# AN EVALUATION OF TWO APPROACHES FOR DEVELOPING KEYBOARDING SKILLS IN CHILDREN WITH COGNITIVE DISABILITIES

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# ABSTRACT

This study examined the efficacy of two programs designed to teach keyboarding skills to school-aged children with intellectual disabilities. The study employed a mixed methods research design utilizing the number of accurate key strokes and speed in completing a task as dependent variables in the quantitative analysis. The scores used in the analysis were derived from a teacher-designed test that consisted of a timed test with students keyboarding specific sets of letter sequences. The qualitative segment of the study consisted of focus group interviews with the participating teachers to determine the method perceived to be effective in teaching keyboarding skills to children with intellectual disabilities. Decisional statistics were performed to determine which program was more effective in teaching the selected students keyboarding skills. Teachers were interviewed in focus sessions and the results from the interviews were analyzed to determine their perceptions of the two programs. Overall, both programs were successful in teaching keyboarding skills; however, teachers stated that ColorCoded Keyboarding© was more effective in increasing the number of keys learned and promoting self-esteem and self-efficacy.

# DEDICATION

To my husband, Paul, who, although he questioned my sanity at undertaking this endeavor, provided unceasing support and encouragement throughout this journey. Thank you for your constancy and your consistency and your ability to make me see the "logic" in the process when I was ready to give it up. I love you.

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## LIST OF ABBREVIATIONS

CCK©, ColorCodedKeyboarding©

CDC, Comprehensive Development Class

ID, Intellectual Disability

IQ, Intelligence Quotient

ISTE, International Society for Technology in Education

NAEYC, National Association for the Education of Young Children

NICHCY, National Information Center for Handicapped Children and Youth (now known as the National Dissemination Center for Children with Disabilities)

NCLB, No Child Left Behind

TBI, Traumatic Brain Injury

TTL4®, Type to Learn 4®

# CHAPTER I

## INTRODUCTION

"Keyboarding is the penmanship of the computer age" (Johnson, Nelson & Townsend, 2002). This concept was reinforced by former President Bill Clinton ("State of the Union Address," 1996). In his 1996 State of the Union address Clinton challenged the nation to ensure that all students are technologically literate by the twenty-first century. Obviously, that is a challenge not yet fulfilled. In 2011, President Obama launched the "Digital Promise" that challenged teachers to bring all students into the digital age (Duncan & Hastings, 2011). There are educators who feel that teaching keyboarding to any student younger than third or fourth grade is superfluous (Boyce & Whitman, 1987; Neiman, 1996; Russell, 1994) and those who believe that all students must know how to use a keyboard effectively (Jukes, McCain, & Crockett, 2010; Wetzel, 1985). Despite debate over the timing of when to introduce the student to keyboarding, it is clearly an essential skill to possess in today's technology-driven society. Currently, during preschool years, children use computers and must be guided towards efficient keyboarding habits. Appropriate keyboarding instruction in the elementary curriculum and reinforcement throughout their school years can provide the necessary foundation for the rest of any student's life. Although once taught mainly at the middle and secondary school levels, a study of Wisconsin schools showed that 85% of the state's schools introduced keyboarding at the elementary level (Rogers, 2006). While the most popular grade levels for introducing keyboarding are third and fourth grades, recent years have seen successful introduction into kindergarten classes (Jukes et al., 2010). Combining keyboarding with letter recognition and

hand-eye coordination activities in the early grades provides a developmentally appropriate skill that reinforces learning and assists in developing fine motor skills (Jaras, 1998). This early introduction assists in reducing bad habits such as developing personalized methods for keying and provides additional benefits that include improvements in spelling, writing, and reading comprehension (Zeitz, 2010). Only a small number of classroom teachers have any formal preparation for teaching keyboarding (Sormunen, 1991). Business or vocational teachers are primarily responsible for teaching keyboarding at the secondary levels, whereas over half of the keyboarding teachers at the elementary level are classroom teachers (Rogers, 2006). However, Wiseman (2000) found that teachers without touch-typing experience can, with minimal training, successfully teach that skill. Regardless of the argument over the proper age or grade level, there is little doubt that knowing how to keyboard gives a person a marketable job skill.

## Purpose of the Study

This dissertation addressed research designed to determine which of two programs, ColorCoded Keyboarding© (Blazek, 2012) or Type to Learn 4® (Sunburst Technology, 2008) is more effective in teaching keyboarding skills to young students with intellectual disabilities. This study compared the two methods by determining the degree of accuracy (number of words typed correctly), and the use of punctuation, spacing and capitalization. Teacher perceptions of the programs as well as their perceptions of student responses to the program were also measured.

## Rationale for the Study

For students with intellectual disabilities, such as children with mild to moderate cognitive disabilities, autism, and/or developmental or physical impairments, the ability to utilize

keyboarding as a job skill is crucial. In February 2009, for the first time, the Department of Labor's Bureau of Labor Statistics began reporting the employment situation for people with disabilities. The current administration hosted a Disability Job Fair to bring qualified candidates with disabilities and agencies together to help increase federal employment for people with disabilities in the federal government (United States Department of Labor, 2011).

A paper prepared for the President's Committee on Employment of People with Disabilities (Martinez, 2012) noted that adults with intellectual disabilities can work and hold steady jobs if they are properly trained. To underscore the point that training is key to employment, the U.S. Department of Labor's Office of Disability Employment Policy recently launched a new initiative designed to identify and develop strategies to increase employment opportunities for people with disabilities within small businesses owned and operated by minorities (United States Department of Labor, 2011). The Department of Labor made available the 2011 Workforce Recruitment Program Database to help college students and recent graduates with disabilities find jobs in the public and private sectors. Summarizing, Wehman and Bricourt (2001) have stated that in the 21st millennium, there is no reason to exclude persons with disabilities from the opportunity to pursue the American dream of greater wealth and economic independence. Appropriate skill sets must be present however, and in many employment situations, keyboarding is essential. Keyboarding is a skill that can be used throughout a lifetime and mastering this skill involves learning movement and physical position (technique), comfortable keyboard interaction (ergonomics), and key locations. Learning key location requires a sequential introduction and a great deal of repetition and reinforcement in order to develop the kinesthetic memory that leads to automatic keyboarding (Zeitz, 2010). Efficiency in

accomplishing these outcomes is an important instructional goal, particularly for learners who acquire skills at a slower rate**.**

## Importance of the Study

There are large numbers of students in public schools with intellectual, cognitive, or physical delays that impede learning. These students face a future that could consist of living below the poverty line, subsisting on government supplements, or being forced to live in institutionalized care (Emerson, 2007). One of the obstacles to gaining competitive employment for people with intellectual disabilities is a lack of self-efficacy (Rusch & Hughes, 1990). According to Bandura (1997) self-efficacy is the belief that one is capable of performing a certain goal. Without a reasonable level of self-efficacy for needed employment skills, it is difficult for anyone to succeed in the workforce (Bender, 2008). Frequently, people with disabilities have a low level of self-efficacy (Rusch & Hughes, 1990). Proper training in a set of marketable job skills is one key to promoting a sense of self-efficacy in children with intellectual disabilities and can extrapolate into future employment. Low self-efficacy causes a person with an intellectual disability to assume he or she will fail at a job before they even start work (Bender, 2008) and can cause a person to quit a job or give up when it seems difficult because they do not believe they have the ability to succeed in the position.

Social structures also help to create low or high self-efficacy. If a person with an intellectual disability is surrounded by family, friends, or service providers who see the person as weak or inferior, the conditions will promote low self-efficacy. It cannot be expected that a person with an intellectual disability will raise their level of self-efficacy if they are in a social structure that does not promote self-efficacy (Bandura, 1997). People that succeed are people

who have been encouraged to have a higher level of self-efficacy. One way to build this level of self-efficacy is to provide the individual with skills that promote self-efficacy. Arguably, in today's workplace environment, keyboarding is one of those skills.

It is important that students with special needs receive instruction in skills that will enable them to be productive citizens capable of being employed (Wehman & Bricourt, 2001). Exclusion from competitive employment is realized as a key factor in the exclusion of people with disabilities from wider society, as a lack of employment has been recognized as contributing to economic, social, and political marginalization (Barnes & Mercer, 2005). One problem with achieving this outcome lies in the limited availability of programs that are engineered to teach children with slow response times, impaired physical reactions, and other delays. School systems are reluctant to spend money for technology and software that is specific to a small fraction of the school population (Pardin, 2002); the current program in the school system being studied, Type to Learn 4®, was not designed for students with cognitive disabilities. Although the program is repetitious in nature, the timed sequences and supposition that the students involved recognize their lower case letters may not be conducive to success with students who do not possess the prerequisite knowledge skills or the ability to react quickly.

## Background to the Problem

In 2000, I transitioned to a new position as a teacher in a primary Comprehensive Development Classroom (CDC) consisting of eleven six, seven, and eight-year old students with differing levels of developmental delays, cognitive impairments, autism, and traumatic brain injury. It was quickly apparent that these students had extremely limited letter recognition, including the skill of recognizing their own names in print. I found the school system's default

keyboarding program incompatible with the cognitive level and physical skills of my students. That program operated on the assumption that the students already knew the lower case alphabet and were capable of matching lower case type to keys with upper case letters. It was also paced too quickly for student response. For these reasons, I designed the keyboarding instruction that I use today.

Based on the research that was current at that time and daily observation in the classroom, I developed a color-coded system, ColorCoded Keyboarding© (Blazek, 2012), that met several criteria. First, the program would teach the students their names; second, it would develop hand-eye coordination; and third, it would supplement teacher directed lessons in letter recognition. I utilized conspicuous strategies (Chard, 1995), or sequences of teaching events and actions that consist of explicit steps that enable a student to make the connections between what they see and what they type. Students learn to keyboard their first names in all upper case letters, then their first and last names in all upper case, then simple sentences all in upper case until they are able to transition to mixed case. As they progress, spacing, capital letters, and punctuation marks are indicated by color and the corresponding keys are marked by colored stickers. All letters are originally practiced in upper case and the keys are marked in upper case. This approach is based on landmark studies by Read (1986) and much of the work that followed (Bender, 2008; Bissex, 1980; ERIC Development Team, 1997; Graham, Weintraub, & Berninger, 1998; Treiman & Kessler, 2004). In these studies children learned best if their spelling words were printed in all uppercase letters. This convention was motivated both by substantive considerations (the beginners in these studies often wrote using uppercase letters) and stylistic considerations (readers could more easily distinguish children's spellings from conventional spellings if written in upper case). Additionally, students with cognitive delays are more likely to be able to print uppercase letters than lower case letters as upper case letters do

not have descenders (the part of the letter that drops below the line) and fill up the same space (Olsen, 2012).

## Theoretical Framework

Keyboarding is a psychomotor skill that encompasses established learning theories such as operant conditioning. Operant conditioning, as defined by B.F. Skinner (1938), is dependent upon reinforcement and is utilized during the beginning stages of learning (Skinner, 1938). Operant conditioning suggests the following steps when teaching a new skill:

1. clearly specify the action or performance the student is to learn;
2. break down the task into small achievable steps, going from simple to complex;
3. let the student perform each step, reinforcing correct actions;
4. adjust so that the student is always successful until the goal is reached, and;
5. transfer to intermittent reinforcement to maintain the student's performance (Keller, 1968).

The ColorCoded Keyboarding© (Blazek, 2012) program is based on these steps. When a student keys the correct letter, the action is recognized as correct on the screen. The learner is presented with a stimulus (letter) and makes a response (strikes a key). An important component of stimulus-response theory is knowledge of results. If learners know that their response is correct, the next time they are presented with that stimulus, they are very likely to make the same response (Zeitz, 2010). Knowledge of results correlates to closeness in time between stimulus and response (Domjan, 1998; Robinson, Erickson, Beaumont, Crawford, & Ownby, 1979; West, 1983). In the early stages of keyboarding, learners tend to mouth or vocalize the letters. For example, in between seeing the letter “A” in the copy and striking the “A” key on the keyboard, the learner may mouth or call the letter. This presumed mediator can slow down the speed at

which a student types (Erthal, 2009); however, in the early stages this audible reinforcement is helpful to a student with cognitive disabilities. The ultimate goal is to elicit the correct response of seeing a letter and striking a key on the keyboard without calling the letter. Historically conventional wisdom suggested that students not look at the keyboard while typing (Erthal, 1998). But insisting that a student not look at the keyboard can be detrimental to skill development (West, 1983). For example, research by Rieger (2004) found that visual feedback produced the best overall performance for speed and accuracy while copying material. McLean and Pulak (1995) found similar results in their study of visual access and keyboarding performance. Conventional wisdom thus may be revised. Unfortunately, no studies have explored this point with students with intellectual disabilities.

Definitions and Terms

1. Academic efficacy: describes the belief that students hold about their ability to learn and be successful in the classroom (Doll, Zucker, & Brehm, 2004).
2. Autism: a developmental disability that significantly affects verbal and nonverbal communication and social interaction, generally evident before age three; autism adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term autism does not apply if the child's educational performance is adversely affected primarily because the child has an emotional disturbance. A child who shows the characteristics of autism after age 3 could be diagnosed as having autism if the above criteria are satisfied ("Individuals with Disabilities Act," 2012)

3. Developmental Delay: term used to identify children with an IQ less than, or equal to 70 on a standard intelligence test. Additionally, a child must be identified with two of the following: significantly impaired adaptive behaviors, physical delays, communication, or social-emotional impairment. This identifier will be amended to Intellectually Disabled or Functionally Delayed on or before the child's tenth birthday. Students who are identified as Developmentally Delayed are considered Language Impaired by definition ("Individuals with Disabilities Act," 2012).
4. Intellectual Disability: significantly sub-average general functioning, existing concurrently with deficits in adaptive behavior, and manifested during the developmental period that adversely affects a child's educational performance. Intellectual Disability or ID, is a new term. Until October 2010, the legal term was "mental retardation" ("Individuals with Disabilities Act," 2012).
5. Multiple Disabilities: formerly referred to as Multiple Handicapped, means concomitant [simultaneous] impairments such as intellectual disability-blindness, intellectual disability-orthopedic impairment, and the combination of which causes such severe educational needs that they cannot be accommodated in a special education program solely for one of the impairments. Deaf-blindness is not included in this category ("Individuals with Disabilities Act," 2012).
6. Pangram: a sentence that utilizes all 26 letters of the English alphabet at least once (Pangram, n.d.).
7. Self-efficacy: the concept defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1997, p. 391).

8. Self-esteem: a person's inner appreciation or assessment of him or herself (Alexander, 2001).
9. Transcription: the act of copying information from one format (such as longhand or recorded tapes) to a digital format (Transcription, n.d.).
10. Traumatic Brain Injury (TBI): an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma ("Individuals with Disabilities Act," 2012).

## Delimitations of the Study

Delimitations are boundaries that are set by the researcher in order to control the range of a study. They are created before any investigations are carried out in order to reduce the amount of time spent in certain areas that may be seen to be unnecessary to the overall study (Simon, 2011). In this study, the researcher excluded students identified as Visually Impaired or Severely Physically Impaired as the typing programs used in the study were not designed for implementation with students who cannot see a visual model or cannot physically utilize a keyboard. Two classrooms in the researcher's school were involved in the study, but to minimize bias the researcher's class was not included in the study. The study did not extend beyond the

parameters of the local school system. This was done in an attempt to ensure regulation of subjects, program administration, and data collection. The samples were obtained through volunteer teachers who: (1) were willing to participate in the study; (2) were able to participate in training, and; (3) had students in their classrooms who met the study criteria. Consequently, both experimental and control groups were small with less than 25 students per group.

## Limitations of the Study

Limitations are those characteristics of design or methodology that impact or influence either the application or interpretation of the study. Limitations also reduce generalizability and utility of findings due to the design of the study or the methods utilized to establish external or internal validity. A limitation of this study was the small, non-random sample size and the resulting ability to generalize the program to all self-contained classrooms or other disabilities. Another possible limitation was the instructional skill levels of the teachers who volunteered to participate as some teachers had already used one or another of the two programs and others had not. All of the teachers, regardless of familiarity with the experimental program, received training prior to starting the school year and their instructional activities were monitored throughout the study. There could be possible bias on the part of the teachers as they knew which approach was experimental and associated with the researcher. The researcher conducted the focus sessions and it is possible teachers were perhaps more likely to express positive statement regarding the researcher developed experimental program. It should be noted that three of the six teachers knew the researcher prior to the study and thus despite being asked to be objective could have been influenced by this prior experience. There were also dissimilar variables within the classrooms such as economic backgrounds of students, home computer use, and students'

specific disabilities. Another limitation was the aspect of reporting the results of the assessment; teachers administered the timed test and it was expected that they adhered to the test protocol. However, self-reporting was limited by the fact that it could not be independently verified.

