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An Examination of Classroom Technology Use by Childhood Educators in Inclusive
Settings

by

Gregory Karras

A thesis submitted to the Department of Education and Human Development of the
State University of New York at Brockport in partial fulfillment of the requirements
for the degree of Master of Curriculum Specialist

January 4, 2011

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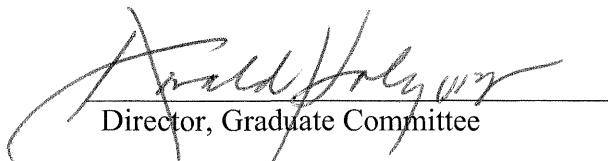
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Advisor



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Director, Graduate Committee



Date

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Abstract

As technology has become more accessible to the public, children are more readily exposed to it and have become fairly proficient. Given this routine use, it comes as no surprise that technology has made its way into the classroom, transforming traditional teaching. In inclusive classrooms, technology use may have the unique ability to allow disabled students to become active learners alongside their non-disabled peers (e.g., Hasselbring & Williams Glaser, 2000). In light of this integration, a study was conducted including 10 one-on-one interviews ($N = 10$) with employed childhood teachers to determine how technology is used and what barriers to its use currently exist. Findings indicate that teachers utilize several distinct grouping strategies when utilizing technology in an inclusive classroom. Findings further reveal that teachers encounter problems when trying to properly implement classroom technology tools. Results have implications for the training of educators to integrate new learning technologies.

Chapter 1: Introduction

Background

According to the Individuals with Disabilities Education Act (IDEA), 2.6 million students nationwide are diagnosed with a learning disability and receive special education services in school. For this group of students, computer based technologies may play an important moderating role in classroom participation (Hasselbring & Williams Glaser, 2000). Not only may adaptive technology assist those students with mild learning disorders, but they may also improve activity involvement for those students with severe disabilities (Hasselbring & Williams Glaser, 2000). In inclusive classrooms, technology use may allow disabled students to become active learners alongside their non-disabled peers (e.g., Hasselbring & Williams Glaser, 2000).

Some research exists on classroom technology use (e.g., Neulight, Kafai, Kao, Foley and Galas, 2007), and how it may engage different student groups to participate (e.g., Luehmann & MacBride, 2009), but little research examines how educators access and utilize this technology to engage disabled learners in classroom lessons. Of what research does exist on educator technology use, barriers to its use tend to be the focus (e.g., Ertmer, 1999) with relatively less attention paid to assessing its utilization for different student groups (i.e., disabled learners). Furthermore, questions of effectiveness and the positive impact on learning have been raised of classroom technology (e.g., Stoll, 1999) especially given its cost (e.g., Cuban, 2001). In contrast, this study may shed additional light on what strategies and applications teachers

employ when seeking participation from disabled learners, as well as problems they encounter when doing so. Such findings may have direct implications for the education of disabled learners. For instance, media technology can help disabled learners overcome many of the obstacles they face when trying to participate in classroom activities, but costs of technology and inadequate training of teachers on how to integrate these technologies reduce its advantages (Hasselbring & Williams Glaser, 2000). Subsequently, understanding educators' orientation towards media technology could be used to improve their access to and proper utilization of classroom technology when teaching to an inclusive classroom, which, in turn, may enhance participation and overall learning for disabled learners.

As such, this research intends to provide a more complete picture of technology's role in an inclusive classroom by identifying strategies for its use that educators employ for their disabled learners. Two research questions guide this exploration:

- RQ1. What strategies do educators report when utilizing technology in an inclusive classroom to increase participation from disabled learners?
- RQ2. What are the problematic encounters or limitations educators encounter when utilizing technology in an inclusive classroom?

Rationale

This research is beneficial to educators and students alike. First, the results include an exploration of the perceptions of technology use for learning and its effect on participation of disabled learners in an inclusive classroom from a teacher's perspective. Not all teachers decide to implement new and exciting ways of learning

into their practice, and this research sheds light on the advantages of doing so. Second, it will identify strategies that educators use when employing technology. For those teachers that do not feel comfortable utilizing technology or simply don't know how to use it, this research discusses strategies other educators already employ and provides a guide for technology implementation. Third, results from this study help to discover the difficulties educators encounter when trying to implement technology in an inclusive classroom. Although this research explores the benefits of classroom technology use, it is important to also acknowledge the limitations to new media in the classroom as well. By identifying problematic encounters with technology, educators may be able to better adjust new media to their classroom learning. This research has a direct impact on teaching pedagogy as it seeks to inform and help guide the training of educators to properly utilize technology in an inclusive classroom so that disabled learners will feel confident and comfortable participating in learning alongside their non-disabled peers.

Terminology

For the purpose of this study, classroom technology is defined as educational computer-mediated software programs, which may include, but is not limited to, programs on the Internet and interactive educational tools. Classroom technology does not include assistive technologies. Implementations of these technologies refer to their use in the classroom.

Disabled learners include those students who possess some form of classified learning disability, and may require special learning and classroom accommodations.

According to the Learning Disabilities Association of America, a learning disability, is defined as,

A neurological disorder that affects one or more of the basic psychological processes involved in understanding or in using spoken or written language.

The disability may manifest itself in an imperfect ability to listen, think, speak, read, write, and spell or to do mathematical calculations.

In contrast, non-disabled learners include those students who are learning at their expected grade level, and are not legally classified as disabled.

Finally, this research focuses on inclusive classroom education in which both disabled and non-disabled students participate in the same classroom and complete similar curricula.

