

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

**Chapter 14**

**Assistive Technologies for Students with Disabilities:  
What Every Teacher Ought to Know<sup>1</sup>**

**Abstract**

The Education for All Handicapped Children Act, signed into law in 1975, ruled that all children in the United States with a disability have a legal right, up to the age of majority (21 years old), to a Free Appropriate Public Education (FAPE). Coincidentally, 1975 also was a watershed in the history of personal computers. In that year, Bill Gates and Paul Allen started a company called Microsoft and, a few months later, Steve Jobs and Steve Wozniak built the first Apple computer. Over the years since 1975, personal computers have advanced by leaps and bounds and become cheap enough to be ubiquitous; they also have brought to students with disabilities a whole new world of learning opportunities. Assistive computer hardware and software tools have been designed to assist almost anyone regardless of ability or disability to benefit from a pre-k through 12 education. But as John Donne observed: “No man is an island...”. Thus everyone should be aware of the increasingly sophisticated range of available assistive technologies and services to ensure that children who have a disability get all the help they need.

---

<sup>1</sup> This chapter, written by Bernie and his good friend Yvonne Singer, was prepared for publication elsewhere, but we decided to include it, instead, as a chapter in Education for an Information Age. You can read more about Ms. Singer, a professor at Middlesex Community College, at her website (<http://home.att.net/~ysinger/>).

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

## INTRODUCTION

The Americans with Disabilities Act (1990) defines *disability* as a physical or mental impairment that substantially limits one or more of an individual's major life activities. The Assistive Technology Act (2004) defines an *Assistive Technology Device* as any piece of equipment or product system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities; the Act further defines an *Assistive Technology Service* as any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device.

Demand for assistive technologies increases as more children with disabilities attend public schools. Researchers are developing increasingly sophisticated computer-based hardware and software, making it possible for even the most severely handicapped individuals to succeed in school. This paper will examine some of these assistive technologies with the goal of increasing awareness amongst those responsible for ensuring a quality education in our nation's schools.

## ASSISTIVE TECHNOLOGY AND COMPUTER CORPORATION R&D

Leading computer corporations have made an impressive commitment to the development of accessible computing hardware and software. Apple introduced the *Lisa* in 1984, its first computer with a graphical user interface (GUI). GUI technology had already been developed in the 1960s by Douglas Englebart and refined in the mid-1970s at Xerox Corporation. While the GUI was not designed for people with disabilities, it made the computer more accessible for them just as it has made the computer more accessible to the general population.

IBM has a long history of developing technology to assist people with disabilities. In 1975, IBM developed the Model 1403 Braille printer. In 1980, IBM developed a talking typewriter for people who were blind, and this was followed by a talking display terminal in 1981. As computers migrated to graphical user interfaces in the 1980's, IBM introduced its first screen reader for the sight impaired in 1984. IBM's *Home Page Reader*—a talking Web browser introduced in 1998 for the visually-impaired and the elderly—magnifies text and reads out loud the contents of a Web page. Another IBM product, *ViaVoice*, enables users to interact with the computer using voice commands (speech recognition), thus freeing them from dependence on the mouse and keyboard for many applications. More information on IBM's commitment to accessibility can be found at <http://www-306.ibm.com/able/>.

Microsoft Corporation has had a commitment to accessibility since at least 1988 (for more about this commitment, go to <http://www.microsoft.com/enable/microsoft/history.aspx>). Versions of Microsoft's *Windows* OS, in particular *Windows XP*, include a range of accessibility options, which we will discuss further in this paper, that are designed specifically to assist users who have vision, hearing, and mobility impairments.

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

**ACCESSIBILITY AND THE WORLD WIDE WEB CONSORTIUM**

The World Wide Web is an essential information resource with significant relevance to learning. As such, it needs to be accessible to students who have a disability. The World Wide Web Consortium (W3C) has drawn up accessibility guidelines for the Web. The latest version of these guidelines, published in June of 2005, “covers a wide range of issues and recommendations for making Web content more accessible.”

The W3C guidelines define Four Principles of Accessibility to guide developers of Web content. Principle 1 states that *content must be perceivable* to all users, no matter what the impairment (visual and/or audible content must have text alternatives, for example, and the user should be able to customize a color scheme). Principle 2 states that *interface elements in the content must be operable* (for example, there should be a keyboard alternative for interaction with the Web; also the user should be able to control any time limits on reading or interaction). Principle 3 states that *content and controls must be understandable* (the writing should be “clear and simple,” for example, with audio-visual content to assist comprehension). Finally, Principle 4 states that *content must be robust enough to work with current and future technologies* (the Web content provider must remain aware of assistive technologies designed to facilitate access to the Web for users with disabilities).

