A STUDY TO DETERMINE THE NECESSITY OF RE-TEACHING KEYBOARDING AT

THE 6TH GRADE LEVEL

by

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ABSTRACT

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A Study to Determine the Necessity of Re-Teaching Keyboarding At the 6th Grade Level

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Keyboarding has traditionally been taught at either the middle school or high school level. It was a class that was taught to individuals who would enter clerical fields. However, due to technological advances, keyboarding is no longer an elective course. With the popularity of personal computers, the question is no longer whether to teach keyboarding, but at what grade level should it be taught. In the Eau Claire Area School District keyboarding is formally taught for six weeks at the fourth grade level and then repeated in a nine week keyboarding class at the sixth grade level. Even though the entire nine weeks at the sixth grade level is not dedicated to re-teaching the keyboard, it does take up a significant amount of time. There are students, parents, and teachers that feel that this time should not be spent to re-teach a skill that the student has already learned. This research will assist in determining the need to re-teach keyboarding to students at the sixth grade level.

ACKNOWLEDGEMENTS

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Introduction

Business Education in America first began with the preparation of bookkeepers as

apprentices. In the 1600's bookkeeping and business arithmetic were added to the curricula in

the colonial schools. After the Civil War, there was such a large demand for bookkeepers that

private business schools developed commercial ventures that trained individuals in a short

amount of time. In 1827, public high schools in Massachusetts began teaching bookkeeping

which was the first vocational course included in the schools curriculum. This trend of teaching

business classes at the high school level quickly caught on. Soon, secondary schools throughout

the country began to teach student the business skills needed by business and industry. Business

education has continued to remain strong ever since (Calhoun & Robinson, 1995).

As business and industry changed throughout the years, so did the business education

curriculum. Business educators needed to, and still need to, stay abreast of the many needs of

business and industry to teach students the necessary skills to be successful in a business career

(NBEA, 2002). The 1993 study "Keyboarding Coursework and Employment, Earnings, and

Educational Attainment" states that students that have had one class beyond the basic

keyboarding course required, earned an average of $.32 per hour more than those students

without an advanced keyboarding course. This same study also stated that these students that

had taken an advanced keyboarding class added an average of 5 days worked per year (Hearns,

Lewis, & Zilbert). These results indicate that these students are more employable than the

students without an advanced keyboarding course.

Traditionally, a business education teacher taught keyboarding at either the middle school

or high school level. It was considered a class that was taught to individuals who would enter

clerical fields. However, due to technological advances, keyboarding is no longer an elective course. With the popularity of personal computers, the question is no longer whether to teach keyboarding, but when to teach it (Hopkins, 1998).

In the Eau Claire Area School District (ECASD), keyboarding is required at both fourth and the sixth grade levels. The ECASD is located in west-central Wisconsin. The city of Eau Claire (French for "Clear Water") is located where the Eau Claire River flows into the Chippewa River, and is 90 miles east of Minneapolis/Saint Paul, Minnesota, and 247 miles northwest of Milwaukee, Wisconsin. Eau Claire's population is over 56,000, with a county population of approximately 85,000 (ECASD, 2002).

The ECASD is the eighth largest school district in Wisconsin. It covers approximately 200 square miles. The district offers a comprehensive pre-kindergarten through grade twelve programs serving over 11,000 students (ECASD, 2002). There are 15 elementary schools, 3 middle schools, and 2 high schools in the district.

The Wisconsin Department of Instruction (DPI) has standards in place that states at what grade levels various computer and keyboarding skills should be attained. The Wisconsin DPI Model of Academic Standards for business specifies the levels of knowledge students should be at in relation to computer skills at the fourth, eighth, and twelfth grade level. A fourth grade student should develop touch keyboarding techniques and be able to compose simple information using the keyboard. By eighth grade, a student should be able to demonstrate touch keyboarding skills at acceptable speed and accuracy levels, use spreadsheet software, use data base software, understand and use file management, and more (Wisconsin DPI, 2002).