For the qualitative results, there are limitations in that teacher-reported results could contain potential sources of bias such as: (1) selective memory, the act of remembering or not remembering experiences or events that occurred at some point in the past; (2) telescoping, the act of recalling events at a time other than when they actually occurred; (3) attribution, the act of attributing positive results to one's own class while attributing less positive outcomes to outside influences such as technical issues, medications, or illness; (4) exaggeration, which is the act of representing outcomes or embellishment of events as more significant than is actually suggested from the data, and 5) confirmatory bias, or the tendency to seek out, attend to or support experiences that conform to their beliefs (Mahoney, 1977). Finally, populations in urban schools tend to be transient (Heinlein & Shinn, 2000) and attrition is an element of the study that did occur and could affect data. Finally, in the study it was impossible to randomly assign students to treatment conditions. This limitation was a result of the conditions that exist in the participating schools. Classes were intact and all students in a single class received the same program treatment. Classes were paired as closely as possible with respect to IQ, disability, and age. But, while these classes were assigned to one of the treatments in random fashion, the potential for intact group effects or student backgrounds across classes could not be controlled by the required randomization procedure.

# CHAPTER II

# REVIEW OF THE LITERATURE

This review of the literature was conducted in order to examine the impact that technology has had in the field of education and will underscore the need for all students to possess marketable skills that will enhance the possibility of viable employment. Keyboarding, the specific focus of the current study is virtually intrinsic to the effective use of technology in the school and workplace and is, therefore, an essential key skill to be acquired. Laws that have necessitated the inclusion of technology instruction in school are discussed as well as changes in measuring student outcomes that emphasize keyboarding skills. This review also includes the importance that having these skills has on the self-efficacy and self-esteem of students with special needs. Finally, the review describes the instructional strategies that are most successful with students with special needs and present an overview of the two keyboarding programs that were used in the study.

## Historical Background of Education and Employment for Persons with Disabilities

There are over 130 million people with intellectual disabilities around the world, and the vast majority live in poverty, excluded from employment due to their perceived inability to sustain skills necessary to hold a job (Inclusion International, 2006). One study (National Disabiltiy Authority, 2012) indicates that people with intellectual disabilities are more than two and a half times less likely to be employed than their non-disabled peers. Over twenty-five years

has passed since federal legislation relating to persons with developmental disabilities began to place a high priority on employment-related services. The 1984 Developmental Disabilities Act Amendments ("Developmental Disabilities Assistance and Bill of Rights," 2000), for example, set the employment services as a major priority (Rusch & Hughes, 1990). Supported employment programs that were authorized by the Rehabilitation Act of 1986 and its amendments have been a common employment option to sheltered employment (Wehman, Revell, & Kregel, 2008). Federal legislation, such as the Americans with Disabilities Act ("ADA," 1990) and the Rehabilitation Act Amendment ("Rehabilitation Act Amendment of 1992," 1992) continue to emphasize employment opportunities for people with a disability. More recently, the reauthorized Developmental Disabilities Assistance and Bill of Rights Act ("Developmental Disabilities Assistance and Bill of Rights," 2000) maintains the emphasis on employment as a life goal activity. Even with this legislation, there is a gap in employment between disabled and non-disabled workers.

Although passage of the No Child Left Behind Act ("No Child Left Behind (NCLB) Act," 2001) and the ensuing mandates dictating access to test data have brought the gap between students with special needs and their non-disabled peers to the fore, the employment outlook for disabled workers remains bleak (Kaye, 2003). Data from Office of Disability Employment Policy for 2011 indicates that the employment-to-population ratio for the population ranging from 16 to 64 years was 17.8% for males with a disability versus 63.9% for males with no disability. For women in that same age group, the ratio was 24.7% for women with a disability and 65.3% for women with no disability (United States Department of Labor, 2011).

There are several issues that exist and can inhibit implementation of the above-mentioned legislation: physical and attitudinal barriers, unrealistic expectations, transportation, and lack of

prerequisite skills or training. Additionally, terms that describe individuals with special needs and the services they need in order to achieve employment have been expanded and clarified to include services such as more intensive job training as well as assistive and rehabilitation technology (United States Department of Labor, 2011)

Technology has become an integral part of children's lives at a very early age (Zeitz, 2005). The ability to use a computer creates more opportunities for people with disabilities to access the job market (Hasselbring & Glaser, 2000). The attributes of keyboarding that make it an effective learning tool for special education students are the same attributes that make it effective for children in general. Students at most levels of intellectual functioning can learn to keyboard and create documents that enable them to claim authorship. Technology has been shown to be an effective method of providing special needs students with opportunities to practice, explore, and communicate in ways that match their disabilities; this conclusion is supported by the Presidential Committee of Advisors on Science and Technology (Technology, 1997) and the U.S. Office of Technology Assessment (OTA, 1995). The latter stated that it is "incumbent upon the public school system to prepare all students to use technology in ways that will allow them to compete in the increasingly complex technological workplace" (Hasselbring & Glaser, 2000, p. 103). Our world is experiencing exponential change and our schools need to prepare all students for the dynamically new environment they will face when they exit school (Jukes et al., 2010). Many applications on the various devices require a user to enter text (Binderup, 1988) and by first grade, many students have already keyboarded letters on an electronic device (Owston & Wideman, 1997). However, when children begin to confront a keyboard without guidance they usually develop their own methods for using the keys. This practice commonly results in habits that will hinder their later typing ability ("Technology and

young children – ages 3 through 8.," 1998). Therefore it is critical to teach keyboarding strategies as soon as it is developmentally appropriate in order to establish efficient keyboarding (Zeitz, 2005).

In the late 1980s, when school computers were beginning to see extensive use, researchers asked if elementary school students would be taught keyboarding so they could operate the microcomputers efficiently (Sormunen, Adams, Berg, & Prigge, 1991). Over twenty years later, the question remains a point of contention for educators. Our current educational system is basically unchanged from that of the 1950's and is rapidly becoming obsolete (Thornburg, 1993) and it has been argued that educators need to shift instruction from lectures, worksheets and standardized tests to instruction that captures learning whenever and wherever it can best happen (Jukes et al., 2010). Technology can empower students to master skills at their own pace (Vize, 2012). Individualized instruction, delivered through new technological media, can be adjusted to individual abilities (Jukes et al., 2010), a move away from age-based achievement and grade level mastery. Children of all abilities and income levels have access to games, phones and electronic devices that require them to point and click, move a joystick or to swipe across a screen; educators must take advantage of this pre-emptive knowledge and build upon it ("Technology and young children – ages 3 through 8.," 1998). Children who start learning the position of the characters on the keyboard have a much better chance of building high accuracy and words per minute test speed (Rogers, 1997). Developing familiarity with the keyboard will facilitate students' later success in computing. Bartholome and Long (1986) described how they were able to successfully introduce primary students to keyboarding using half-hour instructional sessions three times a week. At the end of the semester children were able to keyboard 15-30 words per minute (Bartholome & Long, 1986). In most schools however,

language arts lessons focus on three main aspects: speaking, writing and reading. In today's cyber world, it is essential to add a fourth aspect of language to the classroom curriculum, that of keyboarding (Jukes et al., 2010). Unfortunately, keyboarding skills are not included in most curricula, so even at a very early age students resort to the two-finger hunt and peck method ("Developing young minds: Touch typing lessons in primary schools," 2013). In many public schools, teaching computer skills starts in kindergarten. The National Educational Technology Standards for Students ("National educational technology standards for students.," 2011) for kindergarten students are presented in Table 2.1. These standards outline the skills to be taught, the areas of competence and the expectation for student understanding and proficiency.

Table 2.1 National Educational Technology Standards for Students - Kindergarten

| | |
|---|---|
| **Standard** | Students will demonstrate safe and cooperative use of technology. |
| **Learning Expectations** | 1.1. Students will demonstrate an understanding of the nature and operation of technology systems. |
| | 1.2. Students will exhibit a proficiency in the use of technology. |
| | 1.3. Students will develop basic skills (alpha numeric and symbol characters) in using keyboard using the touch system. |
| | 1.4. Students will communicate about technology using developmentally appropriate and accurate terminology. |
| **Accomplishments** | K.1.1. Students will demonstrate the ability to navigate in virtual environments such as electronic books, simulation software, and Web sites |
| | b. Demonstrate proper care for computer and other digital devices. |
| | c. Use and apply appropriate computer and keyboarding terminology. (National Educational Technology Standards for Students, 2007). |

Most educators agree that, in order to attain these standards, some sort of touch typing program is best (Wetzel, 1985). The federal government seemingly agrees with this conclusion. The "Digital Promise" Initiative (Duncan & Hastings, 2011) announced by Secretary of Education Arne Duncan in September 2011 stresses the need to advance technologies to transform teaching and learning. The key aspect to the Digital Promise is that it will work with educators and researchers, technology firms and entrepreneurs on three challenges: 1) identifying breakthrough technologies, 2) learn more quickly what works and what does not, and 3) transform the market for learning technologies. The response of educators to this initiative resulted in the Common Core State Standards Initiative ("Common Core State Standards Initiative," 2012). The Common Core standards are designed to be rigorous as well as relevant to the real world. They reflect the knowledge and skills needed by students in order to be successful in further education or careers. The new technology standards are planned for use in the academic school year 2014-2015. In order to align with the new standards, most states will require the state writing assessment for grades 5, 8 and 11 to be taken online beginning in the school year 2014-2015 ("Common Core State Standards Initiative," 2012) . It is evident from these changes that learning to keyboard is vitally important to all children.

To improve one's quality of life, one must be able to use technology to some degree. This is as true for people with intellectual disabilities as it is for the general public. In fact, the potential for technology to contribute to a better quality of life for people with intellectual disabilities is more than simply an issue of convenience and becomes one of access (Wehmeyer, Palmer, Smith, Davies, & Stock, 2009). Technology plays an especially essential role for teachers of children with disabilities. Not only does it make some of the routine teaching tasks easier, but technology also allows a teacher to create learning activities and establish learning

environments that enable the child with disabilities to learn and play along with the other children (Dwyer, 1994). In addition, special education teachers can take advantage of the plethora of information about disabilities and assistive technology that is posted on various web sites. Resources, chat rooms, and articles can be accessed to provide current, important information to any teacher, no matter how remote or rural the classroom may be. Contact can be made with consultants, well-known professionals, and other early childhood colleagues for the purposes of sharing curriculum ideas and gaining resource information. The potential for future uses grows daily as new technologies are created and as inventive teachers realize the power computers have as teaching tools and begin to take advantage of their capabilities (Hutinger, 1996).

Effective technology implementation in the special education classroom---or in any classroom---involves a knowledgeable teacher who understands technology's potential for education (Zeitz, 2010). Dwyer (1994) points out that effective technology integration means teachers must change teaching strategies and move from teacher-centered activities to those that are learner centered; that they must become facilitators and collaborators; and that instruction must move from memorization to problem solving. The teacher's role involves arranging the classroom environment, both the physical and the learning environment, to give children access to the technology (Holder-Brown & Parette, 1992). In addition, the teacher must plan developmentally appropriate technology activities that are available to the children throughout the day. Computer software can be used to introduce a concept or to reinforce a concept that has been introduced through more traditional methods (Hutinger, 1996). Undeniably, the role of technology in early childhood special education is that of a tool for learning, communicating, equalizing opportunities, and creating positive changes in the learning environment. Technology

appears to hold great potential for learning for all ages, and research has shown that technology can have especially great impact on the learning of children with disabilities (Sivin-Kachala, Bialo, & Langford, 1997). The potential technology has for all children possibly exceeds any innovation in past educational experiences. But in and of itself technology is no magic wand and to be effective, it must be utilized appropriately. Simply having a computer available for the children is not enough (Bialo & Sivin, 1990). In order to enhance their viability as candidates for the workplace, students with disabilities must take full advantage of all the accommodations technology offers: voice recognition, software that speaks and specialized keyboards (Schartz, Schartz, & Blanck, 2002).

## Keyboarding, Self-Esteem, and Self-Efficacy

Research indicates that use of educational technology can enhance the acquisition of skills and knowledge for students when the computer is used to deliver well designed instruction (Kozma, 1994). A key aspect of technology is found in the acquired skill of effective keyboarding. Researchers have found that children with keyboarding skills: (1) are proud of their work, (2) are better motivated and (3) have improved language arts skills (Waner, Behymer, & McCrary, 1992). Keyboarding provides an alternative to students who have poor fine-motor skills and exhibit poor or illegible handwriting. Students with a sense of pride in their work demonstrate a strong feeling of self-efficacy which could influence on their motivation to learn (Bandura, 1993). Self-efficacy is more concerned with what one can do with learned skills, not the skills themselves (Bandura, 1986). Most students with and without disabilities value the goal of greater control as well as participation in their school or and enhanced social inclusion. Technology is an important support in achieving these goals (Wehmeyer, Tasse, Davies, &

Stock, 2012). Primary students are at the very beginning of their formal educational process and should be provided with opportunities and training that encourages high self-efficacy beliefs (Arslan, 2012). Students with special needs should also be enabled to grow up to be self-sufficient individuals with the beliefs that they can overcome problems in a successful way. (Bandura, 1997) determined that self-efficacy beliefs are formed in harmony with the information children obtain from performance accomplishment, social persuasion, psychological states and vicarious experiences. Accordingly, Arslan (2012) argues that students with weak self-efficacy are less willing to learn, cannot concentrate on their instructional tasks and do not want to either confront difficulties or make efforts to overcome those difficulties. One cannot expect a person with an intellectual disability to raise their level of self-efficacy if they are in a social structure that assumes that they are incapable of self-evaluation (Bandura, 1993). Proper training on future employment skills such as keyboarding could be critical to a person with intellectual disabilities developing a high level of self-efficacy.

Academic efficacy describes the belief that students hold about their ability to learn and be successful in the classroom (Doll et al., 2004). In a classroom, academic efficacy can be a result of being able to tackle challenging learning tasks with instructional supports that make success likely (Bandura, 1986). This efficacy is reinforced when students recognize that other students like themselves are successful at similar tasks such as keyboarding their name. Most importantly, it is strengthened by early and persuasive feedback from the teacher (Doll et al., 2004)). Research has demonstrated that students with higher academic efficacy perform better and progress more successfully through school (Pajares & Johnson, 1995). Students with low academic efficacy often avoid difficult tasks or give up easily. Their commitment to learning is weak and they see their failure to achieve as a sign of their low ability (Doll et al., 2004). A

strong sense of efficacy in one skill area may transfer to a similar skill as evidence that success can breed success (Bandura, 1997). Interest in an academic task is often the initial point for learning that task; focusing their efforts and continuing to work at that task is reliant upon their belief in self-efficacy (Wolters & Pintrich, 1998). Student performance improves as positive efficacy beliefs influence basic cognitive skills such as memory and attention, skills crucial to effective keyboarding. A strong sense of academic efficacy allows students to participate actively, persist longer and to put more mental effort into completing a task and is developed when a student is provided with the opportunity to master moderately challenging tasks with minimum intervention from others (Bandura, 1997). A keyboarding program geared to a student's specific needs that allows the student to move at his own pace could cultivate self-esteem (Watkins, 2005). The more challenging the task, the higher the value a student assigns to that task. Tasks that are too easy hold little value; tasks that are too difficult and require a great deal of assistance lead to failure. Failure can undermine any efficacy beliefs especially if it occurs early in the learning process (Doll et al., 2004). An instructional program that promotes success in computer-based communication, a skill crucial in today's cyber-society, could have a significant impact upon feelings of self-worth (Zeitz, 2010).

Pride in one's work promotes self-esteem (Watkins, 2005). Global self-esteem is defined as the extent to which the person feels positively about the self (Gergen, 1971). This is important as students with special needs often have lower levels of self-esteem than their typically developing peers (LaGreca & Stone, 1990). Children with lower self-esteem are those who consistently do poorly in academic pursuits and often fail (Lawrence, 1996). Professionals within the field of special education agree that building self-esteem in students with special needs is an effective and meaningful way to assist students in adapting to any future expectations in both the

classroom and employment (Dev, 1997). Children with special needs are often aware of their differences and a loss of self-esteem is often the end result. For these children, technology can have multiple benefits on reinforcing learned material and promoting the utilization of new skills (O'Donnell, 2005). When presented with a student who demonstrates low self-esteem and poor self-confidence that affects academic success, carefully selected programs can provide the student with an additional means for receiving positive feedback and encouragement (Brooks & Goldstein, 2001). Instruction that presents opportunities for a child to demonstrate proficiency on a consistent basis can be pivotal to developing self-esteem (Winebrenner, 2003). For most students with disabilities, efficient learning is more likely when there is a social climate that is empowering, motivating, success-oriented, based on mutual respect and highlights responsible classroom behavior (Wentzel, 1991).