The full description of these W3C Accessibility Guidelines, available on the Web at <http://www.w3.org/TR/WCAG20/checklist.html>, is detailed and comprehensive. For each principle there are guidelines that define how the principle applies in a specific area. Under each guideline are success criteria, definitions, benefits, and examples. Success criteria are testable statements to further define the guideline and to determine conformance.

**UNIVERSAL DESIGN**

The W3C Guidelines make the important point that technology designed to make computers accessible for people who have a disability is often also easier for the rest of us to use. “Following these guidelines,” the document states, “will make your Web content more accessible to the vast majority of users, including older users [and young student users]. It will also enable people to access Web content using many different devices—including a wide variety of assistive technology.”

Universal Designers look at our world through the eyes of people with disabilities. They study how to enable access to anywhere people with disabilities want to go, along with access to anything they want to do. Door handles should be levers rather than knobs, for example; ramps and elevators should be alternatives to steps; curbs should have curb cuts, etc.

The outcome of the application of Universal Design is a world that is easier for everyone to live in, not only those of us who have a disability. A door with a lever for a handle can be opened with an elbow when hands are full; curb cuts allow a smooth transition from sidewalk to street for everyone; a ramp is easier to negotiate than steps when moving a heavy object into a building, and so on. Readers who would like to learn more about Universal Design may visit the

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

Web site of the Center for Universal Design of the North Carolina State University College of Design at <http://www.design.ncsu.edu/cud>.

Research conducted over the past 25 years, reviewed by the author in chapter 1 of Poole, Skye-McIlvain, and Jackson (2004, chapter 1 [online]), has shown that learning is made more effective and efficient for students when they are able to access and make appropriate use of digital tools. We therefore must do everything to ensure access to these technologies for children who have a disability so that they are given an equal opportunity to learn.

What, then, are some of the computer-based accessibility tools commonly available today? We will look first at accessibility options that are designed into the operating systems most used with desktop computers. These are the “meat and potatoes” of computer-based accessibility options because they come bundled with every computer we buy. Then there are accessibility options that are designed as special needs hardware devices and software applications. We will profile a few of these, too, bearing in mind that they are but the tip of the iceberg compared to what will be available in the future to assist those with special needs.

### OS-BASED ACCESSIBILITY OPTIONS

Of the various versions of Microsoft’s *Windows* operating system, *Windows XP* has the most comprehensive set of OS-based accessibility options to-date. But earlier versions of *Windows* were already designed to accommodate the needs of users with vision, hearing, and mobility impairments.

*a. StickyKeys, FilterKeys, and ToggleKeys*

When a physically-disabled student has limited ability to use the regular computer keyboard and is able to press only one key at a time, teachers should show them how to use the *StickyKeys* option. This option is selected from the *Accessibility Options* icon in the *Control Panel*. As illustrated in the dialog box at right, the *Keyboard* tab makes available the option to *Use StickyKeys*. The *StickyKeys* accessibility option is essential for those students who are unable to touch or hold down more than one key on the keyboard at a time. For example, *StickyKeys* enables a student to type a capital letter by first pressing the *Shift* key and subsequently (rather than simultaneously) an alphabetical key. The same works for any double or triple key sequence, such as *Control* or *Alt* key sequences.



The *Keyboard* tab also enables the user to check other accessibility settings such as *Use Filter Keys* (which ignores automatic repetition of characters when the user is unable to release a key quickly enough) and *Use Toggle Keys* (which causes the computer to make a warning sound for the sight impaired when the Caps Lock, Num Lock, or Scroll Lock keys are accidentally pressed).

All students should learn how these various accessibility options work so that everyone can become aware of the needs of those who are in some ways less able than themselves. Moreover,

# EDUCATION FOR AN INFORMATION AGE

## Teaching In The Computerized Classroom, 6th edition

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

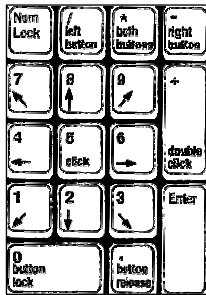
### Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

if everyone in the class knows how to use these accessibility options, there is more likelihood that the students will share this knowledge with others.

