DOCUMENT RESUME

ED 479 685 EC 309 745

AUTHOR	Jackson, Valery L.
TITLE	Technology and Special Education: Bridging the Most Recent Digital Divide.
PUB DATE	2003-00-00
NOTE	26p.
PUB TYPE	Information Analyses (070)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	*Access to Education; Appropriate Technology; *Assistive Technology; Computer Uses in Education; *Disabilities; Educational Technology; Elementary Secondary Education; Evaluation Methods; Information Technology; *Needs Assessment; *Regular and Special Education Relationship; Teacher Education; Technology Integration; *Technology Uses in Education; Vocational Education

ABSTRACT

This paper explores the apparent "digital divide" in information, communication, and/or assistive technology availability that exists between special needs students and their mainstream counterparts. A literature review indicates that although great advances have been made in public schools during the last decade in acquiring computers and Internet access for the general student, the same cannot be said for participants in special education programs. It is asserted that many special education teachers are not provided with the training to enable them to teach advanced technology and/or assistive technology skills to their students. The issue of technology and transition for students with disabilities is addressed, and several examples of how specific assistive technology benefits students with disabilities are provided. The Matching Person and Technology (MPT) assessment is discussed as one way to ensure the learner is fitted with the appropriate assistive technology. ELITE (Everyone Learning with Information Technology) schools are suggested as a possible way to reconceptualize the appropriate use of technology with students with special needs because they attempt to connect the learner to the real world though a suitable academic curriculum along with job placement and training. Characteristics of ELITE schools are described. (Contains 16 references.) (Author/CR)

Running Head: TECHNOLOGY AND SPECIAL EDUCATION

Technology and Special Education: Bridging the most recent digital divide

Valery L. Jackson

Doctoral Candidate in Educational Leadership

Auburn University

English Instructor

Harris County High School

8281 Highway 116

Hamilton, Georgia 31811

Phone: (706) 645-5664

Email: valeryjackson@charter.net

Abstract

The author of this paper explores the apparent "digital divide" that exists in information, communication, and/or assistive technology availability between special needs students and their mainstream counterparts. The point is made that although great advances have been made in public schools during the last decade in acquiring computers and Internet access for the general student, the same cannot be said for participants in special education programs. Many special education teachers are not provided with the training to enable them to teach advanced technology and/or assistive technology skills to their students.

The issue of technology and transition for students with disabilities is addressed. The Matching Person and Technology (MPT) assessment is discussed as one way to insure the appropriate learner and assistive technology fit. The ELITE School is suggested as one possible way to reconceptualize the appropriate use of technology with special students because it attempts to connect the learner to the real world through a suitable academic curriculum along with job placement and training.

Technology and Special Education: Bridging the most recent digital divide

During the last decade, the Internet and the computer have made a tremendous impact on the American schooling process. Initially, educators were concerned that public schools would not gain access to the expensive equipment necessary to properly train students. They felt that student knowledge would lag behind the requirements of the workplace. Some teachers even talked about bridging a type of "digital divide" that they thought would separate the wealthy from the poor in terms of computer access. However, many of these early concerns were quickly addressed and remedied in many school districts for most students.

Technology plans were hastily adopted in educational institutions across the nation. Taxes were levied. Corporate sponsors were contacted. Local, state, and federal government officials were called. As a result, many public schools acquired an array of computers and Internet hookups enabling information literally at children's' fingertips via the World Wide Web.

Most recently, those same schools have been scrambling to keep up with the swift, changing pace of those technological advances. Technology changes occur frequently and can be quite expensive. As an example of this phenomenon, computers and the accompanying software are often obsolete before they are even out of the shipping box. Students have been coming to school already versed in the usage of technological equipment superior to the computers their schools are providing. Meanwhile, many school officials have been exploring a plethora of ways to serve their stakeholders through basic Internet services.