Summary

Simply using technology in the classroom is not enough, a teacher must employ it effectively or participation and learning could be effected adversely. Technology use in the classroom can yield many benefits to students and teachers, but if not properly incorporated into classroom activities, this technology may only serve as a distraction. This research seeks to avoid this consequence by identifying the advantages of technology use as well as strategies educators utilize in implementing it correctly. Although past research argues that students would welcome technology into the classroom, teachers must be able to see the benefits of this tool and how it supplements traditional teaching mechanisms. This study seeks to illustrate this to educators as well as show technology's effective use with a special needs population.

Chapter 2: Literature Review

Introduction

Information has become more readily available and accessible to the public with the advent and integration of new media technologies. Not only are adults engaging in the consumption of these new media, but so are adolescents who have successfully integrated technology into their daily lives (e.g., Pew Internet and American Life Project, 2001). As our youth feel exceedingly comfortable interacting with and using new media, their abilities match and even sometimes surpass the adult population. Student proficiency with technology can allow teachers to supplement traditional lessons with media to help creatively teach students material in an engaging manner. Therefore, it is advantageous for present day educators to incorporate technology in their lesson plans.

Technology use engages students and uniquely connects the lesson in the classroom to the practicality of the outside world (Luehmann & MacBridg, 2009). For example, students are taught a lesson on the capital of Russia and are then able to 'log online' and interactively visit the location as if they were there in real-time. The information taught in this lesson becomes tangible and more realistic as the words on the page of a book become 'alive' by engaging with content presented through technology.

New media need not only be employed inside the classroom to prove beneficial, but student technology use outside the traditional educational setting can supplement lessons. Modern day instruction extends beyond the traditional

constraints of the classroom and allows students to reflect on topics/issues discussed in class online from the privacy of their own home. For example, students can further investigate class content online. Furthermore, technology may help students with differential learning capabilities complete assignments online at their own pace. This participation online and access to information may even empower disenfranchised individuals in an inclusive classroom (e.g. handicap or disabled students) to partake in discussion and learning in class as well (Xie, DeBacker & Ferguson, 2006). For example, a student may go online at home and learn additional material on a topic discussed in class for the week. This information attained from technology use may encourage students to 'speak up' in class as they may feel they know as much, if not more information as their peers, and feel comfortable engaging in class discussion.

The examination of technology's role in the classroom is significant as electronic media may be increasingly crucial as the Internet can act as an educational and social leveler given its multimedia capabilities (Karras, 2010). Furthermore, successful integration of learning technology is linked to a marked increase in student collaboration and teamwork as they work together to complete assignments using digital media (Goos & Bennison, 2008). Not only can technology connect students to the material, but also to each other via its social component. For example, students who may not normally interact or work together (e.g., disabled and nondisabled peers) may be assigned to work together on a project online. Therefore, this technology does more than help to develop academic skill of those students with disabilities; also it also helps those with deficient interpersonal and social skills. In

fact, some students may experience “hyperpersonal communication” or online communication that sometimes surpasses the level of affection and emotion of face-to-face communication (Walther, 1996).

In addition to fostering greater involvement and interactivity, students genuinely grasp and understand the material more than traditional approaches to learning alone (Frye & Dornisch, 2008). Technology allows students to directly work with the information in a lecture rather than passively hearing it from their teacher.

However, this assimilation of classroom technology is only as successful as the educator allows it to be. Frye and Dornisch (2008) argue that a teacher must consciously choose to use a technology to its full capacity/benefit by interweaving its use into individual lessons. Some might be hesitant to allow media to ‘monopolize’ the classroom, while others may find it a welcomed complement to traditional lessons. Nevertheless, it is important that students with learning disabilities progress through the school system ‘fully aware of the strategies, accommodations, and devices that work best for them to learn as successful selection and use of technology has implications for education well into college’ (Day & Edwards, 1996). In other words, if classroom technology is successfully used to educate disabled students at an early age, it can continue to help these students learn for the majority of their education (e.g., elementary school through college). This cannot happen if teacher do not consciously choose to use technology in class.

Student Technology Use

Soliciting student participation in lessons is a challenge that all teachers face from time-to-time. Integrating technology into class not only helps teachers connect with their students, but it also bolsters and highlights students' technological skills, which in turn encourages an interest in growing fields/occupations in modern society (e.g., computer science, information technology, game design, etc.). By electing to place this media in their classroom, teachers are taking a step into a new era of learning, which involves technology as an additional classroom educator.

As technology becomes more commonplace and ubiquitous, education should not be falling behind. Students are connecting to media such as email, iPods, Hulu to watch television shows, and interact with friends and family all over the world on Facebook. Given this constant technological stimulation, education would fall short not to utilize technology to further connect and engage students in the classroom.

Secondary education is not the only institution undergoing revolutionary change. University-level educators experience similar tribulations when seeking participation from students. In an attempt to encourage classroom involvement, researchers have attempted to test the effect of audience response technologies (ART) in which undergraduate students can digitally interact with their professor's lecture (e.g., MacGeorge, et al., 2008). In this study by MacGeorge et al. (2008), adding this technology component to class not only increased student participation in learning, but also increased attendance as the technology served as an informal 'teaching

assistant' by recording who used the technology and, therefore, who was present in class.

Despite the promise and positive attributes of classroom technology, it is not without drawback or impediment. For example, gender may play a moderating role in the successful integration of technology in the classroom. Heemskerk, Volman, and Admiraal (2009) discovered that female students benefit more from educational tools than did their male counterparts. Furthermore, a greater number and variety of tools appeared to improve participation by students, enhance positive attitudes towards learning and technology, and improve the learning affects of both males and females (Heemskerk, Volman, & Admiraal, 2009). This has important implications for teachers. When using different electronic media, educators must take into account sociodemographic factors (e.g., gender, age) as they may have some bearing on the success of these educational interventions.