#### b. MouseKeys



This option also may be selected from the *Accessibility Options* icon in the *Control Panel*. As illustrated in the dialog box at left, the user selects the *Mouse* tab to use the *MouseKeys* accessibility option. Clicking on the *Settings* button allows the user to also set the speed at which the pointer moves across the screen. This can be a critical issue for those with an impairment related to hand-eye coordination.



Using the *MouseKeys* accessibility option, students can also control the mouse pointer by using the Mouse Keys located on the numeric key pad . The illustration at left shows which of the keys control the directional movement of the mouse pointer on the screen, along with keys to control single and double clicking and left or right mouse button selection.

Users unable to use a mouse can use a pointer, in their mouth or between their toes or attached to “hats” on their heads, in order to depress a key on the numeric keypad which moves the cursor on the screen.

#### c. MousePointers

Students who are sight impaired can be assisted by increasing the size and style of the mouse pointer. This option also is selected from the *Accessibility Options* icon in the *Control Panel*. As illustrated in the dialog box at right, the user selects the *Pointers* tab to increase the size of the mouse pointer. One also can select a specific style of mouse pointer from the *Customize* menu, along with a pointer shadow if this helps a visually-impaired student better locate and follow the pointer on the screen.



#### d. The Accessibility Wizard

Microsoft’s Windows XP has an Accessibility Wizard to help students with special vision, hearing, or mobility needs to set up their computer. The Wizard is one of the Accessories in the Start menu, along with a *Magnifier*, a *Narrator* (a simple screen reader), and an *On-screen Keyboard*.

In the previous sections we described the *StickyKeys*, *FilterKeys*, *ToggleKeys*, *MouseKeys*, *CursorSpeed*, *MousePointers* and *Magnifier* accessibility options, all of which can be set using the Accessibility Wizard. For users with impaired vision, the Accessibility Wizard also helps set up *TextSize* options, such as large titles and menus, increased font size, and lower screen resolution. Students with vision impairments, including color blindness, can use the Accessibility

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

Wizard to adjust the size of the scroll bars and window border, along with the size of icons, the color scheme, and the cursor's width.

Students with hearing impairments can have visual warnings when the computer provides an audible alert, along with captions for speech and other sounds.

People who have an impairment that affects their mobility can use the Accessibility Wizard to access *Extra Keyboard Help* when using certain programs that offer tips to help the user use the keyboard. There also is a *Mouse Button Settings* option, which enables a user to configure the mouse for either right-handed or left-handed use.

### APPLICATION-BASED ACCESSIBILITY OPTIONS

#### *a. Word Prediction and Speech Recognition*

Word prediction programs such as *SoothSayer* or *Co-Writer* are designed to facilitate writing by suggesting words based on one or two letters typed by the user. For example, if a student types the letter "d", the program will generate a list of words that begin with "d" (dog, dress, etc.) from which the student can select the target word. Typing a second letter (e.g., "du") generates another, shorter, list of words beginning with "du". Each successive letter of a desired word that the user types narrows down the selection of possible words until the correct word is recognized in the displayed list. Most of the time it is necessary to enter no more than two or three letters before the desired word is displayed. This saves a great deal of time for a mobility-impaired user for whom use of the keyboard is a painstaking task. Speech recognition systems such as *ViaVoice* combine speech recognition with word prediction to assist computer interaction for people who have a mobility-impairment, but who otherwise are able to speak clearly.

#### *b. Speech Synthesizers*

Speech synthesis is a term used to describe the capability of a computer to synthesize human speech. *JAWS* and *Home Page Reader* use a speech synthesizer in their Screen Readers for the blind. Speech synthesis also is a powerful communication medium for anyone with a severe speech impairment. *DynaVox* is a communication device which enables students with a speech impairment to have the computer speak for them after selecting a category from the screen by touching a customized icon. *DynaVox* also enables students with a speech-impairment by helping them create customized statements or even a lengthy speech which *DynaVox* speaks for them. More about *DynaVox* may be found at <http://www.dynavoxtech.com/>.

#### *c. Screen Readers*

People who are sight impaired can use a screen reader such as *JAWS* to "read" what is on the computer screen. *JAWS* is controlled by keyboard commands. Using an internal software speech synthesizer and the computer's sound card, information from the screen is read aloud. The output is produced as a Braille display (the raised tactile language codes for the sight-impaired) or as natural language speech using a voice synthesizer. More information about *JAWS* may be found at the following URL: <http://www.scc.losrios.edu/~access/AssistTech.html>.