Of certainty, the complexion of schooling has mutated remarkably from previous decades and that evolutionary process does not show signs of stopping any time soon. However, while educational technology has developed quite remarkably in a general sense, an overt

weakness in its planning and implementation has become apparent. The varied technology needs of special children have been and are being neglected by many (Donlevy, 2000; Abbott, 2001; Hopkins, 1998; Cronis & Ellis, 2000). Comparatively little data have been collected on using technology and/or gauging its effectiveness with special needs students (Castellani, 2000).

Special Needs and Technology Funding

Special education funding has always been a bit controversial. In a recent article, Cronis & Ellis (2000) outlined the constant upheaval than seems common place in the field. They declared that though special education is relatively young, it has experienced a number of relevant ideological shifts during the second half of the twentieth century. Social, political, legal, and scientific forces have prompted these revisions. The result has been fragmentation among the group's major stakeholders. Consequently, few can agree on an appropriate direction for special education funding for any length of time (Hauser & Malouf, 1996).

Federal research and its accompanying funds/resources have tended to follow emerging trends and those trends could/can be here one day and gone the next. Special educators, also, have followed those varied movements in order to be eligible for federal funding. Sometimes, those chosen paths may have been less than the best choice for the special needs pupil (Jackson, 2001; Castellani, 2000; Hauser & Malouf, 1996). In the new millennium of special education services there is a focus on early intervention and planning for the transition into adulthood. Special education teachers and school districts have started to acknowledge that students must be prepared for elementary school in their early years and must be prepared for their workplace upon leaving high school (transition skills). Many special education advocates see the high school diploma as the overall goal (Cronis & Ellis, 2000; Donlevy, 2000).

The demand for adequate funding and resources has been a perennial challenge for special education. Quite simply, it is difficult to insure that some special education students have the resources and financing available to adequately meet their needs. A school administrator contemplating spending millions of dollars for technology may want some evidence of its advantages over existing alternatives for the special needs population. A research base documenting/building the advantages of technology for special education students has not been adequately developed (Hauser & Malouf, 1996). As a result, general education students in regular classroom settings often get the computers, Internet access, and software. Special students may not have the same access (Abbott, 2001; Cronis & Ellis, 2000). Without that access, the special students may not exposed to the same curriculum (Hauser & Malouf, 1996). This lack of accessibility is a significant factor in the special education digital divide.

To acquire a high school diploma, a student must learn high school objectives according to a set curriculum. Many states have started using high school graduation tests in order to identify the members of the population that have mastered the basic information in the general curriculum. A special education student cannot earn a degree with a watered down educational track in such an environment. One result from the requirement of higher graduation standards is that there is, now, a push for higher curriculum standards for special education programs. Other hot topics under constant debate in the special education field include discipline, inclusion, teacher training, personnel shortages, parental and student rights, funding, and the research to practice gap in instructional technology (Cronis & Ellis, 2000). Although technologies used in school programs have become more common, barriers to full implementation for special education students still exist (Lewis, 1997).

Interestingly, teacher shortages in special education often appear neither universal nor uniform. This is because states and districts often counter the lack of available certified special educators with multi-categorical or non-categorical service delivery. Then, even though the person in the special classroom is called a teacher, the instructor may or may not be certified and trained to best standards in technology usage with special students. This overt lack of educator training compounds the problem of implementing reforms that call for special students to receive an enhanced curriculum using technology that is comparable to that of general education (Cronis & Ellis, 2000).

Castellani (2000) stated that many special education teachers and administrators should get technology training on appropriate strategies to use to incorporate effective strategies to use and to explore how much information influences what is ultimately learned by the special needs pupil. Research has revealed that the special education teachers who do integrate technology into their instruction often find the Internet to be a useful tool for transition services, career development, developing technology competencies, and accommodating individual student needs. However, as mentioned previously, many special education teachers do not have the adequate technology training appropriate to enable ideal support for their pupil's individual mechanisms/ equipment. Some have not even been trained to use a standard computer.

Does Technology Help the Special Student?

