diverse range of AT for persons with visual impairments, teachers were unfamiliar with the diverse types of AT available for specific needs. Typically, students may require AT for support: speech access; Braille access; large print access; tactile communication systems, or any combination of these modes. In addition, teachers understood AT, ICT and web educational packages designed for general instruction to be collectively understood as AT. Not knowing what AT devices are available and the variable understanding of general applications result in AT not being fully adopted and utilized to benefit students.

Champions of AT

While all teachers possessed limited skill and knowledge in AT, a handful of teachers emerged as champions of AT to varying degrees. In spite of constraints in knowledge and resources, at least one teacher made extraordinary effort to learn about AT and acquire fundamental knowledge to help the

students. The current practice, however, benefits only students of this teacher advocate. To gain wider adoption, greater collegial and school-wide vision is necessary for all students to benefit from AT.

Students with Visual Impairments

By and large, students had limited skills, concepts and use of AT. Even amongst students who were exposed to AT, the extent of usage was at best basic. This was evident from the elementary keyboarding skills to the knowledge of using screen readers as a tool to access the computer. Where some children were familiar with the keyboard, others needed help to locate specific alphabets on the keyboard. Similarly, while some children had some knowledge in operating the screen reader using keystroke commands, others were unacquainted with the commands to execute even simple functions.

Inconsistencies in ability were also noted in AT instruction across the school grades. There was little differentiation between lower primary and upper primary ability of AT. Students were not necessarily working on higher ability AT tasks as they progressed in school standards. For instance, some upper primary students were found to be working on activities common to their lower primary schoolmates.

Where formal school channels were inadequate in offering a comprehensive AT curriculum, external influence from parents, friends, siblings and social networks formed alternative channels of information for students where they received formal and informal sources of information and knowledge of AT. The challenge was the inconsistency and unpredictability of information gained through these channels leaving students with varying degrees of knowledge and skill.

IMPLICATIONS FOR POLICY/PRACTICE

For Policy

Support for providing AT devices and services to students with disabilities is critical in enabling students to access information and enhance communication. In fact, the appropriate application of AT is said to be the “greatest equalizing forces in the education and meaningful inclusion of students with disabilities both in terms of promoting access to the general curriculum and in facilitating the ability of students to demonstrate mastery of that knowledge”

(Michael & McDurmot, 2003, p. 29). The need is even more imperative as the Singapore government is committed to transforming Singapore into a global city that leverages on ubiquitous computing to enrich the diverse learning experiences of the individuals and to enhance the nation’s technological capacity. One tangible expression is the Ministry of Education’s commitment and involvement in contributing to the milestones through the three ICT Masterplans spanning from 1997 to 2014 that have put in place, and are undergoing long term effort to embed ICT in the use of and delivery of education (Ng, 2008). Provision of AT not only in terms of hardware, but also software for students and teachers therefore needs to begin now to avoid deepening the digital divide for students with disabilities to participate in a knowledge intensive society led by technology (Wong, 2012).

For Practice

In the language of Vygotsky, the more knowledgeable other is a beginning point where fellow teachers, AT specialists, parents, individuals with disabilities experienced in assistive technology are critical and potential partners to collaborate in the support of students with disabilities.

Stakeholders working with students with disabilities need not be an expert in all types of AT, rather, to focus on those that serve the needs of the individual. Instead, greater collaboration between other special educators and professionals in the field is necessary to determine the specific needs of students supported by training in the use of the technology and monitoring of instruction in the use of appropriate technology.

Keyboarding skills are fundamental for students with visual impairments to acquire if they are to be proficient users of computers. Schools can introduce this skill as a prerequisite to the computer and screen readers.

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