These differences between males and females may be due, in part, to gender socialization, which in turn may have affected their learning styles. For example, McCornack (2007) argues that beginning at a young age, men are socialized to be masculine, assertive, and to view themselves and their accomplishments independent from others (e.g. my achievements). On the other hand, women are taught to be feminine, nurturing, compassionate, and sensitive to their own and others emotions. These socialized differences could contribute to divides in learning styles by gender. In fact, this socializing effect is evident in that males tend to learn by using a more hands on approach (assertive behavior) to technology use, whereas females prefer

interactive group work involving their peers (connection with others) (Heemskerck, Volman, & Admiraal, 2009). Despite these differences, technology has the unique ability to appease different learning styles. For example, students can interact in an online classroom chat, and at the same time, complete assignments individually from home.

Participation in class work and activities is vital to success in understanding and remembering key concepts taught (Neulight, Kafai, Kao, Foley and Galas, 2007). When a student participates, the information becomes salient to them, and by discussing the issue at hand, students gain a clearer picture and understanding. According to Neulight, Kafai, Kao, Foley and Galas (2007) technology is a key component to encouraging this participation. Technology used to connect the content is effective and plays an integral role in pushing students to participate. In fact, technology itself has the ability to become so engrained in our daily lives that we hardly recognize its impact. Its ubiquitous nature may lead students to not even realize they are learning. They become so involved with the technology and software that learning becomes a desired and positive side effect of the experience.

The use of technology may also take the 'pressure' off of some students who fear or are anxious in presenting or answering questions in front of the class. In fact, classroom media use can bolster interpersonal connections and help to develop relationships between peers. For example, in a study conducted by Luehmann and MacBride (2009), students who blogged outside of class for an assignment not only

expressed themselves more, but also opened up and interacted (albeit virtually at first) with their teachers and their classmates more face-to-face.

Digital media can also apply across subjects and is not only limited to the social science subjects of the curriculum (e.g. language arts, social studies) as many programs such as word processor serve to help develop writing skills (e.g., Hetzroni & Shrieber, 2004), but can also thrive in the teaching of ‘hard sciences’ like math and science as well.

Math and Technology

Math and science skills have increasingly become an important issue in education. The application of technology in these content areas is gaining popularity as of late. Electronic media use may lead to better understanding of mathematics as it may assist in the absorption of information and comprehension of complex concepts differently than textbook and instruction alone (Liang & Zhou, 2009). This may allow a student who has historically encountered problems when trying to understand math lessons to learn in a whole new way. Workbooks are a thing of the past, with the future of mathematics education focusing on the use of computers, graphic calculators, and Internet, a trend that many schools all over the country are starting to follow (Goos & Bennison, 2008). In the past, students recited multiplication tables and repeated math problems until all were correct, but nowadays math need not be torturous to learn. In fact, students report technology use to make math ‘more interesting’ and even were more apt to participate in math lessons in class as a result (Goos & Bennison, 2008).

Although technology use is an educator's choice, those who elect to use it yield better learning results in comparison to those who do not (Goos & Bennison, 2008). In addition, those teachers who appropriated the technology correctly had more students who paid attention and could, as a result, grasp the lesson more (Hughes & Ooms, 2004). Thus, it is important to precisely understand the effects of technology on learning so that teachers are more aware of benefits and drawbacks to its use and can subsequently make informed decisions of its integration in their classroom. Yet most instructors are excited at the prospect of a new educational tool and list technology use as part of their own personal teaching goals. Although some may argue certain content areas and lessons are better suited for technology, Hegedus and Penuel (2008) argue the opposite – that software exists for a plethora and variety of topics. For example, mathematical software that is dynamic and representational can provide classrooms with an alternative approach to introducing mathematical constructs.

Technology extends beyond the instructor's lecture and allows students to directly interact with class content. For example, Neulight, Kafai, Koa, Foley and Galas (2007) found technology to allow students to interact with the information more than simply watching the instructor lecture. However, it is important to acknowledge the learning curve associated with these electronic programs as no new technology is without it. Although it may take time for both students and educators alike to acclimate, the long-term benefits arguably outweigh the initial drawbacks. Often times teachers are provided tutorial software to help implement technology and

other support such as ‘help lines’ for questions regarding the software, etc. (Hegedus & Penuel, 2008).

In order for technology to ‘work’ in a classroom, a teacher must understand not only how to use it but also how to implement it into a lesson plan in a way that promotes and enhances student learning (Frye & Dornisch, 2008). If technology is not correctly intertwined with the lesson, students may become distracted rather than learn. However, when technology is effectively incorporated into mathematics lessons, students become more involved with the material and increase their content knowledge (Frye & Dornisch, 2008). In order to ensure effective implementation, Hughes and Ooms (2004) argue that establishing and sustaining a content-focused technology inquiry group for teachers in the same content area will provide the support and resources to practice and understand the technology prior to implementation. This ‘support group’ not only provides technological assistance but also allows teachers to brainstorm and share teaching and lesson ideas with each other.

Discrepancies and Divides

Unfortunately, educational institutions and individual students do not have equal access to these technologies and resources across the board. People with disabilities have historically been marginalized and even dehumanized, and students are no exception. New media developments both in and outside of the classroom may help bridge social and communicative divides, and help to change perceptions of physical disability.