Cronis and Ellis (2000) suggested that technology can be used to bridge a portion of the gap between expectations for special education students and general pupils. They maintained that technology can produce increased efficacy for special students in schools. Hauser and Malouf (1996) maintained that computer technology that is grounded in a sound program of instruction

has the potential to enhance students' work and to perform routine basic-skill tasks. However, Cronis and Ellis cautioned that schools should remember the stark reality of the current situation(s) of many special students. Technology for a special student may require more than just the latest computer with a current piece of software. In the most novel of circumstances, technologies are/should be invented for a particular person with a special circumstance at a particular site. Needless to say, many of these new technologies posses capabilities that go far beyond a standard computer with Internet access (Peck & Scarpati, 2002; Hopkins, 1998).

Research studies have been done and are being conducted to answer the question of whether or not technology teaches students with learning disabilities better than other approaches. Questions about the advantages of computer training versus other methodologies are unavoidable because any administrator contemplating spending millions of dollars for educational technology wants to have some evidence of its advantage over other ways of teaching. In addition, the federal government wants some feedback about the effectiveness of its monetary allocations. So far, the studies suggest that students benefit from the incorporation of the technologies. This is especially true when technologies designed for business, science, medicine, and the military, have the potential to help people with disabilities when they are altered to be especially suited for people classified as special (Hauser & Malouf, 1996).

Although there was some agreement among scholars that technology is educationally beneficial, Duhaney and Duhaney (2000) noted in their article that research results could be strengthened related to the case for its impact on teaching and learning. More research needs to be conducted to document the impact of technology on the teaching and learning process of special students.

Some researchers maintained that access to the Internet appears to help a special education student. As an example, the incredible amount of information that can be accessed via the Internet has the potential to enhance the development of materials to support students with emotional and learning disabilities by providing the textual information in a universally accessible format (Castellani, 2000). However, basic Internet capability is certainly not the full extent of the benefits derived from technology for the special student.

For example, screen magnification programs are available to enlarge print for visually impaired students. These programs adjust the size of the computer text and graphics. Usually, a mouse is used to manipulate the cursor and display size. Besides this particular use, there are other, varied, computer applications designed to suit the individual needs of special learners (e.g., learning disabled, speech and language impairments, behavior disorders, mental retardation, deaf or hard of hearing, physical disabilities, etc). Research has confirmed the benefit of technology when it is adapted to meet the particular needs of the learner (Duhaney & Duhaney, 2000).

Duhaney and Duhaney (2000) pointed out that the computer may become a powerful tool if used in conjunction with teaching strategies that have a theoretical base. They wrote that the behaviorist and constructivist theories of learning can be used to demonstrate that the computer is a useful tool for learners with disabilities. Behaviorists believe that the teacher is the manipulator of the environment that is experienced by the learner. Constructivists believe that teachers try to create classrooms in which learners actively construct their own learning. Duhaney and Duhaney, also, advocated that special education teachers use technology that is consistent with the teachers expectations for the learner within the particular class. Of course, there is an implication inherent in this idea that teachers know their own practices very well in order to

identify/access the computer programs that will best benefit the particular needs of the student during teaching/learning experiences (Hauser & Malouf, 1996).

Researchers maintain that it is important that educators recognize the importance of technological devices and how those pieces can support instruction and facilitate learning for students with disabilities. It is imperative that those teachers closely examine their teaching practices so they may guide technological use in their classroom. In light of recent legislation, the use of technology may increase, not decrease in the special education classroom. Therefore, it is crucial that teachers receive appropriate training for the utilization of the devices (Duhaney & Duhaney, 2000; Hauser & Malouf, 1996).

Hauser and Malouf (1996) advocated getting trained teachers together with special education students using appropriate computers and programming. They noted that computer technology, grounded in a sound program of instruction that is closely aligned to general curriculum, has the potential to enhance special students' work and assist them with routine basic-skills tasks. This "frees" the student from the limits of their disability and enables learning at the higher cognitive levels required in the workplace.