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

*d. Alternative Keyboards*

Alternative keyboards are a life-saver for students who are unable to use the small keys on a standard keyboard because they lack physical coordination and fine motor skills. The *IntelliKeys* keyboard plugs directly into the standard keyboard port of the computer. Seven standard overlays, once slid into place, have barcodes on the back that *IntelliKeys* “reads.” More information on alternative keyboards may be found at <http://www.utoronto.ca/atrc/reference/tech/altkey.html>.



**CONCLUSION**

Assistive technologies include a wide variety of accessibility devices that enable students who have disabilities to perform difficult tasks by themselves. For such students to take advantage of these technologies, school districts need to hire qualified teachers who are knowledgeable about assistive technology and have experience working with students who have a disability. Training in assistive technologies should be part of every teacher’s ongoing professional development. Teachers also should pass on this knowledge to all the students in their classes. Universal design improves life and learning for everyone after all.

**LOOKING FORWARD**

This concludes our study of the social impact of computing. In the next chapter of the book we will reflect upon the theory and practice of computer-based teaching and learning. Computers have value in schools only to the extent that they reinforce the centrality of the individual student in the educational process while providing opportunities for that individual student to work collaboratively with peers at home and abroad. The cultural change brought on by technology will be as dramatic for teachers as for students. The most successful teachers will take every opportunity to acquire the skills and concepts that are necessary to provide an appropriate and effective learning environment for their students.

What shape that learning environment will take is still largely a matter of conjecture. Cheaply available, wireless notebook size computers may eventually replace paper-based grade books and rosters. A computer weighing a couple of pounds with the power and functionality of an end-of-twentieth century supercomputer and costing no more than a few dollars will find its way into every teacher's brief case and every student’s backpack. We will be able to download into it a lifetime of relevant data. We will be able to link to networks which will put us in touch, not only with the entire world of information available at the end of telecommunications lines, but also with our students wherever they may be.

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

Perhaps much of education will eventually take place from the home—a tele-schooling equivalent of telecommuting. Just as many workers now log on to their companies from home-based offices, so tomorrow's children may power up the information center in their room at home to log in to classes which do not require their physical presence at a central learning location. Student teachers in this first decade of the 21st century will see extraordinary change during the course of their careers. *The key to their survival will be their ability to adapt.* An understanding of reality is the foundation for purposeful adaptation, and an understanding of reality is borne of experience and conscientious study of the wisdom of those who have gone before. Chapter 15 tries to capture past and current pedagogical wisdom and apply it to the realities of Education for an Information Age.

**REFERENCES**

- Anderson, G. H. (2004, October). Freeware, shareware, and demos on the Internet. ConnSENSE Bulletin, 52-58.
- Besio, S., & Salminen, A. (2004). Children and youngsters and technology. Technology and Disability, 16. 115-117.
- Blanck, P. D., Berven, H. M. (1999), Evidence of disability. Psychology, Public Policy, and Law, 5(1), 16-35.
- Campbell, D. M. (2004). Assistive technology and universal instructional design: A postsecondary perspective. Family & Excellence in Education, 37. 167-173.
- Cooke, A. A. (2004, March). History of accessibility at IBM. In AccessWorld, 5(2).
- Docu+Design. (n.d.) Mouse Keys. (On-line). Web: <http://www.daube.ch/share/win02.html>.
- Dynavox Systems. (n.d.) DynaVox - Facts at a Glance. DynaVox Systems: Communications Systems for Life. (On-line). Web: <http://www.dynavoxtech.com/index.cgi/67478oc28b9cb64cc67af3cba15boa74?rm=content&contentid=129>.
- EEOC. (2002). *The Americans with Disabilities Act (ADA): 1990-2002*. Online publication of The US Equal Employment Opportunity Commission. (On-line). Web <http://www.eeoc.gov/ada/>.
- Eisenberg, N. (1991). Values, sympathy, and individual differences: Towards a pluralism of factors influencing altruism and empathy. Psychological Inquiry, 2(2). 128-130.
- Eisenberg, N., Wentzel, N. M., & Harris, J. D. (1998). The role of emotionality and regulation in empathy-related responding. School Psychology Review, 27(4). 508-514.
- Elkind, K. (2004). Choosing assistive technology for teaching reading and writing. Media & Methods, 40(6). 20-21.
- Foote, W. E. (2000). A model for psychological consultation in cases involving the Americans with disabilities act. Professional Psychology: Research and Practice, 31(2), 190-196.
- Freedom Scientific. (n.d.) JAWS for Windows. (On-line). Web: [http://www.freedomscientific.com/fs\\_products/software\\_jawsinfo.asp](http://www.freedomscientific.com/fs_products/software_jawsinfo.asp).
- Hodges, A. (1992). Alan Turing: The Enigma. Random House, London.
- IntelliTools. (n.d.) IntelliKeys - The Alternative Programmable Keyboard. (On-line). Web: <http://www.intellitools.com/Products/IntelliKeys/home.php>.