The ECASD requires keyboarding at the fourth and the sixth grade level (Hughes, 2002). It is believed that keyboarding is a great way to introduce students to computers and improve

their ability to interact with the computer (Nimblefingers, 2000). If there is not a need to re-teach keyboarding skills at the sixth grade level however, a more advanced computer skills course could be required so that students are learning the more advanced features of the computer, thus helping the students to achieve the requirements of the Wisconsin State Standards in Business Education.

Statement of Problem

Fourth grade keyboarding, along with sixth grade keyboarding, has been taught at the ECASD for a number of years. There was no study that showed the retention level of the students who had the fourth grade keyboarding course and whether or not the sixth grade keyboarding course should repeat the teaching of the keyboard, or spend this time to possibly begin more advanced computer applications which would assist the students in achieving the Wisconsin DPI Model of Academic Standards for Business Education. The subjects of this study included students enrolled a randomly selected 6th grade keyboarding class at South Middle School in the ECASD. These students were enrolled during the 2002-2003 school year.

Purpose of the Study

The purpose of this study was to survey sixth grade students regarding their keyboarding skills in order to determine the necessity of re-teaching keyboarding at the sixth grade level, specifically at South Middle School in the ECASD.

Research Objectives

The objectives of this research included:

1. Assess students keyboarding skills before sixth grade keyboarding.

2. Assess students keyboarding skills upon completion of sixth grade keyboarding.

3. Determine the need for keyboarding at the sixth grade level.

Significance of Study

        This study was important for ECASD for the following reasons:

1. This research was needed to identify the keyboarding needs of students in the ECASD.

2. The data collected provided information about the keyboarding skill levels of sixth grade students at South Middle School in the ECASD.

3. The data gathered will be of value in keyboarding curriculum writing at the sixth grade level.

4. Keyboarding teachers will be better prepared to meet students keyboarding needs.

5. The results of this study could be used by other school districts to also modify their keyboarding curriculum.

Limitations of the Study

        There are several limitations to this study that include:

1. This research was restricted to those students that attend South Middle School in the ECASD.

2. The analysis was restricted to a random sample of middle school students in the ECASD.

3. A skills assessment was given to students by the sixth grade keyboarding teacher.

4. The students, based on their opinions and their keyboarding skills, answered the questions that made up the quantitative data.

5. This study was for informational purposes only and did not include making any revisions to the keyboarding programs at both the elementary and middle school level in the ECASD.

6. The survey instrument used was created and validated by the researcher.

<u>Assumptions</u>

This study assumed that:

1. The students surveyed answered the survey questions truthfully and honestly.

2. The students worked to their ability when given the skills assessment.

3. The students keyed the skills portion of the survey without looking at their fingers, which helped to assured student were using the touch method of keyboarding.

4. The random survey and assessment of the students at South Middle School in the ECASD were good indicators as to how the other students in would test.

5. Each sixth grader attended the entire nine-week keyboarding class.

<u>Methods and Procedures</u>

This study was conducted at South Middle School in the ECASD. It consisted of quantitative data collected from a random sixth grade keyboarding class. The researcher communicated with the teacher that administered the survey instrument to assure that she understood the significance of the survey and could relay this information to the students. The researcher also discussed the procedure for the one-minute timing of the students' keyboarding ability to assure that this timing was properly administered. This survey method was selected because it was inexpensive, and was able to reach students to ensure a high response rate.

<u>Definition of Terms</u>

1. Computer-aided instruction—the use of computers to help student increase skills at their own pace.

2. Keyboard—the set of keys on a computer or typewriter that you press in order to make it work.

3. Keyboarding—a course offered to students to teach them how to use the QWERTY method of keyboarding.

4. Key by touch—a method of keyboarding which allows individuals to use the keyboarding without looking at their fingers. It is considered beneficial because once the key by touch (sometimes referred to as touch keying) method is mastered, individual's keyboarding skill and speed increase because they no longer have to think about which keys the fingers should hit.

5. QWERTY—a type of keyboard used most frequently in the United States. The keys on the keyboard are arranged in such a way that the upper left side of the keyboard's characters, spell the word QWERTY. Thus, the name of the keyboard type.