Zhang (2000) conducted a year-long study with 5 fifth-grade students with learning disabilities in written language. The participants in the study used a specially designed computer program, ROBO-Writer, as a tool to assist them in a weekly-based writing curriculum. These five students wrote three times a week, 20 minutes per session. The study showed positive results from the use of the technology. In the past, the students had shown self-consciousness about their poor handwriting skills. This negative, past experience had caused the students to resist practicing their writing skills. With the new word processing software, the pupils had the opportunity to

maximize their power of expression. Most of the special students improved the quantity and quality of their writing products. They emphasized the following major areas: idea and content, word choice, sentence fluency, and convention.

The study, also, revealed that students who have learning disabilities have to have special instruction in order to utilize the equipment. This need of special instruction necessitated the training of teachers in the use of existing technology. This could be problematic if the teacher does not have appropriate staff development support for the implementation of the idea (Zhang, 2000). It is worth repeating that the idea of special education teachers needing training in the varied technologies used with their individual students was supported earlier in this paper through the research of Hauser and Malouf (1996).

Additionally, actual classroom practice incorporating computer technology continues to be a challenge for many teachers who work with special needs students. State and federal regulations forbid that any student(s) to be left alone in classrooms and computer labs without adult supervision. Schools have started placing a few computers in the regular classroom under the assumption that the teacher can keep an eye on the computer user and the classroom. The result is a difficulty for general teachers (esp. general/inclusion teachers) to provide individualized instruction for students with disabilities. The mere presence of a teacher in the room does not guarantee individualized instruction. The study called for further research to determine the relevance of incorporating technology in the special education classroom (Zhang, 2000).

Assistive Technology

Technology with extended capabilities to serve special needs is labeled as assistive (AT). A number of assistive technology devices are readily available on the market. These include telecommunication devices for the deaf, high-resolution monitors, speech digitizers and

synthesizers, and electronic communication aids. Many of these existing devices are actually modified as needed to meet the special needs of students as those requirements become identified. These unique devices can be used to implement the following educational practices: presentation, demonstration, discussion, drill-and-practice, cooperative learning, simulation, discovery, and problem solving (Duhaney & Duhaney, 2000).

According to Duhaney and Duhaney (2000) The Technology -Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act) defines AT as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." Basically, this law affirms that a student with a disability will be offered any assistive device(s) and/or service(s) necessary to enhance his/her educational experience.

Assistive technology can play an important role in the education of pupils with disabilities because many special students require a differentiated instructional treatment. For example, a student with mental retardation may benefit from the highly organized structure of computer training modules because of their limited cognitive capabilities. A student who is blind may need differentiated pedagogical materials, etc. (Duhaney & Duhaney 2000).

It is reasonable to assume that the higher standards and expectations being placed on the special education population will lead to the increased need for computers and technology in educational settings. In order for such technology to be successful, though, educators are going to have to be aware of what technology is available, how to obtain it, and how it will help the student. Discussing an advantage and providing that advantage to a student are two different concepts. The bottom line is that special education students need access to technology in order to derive a benefit from it (Nochajski, Oddo, & Beaver, 1999). Ideally, that technology should fit

the particular need(s) of the individual student (Scherer & Craddock, 2002; Nochajski, Oddo, & Beaver, 1999). Interestingly, some of the newer devices may be so newfangled that educators are unaware of their existence, much less their diverse capabilities to meet student needs.

Steele and Steele (2002-2003) proposed that some recent technological developments will provide heretofore unseen benefits for the special needs population. As an example of this, technology for the disabled will provide the benefits of affective computing. Through using an affective computer, the interpretation of emotions could be applied to social skills training. This future type of computer will compute signs of anxiety by measuring body temperature or skin conductivity changes. It can evaluate a person's performance during a speech, interview, or peer interaction. Such technology could help the special needs student by enabling both the student and the teacher to understand the emotional effects and physical requirements of a particular task for an individual pupil. This example is one of many possible scenarios for computer usage/applications and the special needs student (Zimmerman, 1996).

