Identifying and Integrating Relevant Educational/Instructional technology (E/IT) for Culturally and Linguistically Diverse (CLD) Students with Disabilities in Urban Environments

Monica R. Brown, Ph.D.
New Mexico State University

Abstract

The aim of this manuscript is to address the significant void in the literature related to technology integration for culturally and linguistically diverse (CLD) students with disabilities living in urban communities. Given that the vast majority of CLD students attend school within urban districts, the focus of this article is to (a) identify and address the challenges students and educators encounter with technology integration in urban environments, (b) deconstruct the discrepancy between the need and the ability to implement AT and I/ET in urban school settings, and (c) identify and provide relevant resources and recommendations for educators working in urban school districts who have limited access to I/ET.

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From a historical perspective, McDonald and Hannafin (2003) argued that recent technological advances have had the most significant impact on society compared to any other era. This is evident as recent technological advancements have improved support systems for individuals with disabilities (Bausch, Ault, Evmenova, & Behrmann, 2008; Brown & Fitzpatrick, 2010; Bryant & Bryant, 1998; Dyal, Carpenter, & Wright, 2009; Fitzpatrick & Brown, 2008; Fitzpatrick, 2005; Fitzpatrick & Knowlton, 2009). Moreover, it is well documented that legal mandates have been established regarding addressing assistive technology (AT), including educational/instructional technology (E/IT) within a student's individualized education program (IEP) (Bausch & Hasselbring, 2004; Dissinger, 2003; Judge, 2006; Parette & Peterson-Karlan, 2007; Parette, Wojcik, & Peterson-Karlan, 2005). For example, in 1988 Congress passed the Technology-Related Assistance for Individuals with Disabilities Act (Tech Act) which established a legal precedent and proclaimed that technology plays a vital role in educating students with disabilities (Alper & Raharinirina, 2006; Smith & Jones, 1999; Turnbull, Turnbull, Shank, & Smith, 2004). Similarly the 1997 amendments to the *Individuals with Disabilities Education Act* (IDEA) and subsequent 2004 reauthorization *Individuals with Disabilities Education Improvement Act* (IDEIA) further emphasized the importance of technology devices and services for students with disabilities (Fitzpatrick & Knowlton, 2009; Van Laarhoven, Munk, Zurita, Lynch, Zurita, Smith, & Chandler, 2008; Zirkel, 2005).

Comparable to private and corporate sectors, special education (SPED) technology is always evolving (Brown & Fitzpatrick, 2010; Edyburn, 2000; Fitzpatrick, 2002; Fitzpatrick, 2005;

Fitzpatrick & Knowlton, 2009; Hauser & Malouf, 1996; Mechling, 2008) and although it should not be viewed as *the great panacea,* evidence suggests that critical features inherent in various forms of SPED technologies are closely associated with characteristics of effective instruction (Cihak & Shrader, 2008; Fitzgerald, 1990; Parette & Peterson-Karlan, 2007; Weber, Forgan, & Schoon, 2002; Xu, Reid, & Steckelberg, 2002). However, despite the increased emphasis of addressing AT and instructional and I/ET within the IEP and the influx of hardware devices and software programs available to K-12 educators, there continues to be a critical disconnect between what is known about educating students with disabilities from CLD backgrounds and how these students access and utilize technology (Brown, 2004; Brown, Higgins, & Hartley, 2001; Fitzpatrick & Brown, 2008) specifically in urban school settings.

Unfortunately, given the copious number of technologies available, many novice and veteran urban educators are unaware of how to appropriately identify or select I/ET software and/or hardware devices for CLD students with disabilities. This lack of awareness can often leave educators frustrated, have a negative impact on CLD students with disabilities, and subsequently leads to an emerging trend in K-12 education known as *digital inequity* (Brown & Fitzpatrick, 2010; Jameson, 1999; Kalyanpur & Kirmani, 2005; Lee, 2006).

Therefore, the purpose of this article is to address the unique I/ET needs of CLD students with disabilities within urban school settings. This article will (a) address the student and teacher challenges associated with urban schools, (b) deconstruct the discrepancy when implementing AT and I/ET in urban school settings, and (c) provide relevant resources and information for educators who have limited access to E/IT. Finally, recommendations will be provided to assist urban educators who continually struggle to integrate technology throughout their curriculum. The following section provides a brief account of the challenges associated with educating and being educated in urban environments.