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

- Lankutis, T., & Kennedy, K. (2002). Assistive technology and the multiage classroom. Technology & Media, 22(8). 38-43.
- Marbler, J. B., A. Hadadian, & Ulman, J. (1999). Using assistive technology in the inclusive classroom. Preventing School Failure, 43(7). 113-120.
- Microsoft Corporation. (2004). History of Microsoft's Commitment to Accessibility (On-line). Web: <http://www.microsoft.com/enable/microsoft/history.aspx>.
- Nurse, T. (2005). *Tasty Transition TILE Tidbits*. Presentation at the *Recipe For Success: A Community Conference on Disability*. Florida Gulf Coast University, Florida, March 5, 2005.
- PBS. (2004). *P.O.V. Freedom Machines*. (On-line). Web: <http://www.pbs.org/pov/pov2004/freedommachines/>
- Poole, B., E. Skye-McIlvain, and L. Jackson. Y. Singer (2006). *Education for an Information Age: Teaching in the Computerized Classroom, 6<sup>th</sup> ed.* Self-published online. <http://www.pitt.edu/~edindex/InfoAge5frame.html/>.
- Roach, R. (2002). Assistive technology comes into focus. Black Issues in Higher Education, 19(11). 20-24.
- Thomason, Larisa. (2001). Accessibility Tip: Let JAWS Taste Your Site. In WebMaster Tips, NetMechanic, Inc.
- W3C. (2005). *Web Content Guidelines 2.0*. W3C Working Draft, 30 June 2005. (On-line). Web: <http://www.w3.org/TR/WCAG20/checklist.html>.
- Wilkes, D. (2001). Assistive technology. Media & Methods, 37(5). 36-38.
- Zascavage, V. T., & Keefe, C. H. (2004). Students with severe speech and physical disabilities: Opportunity barriers to literacy. Focus On Autism And Other Developmental Disabilities, 19(4). 223-234.

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

**Case Study: Seeking a Post-Secondary Education**

by

Yvonne Singer, MA

**Introduction**

When people with a disability are told that they are too disabled to attend college, they should seek affirmative action. This might involve writing a formal letter to the president of a college explaining that disabled people have the ability to learn. It also may be necessary to arrange for others to advocate for their educational rights. Unfortunately, without affirmative action it is still the sad reality that many disabled people will not be able to attend college. This also will mean that many disabled people will not be able to obtain careers that are consonant with their abilities.



**A Case in Point**

I was born a quadriplegic, with a severe case of Cerebral Palsy. People constantly told me that I would never attend a university and achieve my goal of becoming a psychologist for the physically challenged. Growing up, I had to endure silly remarks such as, "Yvonne, how can you hope to go to college when you do not know basic algebra? You cannot even count change. And besides, you do not have normal intelligence to compete with normal students."

Such put downs have not stopped me from achieving my long and short-term goals. They only made me work harder to overcome the obstacles in my path. My family taught me to always strive to become a better individual and that I can never fail as long I keep trying. These words of advice have helped me to develop a positive attitude that anything can be achieved.

People tend to judge me by my physical disability. They see my wheelchair, my arms and legs flailing in all crazy directions, and my speech impediment, and they more often than not assume that I am mentally retarded. Proving that I have a good mind has always been a frustrating challenge because most people never take the time to look beyond the surface to discover how intelligent I am.

For instance, school psychologists and learning specialists had difficulties determining how smart I was. In other words, these professionals administered a

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

batch of standardized tests that required me to point with a finger and verbally express my thoughts. I scored very poorly on these tests because I did not have any voluntary control to point with my finger and the professionals had trouble understanding my speech.

This happened frequently throughout my school years. I was outraged to be labeled as having very low intelligence, but I was nonetheless able to demonstrate that I had above average intelligence by performing quite well in my honors classes.