Another example of a use for affective computing is utilizing a "wearable" to identify the amount of sweat produced by a student could be used to detect and, thereby, prevent a disruption to the educational environment. One might consider the pupil with learning disabilities who has deficits in writing. That student may have above-average intelligence, but have a lack of visual motor and visual processing skills. Written tasks might become severely frustrating and difficult to the point where the student destroys his/her work. Through using a device to make fingertip impressions, the amount of sweat markings could be counted. To measure these markings, a plastic impression could be made of the finger or other area of skin. The sweat dots could be counted, and a significant increase in the dots could signal that a student outburst is about to happen. This could clue the teacher to instruct the student to put the writing aside for a moment

until it could be better handled. The student could work on other academic tasks and return to the writing when he/she had regained a more positive temperament (Steele & Steele, 2002-2003).

Obviously, equipment designed to cue a teacher about physical reactions from students could be valuable. As discussed, early detection of physiological changes could alert the educator of redirect student behavior and avoid oncoming misbehavior. A student could be trained to self-assess and self-monitor his/her own behavior. Emotions are intricately tied to special education theories and practices and affective computing provides one possible way to manage them in an equitable, humane manner (Steele & Steele, 2002-2003). However, how does a teacher even know about the existence of such equipment much less identify which student should get it? In the next section, the author will address how an appropriate match can be made between learner and equipment.

Matching the Person to the Technology

The very existence of technology does not insure the appropriate match of the machine to the user. An adequate match of person and technology requires attention to the environment where the technology will be used, the needs and preferences of the user, and the functions and features of the particular technology. Duhaney and Duhaney (2000) recommended that the special education provider should consider how well a device can be integrated into a special student's instructional environment, how rapidly the technological device can be upgraded, and whether the device be easily maintained through readily accessible repair and maintenance facilities. Assessment instruments are, also, available to assist with the process of determining the appropriate fit between technology and user . One such instrument is The Matching Person & Technology (MPT) assessment process (Scherer & Craddock, 2002).

The Matching Person & Technology (MPT) assessment process is designed to enable an appropriate match between consumer and technology . This assessment instrument is composed of a set of person-centered measures that determines the self-reported perspectives of adult consumers regarding strengths/capabilities, needs/goals, preferences and psycho-social characteristics, and the expected technology benefit. It is administered before the technology is selected in order to determine the best fit between consumer and assistive technology. Once the technology has been received, the MPT forms are administered at one or more times post AT acquisition. The MPT is a practical solution to studies that have revealed the need for special education personnel to derive a better person to AT fit (Scherer & Craddock, 2002).

Matching Person & Technology assessment process use has generated some recommendations for improvement in the way practitioners are trained. Specifically, practitioners have commented that they require more training on how to maximize the benefits of the instrument. At present, a beta prototype exists of computerized scoring and an interactive CD program that trains users in the comprehensive MPT process. The training program is being modified in order to enhance the training experience of those who administer the MPT (Scherer & Craddock, 2002).

Of significance, the MPT has been around long enough for researchers to conduct tests to determine inter-rater reliability, internal consistency, criterion-related validity, concurrent and construct validity, and predictive validity. These studies reveal that the instrument focuses well on the pertinent factors related to an individual's decision to use or not use an assistive technology (Scherer & Craddock, 2002). MPT findings have been used clinically. In addition, MPT research findings have been included in assistive technology funding requests and justification reports as

support for special education technology programs. Those who have implemented the MPT have reported high satisfaction with its usefulness (Scherer & Craddock, 2002).

Technology and Transition

Once a student has been matched with the appropriate assistive technology, a relevant, necessary question emerges. What connection does this technology have to the student's future? After all, particular care may have been made to match pupil and machine. It simply makes sense that the machine should connect the pupil to the real world of work and life.

The connection/transition of person to work has long been the intent of the federal government while researching the relationship between technology and special needs. In the 1960s general research efforts by The Office of Special Education Programs (OSEP) were laying the groundwork for what would become closed-captioned television. In the 1970s, research developed the Kurzweil reading machine. The OSEP conducted a study in 1984 to investigate technologies and their impact on students with disabilities. The project researched applications of simulation, artificial intelligence, and robotics in business, medicine, and the military. The study revealed that computer simulation presented the fewest technical barriers to adaptations for special needs individuals (Hauser & Malouf, 1996).