Urban Challenges

Although it may be viewed as common knowledge, a review of the literature revealed that many urban schools typically lack basic supplies such as (a) up-to-date textbooks, (b) children's literature books, (c) desks, (d) chalkboards (Bowers 2000; Kozol, 2005), and (e) lack of appropriate programs (Scales, 1992). In 2008 an article in *The Economist* reported that the United States ranked 17th among nations reporting graduation rates. More alarming is the graduation rates in urban schools. *Education Week* (2008) reported that the odds of graduating from high school in one of America's 50 largest urban cities were akin to flipping a coin. When deconstructing urban school settings, the ideal is easily lost in the endemic challenges the majority of schools located in urban districts currently face (Crosby, 1999; Lopes, Cruz, & Rutherford, 2002; Manning, Lucking, & MacDonald, 1995). And, if the schools are struggling to adequately meet the needs of the students, imagine the difficulties the students and teachers are having learning and teaching in those environments.

Urban Students

Few would argue that *ALL* students should receive an excellent education (Mathis, 2003) in order to develop into active and productive members of society (Crosby, 1999). However, students in urban school settings are at high risk for failing to: (a) learn to read, (b) develop study

habits that promote inquiry, and (c) enhance their technology skill sets (Laffey, Espinosa, & Moore, 2003). Slaughter (2009) reported that these students are often performing below proficiency level and are some of the most difficult students to manage. Additionally Slaughter (2009) noted that these students are most likely to drop out of school because of outside of school factors (i.e., living in poverty households and lack of one supportive, motivated role model at home). In addition to the challenges faced by urban students in and out of class, urban educators also presented characteristics that are problematic when trying to educate students within urban school settings.

Urban Teachers. Within the last five years estimates suggest that approximately 1.1% of all SPED positions have remained unfilled (Boe, 2006). This has led to urban schools confronting huge teacher shortages (Fitzpatrick & Knowlton, 2007). Additionally, they are often staffed with educators who hold only emergency certification (Berry, 2004) and have reached critical teacher shortages primarily in the area of SPED (Duvall, 2001). And, many of them are unprepared to employ developmentally appropriate instructional strategies (Huffman & Speer, 2000) and implement classroom management systems (Fitzpatrick & Knowlton, 2007) which promote both academic and behavioral outcomes. Sadly, without these basic necessities and highly qualified educators (NCLB, 2002) these schools are unlikely to have access to low and high tech devices (Fitzpatrick & Knowlton, 2007) as mandated by the Tech Act (1988).

Urban Educators and Technology. Of specific concern are untrained educators who may not be aware of the need to address AT and I/ET when developing an IEP. Although multicultural education has become a focal point of virtually every postsecondary educational program (Inglebret, Jones, & Pavel, 2008), *technology integration,* specifically for CLD students with disabilities, is a relatively new frontier (see Brown & Fitzpatrick, 2010; Fitzpatrick & Brown, 2008). This apparent lack of knowledge perpetuates the research-to-practice gap between what is known about employing AT and I/ET and how to identify the appropriate technologies to meet the unique and individual needs of CLD students with disabilities. Moreover, as noted above, without the basic resources to run an effective classroom (e.g., chalk, desks, or books), it is difficult to imagine a school would have access to technology that would adequately meet the requirements of the students.

The challenges of urban education have been widely discussed and suggestions have been made as to how to address some of these challenges. One potential solution is the integration of technological innovations to assist urban educators in delivering instruction in 21st century urban classrooms. Because we live in a world where students are bombarded with electronic devices (i.e., cell phones, iPods, iPads, Internet, etc.), educators have to embrace the fact that they are going to need to enter into a new educational mode in order to stimulate student interest and get them motivated to learn.

Venezsky (2004) suggested that a new level of teaching and learning will have to take place if we want to keep students motivated and attracted to lifelong learning. He suggested that the new level of teaching and learning will need to focus on increased levels of effectiveness and social importance in order to keep students engaged. Perhaps technology is one way to keep 21st century urban students engaged, motivated, and in school. The following section will deconstruct

the impact of the *digital divide* (Mason & Dodd, 2005) by providing a truncated overview of AT and I/ET for CLD students with disabilities served in urban school settings