6. Speed—another term sometimes used in place of words a minute.

7. Typing—a term that is sometimes used in place of keyboarding. The word typing is a termed that refers to an individual's manipulation of a typewriter's keys. A computers keyboard is almost identical to typewriters keys.

8. WAM—an acronym for words a minute. Used in keyboarding to determine how many words an individual can key during a one-minute timing.

9. Word processing—the use of the computer to write, edit, and store information such as stories, poems, and other text.

10. Software—the programmed instructions that tell the computer what to do. You cannot see software.

Chapter II

Literature Review

Business Education in America first began with the preparation of bookkeepers as apprentices. In the 1600's bookkeeping and business arithmetic were added to the curricula in the colonial schools. After the Civil War, there was such a large demand for bookkeepers that private business schools developed commercial ventures that trained individuals in a short amount of time. In 1827, public high schools in Massachusetts began teaching bookkeeping which was the first vocational course included in the schools curriculum. This trend of teaching business classes at the high school level quickly caught on. Soon, secondary schools throughout the country began to teach student the business skills needed by business and industry. Business education has continued to remain strong every since (Calhoun & Robinson, 1995).

As business and industry changed throughout the years, so did the business education curriculum. Business educators needed to, and still need to, stay abreast of the business and industry needs and teach students the necessary skills to be successful in a business career (NBEA, 2002). There has been much literature written detailing the issues that business educators face. This paper will focus primarily on the issues of keyboarding education at both the elementary and secondary school levels.

Keyboarding has traditionally been taught at either the middle school or high school level. It was a class that was taught to individuals whom would enter clerical fields. However, due to technological advances, keyboarding is no longer an elective course. With the popularity of personal computers, the question is no longer whether to teach keyboarding, but when to teach it (Hopkins, 1998). Another question is who should teach keyboarding to student? Business education teachers have traditionally taught keyboarding, however a current trend is for the

elementary school teachers to teach this course. Much research has been conducted and many articles relating to these two issues have been published.

What is Keyboarding?

Keyboarding is defined as the act of placing information into various types of equipment, such as a personal computer, through the use of a typewriter-like keyboard. Keyboarding focuses on input, and unlike typewriting, a hard copy is not an immediate result of keyboarding. Keyboarding has almost completely replaced typewriting in recent years. In fact, typewriters are not even produced any longer in the United States (Bartholome, n.d.).

Most keyboards on computers in the United States are arranged in a specific sequence. This arrangement of both the alphabetic and the numeric keys is called the QWERTY format, or QWERTY Keyboard. The name QUERTY comes from the first six letters on the top alphabetic row and was invented in the 1860's by C. L. Sholes. The arrangement of the letters on a QWERTY Keyboard were developed to try to lessen the clash of the type bars while the typists typed on a manual typewriter Even though the QUERTY Keyboard makes no sense, is awkward, inefficient, confusing, and manual typewriters are not used anymore, it is still being used in the United States today. (Consider QWERTY, 2003).

Should keyboarding be taught to students?

Before 1878 when typewriters were widely used, most typists used the hunt and peck method of typing. This method was not very efficient. In 1878, a man named McGurrin taught himself how to type without looking at the keys and using all fingers. This was a new concept in his days. There was much success including increases in speed with students whom used this all-finger touch method. Eleven years later, Bates Torey published a typewriting manual describing the touch system and in the early 1900's, this touch system of teaching typewriting

swept across the United States (Bartholome, n.d.). This touch system of keying is still used to teach students to today.

In a 1993 study called "Keyboarding Coursework and Employment, Earnings, and Educational Attainment" states that students that have had one class beyond the basic keyboarding course earned an average of $.32 per hour more than those students without an advanced keyboarding course. This same study states that these students that had taken an advanced keyboarding class added an average of 5 days worked per year. These results indicate that these students are more employable than the students without an advanced keyboarding course.

In 1995, over 34 million computers were sold worldwide which means that yearly unit sales of PCs and automobiles were in the same ballpark (Bartholome, n.d.). With the popularity and accessibility of personal computers to students, and the research that shows that keyboarding is necessary for many jobs, most experts in education agree that teaching keyboarding to students is a given, however when the best time to teach keyboarding to students is not so clear (Hopkins, 1998).