Recent studies of the future workplace revealed that society is shifting from skills-based to service-based. This shift will require higher-order thinking skills and interpersonal skills. Workers will need to be able to apply fundamental math concepts, write brief communications, and work as part of a team. These changes are likely to worsen a disabled person's ability to acquire a job. Unless the training of these individuals is altered to meet the new demands, the special needs person may find himself/herself without employable skills (Hauser & Malouf, 1996). Perhaps,

assistive technological equipment will enable the special needs person to acquire the needed skills to make the transition to the newer requirements of the workplace.

The Individuals with Disabilities Act (IDEA) defines transition serves as:

> ...a coordinated set of activities for a student, designed with an outcome-oriented process, which promotes movement from school to post-school activities, including post-secondary education, vocational training, integrated employment (including supported employment), continuing adult education, adult services, independent living, or community participation. The coordinated set of activities shall be based on the individual student's needs, taking into account the student's preferences and interests, and shall include instruction, community experiences, and development of employment and other post-school adult living objectives, and, when appropriate, acquisition of daily living skills and functional vocational evaluation (Nochajski, Oddo, & Beaver, 1999, p. 1).

Nochajski, Oddo, and Beaver (1999) wrote that in spite of best intentions otherwise, many students with disabilities leave high school without the education, training, and services needed to promote employment, post-secondary education, and successful adult living. They pointed out that many disabled students are unemployed or employed on a part-time basis. Plus, fewer students with disabilities attend post-secondary education institutions.

The Technology and Transition project was developed in order to meet the requirements of the IDEA legislation. Nochajski, Oddo, and Beaver discussed The Technology and Transition Project in detail in their 1999 article. Additionally, they outlined a model for providing and coordinating assistive computer technology services to disabled students. The model addresses the support for the role of occupational therapy in secondary settings and the transition process, the provision of assistive technology services to students with disabilities in those settings, and the facilitation of successful transition outcomes for students with disabilities.

Nochajski, Oddo, and Beaver (1999, p. 1) wrote that The Technology and Transition model has four interrelated components. These are as follows:

1. Assistive computer technology delivery including evaluation, student training in the use of devices, and coordination of assistive computer technology used in the school.
2. The provision of assistive computer technology devices through a Lending Library, a key component of the model.
3. An education component including a website providing transition related materials and resources and summer training program in which students learn computer literacy skills.
4. Working with school personnel to facilitate coordination and collaboration between the student, family, school personnel, employers, and adult service providers.

A perusal of existing literature revealed many technology and transition models from countries around the globe available to help advocates design and implement programs for students requiring assistive technology. The following concept is from the United Kingdom.

The ELITE School

Chris Abbott (2001) wrote that a comprehensive survey of United Kingdom (UK) school revealed that the rapid increase in Internet usage by mainstream schools is not mirrored in special schools. Of interest, he also pointed out that the special schools in the UK have had to seriously rethink their role and the ways in which they interact with their students and the rest of the education service and agencies in a wider context. The next section of this paper includes a discussion of a United States prototype that offers a possible answer to the very issue of 'reconceptualizing a school's purpose' that Abbott generated within the context of his article.

Not all special education advocates are willing to settle for inclusion practices with specialized, computer technology used as the only possible answer for special education students to access the general curriculum. Some educators advocate restructuring the very nature of the learning institution itself in addition to providing appropriate technology. They advocate reconceptualizing how and why students attend school in order to provide a better, more comprehensive service (Donlevy, 2000).

To justify this notion, Donlevy (2000) pointed out that special education students are often relegated to second-hand, inferior academic programs. Often, individualized programs are developed for each child. However, the main focus remains the therapeutic encounter, not the academic learning. He proposed that technology should be used to transform special education programs by allowing the participant access to a superior curriculum. The acquired information

could follow the learner into the adult world of work. He suggested a possible remedy - the ELITE School.