In a classroom, the goal should be to learn a new skill, understand something more fully, or perform a specific action (Kavussanu & Harnisch, 2000). Technology that presents information in a variety of ways, including restating directions and objectives provides the students with opportunities to gain practice through seeing, hearing or physically manipulating that information. An appropriate technology program should also present opportunity for repetition as well as a careful balance of immediate feedback and delayed teacher feedback while learning the skills inherent in good keyboarding techniques (O'Donnell, 2005). Students and teachers evaluate performance by monitoring improvement. At the primary grade level, both students with special needs and their typically developing peers utilize the undifferentiated concept of ability to judge the demonstrated competence and are most concerned with mastering that task (Nicholls, 1984). Student perceptions of their competence and accompanying feelings of self-esteem are dependent upon self-referenced accomplishments (Kavussanu & Roberts,

1996). Keyboarding programs that allow children to work at their level, but to their greatest potential, and provide positive feedback, both visually and from the teacher, facilitate a student's self-esteem (Cosden, Brown, & Elliott, 2002). Evaluation is based on a broader set of criteria and progress is individualized rather than compared to classmates. Teacher feedback and the actual task completion, as well as differential expectations are less public than traditional methods (Rosenholtz & Wilson, 1980). A program that allows for this type of evaluation prompts a student to compete within himself and to reward his individual effort. This objective information about oneself, such as seeing a completed sentence, and subjective evaluation of that information can promote a feeling of positive self-esteem (Brooks & Goldstein, 2001; Kavussanu & Harnisch, 2000). Additionally, a keyboarding program that promotes self-evaluation and individualized progress empowers students of all abilities to take control of their own outcomes which engenders autonomy, a sense of ownership and a sense of responsibility (Weinstein, Marshall, Sharp, & Botkin, 1987).

Students are more likely to do well in situations where they feel connected and where they are making a valuable contribution. An opportunity to participate in a class activity reinforces social responsibility and motivates competence and interest (Kozeki, 1985). Possessing a level of competence in keyboarding can also be a motivational factor for students. (Brooks & Brooks, 1993). Robert Brooks described a student's island of competence as any area that is a source of pride and accomplishment, or an area that has the potential to be so (Brooks, 2009). Taking time to develop a students' ability to keyboard can diminish a sense of hopelessness that a student may have from past failures (Watkins, 2005).

Learning Strategies in Typing Programs

Although researchers debate the optimal time for teaching keyboarding (Neiman, 1996), they agree on the importance of learning to keyboard in order to be successful in today's technological society (Toppe, 1991). State school systems are beginning to require online testing for the writing component as early as fifth grade ("Common core standards, K-12: Technology," 2012); the evolving testing programs associated with Common Core Writing standards will require keyboarded responses and will no longer be handwritten ("Writing assessment revision," 2013). This researcher had noted that the default keyboarding utilized in the local school system did not meet the needs of her students with cognitive disabilities, thus initiating the design of a program that successfully met those needs. Students with intellectual disabilities need instruction that is systematic and explicit, repetitive in its use of routines, self-paced and motivating (Everhart, Alber-Morgan, & Park, 2011). Students also require large amounts of repetition to make meaningful progress (Allor, Champlin, Gifford, & Mathes, 2010). Gagné (1984) stated that there are two steps critical to utilizing the conditions of learning theory. The first step would be to specify the type of learning outcome desired and the second would be to determine the events of learning, or the factors that make a difference in instruction (Timperly, 2007). In keyboarding, two of the outcomes to be considered are intellectual skills, which include rules, procedures, and concepts, and motor skills. Intellectual skills can be acquired quickly, but motor skills develop gradually with deliberate and consistent practice (Ericsson, Krampe, & Tesch-Römer, 1993). For students with intellectual disabilities, it is often crucial to employ developmentally appropriate instruction (Kostelnik, Soderman, & Whiren, 1999). Instruction is often organized to reach the middle segment of a classroom and is not developmentally appropriate in terms of a student's prior knowledge or fine motor skills.

Unique Features of ColorCoded Keyboarding©

In this study two introductory keyboard programs will be contrasted. Type To Learn4®, designed by Sunburst Technology (Sunburst Technology, 2008) uses lessons that are appropriate for students who already know their lower case letters and have developed the fine motors skills commensurate with the pace of the lessons; it is not always the case with their peers with disabilities. For these reasons ColorCodedKeyboarding© (Blazek, 2012) instruction starts with the student keyboarding first name in upper case letters. The program then uses colors as visual cues and allows the student to use a finger placement that feels natural to him. The combination of experience (the learner's first name) and motor skills (pressing the keys) enables a student with special needs to sequentially and successfully integrate differing mental processes (Youssefi & Youssefi, 2012). The lessons are developmentally appropriate for the individual student's ability. In developmentally appropriate instruction, the social environment is important (Standifer, 2009). Students receive ideas, opinions and feedback that support their feelings of self-efficacy and self-esteem and compare their present work with their previous efforts to determine progress (Ames & Ames, 1984). Another benefit to utilizing developmentally appropriate instruction is that it avoids the conflict inherent when material outpaces the student's knowledge and abilities (Meece, 2002). Developmentally accurate instruction should incorporate active exploration and hands-on activities as suggested by (Bruner, 1985). Developmentally appropriate programs should:

- Provide opportunities for children to engage in active exploration and interaction.
- Allow children to stay active as the engage in self-directed learning
- Have children work independently or in small groups.
- Allow children to work with concrete, hands-on activities.

- Monitor children's work to ensure continued involvement.
- Focus on process and not always insist on one correct answer all the time (Meece, 2002).

Students with intellectual disabilities frequently struggle with memory retention. However, various strategies can be utilized to improve these problems. Repetition is one of the best ways to learn and retain new information, so teachers should constantly review concepts with students struggling with memory loss problems. The more a student practices a task, the more likely he is to retain that information (Richards, 2008). ColorCodedKeyboarding© (Blazek, 2012) employs repetition as the major strategy in learning key location; Type to Learn 4® (Sunburst Technology, 2008) utilizes finger position and touch-typing. Repetition is perhaps the most intuitive principal of learning (Weibell, 2011) and has long been so recognized. Through shaping, or teaching a goal behavior by reinforcement of successive approximations to that behavior, Skinner was able to teach new behaviors that do not naturally occur (Peterson, 2004) and through vanishing, or the gradual fading of cues which prompt a desired behavior, enabled the performance of behavior without the need for detailed cues to prompt its occurrence. Skinner also discovered that a significant change in behavior is often obvious as the result of a single reinforcement (Skinner, 1938). In the psychology of learning, it is easy to confuse the effects of repetition on a single association of stimulus and response with the effects of practice on the development of skill. In learning any skill what must be acquired is not an association or any series of associations, but many thousands of associations that will connect specific movements with specific situations (Gergen, 1971). The repeated stimulus-response pairings and multiple reinforced trials of behavioral learning theory are paralleled in cognitive learning theory by concepts of repeated presentation, rehearsal and review (Weibell, 2011). Fleming (2002)

reported that frequent repetitions were necessary to get to the point where keystrokes could be reproduced from memory. The work of these researchers as it applies to keyboarding has been replicated in contemporary studies by Hoot (1986) and Crews, North, and Erthal (2006).

Under ordinary learning circumstances frequent repetitions are indispensable in order to make possible the reproduction of a given content; (Brooks & Brooks, 1993) this is even more necessary when the students have intellectual disabilities (Pintrich, 2004). Information prompts the emergence or enhancement of cognitive structures that enable us to rethink our prior ideas (Brooks & Brooks, 1993). Development is the result of repeated patterns of exercise of the reflex, the circular reaction, the reuse of known schemes of assimilation employed in novel situations, and the gradual accommodation to real life through repeated use (Piaget & Cook, 1952)

According to Bruner (1964) it is only through the exercise of problem solving and the effort of discovery that one learns the working heuristics of discovery. The more a student has practice, the more likely he is able to generalize what he has learned into a style of problem solving or inquiry that serves for most tasks (Bruner, 1985). Bruner also believed that it was by translating redundancy in the environment into a model that the child is able to go beyond the information before him (Bruner, 1964). The importance of repetition to Bruner's concept of learning was particularly clear in his description of the spiral curriculum which he believed revisits basic ideas repeatedly, building upon them until the student has grasped the full concept that goes with them (Bruner, 1960). Bruner's concept of the spiral curriculum builds on presented ideas that repeated experiences proceed in a spiral, passing through the same point at each new revolution continuing to a higher level (Standifer, 2009). Through repetition, the need for sign-mediated association and the process of internalization takes place. CCK© employs

repetition as the major strategy in learning key location; TTL4© utilizes finger position and touch-typing. Proficiency requires practice; the more a student practices at a particular level the more comfortable he becomes. Once a student becomes comfortable with a keyboarding task then it is easier to move forward to a task that is more challenging

Authentic instruction involves the use of names or events that are familiar in a child's environment (Hughes, 2013). Children recognize franchise logos, such as McDonald's ®, long before they learn the names of the letters that make up that logo (Herrington & Herrington, 2006). To a child, there is nothing more important than his own name. Using names to teach letter recognition is a very powerful teaching tool. Names are very meaningful to children, therefore they are eager to learn to identify the letters in their own names (Levin, 2013). ColorCoded Keyboarding© (Blazek, 2012) uses a student's first name to begin teaching letter placement. The names, words, and sentences are taught in all upper case letters as the keyboards are in all upper case letters. The goal at this point of instruction is letter/key matching and letter recognition. The transition to words and sentences comes at a later point in the instruction.

It is evident that keyboarding is a skill necessary in the 21st century, and that this point is true for persons with intellectual disabilities. This review supports the use of learning and teaching strategies such as repetition and authentic materials to teach keyboarding to students with intellectual disabilities. A program specifically designed to allow a student the repetition necessary for the mastery of letter recognition and key position, especially one that utilizes objects that are familiar to the student will help ensure success. Success, in turn, promotes self-esteem and engenders a higher level of self-efficacy. Keyboarding, then, is an essential skill that can improve options for employment and promote aspects of emotional well-being for persons with intellectual disabilities. An essential question then is how best to promote the skill in

populations of individuals with intellectual disabilities? This study will examine two keyboarding programs to determine which program is most effective in teaching keyboarding to persons with intellectual disabilities.

# CHAPTER III

# METHODOLOGY

This chapter describes the research design, the population and sample from which the data were collected, the type of data collected and analyzed, and the instrumentation procedures. Approval of the Institutional Review Board at the University of Tennessee at Chattanooga (Appendix A) as well as parental permissions (Appendix B) was obtained to ensure the protection of the children involved in the study. Teachers agreed to participate (Appendix C) and approval to conduct the study was acquired from the school principals (Appendix D) and the Office of the Superintendent (Appendix E). Due to the functional level of the students involved in the study there was not a student assent form only Parental/Guardian consent (Appendix B). These permissions were completed before any aspect of the study was implemented.

## Research Questions

This study evaluated two methods of teaching keyboarding skills to young children with developmental disabilities and compared data from the two programs that focused on accuracy of key strokes, correct punctuation, capitalization, and spacing. Teachers provided data regarding changes in student behavior that may have indicated changed levels of self-efficacy and self-esteem.

The following research questions were addressed in this study:

1. Will there be a significant difference in the levels of accuracy in students trained in ColorCodedKeyboarding© (Blazek, 2012) than students trained in Type to Learn 4® (Sunburst Technology, 2008)?

   Hypothesis: The students receiving training on ColorCodedKeyboarding© (Blazek, 2012) model will demonstrate higher levels of keystroke accuracy than those using Type to Learn 4® (Sunburst Technology, 2008).

   Null Hypothesis: There will be no difference in the accuracy levels of keyboarding strokes between the students in the two keyboarding programs.

2. Will students trained in ColorCodedKeyboarding© (Blazek, 2012) achieve higher rates of accuracy in the utilization of capital letters, punctuation, and spacing than students trained in Type to Learn 4® (Sunburst Technology, 2008) program?

   Hypothesis: The students receiving instruction in the ColorCodedKeyboarding© (Blazek, 2012) program will demonstrate a higher rate of accuracy in the use of capital letters, punctuation, and spacing then those in Type to Learn 4® (Sunburst Technology, 2008).

   Null hypothesis: There will be no difference in the accuracy rates in using capital letters, punctuation, and spacing.

3. Will teachers indicate a preference for either program (ColorCodedKeyboarding© (Blazek, 2012) or Type to Learn 4® (Sunburst Technology, 2008) in regards to ease of use, materials, progress monitoring and student outcomes?

4. Will teachers see changes in behavior potentially associated with increases in the level of self-esteem of students using either CCK© or TTL4 program?

5. Will teachers see changes in behavior potentially associated with increases in self-efficacy in the students using either CCK© or TTL4®?

## Overview of Methodology

This study involved a quasi-experimental comparative approach to analyze data collected from two existing keyboarding programs used in the local school system. Students in the participating elementary schools (K-5) participated in one of these two programs as part of their school program. Participation in the program and subsequent progress was tracked on the student computers. This information was available to teachers, administrators, parents, and guardians. A baseline assessment utilizing the pangram ‘‘The quick brown fox jumps over the lazy dog’’ was given at the beginning of the program to determine what skill level, if any, is present. The end of semester data, consisting of scores from the same timed, single sentence assessment measure, was analyzed to determine if there is a difference between the scores of those students who participated in the default-keyboarding program and those of the students who were participants in the experimental program. The assessment measured the number of correct keystrokes and proper use of capitalization, spacing, and punctuation and used these as elements of analysis to form conclusions regarding program efficacy. There is no set standard for how fast young children should be expected to keyboard at a particular grade level (Hartman, 2005). However, research does provide insight as to what expectations schools may have when setting goals for their students. Table 3.1 represents suggested expectations for children in elementary school (Nicholson, 2004), as well the rates (Words per Minute) that are commonly accepted among elementary school technology teachers (Murray, 2011).

Table 3.1 Keyboarding Expectations – Words per Minute (WPM)

| Grade Level | Recommended Typing Speed (WPM) | Murray (WPM) |
|---|---|---|
| 3 – Lower | No expectations. Focus on accuracy | 15 |
| 4 | 14 | 25 |
| 5 | 17 | 30 |

Population and Sample

The study involved six Comprehensive Development Classrooms (CDC). At the location of this study, a comprehensive development classroom is defined as a small, highly structured environment where core academics are addressed at the student's instructional level while tying the instruction to curriculum standards. Generally, students in a CDC have cognitive deficits across the curriculum that places them significantly below grade level. Placement in a CDC is decided by the instructional team ("Special Education Services," 2014).

Of the six, three of the classes participated in the experimental program, ColorCoded Keyboarding© or CCK© (Blazek, 2012). Initially there were 21 students in the This experimental group; this number was reduced to 19 prior to the beginning of the study. This group contained students ranging in age from 5 years, 7 months to 11 years of age. The average age in the primary grades was 5 years, 7 months; the average age in the intermediate grades was 8 years, 2 months, and in the upper elementary grades, the average age was 9 years, five months. The remaining three classrooms utilized the control program Type to Learn 4® (TTL4®) (Sunburst Technology, 2008). In the experimental group, the majority of students ($n$= 14) were identified as Intellectually Disabled; five other students were identified as Autistic. There were 23 students in the control group, ranging in age from 5 years 3 months to 10 years, 9 months. The average age in the primary grades was 5 years, 8 months; in the intermediate grades the

average was 8 years, 1 month, and in the upper elementary the average age was 10 years, 9 months. There were 19 students with an identification of Intellectual Disability and 4 additional students were identified as Autistic.

Specific information about the level of cognitive functioning was not available although historically students in a Comprehensive Development Classroom have intelligence quotients between 40 and 60.The researcher was unable to technically verify that this score range of intellectual capacity was in place; however, there was no evidence to suggest otherwise.

The control classrooms ( *n*=23) utilized the control program Type to Learn 4® (TTL4®) (Sunburst Technology, 2008). In the experimental group, one student moved out of the school system; one came into the program at a date too late to participate, and one student refused to participate in the posttest. There were more boys (59.5%) than girls (40.5%) in the study. There were a higher proportion of boys (57.8%) to girls (42.2%) in the experimental group and a higher proportion of boys (78.3%) to girls (21.7%) in the control group as well. The grade levels ranged from kindergarten to fifth grade; therefore, the ages ranged from 5 years, 7 months to 11 years, 11 months. Table 3.2 describes the distribution of students per grade level for each group.