Deconstructing the Digital Divide in Urban Schools

All technologies should be considered for *ALL* students receiving SPED services (Quinn, Behrmann, Mastropieri, & Chung, 2009) regardless of educational setting (e.g., suburban, rural, or urban). Based on this perspective, contemporary American society is encountering a major challenge of ensuring *ALL* students are prepared for the technological advances of the 21st century (Brown and Fitzpatrick, 2010). Thus, the *digital divide* is exacerbated among CLD students with disabilities (Brown, 2004; Brown et al., 2001; Fairlie, 2005; Fitzpatrick & Brown, 2008; Mossberger & Tolbert, 2003; U.S. Department of Commerce, 2002) who attend urban schools. In addition to issues of federal noncompliance, urban educators are at a substantial disadvantage when attempting to bridge the *digital divide* which has raised issues of *digital inequity* among CLD students with disabilities (Brown & Fitzpatrick, 2010; Lee, 2006; Mason & Dodd, 2005); thus increasing the discrepancy between the legal mandates for AT and I/ET and the actual implementation of these technologies in urban school settings.

Technology Integration in Urban School Settings

Educators have recognized the potential of technology (Fitzpatrick, 2005), and a review of the literature revealed several studies that described the effectiveness of technology for urban students with disabilities (Fitzpatrick & Knowlton, 2009). However, technology integration within urban school settings is often a daunting challenge. Additionally, despite the 20+ year commitment of the Office of Special Education Programs (Hauser & Malouf, 1996), it is important to note that regardless of educational setting (e.g., rural, suburban, or urban), simply having access to AT devices and I/ET technologies does not guarantee successful implementation for students with disabilities (Simpson, McBride, Spencer, Lowdermilk, & Lynch, 2009). This is evident as the literature is replete with barriers (i.e., educator knowledge, educator level of preparedness, educators' level of confidence with technology, lack of funds, time, support and training; and access issues) that hinder effective technology integration. The following is a summary of factors that inhibit educators from employing technology into their curriculum:

- Educators often lack knowledge and expertise while working with AT and I/ET (Van Laarhoven et al., 2008).
- Educators are underprepared to work with the technology (Staples, Pugach, & Himes, 2005).
- Educators experience diminished levels of confidence while working with technology (Al-Bataineh, Anderson, Toledo, & Wellinski, 2008).
- Educators encounter a lack of funds, time, technical support, and training (Clark, 2000; Yu & Smith, 2008).
- Educators have difficulties accessing the Internet (Fitzpatrick, 2005).

Although this is not an exhaustive list, it provides a snapshot into some of the factors that impede educators from infusing AT and I/ET into their curriculum. Despite these barriers, the literature

offered several examples of how educators have integrated technology into their classrooms, including:

- Okolo and Ferretti (1998) conducted a study in several fourth-to-sixth grade urban schools. They researched the effectiveness of a multimedia project in inclusive social studies classrooms. They discovered that students who engaged with the multimedia project learned and developed new ways to argue and settle disagreements and increased cooperative learning skill sets.
- Lackey, Borkin, Torti, Welnetz, & Moberg, (2007) researched a Science Explorations program that was developed by the Milwaukee Public Museum. The intent of the program was to employ technology in science education for female minority middle school students attending school within urban environments. Findings suggested that the program (a) demystified science, (b) promoted family support, (c) encouraged greater confidence in knowledge acquisition, and (d) yielded higher GPAs among participants compared to the control group.
- Englert, Manalo, & Zhao (2004) introduced a web-based program to lower elementary students to improve their personal narratives composition skills. Findings indicated that students wrote more, incorporated genre specific characteristics, and demonstrated conventional writing skills on the supported writing assignment.

Each of the programs outlined above have had a direct impact on CLD students with and without disabilities in urban school settings. As mentioned above, integrating technology (AT or I/ET) in urban classrooms can be difficult. There is existing systemic (i.e., lack of resources, lack of support, poor infrastructure, overly bureaucratic, etc.) and personnel (i.e., educator attitudes toward technology, lack of educator training, knowledge base, etc.) barriers that oftentimes prevent seamless integration. But, there are examples of successful stories of technology integration with urban CLD students--with and without disabilities. Additionally, there are resources available to assist urban educators in their efforts to procure and integrate technology. The next section will offer recommendations for urban educators that wish to implement technology into their classrooms.

Recommendations and Resources for Urban Educators

Within recent years there has been increasing pressure to provide fair and equitable funding across schools within large urban school districts (Baker, 2009). However, as noted above, this trend has been slow to emerge. Therefore, the following recommendations are presented to bring about greater awareness for urban educators who are seeking additional resources and funding for I/ET hardware devices and software programs. The purpose of each recommendation is to provide tangible solutions that educators within urban school settings can implement immediately without additional training.