<u>When should keyboarding be taught to students?</u>

There are many differencing opinions on when keyboarding should be taught to students and the reasons for these opinions are varied.

One opinion is that of Theresa Tovey, an occupational therapist in Connecticut. She feels that formal keyboarding should be taught to students around grade four. She states "All kids do not have the eye-hand motor coordination to learn keyboarding skills earlier than that." Tovey continues by saying that it is still good for students to get familiar with the keyboard at earlier ages, however before grade 4, students need to develop handwriting skills (Hopkins, 1998).

A study was done between 1950 and 1960's, which differs from Theresa Tovey's opinion. In this study, there were experiments in teaching both preschoolers and elementary school children typewriting. These studies showed that children of these ages could learn to operate the typewriter correctly and usefully. It showed that elementary school student in both the first and second grade could handle the rigorous task of keyboarding (Bartholome, n.d.).

Another argument for why students should wait until they are at least in grade 4 is that it is a challenge for them to learn to touch-type correctly if they are using an adult-sized keyboard (Starr, 2001). Again, there are individuals who agree with this, and individuals who do not. A company called Datadesk Technologies focused on this argument of children having too small of hands, and introduced a keyboard called LittleFingers®. This keyboard is ergonomically designed and allows children to reach all the computer keys without having to stretch their hands and fingers. This allows the children to acquire the proper touch-typing techniques at young ages. Datadesk's Vice President of Education, Rick Feutz, says that "It's an idea that seems so simple…kids in school use little desks, little chairs. Why not little keyboards?" (LittleFingers®, 2001). One the other hand, since the early 1930's, business educators have known that elementary school students can learn to type when using an adult-sized keyboard. Physically, it is known that elementary school students do have the finger dexterity, as shown by the fact that these students can learn to play the piano very well (Bartholome, n.d.).

Another benefit to start teaching keyboarding early is that elementary students who do type (keyboard) improve their language arts skills. This link between keyboarding and the improvement of language arts skills was established in the 1931 landmark study by Wood and Freeman, and reinforced in a 1959 by Erickson (Bartholome, n.d.). Many elementary school

teachers like to use a variety of tools to help their students with language skills. Keyboarding is just another tool.

Many feel that keyboarding should be taught as soon as students are exposed to the keyboard. When students start to use microcomputers to type sentences and words, keyboarding should be taught (Bartholome, n.d.) It is felt that poor technique skills are being developed early and by the fourth or fifth grade, these improper techniques are hard to break. Many elementary school students are being required to key papers using the computer without much, if any, formal training on the keyboard which could lead to poor keyboarding habits. Thus, keyboarding is needed early enough so that students develop the proper technique. Carla Cruzan, a business teacher at Southwest High School in Minneapolis says that if proper technique is not taught correctly to students when introduces to the keyboards, "you have no idea how hard it is to untrain students…" (Starr, 2001). Many keyboarding teachers believe that technique is the most important skill that should be taught to young learners (Hughes, 2002). Some areas that are included in what good technique consists of which is outlined in the article from the Saskatchewan Education Science and Technology Unit for Elementary Keyboarding, is to have the students:

1. Spine straight, against back of chair, leaning slightly forward from the waist

2. Centered in from of the keyboard (body directly in front of the "J" key)

3. Sitting approximately a hand span away from the keyboard

4. Feet on the floor and slightly apart

5. Arms relaxed and elbows naturally close to the body

6. Forearms almost parallel with the slope of the keyboard

7. Fingers at home row for the beginning and the ending of all keystrokes

8. Pinky (little) finger of the right hand for the enter or the return key

9. Eyes on copy. This means that the students eyes should be on text, screen, or board, rather than the keyboard, once a key has been learned by the student

10. Consult their text if they forget the location of a previously learned key. Beginning keyboarding textbooks usually have color-coded diagrams of a keyboard on each page of the textbook. The color-coded diagram assists students in making the correct finger-to-key placement. Students can refer to their text if they forget which finger to use for a previously learned key. This allows the student find the location of a key without peeking at their fingers or keyboard.