Table 3.2 Distribution of Students by Grade Level

| Grade Level | Control | Experimental |
|---|---|---|
| Kindergarten | 6 | 6 |
| First | 0 | 0 |
| Second | 2 | 3 |
| Third | 5 | 4[a] |
| Fourth | 3 | 3 |
| Fifth | 7 | 5[b] |

[a] One student refused to participate in posttest
[b] One student left school system

Materials

Type to Learn4® is the default keyboard instructional program used in a local school system. It provides a research-based interactive learning environment to K-12 learners. Technique and ergonomics is emphasized from the beginning of the program and is reinforced throughout. Key location is taught in cumulative sequences where new keys are integrated with previously learned skills and motivational activities are provided to encourage and motivate practice. Diverse student needs are addressed through multiple teacher-selected settings throughout the program. Visual and auditory adaptations are included to extend accessibility to students with visual and hearing impairments. An extensive data management system enables teachers to monitor student achievement and facilitate student progress (Sunburst Technology, 2008). Type to Learn4® builds critical career-technical touch-typing skills through sequential instruction that is individualized for each student's need and keyboarding abilities. Type to Learn4® aligns with the ISTE National Educational Technology Standards for Students (International Society for Technology in Education, 2007) and NCLB Technology Requirements (Zeitz, 2010).

ColorCodedKeyboarding©(Blazek, 2012) is a keyboarding program designed to teach keyboarding skills to children with intellectual disabilities. The program progresses in steps that use letter identification based on sight recognition as opposed to keystroke and finger placement. Function keys, such as punctuation marks, space bar, and shift are color coded to assist with memory. Text to be typed is presented in a variety of ways based on the student level. Mastery is determined by each student's Individualized Education Plan. For example, if a student must show 90% mastery, then the student must correctly keyboard from the model 9 times out of 10 not 90% correct on one trial. Each student's progress is maintained on their individual Word®

document. The program requires the use of colored dry erase markers, a dry erase surface and colored stickers, as well as student name cards for the beginning phase of the program. The sequencing of the program is described in detail in Appendix F. ColorCodedKeyboarding© meets the requirements of the 2012 Common Core Standards for Technology, Appendix G ("Common Core State Standards Initiative," 2012), the ISTE National Educational Technology Standards for Students (International Society for Technology in Education, 2007), Appendix H, and the state technology standards ("Common core standards, K-12: Technology," 2012).

## Procedure

Approval of the Institutional Review Board at the University of Tennessee at Chattanooga (Appendix A) and parental permissions (Appendix B) was obtained to assure the protection of the children involved in the study. Permissions from school administrators (Appendix D) and the Superintendent of Schools (Appendix E) were also obtained prior to the study, and a participation waiver (Appendix C) was obtained from each teacher in the study. Participating teachers were trained prior to the start of the study. Classes were matched as closely as possible based on IQ, age, and disability; one class in each pair participated in the Type to Learn4® (Sunburst Technology, 2008) program while the second class of each pair participated in the ColorCoded Keyboarding© (Blazek, 2012) program. The designation of which keyboarding program was to be used in a particular classroom was determined randomly for each pairing in this study. Each class participated in the designated program twice a week for twenty-minute sessions. The decision to use twenty-minute sessions was based on research that indicated that twenty minutes is the maximum amount of time one can expect a child of early elementary age to remain seated and on task (Dukette & Cornish, 2009). Progress in the Type to Learn4®

program was automatically maintained on the individual school server as part of the program; progress in the ColorCodedKeyboarding© program was maintained as a continuous Microsoft Word© document for each student.

Teachers in the study received training in the teacher-developed program before the study commenced. Teachers who participated in the ColorCodedKeyboarding© (Blazek, 2012) program received the following materials: a copy of the manual (Appendix F) that provided an outline for sequencing and pacing as well as a practice package containing black, red, blue, green, and yellow dry-erase markers, a laminated sheet of lined paper, and a pack of colored stickers. The participating teachers practiced modeling sentences with the markers and stickers on the lined paper as described in the manual. Teachers participating in the Type to Learn4® (Sunburst Technology, 2008) program received training to ensure familiarity with the program as well as assistance in entering their student's data into the program database. In informal sessions with teachers, the researcher introduced the programs and asked teachers in each group key questions regarding the use of the program and the manner in which student information was monitored for each program. Once the researcher was satisfied that all teachers fully understood the programs and how to implement them, the study began. A pretest was administered to all students. The pretest consisted of a two-minute timed test utilizing the sentence "The quick brown fox jumps over the lazy dog." The researcher visited participating classrooms weekly during the first three weeks and twice more before the nine-week study was completed. The visits occurred during the time of keyboarding instruction. A checklist (Appendix I) was utilized to ensure treatment fidelity of both programs.

All students were assessed at the end of the semester on a two-minute timed test using the same sentence "The quick brown fox jumps over the lazy dog." This sentence, an English

pangram that uses all twenty-six letters of the alphabet, is used in multiple states to assess keyboarding skill and is recognized in the business world as an effective assessment of skill ("Typing tests: Pre-employment testing," 2012) . The model was displayed in a manner familiar to the students. This would have included sentence strips, white boards, or the sentence presented on the document itself. The assessment was graded for accuracy by correct number of key strokes, correct use of capital letters, spacing, and punctuation (Table 3.2).

Table 3.3 Activities and Maximum Performance Scores on Timed Tests

| **Activity** | **Maximum Score** |
|---|---|
| Correct letters | 35 |
| Correct spacing | 8 |
| Capitalization | 1 |
| Punctuation | 1 |
| **Total possible** | **45** |

Data were obtained from each classroom and coded for quantitative analysis. Scores are presented in raw numbers. The scores were investigated as to which program obtained the highest percentage of accuracy in four categories: keystrokes, capitalization, spacing, and punctuation. Means, standard deviation, and appropriate test statistics (non-paired t-tests between groups and paired samples *t*-tests between the pretest and posttest scores of the students using the ColorCoded Keyboarding© (Blazek, 2012) program and the Type to Learn4® (Sunburst Technology, 2008) program were then conducted.

Two focus groups, each one consisting of teachers assigned to the same instructional program, (Appendix J) provided information as to teachers' perceptions of the programs. Data gathered through qualitative analysis techniques was evaluated to summarize the experience through the emergence of themes. Questions were formulated to gather information on fidelity of treatment, teacher reactions, and perceptions of student self-esteem and self-efficacy. The focus groups also addressed questions concerning the training, development, and implementation of each program as well as teacher perceptions of self-efficacy and self-esteem (Appendix J).

# CHAPTER IV

# RESULTS

## Purpose of the Study

In this study, the researcher investigated two programs designed to teach keyboarding skills; one a prepackaged software program and the other a researcher-designed program. For the purpose of quantitative analysis, the pretests and posttests were scored for accuracy in keystrokes to determine which program was more effective in developing keyboarding skills. For the qualitative aspect of this study, teachers participated in focus groups that addressed questions regarding their perceptions of the programs and student reactions.

## Research Questions

This study was guided by two quantitative and three qualitative questions using a quasi-experimental comparative design conducted over a fourteen-week period. Quantitative data were collected primarily to measure student progress in the acquisition of specific keyboarding skills. Qualitative data were gathered during two focus group discussions involving the participating teachers. The qualitative data were coded and analyzed utilizing the model described by Ritchie (2003). The data were used to investigate the themes of: a) fidelity of treatment; b) teacher reactions to the training; c) development; and d) implementation of each program as well as teacher perceptions of the students' self-efficacy and self-esteem.

The quantitative questions investigated rates of accuracy and use of capitalization, spacing, and punctuation. The qualitative questions explored teacher preferences for either program, the reasons for their preference, perceptions of behavior changes associated with self-esteem, and possible changes in student self-efficacy due to involvement in a program. Those questions involving teacher observations and opinions are as follows: Will teachers indicate a preference for either program in regards to ease of use, materials, progress monitoring, and student outcomes? Will teachers see changes in behavior potentially associated with increases in the level of self-esteem of students using either CCK© or TTL4 program? Will teachers see changes in behavior potentially associated with increases in self-efficacy in the students using either CCK© or TTL4®?

## Population and Sample

The study involved six Comprehensive Development classrooms. All students in both programs met the criteria outlined and described in Chapter 3. Three of the classes ($n$=19 students) participated in the experimental program, ColorCoded Keyboarding© (Blazek, 2012). The remaining three classrooms, with $n$=23, utilized the control program Type to Learn 4® (Sunburst Technology, 2008).

## Analysis of Research Question #1

The first quantitative research question sought to determine if there would be a significant difference in the levels of typing accuracy between students trained in ColorCodedKeyboarding© (Blazek, 2012) and students trained in Type to Learn 4® (Sunburst Technology, 2008). The null hypothesis was that there would be no difference in the accuracy

rate of keyboarding strokes between the two keyboarding programs. The data in Table 4.1 presents the means and standard deviations for the pretest and posttest for each program. Four comparisons were made: pretests between the two groups, posttests between the groups and pre- and posttest comparisons within groups.

Table 4.1 Comparison of CCK© and TTL4® Pretest and Posttest Means

| | Program | *N* | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Pretest | CCK© | 19 | 16.37 | 17.54 | 4.02 |
| | TTL4® | 23 | 14.78 | 13.50 | 2.81 |
| Posttest | CCK© | 19 | 23.37 | 18.66 | 4.28 |
| | TTL4® | 23 | 17.17 | 16.27 | 3.39 |

To determine whether there was a significant difference between the pretest scores of the two groups an independent samples *t*-test was conducted. It can be noted in Table 4.2 that there was no significant difference between the group pretest means, $t\ (40) = .33$, $p = .742$. This demonstrates that the two samples were equivalent before treatment. Additionally, it can be noted that there was no significant difference in the posttest means between the two programs, $t\ (40) = 1.15$, $p = 2.57$; thus, the null hypothesis of no difference between the groups following training was accepted. This was the main hypothesis for the study; it indicates that although the groups were equivalent at the start of the study program, the training programs did not result in a significant difference between groups at posttest. In order to determine if gains within groups had been achieved, paired samples *t*-tests were run on both groups' pre- and posttests. According to the statistical tests (Table 4.2) the mean for the CCK© pretest was significantly different than the mean posttest score, $t\ (18) = -4.02$, $p < .001$. This suggests that there was a change in the

overall accuracy of the group using the CCK© program during the course of the study. Only the CCK© group achieved a statistically significant within group change. Table 4.2 provides a complete result of all *t*-tests associated with Research Question 1.

Table 4.2 Mean Differences across and within Programs

| | *t* | df | Sig. (2-tailed) |
|---|---|---|---|
| CCK©-TTL4® Pretest Comparison | 0.33 | 40 | .742 |
| CCK©-TTL4® Posttest Comparison | 1.15 | 40 | .257 |
| CCK© Pretest-Posttest Comparison | -4.02 | 18 | .001 |
| TTL4® Pretest-Posttest Comparison | -1.06 | 22 | .299 |

Analysis of Research Question #2

The second quantitative research question attempted to establish whether students trained in CCK© would demonstrate higher rates of accuracy in the utilization of capital letters, punctuation, and spacing than their peers trained in TTL4®. The null hypothesis stated that there would be no difference in the posttest means for capital letters, punctuation, spacing, and combined elements (CSP) between the two programs. To test the hypothesis, an independent samples *t*-test was conducted to determine differences between means across the programs and within each program. The results were analyzed employing a method parallel to that used in Research Question 1. Table 4.3 demonstrates the means for each of the three elements and the means for the combined elements (CSP) for each program.

Table 4.3 Means and Standard Deviations of the Three Elements of CCK© and TTL4®

| | Program | *N* | Mean | Std. Deviation |
|---|---|---|---|---|
| Combined Elements (CSP) Pretest | CCK© | 19 | 2.84 | 3.13 |
| | TTL4® | 23 | 2.65 | 2.42 |
| Combined Elements (CSP) Posttest | CCK© | 19 | 4.68 | 3.92 |
| | TTL4® | 23 | 3.35 | 2.69 |
| Capitalization Pretest | CCK© | 19 | 0.58 | 0.51 |
| | TTL4® | 23 | 0.65 | 0.49 |
| Capitalization Posttest | CCK© | 19 | 0.68 | 0.48 |
| | TTL4® | 23 | 0.74 | 0.45 |
| Spacing Pretest | CCK© | 19 | 1.94 | 2.61 |
| | TTL® | 23 | 1.82 | 2.17 |
| Spacing Posttest | CCK© | 19 | 3.58 | 3.24 |
| | TTL4® | 23 | 2.26 | 2.51 |
| Punctuation Pretest | CCK© | 19 | 0.32 | 0.48 |
| | TTL4® | 23 | 0.17 | 0.39 |
| Punctuation Posttest | CCK© | 19 | 0.42 | 0.51 |
| | TTL4® | 23 | 0.34 | 0.49 |

In order to establish equivalency independent samples *t*-tests were conducted that compared the pretest scores between the two programs for the combined elements (CSP) as well as for each of the three components. Table 4.4 illustrates the mean differences for pretest results for the individual and combined elements (CSP) for each program. It can be seen that the combined elements of capitalization, spacing and punctuation (CSP) pretest difference between CCK© and TTL4® is not significant, $t$ (41) = .22, $p$ =.83. It can also be noted that the individual differences in the pretest means for capitalization, $t$ (41) = -4.76, $p$ = .64, spacing, $t$ (41) = .164, $p$ = .87, punctuation, $t$ (41) = 1.064, $p$ = .29, are also not significant. These tests indicate that the groups were equivalent. There was also no significant difference in posttest mean comparisons for the combined elements of capitalization, spacing, and punctuation (CSP). However, as demonstrated in Table 4.4 the mean difference in the CCK© pretest to posttest scores for the

combined elements (CSP) of capitalization, spacing and punctuation was significant, $t$ (18) =-4.31, $p < .000$. Similarly, the pretest and posttest difference for TTL4® programs for the combined elements is also significant, $t$ (22) =-3.27, $p < .003$: the null hypothesis in both instances was rejected. Student scores in both programs improved from baseline levels even though one instructional strategy did not yield superior results.

To make more in-depth comparisons of the features of the programs paired samples $t$-tests were conducted on the individual components of each program. Six possible comparisons were made on the pretest to posttest differences for each program in the areas of capitalization, spacing, and punctuation. Of the six comparisons, only two were found to be significant. The mean for the pretest to posttest difference in spacing for CCK©, $t$ (18) = -4.20, $p < .001$, was significant as was the mean for the pretest to posttest difference in spacing for TTL4®, $t$ (22) = -2.65, $p < .015$. For both programs, the null hypothesis was rejected for spacing but not for the elements of punctuation and capitalization.

Table 4.4 Pretest Mean Comparisons for Combined and Individual Elements

| | *t* | *df* | Sig. (2-tailed) |
|---|---|---|---|
| Combined Elements (CSP) | | | |
| CCK©/TTL4® Pretest Comparison | .22 | 41 | .83 |
| CCK©/TTL4® Posttest Comparison | 1.30 | 40 | .20 |
| CCK© Pretest-Posttest Comparison | -4.31 | 18 | .000 |
| TTL4® Pretest-Posttest Comparison | -3.27 | 22 | .003 |
| Capitalization | | | |
| CCK©/TTL4® Pretest Comparison | -4.76 | 41 | .64 |
| CCK©/TTL4® Posttest Comparison | -3.83 | 40 | .70 |
| CCK© Pretest – Posttest Comparison | -.81 | 18 | .429 |
| TTL4® Pretest – Posttest Comparison | -.81 | 22 | .426 |
| Spacing | | | |
| CCK©/TTL4® Pretest Comparison | .164 | 41 | .87 |
| CCK©/TTL4® Posttest Comparison | 1.49 | 40 | .15 |
| CCK© Pretest- Posttest Comparison | -4.20 | 18 | .001 |
| TTL4® Pretest- Posttest Comparison | -2.65 | 22 | .015 |
| Punctuation | | | |
| CCK©/TTL4® Pretest Comparison | 1.064 | 41 | .29 |
| CCK©/TTL4® Posttest Comparison | .476 | 40 | .64 |
| CCK© Pretest – Posttest Comparison | -.81 | 18 | .429 |
| TTL® Pretest – Posttest Comparison | -1.28 | 22 | .213 |

## Development of Focus Groups

The participants in the focus groups included the six teachers involved in this study.. Three teachers utilized the Type to Learn 4® keyboarding program; although Type to Learn 4® has been available to all teachers, none of the teachers had ever used the program. The other three teachers used the ColorCoded Keyboarding© program (Blazek, 2012); this study was their first exposure to ColorCoded Keyboarding©. At the beginning of the study, the teachers learned that participation in the study would involve focus group discussions about the program. At that time, they received a list of the questions that would be discussed in the focus groups. The questions were developed in order to establish the ease of use of each program, materials, progress monitoring, and student outcomes as well as the influence of each program in terms of student self-esteem and self-efficacy. The sessions were recorded, and the resulting data were analyzed for themes (Bowler, 2009), transcribed, and color coded for ease of analysis.