During my high school years, I was not allowed to use a computer to complete homework assignments and examinations. No reason was given for this; it was just the way things still were back then (mid to late 1980s). As a result, I had to verbally dictate test answers and essays to my full-time aide. This was the beginning of a hard struggle that lasted close to five years. My aide could not understand my speech; nor did she know any of the subject matter. As a result, I did very poorly in my classes.

Naturally, I was extremely frustrated because I knew and understood my subjects well, but I could not successfully communicate what I wanted to say. I was constantly reminded that I had low intelligence and that I should enroll in a United Cerebral Palsy school. After visiting a UCP school and witnessing other physically disabled students not engaged in learning anything, I spent a whole week in bed crying. I became extremely depressed.

Suddenly, I just decided to stand up for my educational rights because I simply refused to spend the rest of my life gazing at the ceiling. Moreover, I found the courage to see my counselor about seeking alternatives for testing my knowledge.

My counselor realized that I had a mind; furthermore, he arranged to have a tutor assist me with tests and homework assignments. Verbally dictating answers to a professional tutor was one hundred percent better than doing so with my uneducated aide.

However, I was still angry and depressed because I had to start taking resource classes due to my poor grades. Taking these classes insulted my intelligence. There were numerous times when I wanted to commit suicide; nevertheless, I never gave up pursuing my ambitions.

I learned that most physically handicapped children are reduced to wasting away and eventually wind up in adult training centers designed for the mentally retarded. This awareness caused me to fight with all of my might to become a well educated individual.

After graduating high school, I was obliged to enroll in two state institutions designed to assist the physically handicapped to become productive members of society. Since I always had a burning desire to attend college, I was completely dumbfounded to hear my high school teachers, Child Study Team (a group of educational experts who help disabled students adjust to public school), counselors, and parents had

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

casually decided that college was inappropriate for me. My world shattered into pieces when I realized that all of my hard work through high school was for nothing and that even my own parents had lost faith in me.

Since nobody thought that I could attend college, I spent the next eight months being physically, psychologically, and verbally abused by the instructors in the two state institutions for the disabled. Convincing the staff members that I wanted to lead an independent life and attend college only made matters worst.

The abusive treatment I received was so unbearable that I stopped eating and I was tempted (again) to commit suicide. I wrote long poems and joined a church group as a temporary means of escape. I rebelled because I certainly did not want to be isolated from society and I did not want to give up my dream of becoming a psychologist for people who are physically disabled.

Finally, I was able to convince my parents to bring me back home. My family was incredulous to discover that I was on the verge of death. I spent the next month recovering at home in bed. My bed became a safety net because I felt that nobody could harm me there.

Then, my mother read an article about a computer program for the physically disabled that was being offered at Brookdale Community College, in New Jersey. Since I now thought that I was a first class moron, I was very hesitant about starting life all over again. Once I enrolled in the computer program, however, I felt like a different person because I was able to successfully demonstrate my knowledge without being put down. After being in the program for one day, the director encouraged me to take the Basic Skills Test which would allow me to enroll in college level classes!

My will power was restored when I passed the test with flying colors and started to compete with non-disabled college students. Suddenly, I had brand new energy to overcome my daily obstacles. There were times when various professors were so frightened that they did not want to teach me. I sought affirmative action by speaking and writing letters to the dean. It felt terrific to stand up for my rights and thus overcome these seemingly insurmountable problems.

To conclude, if I had not sought affirmative action, I certainly would not have completed my Associate degree in Liberal Arts at Brookdale Community College (1994), gone on to get my Bachelor's in Psychology at Monmouth University (1999), and finally attained my Master's in Psychology from Walden University in 2002.

Unfortunately, I still have not achieved my goal of becoming a psychologist for the disabled, but I continue to hope that that dream will one day become a reality.

---

*Case Study Recommendations*

- This student could not demonstrate her cognitive abilities on the standardized tests because she did not have any way to communicate. The Child Study Team should have

**EDUCATION FOR AN INFORMATION AGE**  
**Teaching In The Computerized Classroom, 6th edition**

Copyright © Bernard John Poole, Betsy Sky-McIlvain, Lorrie Jackson, Yvonne Singer, 2006, all rights reserved

Chapter 14: Assistive Technologies for Students with Disabilities, What Every Teacher Ought to Know

concluded that the student needed assistive technology in order to perform better on the standardized tests and on her academic subjects.

- The Child Study Team should have documented the importance of utilizing assistive technology in the student's IEP.
- If the student had been able to use assistive technology (typing independently on a computer), she would have had little difficulty with high school college prep classes and she would have attended the university of her choice.