Donlevy (2000) continued in his article to discuss the ELITE Schools that have Everyone Learning with Information Technology. He offered this type of school as a solution for alleviating current ills because academic studies pair special and general educators to intensify instruction leading to high school diplomas for children while adhering to higher standards. He advocated that special and regular teachers join forces to accomplish the goal of the high school diploma.

According to his article, ELITE schools have the following characteristics:

1. ELITE Schools have Everyone Learning with Information Technology;
2. Students build, test, and use computers to become certified in industry-validated programs as a basic expectation;
3. Articulation agreements are forged with area colleges to provide college credits to students for vocational program completion;
4. Opportunities for workplace experiences are available and these are community-based as much as possible for all students;
5. Dress codes for the workplace are established and students wear uniforms in school;
6. Advisory Boards comprised of business people in the

occupations of vocational preparation are established;

7. Academic standards in content areas are on par with regular public schools;

8. Special and regular educators are paired to intensify high-level academic experiences; content-certified teachers carry the primary instructional obligation while special education professionals craft lessons to meet special needs; special educators model techniques and strategies for the content teachers.

9. Guidance, clinical, and substance abuse counseling explicitly support academic goals;

10. Behavior management programs have a clear focus and are linked to academic goals;

11. Staff development draws upon local college and university resources;

12. Staff development includes opportunities for certification in technology program areas;

13. In residential programs, a common planning process between the schools and the child care agencies they serve is established;

14. Committees on special education deliberations are tied to the child care agency's treatment planning;

15. Each child has only one unified plan;
16. Residential programs have access to first-rate educational media like Channel One, and schedule viewing times as part of residential activities for all young people;
17. Residential childcare agencies provide computers to all children in their residences; ideally, these are networked and offer links to computers in the school program.
18. A full complement of services - education, social, mental health - is available to children in residence and additional services to family members in their home communities (Donlevy, 2000, p.7).

The re-authorized Individuals with Disabilities Education Act (IDEA) recognizes that too many students in special education programs fail to achieve levels/scores comparable with students in general education and many of those students end up dropping out of high school (Donlevy, 2000). Many students with learning disabilities acquire jobs with low pay and diminished social status (Hauser & Malouf, 1996). The ELITE School offers a possible alternative to that scenario (Donlevy, 2000).

Closing Thoughts

Perhaps the most pertinent digital divide for special educators remains to be bridged. Maybe the most significant use of technology could be as an "enabler" for a human being to perform an actual work-related activity, not just as a mere student tool for writing and Internet surfing (one typical/common use for a computer in the educational setting). Maybe creative thinking and planned

effort can provide a vehicle for the use of information, communication, and/or assistive technology to improve society and the life of an individual while connecting its use to the workplace in job suitable for the special needs person.

There is no doubt that the dream of providing an ideal technology fit between the special education student and the available technology will require an incredible financial investment. However, this has historically been the case with technology and children. As mentioned earlier in this paper, the idea of high cost did not stop the American people when they wanted computers in their public schools. They levied taxes. They contacted corporations. They called their legislators. Could the same effort be afforded the special education population's technology requirements that has been given to the mainstream's technology needs? Who is willing to speak for the special student? Perhaps the same forces that support the public schools in other issues will have to focus their labor and get the job done. Perhaps an awareness of the needs of special students will have to be generated. Those who know will have to speak up for the children with no voice (Jackson, 2001).

Of note, public schools in the United States are not alone in the struggle to discover the most appropriate way to utilize technology for the special education population. Nor, are they alone in dragging their feet in serving special children's technological needs. The push for adequate technology utilization has been/is going to be quite a challenge for all involved with special children.

However, one might imagine a improved, different future. If a disabled/special needs person could be enabled through specialized equipment to perform a socially valuable and personally lucrative job, then the cost of special education training could theoretically be offset by the benefits given back to society and the individual through a lifetime of quality, purposeful contribution(s). Then, the disabled could become the enabled. Education could truly make a profound difference by

fulfilling a proposed role of not only providing access for all students in information, communication, and/or assistive technology, but also through linking that same technology and training to purposeful application(s) in the real world of work.