During the focus sessions teachers were asked to state their opinions and perceptions of the various aspects of the program they utilized in their classroom. For the sake of clarity, those teachers in the TTL4® program are listed as Respondents T1, T2 and T3; those in the CCK© program are identified as Respondents C4, C5, and C6.

## Analysis of Research Question #3

The first qualitative question discussed teacher perceptions for their program in regards to ease of use, materials, progress monitoring and student outcomes. It was noted by the interviewer that there were two definitive themes in respect to ease of use: the first being teacher use as in setting up the program, instruction, and progress monitoring, and the second being student use for logging in and following instructions. With regards to teacher use, Respondent T1 indicated

that entering student information at the onset of the TTL4® program was difficult. Respondents T1 and T2 also mentioned that they found that TTL4® did not save the information for each session if the student stopped typing or if the lesson was not completed. Respondent T3 concurred with this assessment. She added that she felt the time allowed for response in "each lesson was not adequate for her students." All three respondents stated that once the program was installed and they were able to enter the student information, there was no additional set up time or preparation needed; all agreed that this was a positive aspect of the TTL4® program. All three respondents indicated that although the progress monitoring was automatic on TTL4®, it was not useful; if students stopped typing or were too slow in finding the correct key then the program would revert back to the start of that lesson. Respondent T1 said that students could repeat a lesson several times and still not master it in terms of finding the correct key in the allotted time frame. She felt that there was no room for teacher instruction in the program; all instruction was done through practice in each lesson.

Teachers who participated in the CCK© program provided feedback regarding teacher use as well. Respondent C5 indicated that while the set up for each session took more time than the TTL4® program, she felt that the individualization of the program compensated for that time. Respondent C4 stated that "it's also really cheap (inexpensive) and tailored to each student." She felt that progress monitoring was easy and that student outcomes were evident to both her and the student. Respondent C5 explained that

> "Every kid was at his own level, so any teacher directed instruction came at different points. Me [*sic*] or my assistant just monitored what was going on at the computers while we worked at other centers. If I needed to teach a new skill, like using the shift key, then I would just go over and show the student how to do it. After a few tries, he usually got it and I would go back to another center."

C4 said that the included instruction manual assisted the user with step-by-step pictures and text. All three CCK© respondents indicated that once they adapted to planning ahead and having each student's set up ready, CCK© was very easy to use. Respondent C4 felt that CCK© "provided students with the visual cues on the keyboard that promoted key memory, which in turn increased typing speed and comprehension of material." She added that because the visual model looked inviting, the students perceived the keyboarding assignment as fun. Respondent C6 designated CCK© as her preferred program as "it was based on a kid's individual level and kept their attention." Respondent C4 submitted that she was impressed by how quickly she saw results with her students.

A secondary theme surfaced while discussing the ease-of-use for each program which respondents identified as student use. TTL4® participants pointed out that while some students were capable of logging themselves onto the program and finding the correct lesson (Respondent T1 had two such students; T2 had one such student and T3 had none); the majority of the students needed a teacher or paraprofessional to log them in and select the lesson. The teachers in the TTL4® group agreed that once the students were logged on, they restarted the lesson when needed and followed the verbal instructions within the lesson on their own. Teachers in the CCK© program stated that they because they were responsible for the initial set up such as writing or typing the words or sentences for each student, their students were precluded from having to log in and/or find and select the lesson. Students proceeded directly to their computers and began typing. Respondent C4 stated that she was impressed by how well the students understood the program.

To summarize, those teachers using TTL4® indicated that the initial set-up was tedious, but that once all students were entered into the system the program itself was very easy to use in

terms of teacher involvement. All TTL4® teachers stated that although it was very easy for students to get on their program the program itself was too fast paced for most students. The teachers involved in the CCK© felt that the set-up process for that program was more intensive and time-consuming than that of TTL4®. However, the three teachers stated that they felt it was time well spent as it provided highly individualized instruction for each student. Those same teachers expressed the opinion that the pacing in CCK© was good as it was designed to teach each student at his own level.

Analysis of Research Question #4

In discussing this question, teachers were asked if they saw behaviors that could be associated with increased levels of self-esteem. The teachers who participated in the TTL4® program pointed out that although students could theoretically log themselves in, only a few students were able to do so. While those students who were able to log in were very proud that they were able to do so, the teachers noted that most students did not seem to care as long as they were able to access their program. The respondents indicated that once the students were logged in and the proper lesson was selected (either by the student or a teacher or paraprofessional) the students could continue without additional outside assistance. Respondent T2 noted that the students liked this feature. Respondent T1 stated that if students paused and the lesson repeated, then the student had to start over again; this resulted in increased levels of frustration and off-task or inappropriate behaviors, which could be considered indicators of engagement and self-esteem. Respondent T2 indicated that some of her students would turn off the computer rather than repeat the lesson multiple times. All three respondents stated that the students had difficulty

getting past the pretest. T3 stated that “it [the computer pretest] did not give my students enough time to find and press the right key.”

The CCK© teachers stated that although they had to open the Microsoft Office Word® document and move the cursor to the correct starting point for each student, after that point the students were able to proceed without direct intervention. Respondent C4 stated that teacher-directed instruction occurred when a student mastered a concept and needed to move to a new point; she stated that she was able to do this on an individual basis and that it usually took “only two or three times of me showing him how to do something” before the student was able to proceed on his own. Respondents T3 and C5 agreed with her and added that on the CCK© program, the students were able to move at their own rate and finish within a reasonable time frame. All three CCK© respondents felt that student participation was good; they also indicated that the majority of the students were willing to go to the journaling centers. Two of the three TTL4® teachers felt that students got frustrated with the pace of the program, and it became increasingly difficult to engage them in the journaling sessions. Respondent T2 agreed with the others with one exception; she had one student who liked the pace of the programmed lessons and appeared to enjoy the increasing levels of difficulty. Conversely, she had one student who became so frustrated that he refused to participate. Respondent T3 stated that “mine were older and did not balk at going to the computers”, but did not appear to have much fun and jabbed at the keys. While formal assessments of self-esteem were not included in this research, information from teacher observations suggested that there were increased levels of self-esteem with the students using the CCK© program throughout the duration of that program. The teachers felt that this was most likely due to the self-pacing aspect of that program. The teachers who utilized the TTL4© program offered the opinion that the students who were capable enjoyed

the ability to log themselves in, however, they felt that this feature was unable to balance out the frustration that their students encountered with the fast pace and redundancy of lessons. Overall, the CCK© participants felt that, based on what they observed, the program increased the self-esteem of their students; the teachers employing TTL4® indicated that the majority of their students struggled with the program and that they did not see a rise in student levels of self-esteem.

Analysis of Research Question #5

The final research question dealt with whether teachers saw changes in behavior potentially associated with increases in self-efficacy. T1 and T2 felt that the frustration levels caused by the inability to finish a lesson caused the students to feel that they were incapable of doing well; some students voiced complaints about having to do "that stupid [*sic*] work" and remarks about not being able to do the work. The teachers felt that this self-defeating attitude was responsible for student reluctance to participate and possibly an increase in inappropriate behavior such as turning off the computer, pounding the keyboard, or leaving the center. All three teachers reported increasing resistance to participation at the computer center as the semester progressed and that they all saw their students becoming increasingly frustrated. One teacher reported that she had one student who did enjoy the TTL4® program; he was challenged by the pace and the differing levels and she was going to keep him on that program. All three respondents stated that their students with autism did slightly better with the pacing on the program until the lessons went to letter combinations such as "jf, kd, etc." The three teachers indicated that they felt that at that stage in the program there was not enough time allowed for the students to locate two keys.

All CCK© teachers agreed that the students appeared to feel good about their ability to type. C4 declared that this did not mean she "never had any behavior issues; there might be a day when one of the kids just didn't want to do his work" but generally the journaling center (where CCK© took place) was one of the favorite activities. C5 shared that she had one student who came in every Tuesday and Thursday morning happy that "we gets to [*sic*] journal today." The teachers felt that the ability to keyboard successfully and meaningfully empowered the students. C6 printed out each student's results for the semester and gave the printouts to the parents for an end-of-semester report and that one parent was "stunned at what his child had done." Some of the students were able to tell their parents that they typed their names "when they were little" but that "now they were typing big lines [sentences]." C5 and C6 stated that the principals in their buildings made a "big deal" about their keyboarding progress in school-wide assemblies, due to the state mandates on keyboarding. C6 indicated that her students were so proud of their achievements and told her that "they could do something that them [*sic*] other kids couldn't do." C4 said that it was exciting to have her students want to participate in a challenging activity and to see them do well in that activity. Respondent C6 reported that she observed very little off-task and self-defeating behaviors during CCK© journaling. Respondent C4 stated that her students had never had to type before and showed some initial frustration but that it did not last long. Keyboarding quickly turned into the favorite center and that "some students even asked to continue typing more information into their journal entries."

The respondents in the TTL® program did not see an increase in potential behaviors associated with self-efficacy; the teachers in the CCK© program did see an increase in their students' feelings of self-efficacy. All six respondents felt that possible reasons for the increased levels, or lack of same, were the pacing of each lesson and the end products for each student.

Respondents T1 and T3 stated that they would not continue using the TTL4® program for instruction; they intended to implement CCK© for the remainder of the year. Respondent T2 indicated that she might continue use TTL4® for one of her students. This respondent indicated during a site visit that she had one student who enjoyed the increasing difficulty of the TTL4® lessons; she reiterated this fact during the focus discussion. This teacher also noted that by the end of the semester she had one student who "wouldn't even try towards the end of the nine weeks" on the TTL4® program and she was "unable to get a posttest score for him." Respondent T2 specified a desire to learn to use CCK© for the second semester with her other students. The three teachers who participated in the CCK© program listed several reasons for continued use of the program: ease of use, individualized pacing, student response, one-on-one instruction, and cost.

In summary, the three respondents in the experimental program felt that ColorCoded Keyboarding© (Blazek, 2012) was an effective program for utilization by children with special needs in terms of ease of use, student outcomes, materials, and progress monitoring. Two of the TTL4® respondents did not feel that the TTL4® program met the needs of their students; one of those respondents stated that she was now more familiar with CCK© and would be using it for the duration of the school year. The second teacher in the control group expressed her desire to learn more about using CCK© with the possibility of implementing that program for the remainder of the school year. The third teacher using the TTL4® program indicated a desire to use CCK© based on what she had learned throughout this study and stated that she would use CCK© for her students next year with the exception of one student who did well with TTL4®. She stated that he appeared to enjoy the increasingly difficult levels in that program.

# CHAPTER V

# SUMMARY AND DISCUSSION

This chapter will provide a summary of the study; it will re-visit the statement of the problem, the purpose, and the methodology. Chapter Five will conclude with the findings, implications of the results, problems in the study and recommendations for future research.

## Statement of the Problem

As established in the literature, keyboarding is clearly an essential skill to possess in today's technology-driven society. There are large numbers of students in public schools with intellectual, cognitive, or physical delays that affect their ability to learn. These students could leave school without the skills, such as keyboarding, that are necessary for gainful employment (Wehman & Bricourt, 2001). Without marketable skills these students may face a future that could consist of living in poverty and subsisting on government supplements, or being forced to live in institutionalized care (Emerson, 2007). There are software programs available to teach keyboarding skills; however, these programs are not necessarily appropriate for students with special needs, especially those with intellectual disabilities. This study compared two keyboarding programs, ColorCoded Keyboarding© (Blazek, 2012) and Type to Learn 4® ((Sunburst Technology, 2008) and the results of scores on pretests and posttests in both programs. ColorCoded Keyboarding© (Blazek, 2012) is a teacher designed program that builds sequentially on skills. Each student learns at his own level and progresses at his individual pace. Type to Learn 4®(Sunburst Technology, 2008) is a computer driven program designed to

develop typing skills; it is also based on individual skill levels. A quasi-experimental comparative research design was utilized to gather quantitative data that evaluated student performance on two programs designed to teach keyboarding skills. The researcher then compared the means for pretests and posttests across and within the programs for accuracy of key strokes, capitalization, spacing, and punctuation to determine whether there was a significant difference in student progress in either program. For qualitative data, the participating teachers were interviewed in discussion groups at the conclusion of the study. The questions focused on the following topics: a) teacher reactions to the training; b) development and implementation of each program; and c) teacher perceptions of the students' self-efficacy and self-esteem. In chapter four, the researcher summarized the analyses of the quantitative data and presented the results of the discussions held in the focus groups.

## Findings

As noted in the quantitative analyses of the data, with the exception of the combined elements and spacing, there was no significant difference in the pretest and posttest means of the two programs, possibly due to the large standard deviations caused by the wide variances of scores. Some students scored a zero on their pretest whereas others scored thirty. There was a significant gain in the combined elements of spacing, capitalization, and punctuation that was probably related to the statistical significance in the spacing components in both programs. Overall, there was a significant amount of progress within the CCK© program. The mean gain of accurate strokes in the CCK© program for the duration of the study was seven strokes; the mean gain in the TTL4® was three. Those same students exhibited a significant increase in the use of capitalization and punctuation over the time allotted for the study. This could be explained by the fact that the TTL4® program does not begin instruction on capitalization or punctuation until the

entire first level is mastered; CCK© begins the use of capitalization as soon as a student masters his first and last names in upper case. Punctuation is taught as the student begins sentences. The large gain in the CCK© program implies that young students with intellectual disabilities could successfully learn to keyboard if the program is designed to meet their individual needs.

When discussing the outcomes of the study with the teachers in the study this researcher found there is a limited relationship between the statistical data and the qualitative data collected from the teachers. The teachers provided valuable input during the focus discussions in regards to how their program worked in terms of ease to use, monitor, and assess. The respondents also provided information as to which aspect of the program they felt was most effective in teaching their students. It appeared that the TTL4® program was the easy to use in terms of set up, but teachers found it difficult for the students to use independently during the instructional process. Teachers also noted that although it was difficult to get all the students logged into the program, once the students were into the school-wide server, the program was easy to access. The lessons had a timed response period, and due to student delays often timed out and started over. The TTL4® lessons were self-monitoring and provided teachers with information on student progress throughout the program. The major concerns with TTL4® were the pacing of each lesson and the automatic restart when students were late in striking the requested key.

Those teachers using CCK© stated that it was somewhat tedious to set up as each lesson was tailored to the individual student and had to be typed or written prior to the class period. The respondents indicated that CCK© required planning ahead and prior preparation but liked the fact that it provided daily assessment and also provided students with a product that could be viewed by other students, teachers, parents, and administrators.

In terms of student use, TTL4® needed a teacher or paraprofessional to log on and locate the correct lesson for the majority of students; there were three students who were able to log themselves onto the program and find the correct lesson. CCK© students were able to go directly to their computers and begin keyboarding as set up was completed prior to student usage. Those teachers utilizing TTL4® did not do any direct instruction as the program is computer based and requires no teacher involvement other than set up. CCK© teachers had to teach the students how to use the visual cues and intervene when a new symbol or character was introduced. Those who implemented TTL4® felt that the inability to keep up with the pacing in the lessons caused most students to feel inadequate. There was one notable exception to this; one student enjoyed the increasing levels of difficulty in the program.

The teachers in the TTL4® program indicated that the students involved in TTL4® did not appear to show higher levels of self-esteem. Based on their observations, teachers felt that, with one exception, students were frustrated with the pacing of the lessons and their inability to locate the proper key in the allowed time. Some students were unable to transition from the lower case letters presented in the lesson and the upper case letters on the keyboard. Due to the issues connected to pacing TTL4® students appeared to feel they were not able to perform well on the program; this could lead to low self-efficacy. Teachers reported that some students were so upset over their inability to successfully complete a lesson that they refused to work at the journaling center. In direct contrast, those students on the CCK© program appeared eager to go to the computers for keyboarding. Students were able to move through a lesson and had a visible product each time that could be printed and displayed. The teachers felt that this contributed to higher rates of self-efficacy; students were proud of their work and wanted to share what they could do with others in the buildings.

## Challenges with the Study

As with any study, there are aspects of the design that could have affected outcomes. One aspect would be the nature of the population involved. Students with disabilities often have emotional and behavioral needs that affect their participation in academic endeavors. Additionally, the range of disabilities and levels of cognitive functioning, although matched as closely as possible, were not identical, possibly reducing the homogeneity of the sample. A larger sample could balance that incongruity. The period of time allotted for the study was brief; it is the researcher's opinion that extended time would have provided more statistically significant results. Accordingly, there are several recommendations for future research on this topic. It would be advantageous to expand both the length and breadth of this study to involve both a larger sample of students and a longer period of time. Extending the length of the study would allow the researcher to determine whether the gain shown in the CCK© program is typical. Formal assessments for self-esteem and self-efficacy were not included in this study; this researcher relied on reported observations. Utilization of formal measurements could be an area worthy of further investigation.