Because technique does include so many skills for a student to learn, Craig Nansen, an elementary school keyboarding teacher stated that his top ten goals of elementary keyboarding instruction were (Starr, 2002):

"1. Technique

2. Technique

3. Technique

5. Technique

6. Technique

7. Technique

8. Technique

9. Accuracy

10. Speed"

Most business teachers today recognize the important of stressing good technique with the students especially early on, however for some reason it is not recognized by much of the

leadership in the elementary schools. In 1935, Colahan stated that to "allow the pupils to typewrite without method is to build up faulty habits of typewriting which will later have to be broken down before the touch system can be taught" (Bartholome, n.d.). Thus, if poor habits are established, he says that they must be broken before the touch system of keyboarding can be taught. This is a very powerful statement and suggests that if the teaching of keyboarding it not taught early enough so that good technique is develop other than poor technique, students will have to break the poor technique habits before they will be able to truly learn how to touch type which may be a difficult task. Therefore, much time may be spent to break old habits when if these students were taught correctly to begin with, learning the touch system of keyboarding would be a much simpler task.

The Wisconsin Department of Public Instruction also has ideas as to when keyboarding should be taught to students. The Wisconsin Department of Public Instruction Model of Academic Standards for business states in its standards when keyboarding should be taught to students and at what grade level various computer skills should be attained. It states that a fourth grade student should develop touch-keyboarding techniques and be able to compose simple information using the keyboard. By eighth grade, a student should be able to demonstrate touch-keyboarding skills at acceptable speed and accuracy levels (Wisconsin DPI, 2002).

How should keyboarding be taught to students?

There are different ways that keyboarding can be taught. A teacher or a software program can teach keyboarding. Some teachers try to make a game out of keyboarding instruction while others have a lot of skill building, drill-type excises.

In the Eau Claire Area School District, keyboarding is taught at the fourth and the sixth grade level. Both keyboarding courses utilize a textbook along with computer aided software

instruction programs. The fourth grade course last six weeks and focuses primarily on learning they keys using the correct fingering and technique while using both the textbook and the computer software to support instruction. The sixth grade course lasts nine weeks and also teaches the alphabetic key locations and the correct fingering for the keys using both the textbook and keyboarding computer software, along with proper technique. In addition, the sixth grade course focuses on expanding the students' knowledge of the Microsoft Word program so that the students will be able to better utilize the program in the future for future school demands. At both grade levels of keyboarding instruction, technique is weighted as a higher percentage of the students' grades over speed or accuracy.

In the Keyboarding scope and sequence portion of the Bartholome article, Bartholome states that keyboarding should be taught to students as early as grade one. In grades one and two, students should use and recognize the home row keys. By grades two and three, students should learn the alphabetic keys along with the commonly used punctuation marks. By grade four and five, students should review the alphabetic keys and introduce numbers and symbols. By grades six, seven, and eight students should review all skill and use the keyboard for personal use, report, essays, letter, etc. Finally, during the high school years students should be introduced to basic and advanced business skills including databases and spreadsheet (Bartholome, n.d.). This method of learning the keyboard begins when students are introduced to computers at grade one, and continues through out the k-12 educational experiences.

At the Plano Independent School District, keyboarding is taught at the fourth grade level. There is a formal approach to teaching keyboarding but the intent is not to produce a skilled keyboardist, but rather to help the students become more efficient using the computer. The alphabetical character, numbers, and some computer function keys are taught. The rationale is

that students need both practice in keyboarding and instruction in keyboarding to be proficient users of technology (Plano, 1998).

Some computer aided instruction companies offer software that can be used to teach the keyboard without the use of a textbook. NimbleFingers is a keyboarding program that offers a learner to operate their program from either a home or school environment. The objectives that this keyboarding software program focuses on as detailed on their web page are:

- To develop the correct touch typing technique

- To key data quickly and accurately

- To demonstrate operational skills in using the computer

- To be able to key accurately, at a rate of 25 Words Per Minute (WPM)

This program utilizes a cartoon character type instructor called "Little Professor" which helps the user navigate throughout the program. This program suggests that anyone can learn keyboarding through the use of its software, with or without a keyboarding instructor assisting him or her though the program (NimbleFingers, 2000). This program was unique, as compared to many other programs that were listed on websites, in that there were many fun exercises that were included in the warm-up activities which included neck exercises, shoulders exercises, arm flapping exercises, and an exercise called shake, rattle and roll.

