

INTRODUCTION

It is easy to become overwhelmed when we think about how technology has been assimilated into many aspects of our lives. The computer has become an important part of the way we work, play, and live. Even those who are reluctant to incorporate the use of technology in their daily lives are finding it increasingly difficult to avoid technology in some form or another. For example, banking and shopping, weekly tasks for most people are almost entirely dependent upon the use of technology. We communicate with both business clients and friends using e-mail. Sending electronic greetings (e.g., birthday wishes, congratulations) has become a routine practice. Teenagers surf the web, e-mail friends, and talk in groups for hours on Internet-accessed "chat groups." A 2001 survey completed by Media Awareness Network reported 70% of students between the ages of 13 and 14 and 78% of those between 15 and 17 use chat groups. There are even special abbreviations and meanings assigned to the lingo used for such occasions! In schools, most students work with some form of technology on a daily basis beginning in Primary. Computers are used to provide and supplement instruction, practice newly learned concepts and skills, complete research assignments, and produce sophisticated looking reports and projects. In science class, frog dissections may now be done through the use of virtual reality software. Even preschool settings are frequently equipped with computers containing software to instruct or entertain its young clientele. In the home, computer use has become nearly as common as viewing television. Software manufacturers are producing games and interactive software for children as young as two years of age. Free games on CD-ROM are now enclosed in cereal boxes. Family budgets, investing, and entertainment are all potential functions of the computer. With the information resources available on CD-ROM and on the World Wide Web, the Canadian tradition of having one shelf of the family bookcase reserved for the multi-volume, simulated leather-bound, set of encyclopaedias is gone.

For individuals who are blind or visually impaired, technology has opened a whole new world of access to print material. I vividly recall the enthusiasm of a friend with a severe visual impairment when he first experienced using the World Book Encyclopaedia on CD-ROM. He reported having spent hours just looking things up and reading about items he had never before encountered or had an opportunity to read about, e.g., the Great Wall of China. This man is a college graduate and holds a professional position. It is difficult to fully comprehend the limitations on access to information experienced by those with visual impairments prior to the recent advancements in technology.

Technology has also brought many new career opportunities for those who are blind or visually impaired. Many jobs requiring ready access to print or visual information which were once difficult for those who were visually impaired or blind are now available because of the application of assistive technology such as speech access or print enlargement. The field of assistive technology itself has provided numerous career opportunities in areas such as program development, sales, and education for those with disabilities. For individuals who have disabilities in addition to a vision loss, e.g., cerebral palsy, technology has provided new, more effective approaches to both oral and written communication and greater independence. Independence for those with a disability is a significant consideration not only because it increases what they can do for themselves but the personal control provided by such independence plays a critically important role in the development of positive self-esteem.

When considering the contributions technology has made in the education of children and youth who are blind or visually impaired, there are four further issues which warrant specific discussion. First, technology has become an essential component in the

development of literacy for all students who are blind or visually impaired. It is part of the expanded core curriculum recognized as essential programming for these students. Koenig (1992) contends that when establishing standards for judging literacy, those for students who are blind or visually impaired must have the additional criterion of the mastery of technology which allows them to access and produce both print and braille documents independently. Whether through the use of speech access, scanners, embossers, or other hardware, functional literacy for students who are blind or visually impaired must be measured in terms of the literacy tasks they encounter daily in their home, school, community or work environments. In today's world, these literacy tasks demand the use of assistive technology.

The second issue relevant to the use of technology and students who are blind or visually impaired is the tremendous potential technology has to enhance their opportunities for social interaction and, hence, their social development. The Canadian Media Awareness Network [<http://www.reseau-medias.ca/>] is a not-for-profit organization established to "promote and support media education in Canadian schools, homes and communities through a world class Internet site." In a recent study, they (Media Awareness Network, 2000) heard from 5,682 students between 9 and 17 years of age in schools across Canada. Daily use of the Internet from home was reported by 48% of these students. When asked about their favourite things to do on the Internet, half of the items reported involved interaction with friends or others: 56% use e-mail, 40% use instant messaging (IM), and 39% participate in chat groups. The youth of today consider interaction through technology a routine part of their lives. This same opportunity must be available to students who are blind or visually impaired. It exposes them to the student culture of which they need to be an integral part and provides them with readily available access to friends. However, they must have the assistive technology and the technical expertise to take advantage of these opportunities.

Courses in technology are now compulsory courses in most schools. In larger high schools, students can often take quite specialized course work involving programming and computer assisted design (CAD). Most students have the opportunity to take courses teaching web page design, graphic design and manipulation, and an array of multimedia applications. Information presented in these courses provides students with skills they will need in a great percentage of future work environments and those required in most post-secondary settings.

The third issue relevant to the use of technology by students who are blind or visually impaired is related to the access that these students have to the computer literacy curricula typically available in most schools. Teachers of students who are blind or visually impaired must have the expertise to assist public school technology teachers in making computer curricula accessible to students.

If students with visual impairments are going to be competitive in the workplace and independent in their access of information, it is imperative that they have experience with a wide range of technology and that their instructors, if not knowledgeable themselves, have access to resources to facilitate instruction in and the adoption of technology. (Corn & Wall, 2002, p. 207)

The final issue is the consideration of how technology is being used in classrooms. In a survey of over 100 classroom teachers, MacCuspie (2002) reported that 64% of teachers use computers in their classrooms weekly, 28% use computers once or several times a day, 30 % routinely use computers to complete classroom assignments, and 33%

use specific software to provide instruction which is considered a compulsory part of the curriculum, i.e., part of the Departments of Education's stated outcomes. Classroom teachers reported using technology to provide instruction, supplement instruction, provide an opportunity for students to practice newly learned skills, research information, and present reports. With approximately 99% of Canadian students who are blind or visually impaired enrolled in the regular classroom, it is critical that educators ensure these students have access to software used in the classroom. These programs are becoming an integral part of instruction as they are more routinely used in the learning environment. It is also critical that accessibility is provided in a way that ensures students have independence in their use of software and participation that is meaningful.

The infusion of technology within the curriculum is presenting many challenges for classroom teachers (MacCuspie, 2002). Availability of computers and software, access to timely technical support, time for lesson preparation, and training are frequently mentioned concerns. For teachers of students who are blind or visually impaired, these issues can be even more daunting as they must have the basic level of computer literacy required of the classroom teacher as well as the expertise associated with various types of assistive technology used by students who are blind or visually impaired. Undoubtedly, many may find this requirement an intimidating one. Recent studies investigating the use of assistive technology by students with visual impairments in the regular classroom (Edwards & Lewis, 1998; Kapperman, Sticken, & Heinze, 2002) report that one of the most influential factors contributing to the successful use of assistive technology by these students is the expertise in this area by the teacher of students who are blind or visually impaired. This creates a great challenge for these teachers! Following recent research on the use of assistive technology by students who are blind or visually impaired, Corn (2002) suggested that "teachers of visually impaired students need to develop a working knowledge of high-tech devices and be able to support instruction in the use of these devices while they develop an in-depth knowledge of a limited number of the devices their students use (pp. 208)." While it is difficult to imagine what technology will bring in the next few decades, it is obvious that it will demand ongoing commitment to professional development for teachers of students who are blind or visually impaired. If past experience with this dedicated group of educators is an indicator, I'm optimistic that given the opportunity for training, they'll be leading the way.

Printed with permission from Ann MacCuspie from
A Technology Handbook for Teachers of Students who are Blind or Visually Impaired
By Ann MacCuspie, PhD
Atlantic Provinces Special Education Authority
Halifax, Nova Scotia
June 2002