Another component of design that could have an effect on the results would be the regulation and implementation of each program. The researcher made site visits throughout the study to insure that the parameters of the study were being followed, but there is no way to confirm that these guidelines were followed at all times.

## Implications of the Study

An estimated 4.6 million Americans have an intellectual or developmental disability. According to a 2013 poll by Special Olympics and conducted by Gallup and the University of Massachusetts, only 28% of adults with intellectual disabilities are in the work force as compared to 83% of non-disabled adults (Hananel, 2014). There appears to be a culture of lower expectations for individuals with intellectual disabilities beginning with their teachers in elementary school (Standifer, 2009). A lack of marketable skills is cited as one of the reasons for the low employment rate among adults with intellectual disabilities (NICHCY, 2014).

Research has shown that when the work force supports people with disabilities the result is a cost benefit for the rest of the population as those being employed do not need as many social services such as Social Security disability and welfare (Standifer, 2009). Additionally, hiring people with disabilities promotes diversity, transforms a social issue into a business opportunity, expands the talent pool, allows new ways to work more collaboratively, and creates a business atmosphere of inclusion (Larson, 2008). Studies have also shown that employees with disabilities have better rates of retention than their non-disabled counterparts (Nota, 2010). Corporations such as Walgreen's have made it a goal to employ adults with a recognized intellectual disability as at least 33% of their work force in their South Carolina distribution center. The results have been excellent; employee turnover is 50% lower than that among the non-disabled employees; accuracy and productivity measurements were the same for both disabled and non-disabled employees (Huppke, 2012). Examples such as this provoke thought as to what would happen if students with special needs received instruction in job skills, such as keyboarding, beginning at an early age.

In terms of self-efficacy, there appears to be a correlation between levels of self-efficacy and length of employment (O'Sullivan, Strauser, & Wong, 2012). O'Sullivan et al. (2012) also found that early vocational training and technology skills, along with person-environment fit, are essential. The business world in general has a negative perception of people with disabilities thus limiting employment opportunities (Schur, Kruse, & Blanck, 2005). The low expectations and pervasive stigmatizing behavior of parents, teachers, and society in general can result in the potential for low self-esteem (Dagnan & Waring, 2004). Low self-esteem correlates positively to low self-efficacy (Doll et al., 2004). The roots of self-efficacy lie in social experiences and developmental sources developed by: performance experiences, vicarious learning, verbal persuasion, and affective states (Bandura, 1997). According to Bandura (1997), the most influential source of efficacy is mastery experience. Doing a task provides authentic information about a person's ability to succeed at that task. Success at a task raises self-efficacy while failure lowers it (Larson, 2008). If students participate in a program that is individualized for their skill level, it is reasonable to expect that their level of self-efficacy will rise.

## Recommendations for Practice

It would appear that students with special needs who possess technology skills have an advantage over their peers without those skills as they enter the workforce (USDOE, 2013). If this is the case, then those responsible for teaching these students must have the resources available to implement that instruction. A program that is inexpensive, easily implemented, and student-specific can assist in closing the gap for these students and the technology skills they need to acquire. There are multiple products on the market; in a 2014 review, ten programs designed to teach keyboarding were reviewed and compared (Thomson, 2014). Included in the

top ten programs were Typing Instructor for Kids© ("Typing Instructor," 2014), UltraKey© (Beacon, 2014) and Mickey's Typing Adventure© ("Typing Instructor," 2014). It is imperative that teachers find a program that is highly individualized, skill specific and relevant to students (Brooks, 2014). In addition to providing student instruction, a keyboarding program should be easy to use, provide ready and authentic assessment, and consistent progress monitoring. In order to promote higher levels of self-esteem and self-efficacy, traits valued in both school and workplace (Bender, 2008), a tool to teach keyboarding should allow students to feel as if they are being productive by participating in an activity that is worthwhile. A program that provides a demonstrable product could assist students in creating an artifact that they can utilize to validate their work.

Another consideration when exploring the implementation of a keyboarding program would be the area of teacher training. As noted in the literature, the majority of teachers involved in teaching keyboarding have no formal training in keyboarding (Sormunen et al., 1991). In approaching teacher training it is imperative to find a program that is either a) easy to follow, b) requires a training session, or c) has minimal teacher involvement. In this researcher's experience, teachers most often use whatever programs are available for their use; these are usually designed for use by the general population and do not provide adequate accommodations for students with moderate cognitive disabilities.

## Conclusion

A fundamental mission in public education is to create workers who have the skills necessary to fill and perform available jobs and to develop active citizens with a capacity for personal achievement (Peterson & Loreman, 2004). The current emphasis on standardized

testing, Common Core, and NCLB has pushed public education into a system that may not attend well to those children who need a personalized curriculum (Peterson & Hittie, 2003). Instructional materials are geared towards students who fall in the normal range of intelligence, with average skills, learning styles and attention spans (Peterson & Hittie, 2003). If schools seek to provide curricula for all students, then learning activities should be organized to meet the needs of all students. A standardized program is not always the answer for all students. Integration of technology skills, for example keyboarding, requires a holistic approach that utilizes multiple strategies to teach the same skill (Hew & Brush, 2007).

There is little research on keyboarding for children with special needs (Zeitz, 2010). In the current study students in both programs demonstrated growth in acquiring keyboarding accuracy; however, neither program was fully acceptable as both programs displayed areas of weaknesses. Each program also demonstrated strengths; the implication is that, with modifications, it is possible to use packaged programs intended for general education. Moreover, keystroke gains in the researcher-developed keyboarding program appeared to better meet the needs of the students in the study. Continued training in keyboarding and other technology-based work skills is an important goal for this population; a trained workforce promotes benefits to the general population. Whatever instructional model is employed, it is obvious that students with special needs can learn to keyboard, and should be given the same opportunities to develop skills pertinent to gaining employment in today's job market. Hopefully this study demonstrates some of the features that will be useful in developing new training programs.

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# APPENDIX A

# INSTITUTIONAL REVIEW BOARD APPLICATION

# AND APPROVAL LETTER

FORM A:

APPLICATION FOR REVIEW OF RESEARCH INVOLVING HUMAN SUBJECTS

**If your research involves protected health information, please also submit Form H to the IRB, refer to (www.utc.edu/irb) for the appropriate forms.**

***Investigator's Assurance***: By submitting this protocol, I attest that I am aware of the applicable principles, policies, regulations, and laws governing the protection of human subjects in research and that I will be guided by them in the conduct of this research.

| **Title of Research:** | An Evaluation of Two Approaches for Teaching Keyboarding to Children with Cognitive Disabilities |
|---|---|

| | | Dept. | Mail Code | Email |
|---|---|---|---|---|
| Principal Investigator | Linda Ann Blazek | | | linda-blazek@hcde.org |
| Other Investigator | | | | |
| Other Investigator | | | | |
| Faculty Advisor (for student apps) | Dr. Ted Miller | | | ted-miller@utc.edu |

**Please check that all of the following items are attached (where applicable) before submitting the application:**

- Any research instruments (any tests, surveys, questionnaires, protocols, or anything else used to collect data)
- All informed consent documents (see www.utc.edu/irb for sample informed consent documents)
- Permission from applicable authorities (principals of schools, teachers of classrooms, etc.) to conduct your research at their facilities
- Appropriate permission and signatures from your faculty advisor (if applicable).
- Please be sure the entire application is filled out completely.

****All student applications must be signed by the faculty advisor then scanned and submitted electronically, OR submitted directly by the faculty advisor.**

**All applications should be submitted by email to instrb@utc.edu.**

**Anticipated dates of research project:** September 2013 through December 2013

Please allow 2 weeks for IRB processing from date of submission.

**Please be aware that you cannot begin your research until it has been officially approved by the IRB.**

Type of Research:

X☐ Dissertation/Thesis

☐ Faculty Research (Please see information at the bottom of this form if this research pertains to a grant opportunity)

☐ Other (please explain):

**Purpose/Objectives of Research:** (Briefly state, in non-technical language, the purpose of the research and the problem to be investigated. When possible, state specific hypotheses to be tested or specific research questions to be answered. For pilot or exploratory studies, discuss the way in which the information obtained will be used in future studies so that the long term benefits can be assessed.)

This study compares two computer programs, one purchased, and one teacher-designed that teach keyboarding skills to elementary school children with cognitive disabilities. The purpose is to determine which program is most effective in teaching these children.

**Relevant Background and Rationale for the Research:** (This section should present the context of the work by explaining the relation of the proposed research to previous investigations in the field. Include citations for relevant research.)

Keyboarding is an essential skill for the 21st Century (Jukes, McCain & Crockett, 2010). The ability to enter data provides special needs students with a potentially marketable job skill (Wehman & Bricout, 1994). Combining keyboarding with letter recognition and hand-eye coordination activities in the early grades provides a developmentally appropriate skill that reinforces learning and assists in developing fine motor skills, especially relevant for children with cognitive disabilities (Jaras, 1998).

Methods/Procedures: (Briefly discuss, in non-technical language, the research methods which directly involve use of human subjects. Discuss how the methods employed will allow the investigator to address his/her hypotheses and/or research question(s).)

As indicated in their Individualized Education Plans, students are required to participate in a keyboarding program. The default program has a built-in progress-monitoring component that is

available to the public. The teacher-designed program maintains progress through a continuous Word document. Student mistakes are not corrected; this allows for a visual system of keyboarding progress. Baseline will be determined through a pre-test consisting of typing a sentence in a two minute period. After a semester of instruction through one of the two methods, the timed test will again be administered to each student and the results will be collected and analyzed. Although the individual teachers will be aware, of which student typed which document this researcher will have no knowledge of the subjects and their test results. Data will be coded with numbers in order to match up the pre- and post-tests.

**Subject Population:** (List the size of population be used, and check if any of the populations listed apply to the study. Discuss criteria of selection or exclusion, population from which they will be selected, and duration of involvement. *NOTE: Federal guidelines require selection of subjects be equitable within the exclusions, and subjects meeting the criteria cannot be discriminated against for gender, race, social or financial status, or any other reason.)*

Describe Sample: K-5 Comprehensive Development Students

Approximate Number of Subjects: 40

Subjects Include (check if applicable):

| | |
|---|---|
| Minors (under 18) | X☐ |
| Involuntarily institutionalized | ☐ |

Mentally handicapped X☐

Health Care Data/Information ☐

IF YOU HAVE CHECKED THE BOX PERTAINING TO HEALTH CARE DATA, BE SURE YOU HAVE COMPLETED ANY NECESSARY HIPAA FORMS AS WELL.

Informed Consent: Describe the consent process and attach all consent documents. See **www.utc.edu/irb** for sample informed consent forms and complete information regarding informed consent.

**All research must be conducted with the informed consent** (signed or unsigned, as required) **of all participants: Attachments B, C, D, and E**

**Incentives: What incentives will be offered, if any?** (Indicate whether or not subjects are to be paid, how and when they will be paid, amount, and the rationale for payment. The proposed payment should be commensurate with the time required for participation, travel expenses, and/or inconvenience assumed by the subject, but should not be so great as to constitute undue influence on an individual to assume risks of study participation that would not otherwise be undertaken.)

Students will not be offered any incentives outside those usually utilized by their classroom teachers. Teachers will not receive any incentives.

**Risks/Benefits to Participants and Precautions to Be Taken:** (This section should discuss all possible risks and discomforts from participation in the study, indicating both severity and likelihood of occurrence for each. Risks may range from the physical to the psychological. Inconvenience, travel, or boredom may also be considered risks of participation in the study. The methods that will be used to minimize these risks should also be discussed. Many studies hold the potential for loss of privacy and confidentiality. These concerns should be noted in this section. If subjects are vulnerable populations, or if risks are more than minimal, please describe what additional safeguards will be taken.)

There are no risks to the participants; this study will be conducted within the parameters of a regular classroom curriculum and meets the standards set by the State for keyboarding instruction.

**In your opinion, do benefits outweigh risks?** **X☐ Yes** **☐ No**

**Privacy/Confidentiality:** **(**Please describe whether the research would involve observation in situations where subjects have a reasonable expectation of privacy. If identifiable existing records are to be examined, has appropriate permission been sought, i.e. from institutions, subjects, and physicians? What provision has been made to protect the confidentiality of sensitive information about individuals? Are research records anonymous? If not, there should be discussion of how records will be coded, and where and how they will be stored. It should also note where and how signed consent forms would be maintained. If video or audio tapes will

be made as part of the study, disposition of these tapes should be addressed. In general, the IRB recommends that research tapes be destroyed as soon as the needed data are transcribed, and that only restricted study personnel be allowed access to the tapes. List the names of individuals who will have access to names and/or data. If other procedures are proposed [for example, retaining tapes for future use, allowing individuals other than study investigators access to the tapes] justification should be presented and separate.)

Student responses to the pre- and post-tests will be coded numerically and by color according to what classroom and program they are using; there will not be any names used in this study. Data will be stored in a locked file cabinet in my classroom until the study is finalized at which time they will be shredded. The only persons who know which student does what is their own classroom teacher who needs to monitor progress for the purposes of meeting IEP objectives.

**Signatures: ** If submitted by a faculty member, electronic (typed) signatures are acceptable. If submitted by a student, please print out completed form, obtain the faculty advisor's signature, scan completed form, and submit it via email. Only Word documents or PDF files are acceptable submissions.**

| | |
|---|---|
| Linda Ann Blazek | September 10, 2013 |
| Principal Investigator or Student | Date |
| | |
| Faculty Advisor (for student applications) | Date |

**If this research pertains to a grant opportunity:**

**Grant submission deadline:**

**Funding Agency and ID Number:**

**Students:**

**Graduate X☐ Undergraduate**

THE UNIVERSITY of TENNESSEE CHATTANOOGA

Institutional Review Board
Dept. 4915
615 McCallie Avenue
Chattanooga, TN 37403-2598
Phone: (423) 425-5867
Fax: (423) 425-4052
instrb@utc.edu
http://www.utc.edu/irb

**MEMORANDUM**

TO: Linda Ann Blazek
Dr. Ted Miller

**IRB # 13-126**

FROM: Lindsay Pardue, Director of Research Integrity
Dr. Bart Weathington, IRB Committee Chair

DATE: September 20, 2013

SUBJECT: IRB **#Error! Reference source not found.**:13-126: An Evaluation of Two Approaches for Teaching Keyboarding to Children with Cognitive Disabilities

The IRB Committee Chair has reviewed and approved your application and assigned you the IRB number listed above. You must include the following approval statement on research materials seen by participants and used in research reports:

***The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project #*** *Error! Reference source not found..*

Please remember that you must complete a Certification for Changes, Annual Review, or Project Termination/Completion Form when the project is completed or provide an annual report if the project takes over one year to complete. The IRB Committee will make every effort to remind you prior to your anniversary date; however, it is your responsibility to ensure that this additional step is satisfied.

Please remember to contact the IRB Committee immediately and submit a new project proposal for review if significant changes occur in your research design or in any instruments used in conducting the study. You should also contact the IRB Committee immediately if you encounter any adverse effects during your project that pose a risk to your subjects.

For any additional information, please consult our web page http://www.utc.edu/irb or email instrb@utc.edu

Best wishes for a successful research project.

APPENDIX B

PARENT PERMISSION SLIP

Dear Parents and Guardians

Your child is being asked to participate in a research study conducted by *Lindy Blazek,* a teacher at Hardy Elementary and a graduate student at the University of Tennessee, Chattanooga. The purpose of this study is to compare two different computer programs that teach keyboarding skills. The two programs involved in the study are Type to Learn 4 and ColorCodedKeyboarding. Your child will participate in one of these programs in an attempt to determine which program is most effective in teaching keyboarding. Each child will participate in a short, two-minute pre-test to determine their level of skill. At the completion of the study, your child will take a post-test to again determine their skill level. This study will contribute to the researcher's completion of her doctoral dissertation.

Research Procedures

Should you decide to allow your child to participate in this research study, you will be asked to sign this consent form once all your questions have been answered to your satisfaction. This study consists of students participating in one of two computer programs.

Time Required

Participation in this study will require 20 minutes, twice a week, of your child's time, for the first semester of the 2013-2014 school year.

Risks

Keyboarding is a part of the school curriculum; the investigator does not perceive any risks from your child's involvement in this study.

## Benefits

Potential benefits from participation in this study include learning keyboarding skills, higher self-esteem, and a feeling of self-efficacy.