Teachers must be aware of any disparities in technology access and ability to use it between students. For example, if a child is visually impaired, special arrangements must be made in order to ensure a larger screen or alternate option is available to them. As educators, it is vital to know these differences and exploit them in the classroom so that all the students have an equal opportunity to learn (Heemskerk, Dam, Volman, Admiraal, 2009).

Several steps have been taken to promote equal access to technology, including the Americans with Disabilities Act of 1990 (ADA), a law that requires reasonable accommodations be made for individuals with disabilities, and assistive technologies for students (Lewis, 1998). Technology cannot only help students with learning disabilities to ‘keep up’ with their nondisabled peers, but it can also enable them to compensate for reading, organization, memory, or math deficits. Furthermore, trends indicate computer technology will become even easier to use, more portable, and cheaper, which may make access less of an issue.

Despite the positive steps forward technology is taking, disability spans beyond access to technology in the classroom. Although there are multiple perspectives to understand disability, disability may be viewed as a culture, rather than solely diagnosed as a medical problem (Coopman, 2003). This has significant implications for education, as instructors must understand how children are socialized in viewing their disability. For example, a teacher may have a deaf student in their class. Although this student has been classified as handicapped due to their hearing impairment and subsequently delayed English reading and writing skills, they were

raised to view themselves as culturally Deaf. This cultural perspective views deafness as a way of life rather than marking individuals as 'wrong' or 'deviant' from mainstream hearing society. Interpreting disability from a cultural, rather than a pathological viewpoint, legitimizes disabilities as a positive attribute in individual and group identity, and promotes civic inclusion (Rose, 1995). This perception of disability may influence student technology use, and willingness to adopt classroom technology. Continuing the example above, culturally Deaf students may be apprehensive to adopt classroom assistive technology as they feel they are equal to their nondisabled peers and do not require any more/less help than their classmates. However, in contrast, technology may uniquely benefit these students as people with disabilities may use new media to differentiate themselves from disenfranchised individuals and maintain a more positive social identity (Tajfel, 1978). By engaging in new media, disabled students may feel less stigmatized and more comfortable expressing their opinions of a lesson. Educators and administrators must possess heightened awareness of special needs when communicating and working with these students rather than simply 'lumping them' with their peers.

The social aspects of schooling are arguably just as important as education to students. For disabled learners, sociability and 'making friends' may prove difficult as they face barriers that nondisabled learners may not. For example, the experience of stigma is powerful and has had documented negative effects on mental health, physical illness, academic achievement, infant mortality, social status, poverty, and access to housing, education and jobs (e.g., Major & O'Brien, 2005). Stigma as

defined by Goffman (1963) is the possession of a ‘deeply discrediting’ trait or attribute that spoils its bearer’s positive identity within his or her social community, and can manifest as stereotypes. These stereotypes are ‘widely shared among members of a society and lead to the exclusion or avoidance of members of these groups’ (e.g., Major & O’Brien, 2005). Individuals with disabilities (including students) are one such group that report experiencing stigma (e.g., Green, 2003). For example, those with physical handicaps may express stereotype behaviors by others who believe they are unable to care for themselves. This may also be evident for disabled students. Whether possessing a physical or learning disability, teachers and students alike may make assumptions based on stereotypes of those students with disabilities. For example, nondisabled students may assume that their disabled peers are unable to understand class content easily, and are unwilling to work on assignments with them. However, interacting with peers through technology may help to overcome this. First, as previously mentioned, a disabled learner can work at a comfortable pace online. Second, stigmatizing characteristics can be, to an extent, ‘hidden’ online, and allow disabled students to more freely interact with their peers. In fact, some individuals perceive the Internet (or communication media) as an opportunity to ‘create’ an idealized persona, and put their ‘best face’ forward (e.g., Walther, 1996). For example, a disabled student can project a tailored image online when interacting with peers that gives this student desired traits such as extraversion and confidence and deconstruct existing stereotypes by highlighting their intelligence. In addition, individuals with disabilities can turn to the Internet for social support in

coping with their experiences (e.g., White & Dorman, 2001), which may help disabled learners better manage their classroom encounters and working with nondisabled peers.

In sum, effective implementation and use of classroom technology by instructors can positively affect student life and learning. This technology has the unique capacity to educate and bridge student groups with varying abilities in one classroom, while at the same time can help disabled students better manage struggles social aspects of disability such as social exclusion and stereotypes (e.g., stigma). Therefore, it is crucial to understand how teachers currently utilize technology in classrooms, and help them overcome barriers they may face given these potential positive outcomes.

Chapter 3: Method and Procedure

Procedure

Ten face-to-face interviews were conducted with adult elementary educators. Open-ended interview questions regarding participants' access and use of technology, and the perceived effects of technology on disabled students' classroom participation were. (See Appendix A.) Furthermore, to better understand the difficulties a teacher might encounter when using this technology, questions about perceived limitations or problematic encounters with technology were also asked. At times, impromptu questions were posed to participants in order to clarify issues or interpretations of responses (Karras, 2010).

The one-on-one interviews lasted thirty minutes with only the primary investigator (PI) and participant present. Interviews were held in a comfortable yet private location close to the participant's home (i.e., reserved room in the local library). Locations were strategically selected so that participants felt comfortable responding to questions and less inhibited by concerns of being 'overheard.' A digital audio recording of the interview was made, transcribed verbatim, then promptly destroyed after the research was complete to protect participants' privacy (Karras, 2010). Prior to participating in the study, respondents were provided an informed consent document highlighting their contribution to this area of study as well as any risks or breach of confidentiality associated with this research and asked to sign it. (See Appendix B.) Appropriate contact information of the Institutional Review Board, researcher, and academic advisor was also provided on this consent form. The

voluntary nature of this study was reiterated prior to beginning by the PI, as was the ability to stop the interview and/or strike anything from the record. The College at Brockport Institutional Review Board approved this study's procedures. After the interview, participants completed a short demographic sheet, and they received a five-dollar coffee gift card.