Recommendation 1: Loan Library System. The Tech Act (1988) was a major amendment to *IDEA* (1990). The Tech Act required IEP teams to consider the AT devices and services for students with disabilities (Alper & Raharinirina, 2006; Dissinger, 2003; Fitzpatrick & Knowlton, 2009). In addition, the Tech Act was intended to enhance the availability of AT devices and services throughout the US (Bodine, 2003; Bryant & O'Connell, 1998) by providing funding to

help states develop cross categorical technology assistance programs for individuals with disabilities, service providers, and families (Bryant & Seay, 1998; Smith, 1998; Turnball et al., 2004).

Each state has an Assistive Technology Program which offers a Loan Library System (Bausch & Hasselbring, 2004). The Loan Library System allows *all* educators, regardless of school district demographic (e.g., urban, rural, or suburban), to access difficult to find or costly AT and I/ET hardware devices, software programs, and services. According to Bausch and Hasselbring (2004), the purpose of the Tech Act was to ensure that individuals with disabilities--in all states--had access to AT services including assessment, funding for devices, training, and technical assistance. Table 1 provides an abbreviated list of loan libraries along with some of the common and unique features they may offer. The authors have chosen to include the loan library information of the states with the 8 largest urban districts in 2005 and 2006 (Education Week, 2008; 2009). This is not an exhaustive listing and so educators are encouraged to identify and review the Loan Library System within their state.

Educators within urban school settings who have limited access to technology are encouraged to seek out the Loan Library System within their state. However, it should be noted that only a limited number of devices may be available for individuals to check out, and typically there is an extensive waiting list for these devices. Therefore, the following suggestion focuses on seeking internal and external funding opportunities.

Table 1
Abbreviated List of Urban Loan Libraries (states with 10 largest school districts in 2005 & 2006)

State	Link	Unique Features	Common Features
1. New York	http://www.cqcapd.state.ny.us	• Advocacy Programs • Surrogate • Consent Training • Empowerment Services • Reading Room • Training Modules • Building Your Organization's Capacity • Home Ownership Options • On Site Workshops	Alarm Clocks Audio Devices Computer Keyboards Computer Monitors Door Sensors Instructional Aids Isolation Boxes Mobility Devices Switches Talking Dictionaries Tech Speak Telephones / TTY Video Devices
2. California	http://www.atnet.org		
3. Illinois	http://www.iltech.org		

Table 1
Abbreviated List of Urban Loan Libraries (states with 10 largest school districts in 2005 & 2006)

State	Link	Unique Features	Common Features
4. Florida	http://faast.org	• Community Outreach to Rural and underserved groups • *Hands on* Demonstrations and Trainings • Housing Resources	
5. Nevada	http://www.resna.org/content/index.php?pid=137	• Continuing Education Resources • Professional Development	
7. Texas	http://techaccess.edb.utexas.edu	• AT Alternative Financing • Disability Studies	
9. Pennsylvania	http://disabilities.temple.edu	• Academy for Adult Learning • Leadership Development	
10. Hawaii	http://www.atrc.org	• Camp Cool • Outreach and Public Awareness	

Note: Florida has the 4th, 6th and 8th largest school districts in the United States.

Recommendation 2: Seek Funding Opportunities. Educators who have limited access to technology are encouraged to seek internal and external funding opportunities. For example, governmental agencies, public and private corporations, and various foundations allocate monies specifically for education. Educators who take initiative can identify funding agencies that provide monies for general and special education. They are encouraged to develop and submit a proposal, and upon funding purchase the technology needed for their classrooms.

Carnow (2008) suggested that grants are often important for successful technology plans and intuitively using the Internet is one of the quickest ways to locate potential grants (Bryson, 2007). Bray (2008) has identified seven funding agencies that have assisted educators who are seeking external funding. They can be found in Table 2. However, it should be noted that locating a grant or funding agency is only the beginning.

According to Brooks (2004), applying for a grant can be extremely daunting because announcements typically are made during the busiest time of the year, timelines are short, and many educators are ill-informed about writing a proposal. Ultimately, these factors can significantly hinder urban educators from seeking and applying for grant monies. Therefore, the following resources are offered to assist those urban educators who may be considering or who are writing a proposal. Specifically, the following links can assist educators with (a) Grants writing tips (http://www.k12grants.org/tips.htm), (b) Writing a grant proposal (http://www.learnassociates.net/proposal/, and (c) taking a proposal writing course (http://foundationcenter.org/getstarted/tutorials/shortcourse/index.html).