## Confidentiality

The results of this research will be presented in a dissertation format. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all information that matches up individual respondents with their answers will be destroyed.

## Participation & Withdrawal

Your child's participation is entirely voluntary. He/she is free to choose not to participate. Should you and your child choose to participate, he/she can withdraw at any time without consequences of any kind. He/she will continue to keyboard as part of their IEP.

## Questions about the Study

If you have questions or concerns during the time of your child's participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Researcher's Name: Lindy Blazek

Hardy Elementary

423-413-9198

blazek_linda@hcde.org

Advisor's Name: Dr. Ted Miller

Department: Graduate School

University of Tennessee at Chattanooga

This research has been approved by the UTC Institutional Review Board (IRB). If you have any questions concerning the UTC IRB policies or procedures or your rights as a human subject, please contact Dr. Bart Weathington, IRB Committee Chair, at (423) 425-4289 or email instrb@utc.edu

Giving of Consent

I have read this consent form and I understand what is being requested of my child as a participant in this study. I freely consent for my child to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form.

_____

Name of Child (Printed)

_____

Name of Parent/Guardian (Printed)

_____ _____

Name of Parent/Guardian (Signed) Date

_____ _____

Name of Researcher (Signed) Date

# APPENDIX C

# TEACHER PARTICIPATION AGREEMENT

Teacher Participation Agreement

Procedures for training

Teachers will meet for training prior to the start of the program. Manuals for the ColorCodedKeyboarding will be distributed and an explanation of how to set up for instruction will be given. Type to Learn is installed on all system computers and each teacher will be responsible for submitting the class roster to the school IT personnel.

Teacher responsibilities

Teachers will agree to administer the keyboarding programs twice a week, for twenty minutes a session, throughout the duration of the study.

Test protocols

The pre- and post-tests consists of using the pangram "The quick brown fox jumps over the lazy dog." The tests will be a two-minute period. The sentence will be written on whatever medium the teacher employs: white board, sentence strips, and Promethean board

The undersigned person agrees to participate in the doctoral study as developed by Linda Ann Blazek. In doing so, the participant agrees to adhere to the regimen set out in the training session for the study; to follow the sequence and scope of the program, and to monitor students. The participant also agrees to administer the pre- and posttests as stated above and to collect the data in the appropriate manner and maintain confidentiality.

_____ _____

Participant Signature Researcher Signature

This research has been approved by the UTC Institutional Review Board (IRB). If you have any questions concerning the UTC IRB policies or procedures or your rights as a human subject, please contact Dr. Bart Weathington, IRB Chair, at (423) 425-4289 or email instrb@utc.edu

# APPENDIX D

# SCHOOL ADMINSTRATOR PERMISSION LETTER

Dear Administrator:

My name is Lindy Blazek and I am a teacher in the Comprehensive Development Class (CDC) at Hardy Elementary. I am also a doctoral student at the University of Tennessee at Chattanooga. It is in that capacity that I address you now.

My dissertation is on the efficacy of computer programs to teach keyboarding to special needs children. As you are aware, the new standards necessitate children of all abilities being able to keyboard. I have designed a program to teach children how to keyboard and I will be testing its effectiveness. The CDC teacher(s) in your building have agreed to implement this program or the system default program in their classroom this semester. The students who will be using these programs will not be identified to anyone other than their teacher. The data generated by these programs will be collected by their teacher and given to me. I will visit each classroom in the program at least once during the semester, and at the end of the semester, the teacher will collect all data and pass it to me.

I would like to have your permission for the children in the CDC to participate. Individual parental/guardian permissions will be obtained for each child in the study. Permission has been obtained from Mr. Smith to advance this study.

I thank you in advance for your cooperation. Please sign and return this letter to me via the pony. Please keep a copy for your records.

Sincerely,

Linda Ann Blazek

Linda Ann Blazek has permission to obtain data for her study on computer programs and their efficacy on teaching keyboarding to students in the CDC in my building. I understand that she will not identify students by name or initials and that all information obtained will be confidential.

_____ _____

Signature of Administrator Date

This research has been approved by the UTC Institutional Review Board (IRB). If you have any questions concerning the UTC IRB policies of procedures or your rights as a human subject, please contact Dr. Bart Weathington, IRB Committee Chair, at (423) 425-4289 or email instrb@utc.edu

# APPENDIX E

# SCHOOL SUPERINTENDENT PERMISSION LETTER

4106 Cherryton Drive
Chattanooga, TN 37411

July 23, 2013

Dear Superintendent Smith:

As you probably are aware, I am a Comprehensive Development Class (CDC) teacher at Hardy Elementary. I am also a doctoral student at the University of Tennessee at Chattanooga. I am writing my dissertation on the comparison of two computer programs that teach keyboarding to special needs children. I feel very strongly about this as our standards are demanding keyboarding skills for children of all abilities and our special needs students need these skills as a stepping stone to future employment. My study will involve six or seven CDC's in the system. The students will participate in one of two programs per their Individualized Education Plans. The data collected and given to me will have no identifying remarks; the teachers will have access to which student does what work but I will not. There is no risk to the children and confidentiality will be protected throughout the study. I will make classroom visits to check in with the teachers and monitor fidelity of the study, but no pictures, recordings or videos will be taken. All data will be kept in a locked file drawer until the study is complete and is no longer needed for the dissertation. At that point, it will be shredded. Parental and administrator permissions will also be obtained.

I thank you in advance for your assistance in this matter. Please sign the letter to indicate your permission.

Sincerely,

Linda Ann Blazek

_____ _____

Superintendent signature Date

This research has been approved by the UTC Institutional Review Board (IRB). If you have any questions concerning the UTC IRB policies of procedures or your rights as a human subject, please contact Dr. Bart Weathington, IRB Committee Chair, at (423) 425-4289 or email instrb@utc.edu

APPENDIX F

COLORCODEDKEYBOARDING©

TEACHER'S MANUAL

Teacher Instructions for

ColorCoded Keyboarding ©

Linda Ann Blazek

Hardy Elementary School

Chattanooga, TN

## Overview

Keyboarding is an important skill for students to master. Unfortunately, most of the commercial programs available are not structured for students with cognitive delays or disabilities. As a teacher with over two decades of experience teaching students with special needs I was frustrated with the default programs and developed a program that utilized small, individualized steps to teach keyboarding. ColorCoded Keyboarding © is the result.

The program progresses in steps that use letter identification based on word recognition as opposed to keystroke and finger placement. Mastery is determined by each student's IEP. For example, if a student has to show 90% mastery, then he must correctly keyboard from the model 9 times out of 10, not 90% correct on one trial.

To record progress, save the completed Word document to the desktop for easy access. Until Step 5, enter the date for each lesson. Each student should have their own Word document and all lessons should be typed in this document. I recommend five attempts per lesson to keyboard from the model.

Set Up

To set up your classroom to use ColorCoded Keyboarding ©, you will need the following material:

- Sentence strips or similar material to use for name models
- Large dry erase notebook page
- Dry erase markers (black, red, orange, yellow, green, blue, purple)
- Stickers (solid shapes such as hearts, circles, basic shapes) in the same colors

Use the sentence strips to help students learn to type their names. The large dry erase notebook page will serve as the model for the journal. Once students have progressed to keyboarding a journal entry, you will write a new journal entry on the dry erase notebook page and post it near the student computers. The dry erase markers are color-coded. You can use your own system of colors; the following colors were my first choice eleven years ago and I just continued to use them! I use heart stickers because they are always available in solid colors. The stickers will be placed on the following keys:

Red – both shift keys

Yellow – space bar

Green – period

Purple – comma

Blue – apostrophe

See the picture below for a sample:

“


In the picture above, I used colored heart-shaped stickers on my keyboard. Avoid using something such as a smiley face as this can cause visual confusion. The amount of time you allow each student will be based on your individual needs. My students keyboard twice a week for twenty minutes per session.

TEACHER TIP: For the preliminary steps use the CAPS LOCK key until student masters copying from a model that is printed in upper case. Adjust the font size to meet individual needs; I start my new students out on Comic Sans MS, 36 point, to assist them with “reading” the letters

on the document. I avoid using fonts with stylized letters such as the lower case “a” in this font; this is often confusing for students.

Teaching ColorCoded Keyboarding ©

STEP 1:

Instruct the student to keyboard his/her first name in upper case. I suggest typing the student name at the top of the page or using a card printed with the student name that he can refer to as he keyboards. I start with the name card as the visual model and after mastery, move to the keyboarded name on the document. The picture below shows the card with the student’s name as a model.

In the next model, the student name is typed on the document. In the example below, the model is in black and the student attempt is in green.

Ex JAMES (model on Word document)

JAMES

JSAME

JAMES

JAMES

JAMES

TEACHER TIP: Do not correct the student's attempts. Save the document as typed. Mistakes will show growth and progress over the year.

STEP 2:

Introduce the use of the space bar. Instruct student to use his thumb to hit the yellow sticker on the space bar after his first name. Use a yellow sticker or draw a yellow heart on the model to mark the space between his first name and last name.

Ex JAMES MADISON

STEP 3: Continue with using the space bar by using a simple sentence in all upper case with yellow hearts to designate the need for a space. At this point, the period is not important; you are concentrating on the use of the space bar.

Ex: IT💛IS💛VERY💛HOT💛TODAY

When a student has mastered the use of the space bar (yellow heart), add in the period (green heart). Experience has shown that the students tend to call the keys as they type. The above sentence sounds like this:

I-T (yellow space) I-S (yellow space) V-E-R-Y (yellow space) H-O-T (yellow space) T-O-D-A-Y (green dot).

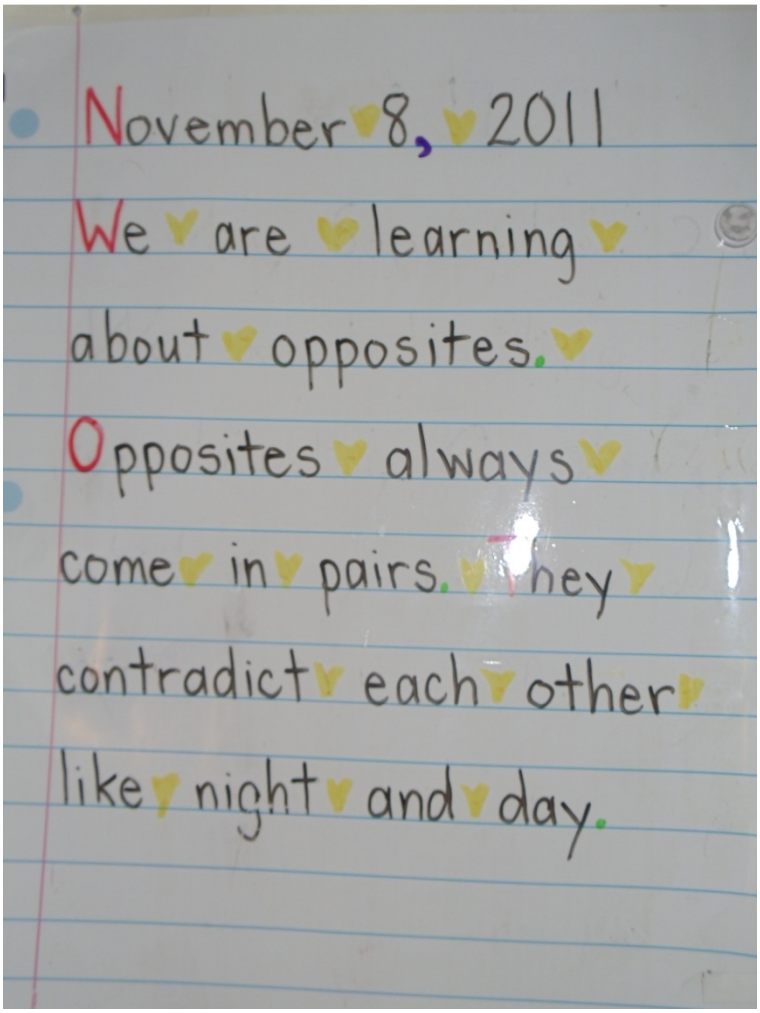
STEP 4: Introduce the shift keys. Explain that the shift keys make a letter a capital letter, and that their name starts with a capital letter. Make sure that students know that they have to hold down both keys in order to make a capital. Write or keyboard a model of the student's first and last names using mixed case and space bar

Ex: Martha💛Washington

STEP 5: Write or keyboard sentences in mixed case using all of the above rules-shift key, space bar, and period. As students progress, add in the use of a comma (purple heart) and apostrophe (blue heart). Keyboarding a date is an excellent way to reinforce the use of a comma.

Ex: August💛13,💛2012

The following model demonstrates the use of all steps except the enter key.




STEP 6: Students are now ready to keyboard multiple sentences from a model. Introduce the use of the enter/return key. I use a replication of the symbol on the individual keyboards (←) to alert the student that there is a return at the end of a sentence. CAUTION: many students like to hit enter when the line ends on the model. Reiterate that the computer will move from line to line and that they are to hit enter/return only when indicated. A good example of this is copying a poem.

TEACHER TIP:  At intervals throughout the year, such as quarterly or semester progress reports, print off each student's electronic journals and give a copy to the parents. It is a very visual way of indicating a student's progress and skill level

# APPENDIX G

## 2012 COMMON CORE STANDARDS FOR LANGUAGE ARTS

**2012 Common Core Language Arts Standards**

**Kindergarten:**

CCSS.ELA-Literacy.L.K.2 Demonstrate command of the conventions of Standard English capitalization, punctuation, and spelling when writing.

CCSS.ELA-Literacy.L.K.2a Capitalize the first word in a sentence and the pronoun *I*

CCSS.ELA-Literacy.L.K.2b Recognize and name end punctuation.

**Third Grade:**

CCSS.ELA-Literacy.W.3.6 With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.

# APPENDIX H

# 2007 INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION STANDARDS

**ISTE Standards, 2007**

**Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.

a. Apply existing knowledge to generate new ideas, products, or processes

b. Create original works as a means of personal or group expression

c. Use models and simulations to explore complex systems and issues

d. Identify trends and forecast possibilities

**Communication and Collaboration**

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media

b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats

c. Develop cultural understanding and global awareness by engaging with learners of other cultures

d. Contribute to project teams to produce original works or solve problems

**Research and Information Fluency**

Students apply digital tools to gather, evaluate, and use information.

a. Plan strategies to guide inquiry

b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media

c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks

d. Process data and report results

**Critical Thinking, Problem Solving, and Decision Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

a. Identify and define authentic problems and significant questions for investigation

b. Plan and manage activities to develop a solution or complete a project

c. Collect and analyze data to identify solutions and/or make informed decisions

d. Use multiple processes and diverse perspectives to explore alternative solutions

**Digital Citizenship**

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

a. Advocate and practice safe, legal, and responsible use of information and technology

b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity

c. Demonstrate personal responsibility for lifelong learning

d. Exhibit leadership for digital citizenship

**Technology Operations and Concepts**

Students demonstrate a sound understanding of technology concepts, systems, and operations.

a. Understand and use technology systems

b. Select and use applications effectively and productively

c. Troubleshoot systems and applications

d. Transfer current knowledge to learning of new technologies (ISTE, 2007)

# APPENDIX I

# CHECKLIST FOR FIDELITY MONITORING

Checklist for Fidelity

| | | |
|---|---|---|
| 1. Program is being implemented correctly. | YES | NO |
| 2. Students are spending 20 minutes a session, twice a week. | YES | NO |
| 3. Student work is not corrected by the teacher. | YES | NO |
| 4. Student progress in maintained correctly per program. | YES | NO |

# APPENDIX J

# FOCUS GROUP QUESTIONS

Focus Group Questions

The following questions will be used to facilitate discussion during the focus group sessions at the end of the study. Answers will be recorded and transcribed for qualitative analysis.

1) Do you feel that the program was successful in meeting the keyboarding needs of your students? Why or why not?

2) Was the program easy to use? What component of the program did you most like? Were your students able to log in themselves?

3) Will you continue to use this program? Why or why not?

4) Please reflect on your students' behavior during keyboarding.

   a) Did your students cooperate during keyboarding time?

   b) Did your students demonstrate enthusiasm for keyboarding?

   c) Did your students demonstrate interest in keyboarding?

   d) Did your students object to leaving the keyboarding center when time was up?

   e) Did they appear confident in their ability to keyboard?

   f) Did your students ask to keyboard?

   g) Did your students show pride in their work?

   h) Were your students excited to show you their work?

   i) Did your students share what they had done with others?

# APPENDIX K

# TTL4® FOCUS GROUP TRANSCRIPT

**Q3. Do you feel that the program was successful in meeting the keyboarding needs of your students? Why or why not?**

T3: No, not really. The time allowed in each lesson was not adequate for my kids. If they didn't know, where the right key was and it took them too long to find it then the program would go back to the beginning of the lesson. Some of my students got so frustrated with having to start over and over that they just gave up.