Participants

Childhood educators were interviewed regarding their experiences utilizing technology during instruction in inclusive classrooms. A purposeful sample of ten participants was recruited through an elementary school in a suburb of a mid-sized Northeastern city in the United States. The school was comprised of predominately Caucasian students with a small percentage of African American and Asian students. Participants were gathered for this study by responding to an e-mail sent out by the school principal. Interested participants were then contacted by the PI to schedule a place and time for the one-on-one interview. Demographics were indicated and recorded by age, sex, race, and satisfaction with technology use in the classroom (Karras, 2010). (See Appendix C.)

Measurement

Ten interviews were conducted with a list of structured interview questions to guide the process. Questions were based on this study's research questions and focused on the impact of technology use on disabled learners' classroom participation.

Analysis

Transcripts were analyzed and coded using open and axial coding methods (Strauss & Corbin, 1990). First, one additional coder was recruited to create a coding team with the PI. This team independently reviewed transcripts to create outlines and identify themes among the participants' responses. They then convened to discuss results and identified relationships and causation between categories. Through this process, inferences were drawn from the data to the research questions in an effort to explain how technology was utilized in the classroom, how this technology is used as a learning tool with disabled students, the perceived effects of technology use on participation by disabled students, and problematic experiences using technology to engage disabled students in classroom activity.

Chapter 4: Results

Descriptive Statistics

Of the 10 respondents ($N = 10$), 60% were female, 40% were male. The average participant was 33 years old ($M = 34.40$, $SD = 8.82$), identified as White (70%), had been teaching in their current district for almost 8 years ($M = 7.7$, $SD = 2.21$), and held their professional teaching certificate for approximately 9 years ($M = 8.70$, $SD = 3.4$). All participants were licensed to teach in New York State and taught in inclusive classrooms. The majority of the participants reported satisfaction with their current classroom technology use (75%), while comparatively less were satisfied with their current traditional teaching methods (20%). (See Table 1.)

In the following sections, an overview of resulting categories is provided along with full participant quotes to further illustrate key findings. Pseudonyms are used to ensure anonymity.

Table 1
Characteristics of respondents

Variable	Category	%
Sex	Male	40
	Female	60
Race	White	70
	Hispanic	0
	African-American	30
	Asian-American	0
Age	24-30	10
	31-37	50
	38-44	30
	45-51	10
	52 +	10
Years Teaching in District	1-4	10
	5-9	70
	10 +	20
Year of Professional Certification	1-5	10
	6-10	80
	11 +	10
State of Certification	NYS	100
	Other	0
Satisfaction with Current Technology Use	Very Dissatisfied	5
	Dissatisfied	10
	Neutral	10
	Satisfied	70
	Very Satisfied	5
Satisfaction with Current Traditional Teaching	Very Dissatisfied	20
	Dissatisfied	20
	Neutral	40
	Satisfied	10
	Very Satisfied	10

Coding procedures

Codes identified during the open coding process reflected two student grouping strategies that were later refined during axial coding to include the three discussed below. Original groupings split disabled and nondisabled students rather than explicitly acknowledge that educators in some cases had these students work

together. Through the process of axial coding and exhausting the data, these categories were further cultivated to include a) disabled and non-disabled peer grouping, b) students work paired by achievement level (e.g., disabled students work together), and the creation of the grouping c) all students work alone. Differences were reconciled by coders through discussion and negotiation. For example, coders presented their categorical themes from open coding, explained why they identified them, and if questions were raised of the appropriateness of the category, coders were required to justify its use including providing examples from the data as support.

Strategies to technology use

Respondents reported three distinct strategies when utilizing technology for classroom instruction to help facilitate learning and increase participation in classroom activities from disabled learners. (See Table 2 for a summary of these strategies.)

One such strategy was to pair disabled and nondisabled learners together when using technology so that students could learn from one another. Many participants expressed employing this strategy as nondisabled students supported those who were disabled not only participate and engage in technology use, but also helped them to better understand the material. Danielle described this experience with the students in her classroom. She explained:

“Students in general love to use anything that is hands on and allows them to interact with their peers. However, I also noticed that when they got the chance to work together, they helped each other learn the material. For

example, one student was paired with a slower learner who did not quite grasp the concepts. She spent the time not only helping their partner use the computer program, but also spent the time to explain the material as well.”

Respondents reported that working with nondisabled peers encouraged their disabled students to learn. In fact, in some cases this encouragement seemed to push those with disabilities to try harder to understand the material, and in turn, interact with the technology in a more meaningful way. For example, rather than simply going through the motions in using the technology for class, disabled learners reflected on how the technology and course material connected to each other, and turned to their nondisabled peers for validation of these connections. Michael commented on this behavior in his own classroom, and said:

“I noticed my disabled students answering a question on the online quiz correctly, and in response to this, their nondisabled ‘technology partner’ congratulate them. Feeling encouraged, the disabled student then tried to elaborate on this correct answer prompting their nondisabled peer to further compliment them. It was really an encouraging thing to see, and made me proud of my students.”

In contrast, other respondents described how they grouped students by their achievement levels when interacting with classroom technology. This strategy seemed to have dual purpose: First, by utilizing this grouping strategy disabled learners could work at a slower pace, and not feel pressured to rush through the

technology assignment to keep up with their nondisabled peer. Jennifer expressed her opinion on this strategy:

“I worry that my disabled learners are rushed to finish a group assignment online because their partners are more advanced and able to more quickly complete the task. By grouping my disabled learners together, they can work at a more reasonable rate and not have to worry about being slow or self-conscious of their progress or understanding.”