References

Abbott, C. (2001). Special schools, inclusion, and the world wide web: The emerging research agenda [Electronic version]. *British Journal of Educational Technology,* 32, 331-342.

Castellani, J. (2000). Strategies for integrating the Internet into classrooms for high school students with emotional and learning disabilities [Electronic version]. *Intervention in School & Clinic, 35, 297-306.*

Cronis, T., & Ellis, D. (2000). Issues facing special educators in the new millennium [Electronic version]. *Education*, 120, 639-649.

Donlevy, J. (2000). Closing the digital divide: Elite schools - transforming special education in public and private setting [Electronic version]. *International Journal of Instructional Media*, 27, 1-20.

Duhaney, L., & Duhaney, D., (2000). Assistive technology: Meeting the needs of learners with disabilities [Electronic version]. *International Journal of Instructional Media*, 27, 393- 402.

Hauser, J., & Malouf, D. (1996). A federal perspective on special education technology [Electronic version]. *Journal of Learning Disabilities,* 29, 504-512.

Hopkins, C. (1998). The role of information and communication technology in providing access for all [Electronic version]. *Support for Learning*, 13, 163-166.

Jackson, V. (2001). *The voices in the wilderness: A call for common sense and*

ethical practice in American educational reform (CI No. EA031350). East Lansing, MI: National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED457593)

Levy, J. (1999). Reaching higher standards: Special education, real-world certifications in technology and the community college connection [Electronic version]. *International Journal of Instructional Media,* 26, 8.

Lewis, R. (1997). Changes in technology use in California's special education programs [Electronic version]. *Remedial &Special Education,* 18, 10.

Nochajski, S., Oddo, C., & Beaver, K. (1999). Technology and transition: Tools for success [Electronic version]. *Technology and Disability*, 11, 8.

Peck, A., & Scarpati, S. (Eds.). (2002). Strong signals in the noise: The impact of technology on special education [Special section]. *Teaching Exceptional Children,* 35, 7.

Scherer, M., & Craddock, G. (2002) Matching person and technology (MPT) assessment process [Electronic version]. *Technology and Disability*, 14, 6.

Steele, M., & Steele, J. (2002-2003) Applying Affective Computing Techniques to the field of special education [Electronic version]. *Journal of Research on Technology in Education*, 35, 236-240.

Zhang, Y., (2000). Technology and the writing skills of students with learning disabilities. *Journal of Research on Computing in Education*, 32, 2-9.

Zimmerman, T., (1996). Personal area networks: Near-field intrabody [sic] communication. *IBM Systems Journal*, 35, 609-617.

U.S. Department of Education

Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

Reproduction Release
(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Technology and Education: Bridging the most recent digital divide	
Author(s): Valery L. Jackson	
Corporate Source:	Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, Resources in Education (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign in the indicated space following.

The sample sticker shown below will be affixed to all Level 1 documents	The sample sticker shown below will be affixed to all Level 2A documents	The sample sticker shown below will be affixed to all Level 2B documents
PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY SAMPLE TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY SAMPLE TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY SAMPLE TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
Level 1	**Level 2A**	**Level 2B**
↑ ☑	↑ ☐	↑ ☐
Check here for Level 1 release, permitting reproduction and dissemination in microfiche	Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in	Check here for Level 2B release, permitting reproduction and

or other ERIC archival media (e.g. electronic) *and* paper copy.	electronic media for ERIC archival collection subscribers only	dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche, or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Signature: Valery Jackson	Printed Name/Position/Title: English teacher	
Organization/Address: Harris High School 8281 Hwy. 116 Hamilton, GA 31811	Telephone: (706) 645-5664	Fax: (706) 645-6664
	E-mail Address: valeryjacks on@charter.net	Date: 5-27-03

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):
If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:
If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:
Send this form to the following ERIC Clearinghouse:

Acquisitions Coordinator
ERIC Clearinghouse on Disabilities and Gifted Education (ERIC EC)
1110 N. Glebe Rd.
Arlington, VA 22201-5704