T1: I agree. The pacing was too fast for the majority of the students; this particular program assumes that the students typing at least know their letters. It is primarily a program that teaches key recognition. I need a program that moves at the pace of my kids.

T2: I had one kid who liked the fact that the levels got harder and harder. He likes to play games on the computer and has one (a computer) at home and was already pretty familiar with a keyboard. I also had one kid who wouldn't even try towards the end of the nine weeks. He was so upset with going to the computer that I couldn't even get a posttest score on him.

T1: I personally did not like the fact that the lessons didn't have a connection with my students. I like the idea that the students learn to type with words that are important, or at least familiar, to them. I think everyone likes to see their own name in print.

T2: A couple of my students did like the animated graphics on TTL. Sometimes they spent more time with the little spaceships than they did keyboarding! The program is cute with those graphics; those were very attention getting.

T3: I agree; the graphics are cute and because of the way the names were listed on the spaceship, it did make log-in easier for some of my higher kids. That was a plus for me. Other than that, I do not think that TTL4® was really a good fit for my kids.

T1: I think that it might work for some kids who already know their letters and are familiar with the basic layout of a keyboard, like kids in the general population third or fourth grade. It just didn't work for my kids. It was too fast and too quick to restart. If a kid coughed or sneezed, he had to go back and start again!

T2: Amen, one of my students told me that his computer didn't have any patience! But overall, I do not think that this is an appropriate program for kids with special needs such as mine.

**Q4. Was the program easy to use? What component of the program did you most like? Were your students able to log in themselves?**

T1: It was really hard for me to get all the student info in at the beginning. I kept losing info; data didn't store, etc. Once I got it, all in then it was easy for me to set up. I just kept my teacher page open and the kids could select their name. Well, at least a few of them could.

T3: I didn't have as much trouble with getting student info in; the pretest gave me fits. It [the pretest] did not give my students enough time to find and press the right key.

T2: I agree; my students struggled to get past the (program) pretest. I finally overrode the pretest and set each student up on Lesson 1. By the way, my IT person entered my class and student info for me, so that wasn't even an issue I had to contend with.

T3: I asked my IT person; even though it is school-wide, he told me every teacher had to enter their own class!

T2: Once my class was in it was easy to use; one of us opened up the teacher page and either the kid logged in or one of us logged them in. Three or four seconds per kid, max.

T1: It was easy to set up; no time at all, and two of my kids were able to find and click on their own name every time.

T2: I had one student who could do that.

T3: I had none!

T2: I did like the fact that most of the kids were able to restart the lesson when needed and the verbal instructions seemed pretty clear.

T3: I agree with that as well.

T1: Me, too, although my kids got frustrated when they had to restart three or four times in a twenty minute session.

T2: Well, that's true; most of mine had to restart every lesson at least once.

**Q5. Will you continue to use this program? Why or why not?**

T1: No, I am going to pick up CCK©. Like I said, I want something that my students can relate to, like their name or what we are talking about in class. I also want something that I can individualize for each kid.

T2: Me too; I think that TTL4® just isn't right for our kids. I would like to try something that is more individualized and structured differently for each level. I will probably keep E. on TTL4® as he likes the harder levels and is the only one in my class who really liked the program.

T3: I am leaving the TTL4® program to the regular Ed teachers; their kids will probably do okay with the pacing. Some of the higher kids may get bored with it.

**Q6. Please reflect on your students' behavior during keyboarding.**

a) **Did your students cooperate during keyboarding time?**

T2: At the beginning, everyone was pretty eager to go to the computer. You know how kids are, they love being on the computer. As time went on, it was more difficult; if they knew that it was keyboarding time they wanted to do something else. Except for E., he loved going to the computer for TTL. At the end, D. wouldn't even attempt keyboarding. Even if Mr. S. walked him over, he would not sit down. He would push the keyboard away, try to turn off the computer and eventually, if we made him sit there, would have a meltdown.

T1: Mine are older, they didn't balk at going, but they didn't have as much fun as I think they hoped to have! I had to keep telling them that everybody in the school was doing this and they had to do it too.

T3: My guys are pretty good about going where they need to go, but I could tell that they were a little hesitant about typing. They liked the games at the end of each lesson, but as the lessons got harder, the games just didn't happen.

b) **Did your students demonstrate enthusiasm for keyboarding?**

T2: Again, at first, everybody did, but that changed toward the end. I had to bribe some of them

T1: Same with mine, and I wasn't above bribing mine either!

T3: It was okay at first, but they appeared to lose their enthusiasm when they had to keep repeating lessons.

c) **Did your students demonstrate interest in keyboarding?**

T1: It's hard to tell; did they like keyboarding because it was something to do on the computer or did they really like to keyboard?

T2: I know that three of mine really like to keyboard. When they have free time they ask me if

T2: I had a problem with the kids changing programs on me; if I turned around to work with someone else then one of the kids on TTL would swap to PBSKids® or Starfall®. I had to tell them to restart. They usually didn't have a problem moving when it was time to change.

T3: Every once in a while one or two of the kids would want to finish a lesson; they knew that if they had to quit when the timer dinged that they would have to do that lesson over. It got to be a bone of contention.

d) **Did they appear confident in their ability to keyboard?**

T1: They did before they had to use this (TTL4®)!

T2: My little guys just got fed up so fast; I would have to say that they lost whatever confidence they may have had before. Well, except for E.; he likes to play on the computer so he thinks he has pretty good skills.
T3: I agree with T2; if my kids had any confidence in their ability to keyboard when we started, they didn't have any when we finished. I am going to have to work really hard to get them to touch the keyboard after this.

T1: A couple of my kids took it out on the computer, you know, saying things like this computer is so stupid (sic) or telling me that the computer is wrong and doesn't have any patience.

**e) Did your students ask to keyboard?**

T3: Occasionally, but they know that we keyboard on Tuesday and Thursday, so they automatically go to the computers when it's time. Like I said before, they just generally like going to the computer.

T1: I agree, but a couple of mine would grumble about having to use TTL; they just wanted to type. I would say that they were more, you know, resigned to the fact that it was time to keyboard.

**f) Did your students show pride in their work?**

T3: Oh, definitely, especially when they managed to get through a whole lesson.

T1: I agree; their hands shot up as soon as they finished a lesson and they were on the little rewards page.

T2: It was so hard for them to finish a lesson without having to repeat it two or three times, that when they did get done they were really proud.

T1: Finishing any lesson was a major accomplishment; I was proud of them.

**g) Were your students excited to show you their work?**

T1: There really wasn't much to show other than the screen where it said that they had finished the lesson, congratulations, etc.

T2: That's true; there wasn't really a product that they could show. I guess I could have printed off a screen shot, but that's about it.

T3: That is about all we can do; but they did want me to know when they had gotten through a lesson. They would yell out, "Hey, Ms. T3, I'm finished!"

**h) Did your students share what they had done with others?**

T2: Have you met my kids? Everything is a competition with them. One of them would always say something along the line of “I done (sic) Lesson 3; which one is you on?” If two of them were on the same lesson, then it became a race to see who could finish first. Of course, they would make major mistakes and have to restart, but they were determined to let the other know who was best!

T1: I saw the same thing; every lesson would become a race until one of them had to restart or just not be able to finish. Then we had that frustration issue we talked about.

T3: I don’t think mine was that competitive; they just sat down and wanted to work. They did shout out when they finished. They would usually want all of us, me, and my assistant, to come look at their reward page.

# APPENDIX L

# CCK© FOCUS GROUP TRANSCRIPT

**Q1. Do you feel that the program was successful in meeting the keyboarding needs of your students? Why or why not?**

C4: Definitely, each student got to type what was right for him. I think that CCK© provided students with the visual cues on the keyboard that promoted key memory, which in turn increased typing speed and comprehension of material

C6: I agree; it was a little onerous at first trying to set up each individual lesson, but it definitely met their skill levels. I had some that were typing their first name and some that were typing sentences from a model.

C5: That's true. I actually had two or three typing their names, some that were doing first and last names and some that were typing full sentences with punctuation.

C6: I really like the fact that it was self-pacing. I think it eliminated a lot of frustration. When my students go to computer for related arts they can't do the typing program because it moves too fast for them. This program (CCK©) is perfect for them.

**Q2. Was the program easy to use? What component of the program did you most like? Were your students able to log in themselves?**

C6: My kids didn't log themselves in; one of us had their stuff (model) ready for them when they got to the keyboarding center. The program was a little hard at first to get started; it took a while to get each individual kid's model ready each time. Once we got a system, going it wasn't as hard.

C5: It did take me a little extra time; I ended up prepping the computer center the night before. Then all I had to do was change the Word document on each computer when the students rotated through. I didn't let mine log in. I would save the document that had been typed and opened the one for the next student. It took thirty-forty seconds, tops.

C4: I didn't mind the set up time. The kids really liked keyboarding, and I think that the ones who were just doing their names were motivated by watching the kid's type sentences. Most of my students liked going to journaling. I most like the fact that each student got to do work that was designed for them. I think that they enjoyed typing something that meant something to them.

C5: That's a good point. I had to print out some of the documents because the students were so excited about their work that they wanted to take it home.

C6: I printed their work out at the end of the quarter and sent it home so the parents could see their child's progress. Some of the parents were really impressed. One of my parents was stunned at what their child had done. Some they told their parents that they could type their names when they were little but that now they typed big lines.

**Q3. Will you continue to use this program? Why or why not?**

C4: I most definitely will; the time it takes to set it up is balanced out by the progress the students make. It's also really cheap and tailored to each student. I mean, you use dry erase markers, some stickers and either laminated name strips or that large sheet that looks like notebook paper. Maybe $10.00 a year? Like I said, I am sticking with CCK. In terms of instruction, I found that when I needed to teach one of the students something new, like adding a punctuation mark, it usually took only two or three times of me showing him how to do something before he got the concept.

C6: Me, too. I started using our theme discussions to come up with shared writings. I would use the shared writing as the journal entry. It adds another whole layer to your curriculum.
C5: I am going to continue. I have seen some really consistent progress with all my kids; I figure with all the emphasis on state testing being done on computers I might as well get my guys conversant with the technology. Our administration made a big deal out of how well my kids were keyboarding. It was exciting for the students to know that they were doing something that the other students could not.

C6: Keyboarding is a big deal in our building as well; everyone is worried about how the schools will implement keyboarding and I already have my program up and running. I particularly like the fact that it was based on a kid's individual level and kept their attention.

**Q4. Please reflect on your students' behavior during keyboarding.**

**a) Did your students cooperate during keyboarding time?**

C4: Yes, my students liked going to keyboarding. I mean, nothing with these kids is 100%, but they were usually eager to move to that rotation. Every once in a while one of them would ask me if they could do something harder. How often does that happen?

C5: I would say that journaling was one of their favorite centers. But you're right, nothing is 100% so there were some days when one of the kids didn't want to work, but overall, everyone was pretty cooperative when it came to keyboarding.

C6: I'm not sure it was their favorite center, but everyone was pretty cooperative about doing their work. Progress was evident to them, so they tried really hard to get their work done. I had two boys who treated keyboarding like a competition; who could finish first and who could do it best, that type of thing.

**b) Did your students demonstrate enthusiasm for keyboarding?**

C5: Most of the time; I have one little girl who comes in on Tuesday and Thursday saying "We get to journal today"; I think that her attitude was pretty indicative of most of my students.

C4: My kids were generally pretty enthusiastic as well.

C6: Most of the time, most of the students were good to go; of course, with this population some days you can't generate enthusiasm for anything.

**c) Did your students demonstrate interest in keyboarding?**

C5: Yes, and the better they got the more they wanted to do. One of my autistic kids tried to keyboard on the iPad so there was some transference there.

C6: Now that you mention it, my autistic kiddos did really well; I think the individualization worked well for them. All of them really like the computer so once they got the hang of it they really seemed to like keyboarding.

C4: Did they like keyboarding or just like being on the computer? That's hard to determine, but I do know that getting them to the keyboarding center was never a struggle.

C6: I understand what you're saying, but I think all my kids just like typing. I think that they see everyone texting and using their laptops and this makes them feel like everyone else. I also think they like being able to do something that the other kids can't do.

C4: I know that some of mine can out-keyboard just about everyone else in the building!

**d) Did your students object to leaving the keyboarding center when time was up?**

C6: Big time, especially if they hadn't finished their journal entry or their sentence.

C5: I had the same problem; now that we are finished with the study, I am going to let them stay until they complete the task.

C4: One of my guys usually had a meltdown if he wasn't done, so I had to give him a countdown. He would hurry up and try to get done before I reached "1".

**e) Did they appear confident in their ability to keyboard?**

C4: Yes, and they weren't shy about telling anyone either!

C5: I think most of them felt pretty well about their skills once they learned what was expected of them. It was difficult at the beginning when they couldn't keyboard their names right off the bat; once they got the hang of matching letters to keys they started to build up their confidence. A couple of them actually asked to use the model on the board before I thought they were ready to move on. I let them give it a try.

C6: I agree; it was slow going at the very beginning but once they understood that it was all about matching letters to keys it started to move pretty quickly. As they got more familiar with the keyboard the faster they typed and the bigger their confidence.

**f) Did your students ask to keyboard?**

C4: A few of them, usually the same three, but they asked every day.

C5: Same with me; one of my littles literally skipped in on Tuesday and Thursday knowing it was journal day. I usually had a couple of kids who asked me every day. My autistic young man would come in, check his PECS schedule, and just grin when he saw the computer icon. He doesn't verbalize much, so I just have his behavior and facial expressions to gauge what he liked,

C6: I usually had one or two ask me if they could type when it wasn't the day or the time; I think they really like to keyboard. Some students even asked to continue typing more information into their journal entries.

**g) Did your students show pride in their work?**

C5: Definitely, like I said I had to print out their documents so they could show their parents how well they were doing. Sometimes I would post the documents in the room so they could show off. We even put some of the papers up in the hall for Literacy Night so the whole school could see them. One of my parents was stunned to see what his kid had done. The kids were quick to say that they "typed their names when they were little but that now they were typing big lines."

C4: I had one student who attempted to read everything he typed. He couldn't, of course, but it tickled me to see him try. When we had our Open House, I put their journal entries, or names, or whatever they were typing, up on the monitors so they could show their families. It was a source of pride for them to show their parents.

C6: A few of them were always quick to tell me that they were finished. Sometimes they would tell me to look at what they had done. The rest of them didn't show an emotion one way or the other when they were done but they didn't object to doing their work there either.

**h) Were your students excited to show you their work?**

C6: Always, it may just be that they were glad to be done, but they always wanted me or my parapro to look at what they are done. Of course, we would praise them to the rafters for the job they had done.

C5: Sometimes; sometimes they just finished and moved to the next center.

C4: D. was always excited; he made us look at every dot and cross. Mine are younger, so they are always excited to show off their finished work. It was fun for them and for me when they could successfully keyboard their whole name.

C5: That could be why mine didn't always appear excited; they are older and it wouldn't be cool to show excitement over class work!

**i) Did your students share what they had done with others?**

C6: With some of my boys it was a competition. They would say things like "I am on such and such word, where are you?" or comment that they were done. Sometimes they would lean over to another student's screen and point out where they were in their document.

C4: My guys did much the same thing; it wasn't so much a competition, I think, as a chance to strut their stuff. They really liked it when I would print off what they had done and point out how far they had progressed. Sometimes I would let them take their copy down to share with other teachers or administrators.

C5: It's funny now, but the first time I saved her document and it disappeared off the screen one of my kids thought it was gone for good and was really upset! I had to open it back up so she could see that her hard work was still there. We have a cafeteria worker who always asks the students what they have done that day; mine would always respond that they had typed their name, or typed a sentence. She would always praise them.

# VITA

Linda Ann Blazek (Lindy) was born in Greenville, North Carolina, and spent her youth growing up in several different states. Lindy attended George Peabody College for Teachers of Vanderbilt University and obtained her Bachelor of Science degree in Physical Education and Special Education. In 2005, Lindy completed her Master's degree in Urban Education at the University of Tennessee at Chattanooga. Lindy has taught in the field of Special Education in Comprehensive Development Classrooms for students with intellectual disabilities and served as Team Leader for her department and Chair for various faculty committees. Lindy is currently a member of the Council for Exceptional Children and the Association of Supervision and Curriculum Design. Lindy is certified as a Special Olympics coach in ten sports and has coached multiple sports with both disabled and non-disabled athletes for over forty years. She currently serves as a coach for the Chattanooga Chill, a Unified Special Olympics Volleyball team and the Penguins, a club swim team for athletes with intellectual disabilities