Some participants used this strategy in order to provide more attention to their disabled learners. For example, Ashley said:

“I try to put my disabled learners together when we break off into groups and utilize new learning technology tools. My reasoning for this is I can keep a more watchful eye on them and their progress with the assignment. If they have trouble, I can be more easily accessible to them.”

Finally, some respondents allowed all students, including those with disabilities, to work alone when engaging in classroom technology. Although not as popular as the other two strategies, participants reported this to be in the best interest of all their students given the varying aptitudes and abilities present in an inclusive classroom. For example, students who are exceptional and work at a quick pace, can continue to use the technology while those who may work at a slower rate are finishing the assignment. This way, no student is left struggling to catch up with their peers, or in contrast, sitting and waiting for others to finish. John, an advocate of this strategy, explained:

“When I use technology in the classroom, I make sure that all my students use it on their own. This way everyone can finish their work at their own pace, as well as develop their comfort and own abilities in using technology. So in essence, students aren’t only learning the material, but also independence in a classroom setting.”

Participants also believed that by allowing students to work independently with technology there would be fewer distractions and that students would be able to work more quietly and concentrate more intently on the material. Some further argued that this cut down on the amount of ‘acting out’ by children who finished their assignments too quickly and were left bored. Jason was one such participant, who said,

“My students who rush through their assignments and then distract their classmates from finishing have actually stopped doing so. They continue to engage with the technology, allowing disabled students to concentrate and complete their work.”

Of note, most participants reported using a combination of strategies rather than simply selecting one strategy over another. Educators argued that some strategies work better under different conditions. For example, some expressed that they often assigned some disabled students to work on technology assignments with their non-disabled peers, and others to work with other disabled learners. Stephanie further exemplified this,

“I tend to utilize different strategies when introducing or using technology in my class. Some disabled students I might assign to work with the more exceptional students because I know they can learn from each other. I also sometimes try to keep my disabled learners with those who have the same abilities, so that no one gets frustrated working with the other.”

In addition, participants reported that the time of day influenced their strategy selection. For example, after lunch students may require ‘winding down’ and educators tried to do so by allowing them to utilize technology exercises alone. This activity kept students engaged and awake, yet, at the same time, re-focused students on schoolwork. Kelly was one such respondent who utilized this tactic,

“Often times I use technology after lunch and have students complete tasks alone. This winds them down, but still keeps them interested and helps to get them focused on school again.”

Table 2
Strategies for technology use

Strategies Utilized	Exemplary Quote
Pair disabled and nondisabled learners together when using technology so that students can learn from one another	“I found my disabled students looking to their non-disabled peers to help them learn the new material when they worked together on technology assignments.”
Group students by their achievement levels when interacting with classroom technology	“I found when I put my disabled and non-disabled students together that they got frustrated with each other. By keeping my disabled learners paired with each other, they get to work at a more realistic rate and were no longer embarrassed if they didn’t understand a question.”
All students work alone when engaging in classroom technology	“I require my students to work alone when using technology to help develop self-learning”

Barriers to technology use

Several barriers were reported by participants in utilizing classroom technology. First, funding for technology proved a great barrier. Given the current economy and allocation of funds in public education, new and updated technologies were difficult to attain. Marisa illustrated this barrier,

“I try to use technology as much as I can. However, it is often old and in comparison to what my students are using at home, really out-of-date. Both my disabled and non-disabled students laugh at some of the programs.”

Julia agreed that the financial burden experienced by many schools made it hard for teachers to properly use technology in the classroom. She explained,

“The economy is still very tough and schools all across the region and still feeling the effects of it. Schools just can’t afford the most up-to-date gadgets and it has a negative impact. I like to use technology everyday because its fun for the students and they really learn from using it. Without the funds for it though, I feel like the students are missing out on new ways of learning.”

As members of society are increasingly expected to access and use different media, students who are not introduced to this technology early in their education are at a disadvantage. Colleen believed that this lack of funding for technology was a significant hindrance in teaching youth. She explained:

“Technology is the future- everything is slowly transforming to media. Traditional teaching is simply not cutting it anymore, as students require more engaging, hands-on assignments. Technology not only benefits the students,

but also the teacher. It helps the teacher present material in unique ways as well as connect with parents and family to keep them ‘in the loop’ on their child’s progress.”

Some teachers reported an unwillingness or reluctance to learn how to effectively use the classroom technology. Adding to the day-to-day stress of the classroom with technology was reportedly too great. Furthermore, taking time to learn how to use and implement technology was difficult for teachers. They reported not having enough time to do so, and not receiving proper support from the school and its administrators.

For example, Nicholas reported:

“I have so much to do on a daily basis. I have to make lesson plans, teach, grade, prepare for state testing- technology would tip the scales and overwhelm me.”

Cara further exemplified this barrier,

“I tried to take a workshop on a new classroom technology and asked the district to help fund me to go. They refused me, so I didn’t go.”

Furthermore, some technologies were perceived as too complicated or confusing to educators and therefore not incorporated into the classroom. Marion described this as something that teachers have to deal with on a daily basis,

“From my experience teachers have so much to deal with everyday that they just don’t have the patience to learn to incorporate technology in the classroom. I tried to once and I got so confused that I simply stopped trying.”

In sum, results indicated that participants were utilizing classroom technology with three distinct grouping strategies, however, they also encountered several limitations or barriers to its use making effective implementation difficult.