Table 2
Selected Funding Agencies for Educators

Funding Source	Link to Site	Information
• Grants Alert	http://www.grantsalert.com/	• This site provides educators with quick access to various grant opportunities and funding agencies.
• Pedera; Government Grants	http://www.ed.gov/fund/landing.jhtml?src=rt	• This site provides educators with all federal agencies which provide grant monies for the field of education.
• Donors Choose	http://www.donorschoose.org/	• This site allows educators to donate school supplies, review projects, and make specific curriculum requests for their classrooms.
• The Foundation Center	http://fdncenter.org/	• This site allows educators the opportunity advance knowledge about U.S. philanthropy.
• Top Teaching Resources	http://www.topteachingresources.com/grants_funding.php	• This site provides a clearing house of various grant and funding agencies.

Identifying and submitting a proposal to the right funding agency is the first step in securing monies. However, the key is for educators to continually seek and apply for grants that will assist them in acquiring AT and I/ET hardware and software devices for urban CLD students with and without disabilities.

Recommendation 3: Hypertext and Hypermedia. There has been increased emphasis on educators to teach CLD students using technology (Harris, Pinnegar, & Teemant, 2005). Hypermedia evolved from hypertext (Higgins, Boone, & Lovitt, 1996) and provides anchored instruction. Both hypertext and hypermedia are forms of technologies that benefit *all* students (Fitzpatrick, 2005; Maccini, Gagnon, & Hughes, 2002), including CLD students with disabilities. According to Higgins et al. (1996), hypermedia and multimedia have become integral within schools because they provide alternative methods to support and enhance text.

Hypermedia assists CLD students with the exploration and learning of new skill sets (Harris et al., 2005). Additionally, hypermedia programs were developed to prompt knowledge acquisition and problem solving abilities (Costabile, De Angeli, Roselli, Lanzilotti, & Plantamura, 2003) and allows linking between other media sources such as sound or movie files (Benjamin, 2003). This allows users to navigate with few restrictions between a vast array of information within the document or a completely different file (Fitzpatrick, 2005). Finally, it should be noted that although hypermedia provides accommodations and promotes learning for all students, research indicated that not every student benefits from learning with hypermedia (Song 2002). For this reason, educators must be ever vigilant in their selection of technologies for the classroom.

Conclusion

Computers have become common tools in today's schools. And, in the 21st century, it is imperative that there be equal opportunities for all students to benefit equally from those technologies available in schools. There is little, if any, argument regarding the benefits (i.e., academic, social, etc.) of technology access and use. But, as technology has permeated every corner of our society, especially our schools, a chasm has been created between those individuals and schools that have access to technology and those that do not. One might assume that our education system has a foundation in place that provides for students to succeed with the use of technologies, but as Hendrix (2005) and Christensen (2008) noted; technology is widening the gap between wealthier (suburban) and poorer (rural and urban) schools. It is commonly referred to as the *digital divide (*Mason & Dodd, 2005).

The digital divide has consequences that extend beyond the school walls. It is not just a matter of having equal access to equipment and/or software. Unfortunately, the educational needs of traditionally marginalized populations (i.e., students with disabilities, students from CLD backgrounds, students attending rural and urban schools, students living in poor households) are far more complex. Educators cannot just replicate what is available in wealthier schools and expect that to solve the problem. The needs of students and teachers in urban schools are different and vast. The barriers that prevent technology integration in urban schools must be addressed first. Once those barriers have been addressed, they can begin to create a cultural climate where educators, other school personnel, students and their families view technology as part of the teaching and learning environment that will ultimately increase their access to resources beyond the classroom.

The resources and recommendations are provided for urban educators. They cannot let the barriers prevent them from being creative in their search for and use of these resources because, ultimately and literally, how persistent they are (or are not) could have a lasting impact on the future of the students they are teaching.

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About the Author

Monica R. Brown, Ph.D. is an Associate Professor in the Department of Special Education/Communication Disorders at New Mexico State University. Her current research interests include disaffected adolescents, multicultural special education, technology access and use, teacher preparation at the secondary level, and secondary education. Dr. Brown teaches general special education courses as well as courses with an emphasis on secondary special education. She is a member of 5 journal editorial boards and is an Associate Editor for Diversity of *Intervention in School and Clinic*.