Chapter 5: Conclusions and Recommendations

This study examined technology use by educators including strategies for its use and problematic encounters. The data were collected using one-on-one interviews with employed elementary school teachers, and findings from the current study are consistent with previous research (e.g., Ertmer, 1999) arguing that teachers recognize the importance of classroom technology and exhibit a desire to use it, however, encounter barriers when trying to do so.

The results highlighted several interesting findings. First, technology may serve as an equalizer for students in the classroom as participation was affected by technology use. Technology has arguably revolutionized the dynamics of a traditional classroom. Not only may technology help educators teach material and ‘spice up’ a lesson plan, but it may also help disabled students feel more comfortable in their classroom and less conscious of any ‘ability divide’ between students in inclusive classrooms. Given its ability to serve, in part, as an educational leveler, future research would do well to examine the social dynamics between disabled and nondisabled students of an inclusive classroom that frequently integrates technology and its ability to serve as a social leveler.

In the current study, participants reported using similar strategies when integrating technology in an inclusive classroom. Teachers reported grouping students in three different ways when utilizing technology. Each strategy has benefits and drawbacks. A common strategy was placing the high-achieving students in groups with low-achieving or disabled students so that they could learn from each other. On

the one hand, peers can serve as an excellent source for information and disabled students may be more receptive when their classmates try to teach or help them with content. On the other hand, high achieving learners may simply answer the question for the low-achieving students if grouped together.

The second grouping strategy includes assigning disabled students to one group and nondisabled learners to another. This strategy may allow disabled learners to avoid feeling uncomfortable or left behind when solving a problem. Furthermore, if disabled students are all working together, they may accomplish a task at a slower more reasonable rate. However, grouping disabled students together may frustrate or alienate them.

Finally, some participants reported their students to use technology independently rather than grouping them with others. This may help all learners to retain and understand the information better as they won't be rushed through to the solution and may feel less embarrassed or feel more at ease to ask questions as they may encounter with group work. However, a classroom with limited student interaction may be lacking connection between students, as they may not feel encouraged to help one another. This is not to say independent work is ineffective, but rather that balance between work assigned to groups and alone is important for the overall climate of the classroom. In fact, this research does not necessarily argue that one method is more effective than another, but rather that educators should consider using a complement of strategies for technology use. Sometimes a task may call for group work, while others may call for students to work independently.

Teachers must discern which method is most effective for the task at hand. Future research should test and refine these strategies. If they are proven consistently beneficial, then they should be considered as part of university or district technology training.

Training Implications

Technology can be useful if teachers are willing to learn how to properly use it. This has important implications for teacher education. Technology use and classroom integration should become a standard part of required coursework for students studying at universities to become teachers regardless of their content area interests (e.g., early education vs. secondary education; social studies vs. math). In essence, teachers should be taught how to use technology before even entering the classroom. Given that technology is generally accepted as the wave of the future for many fields including education, an additional technology certification may need to be required of educators to ensure proper training, understanding, and use of technology. This may help alleviate training issues (e.g., budget constraints; motivating teachers to take training courses) for school districts as universities may be better equipped to train and educate teachers on different technologies. Required proficiency in technology may also help to ensure some consistency across its use in classrooms. Ideally, students in one classroom will not be at more or less of an advantage than students in another classroom as teachers will have similarly training and understanding of technology.

Administrative Implications

Alongside implications for the classroom, this study is of value to administrators and principals as well. It is important that not only teachers know about technology, but also administrators. The majority of school leaders do not have a clear picture of their teachers' technology use and how to evaluate it (Russell, Bebell, O'Dwyer, & O'Connor, 2003). This study has provided administration with an overview of common strategies and encountered problems, which can serve as first steps to drafting training programs and identifying means of assisting teachers to better utilize these learning tools. For example, if teachers are explicitly reporting difficulty learning to use basic classroom technology, this should serve as a 'red flag' warning sign to administrators that continuing education or training is required for effective implementation.

Technology is no panacea and offers no perfect solution to teaching those with disabilities and respondents reported experiencing problematic encounters with technology. This supports existing research (e.g., Hughes and Ooms, 2004) arguing that teachers that are currently trying to integrate technology into their classrooms face a tougher time in doing so as they aren't provided and don't have the proper knowledge and background to successfully use it. As a response to this struggle for technology training for educators, those teachers who are advanced technology users and efficiently integrate its use into the classroom could hold short seminars for other teachers in their school to share what they know and provide helpful tips. Although this may not be as permanent of a solution as an additional technology certification, it

may help those tenured teachers gain additional understanding of technology and have hands-on help. A district may consider implementing required continuing education for teachers, which requires them to prove the continuation of learning new classroom methods and tools. Some states such as Pennsylvania require teachers to prove their progress and growth after certification through participation in seminars.

Finally, school funding is a serious problem faced by educators. Teachers may want to integrate technology but don't have the financial means to do so, leaving their students at a disadvantage to students in other districts that can afford it. This study serves to raise or contribute to the awareness of this budgetary issue and concern that plague public schools in the United States. Without funding for new learning technology tools, students fall behind. However, as this research argues, simply possessing classroom technology is not enough- a teacher must correctly use it as well.

Future research

Future research could also involve interviewing educators at different spectrums of the education pool, or in other words, interview teachers in different grade levels (not solely elementary education). The use and effect of technology may differ greatly dependent on the age of the students and future research could serve to determine this. The type of school in which the instructor teaches at may also influence classroom technology use. For example, do a private vs. public school, integrated vs. special education school/program, rural vs. suburb vs. city school, influence how technology is used and effects the disabled student population? A

second quantitative phase to the current research could serve to describe the frequencies of the categories or different strategies reported, types of technology used, problematic encounters with technology, and perceived effects on disabled students. A mixed method approach would provide a more comprehensive picture of technology use and its implications for disabled learners.

Study limitations

This study was not without limitations. ‘Although qualitative data is rich and methods are excellent for generating typologies, they cannot generate insight on frequencies or magnitude of effects’ (Karras, 2010). Some of the interview questions were too close ended so my expectations were violated when participants’ responses were one word answers or brief with no meaningful elaboration. Although the researcher was permitted to ask probing or follow up questions, the PI was not always properly prepared to ask them. As a result, some conclusions could not be drawn solely based on participants’ quotations, but rather the PI had to return to the extant literature to help explain some of the results. Furthermore, although data saturation can occur with a small sample size, future research would do well with a larger sample as more generalizations could be drawn to the larger population. The current study’s sample size limits the findings’ ability to do so. Finally, no psychological variables were formally measured, so any distinctions or inferences drawn in the demographic variables (e.g., sex) of participants or results and discussion of perceived effects on disabled learners are limited.

Conclusion

This research indicates that teachers acknowledge the usefulness of classroom technology as they intertwine it into their lessons. Yet, teachers also encounter obstacles in trying to adequately use and understand it. Classroom technology has the unique ability to engage and educate student learners. It is essential that teachers utilize this tool effectively and receive proper training so that technology does not simply serve as a distraction but rather an assistive learning media.

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Appendix A: Interview Questions

1. How long have you been working in education?
2. How many years have you been working in an inclusion classroom?
3. What types of disabilities do your disabled learners have?
4. Do you use technology in your classroom?
5. What type of technologies do you implement?
6. What subjects do you utilize technology for and why?
7. What is the ratio of technology-to-traditional teaching in your classroom? (For example 50% technology, 50% traditional)
8. Do you find that using technology in your classroom to be effective for your students that face disabilities?
9. If so, what technologies work the best in your classroom?
10. How do the students respond to using or witnessing the technology?
11. What challenges do you face when using technology in your classroom and why?
12. What technologies do not work with your disabled learners?

Appendix B: Demographic Questionnaire

DIRECTIONS: Fill out the following questions with appropriate answer.

1. How old are you? _____
2. Sex (check one): _____ Male _____ Female
3. Race (check one):
_____ White (non-Hispanic)
_____ Hispanic
_____ African-American (Black)
_____ Asian-American
_____ Other: _____
4. How long have you been teaching in your current school district (in years or months)?

5. In what year did you receive your professional teaching certificate? _____
6. In which state in the U.S. did you receive your professional certificate from? _____
7. Overall, how satisfied are you with your current use of technology in the classroom?
_____ Very dissatisfied
_____ Dissatisfied
_____ Neutral
_____ Satisfied
_____ Very Satisfied
8. Overall, how satisfied are you with your current use of traditional teaching methods in the Classroom (e.g. classroom lecture)?
_____ Very dissatisfied
_____ Dissatisfied
_____ Neutral
_____ Satisfied
_____ Very Satisfied

Appendix C: Participant Informed Consent Document

CONSENT DOCUMENT FOR PARTICIPATION IN RESEARCH Affiliated with the College at Brockport, Department of Education

PURPOSE OF RESEARCH: The purpose of this focus group is to understand the role of technology in teaching disabled learners in inclusive classrooms.

EXPECTED DURATION OF SUBJECTS' PARTICIPATION: An interview taking approximately 30 minutes will be administered by Gregory Karras, the primary investigator (PI).

RESEARCH PROCEDURES: The research will be an interview with only the PI and participant. You do not have to answer any questions you do not wish to.

RISKS AND DISCOMFORTS TO SUBJECTS: Subjects will not be at any known risk, however, subjects have the option to discontinue the interview at any time during the process.

EXPECTED BENEFITS OF THE RESEARCH: This study will help to further understand how disabled students learn through the use of technology in the classroom. By participating in this study, subjects will help to contribute to an understanding of the role technology plays in educating the disabled student population and will help to shed some light on the strategies used to employ technology by educators as well as limitations they encounter when doing so.

CONFIDENTIALITY PROCEDURES: All data generated in the course of this research will be locked in a secure location at the advisor's office at the University at Brockport. The identities of the subjects will also remain anonymous. Any reference to the identities of the subjects that would compromise their anonymity will be removed prior to the preparation of research reports and presentations. In order to ensure that the risk of breach of confidentiality does not occur, demographic information will be separate from the consent forms and interview transcripts.

COMPENSATION FOR PARTICIPATION IN THE RESEARCH: Participants are rewarded for their participation by receiving a five (5) dollar gift certificate for coffee.

WHO TO CONTACT FOR ANSWERS TO PERTINENT QUESTIONS ABOUT THE RESEARCH AND THE RESEARCH SUBJECTS' RIGHTS: Gregory Karras, principal investigator (gkarr1@brockport.edu) and Jeremy Browne PhD, advisor (jbrowne@brockport.edu).

If you have questions about your rights as a research participant, you can call the SUNY Brockport Institutional Review Board office at (585) 395-2779 during regular business hours.

VOLUNTARY NATURE OF PARTICIPATION:

Participation is voluntary. I understand that I may refuse to participate or discontinue participation at any time without penalty of loss of benefits to which I am otherwise entitled. I am free not to answer any questions I do not wish to answer.

I, _____ consent to participate in the research study under the direction of Gregory Karras (graduate student in the Education degree program at the College at Brockport) and am at least 18 years or older.

DATE: _____

Consent with Audio Recording: _____

Consent without Audio Recording: _____