Who should teach keyboarding?

Many different teachers teach keyboarding at the elementary school. In some districts the elementary keyboarding instructor is the classroom teacher, in other districts it's a business education teacher, and yet in other school districts, keyboarding instruction is taught by someone in charge of the computer laboratory (Bartholome, n.d.). Again, there are differencing opinions as to who should teach this course.

In the Eau Claire Area School District, there are two required keyboarding courses that students take. Keyboarding is taught in fourth grade at the elementary school by the classroom teacher and in sixth grade at the middle school level with a business education teacher teaching the course keyboarding. If any student elects to take keyboarding beyond these two required courses, there are also elective keyboarding course taught by business education teachers. Even though Wisconsin requires certification to teach keyboarding and elementary school teachers do not have this certification, these grade-school teachers are still teaching keyboarding (Bartholome, n.d.). However, because elementary school teachers can teach any subject, they can technically teach keyboarding even though they have not taken a keyboarding curriculum class.

At the Minot (North Dakota) Public Schools, Craig Nansen, the technology coordinator stated "We've had a full-time elementary keyboarding teacher in our district for close to 15 years". He continued by stating "We did a lot of research before implementing that plan. At that time, [we brought in an expert in the field] to help us implement our elementary keyboarding program". The expert convinced Minot Public Schools that it was beneficial to hire a keyboarding teacher. Nansen said that before the expert came, he thought that anyone could teach keyboarding. The expert showed the district that there had been a lot of research done in this area that showed that keyboarding teachers are trained to help the students develop the motor skills necessary to become a good keyboarder. The study also should the benefits for keys to be introduced to students in a certain way, and most computer aided instruction software programs ignore this research and introduce keys in a manner that helps the students to spell words and play games. Most other keyboarding teachers agree that students do not get the same feedback

from a computer software package as they do from a teacher, and students need that feedback

(Starr, 2001).

Chapter III

Methodology

This chapter explains the methods and procedures used in this study. This chapter is

divided into five subsections. These subsections include (1) Subjects, (2) Instruments, (3)

Procedures, (4) Unknowns, and (5) Limitations.

Subjects

The subjects for this survey were sixth grade keyboarding students in the ECASD, during

the 2002-2003 school calendar year. The population for this survey included sixth grade

students at South Middle School in the ECASD. From this population, one sixth grade

keyboarding class was randomly selected and surveyed.

Instruments

The researcher developed the survey instrument. The purpose of the instrument was to

evaluate three items:

1. Students' knowledge of finger placement on a QWERTY keyboard

2. Students' WAM

3. Students' ability to touch-key

Questions relating to finger placement and technique were developed by the researcher.

The finger placement questions were asked to examine whether or not the students were using

the correct finger placement on the keyboard. Correct technique, including correct finger

placement, is an important factor of keyboarding correctly. If poor technique is developed, it is

believed that these poor techniques must be broken before the touch system of keyboarding can

be taught (Bartholome, n.d.). Also, a speed test was included in the survey that asked students to

write down their numeric speed in WAM. The numeric speed question was developed to not

only look at speed but to also determine if students have developed how to key by touch. The students were asked not to "peek" at their fingers; their keyboarding teacher then kept watch to assure that this was taking place. Speed is also important because research has shown that students need a speed of around 20-25 words a minute in order to have truly learned to key by touch (Bartholome, n.d.).

A keyboarding content expert in the ECASD validated the survey for content validity. The survey was not tested for reliability however was pilot tested. One sixth grade student took the survey instrument prior to administering the instrument to the randomly selected classes. The student informed the researcher of questions that were hard to understand.

Procedures

The students in this study were sixth grade keyboarding students at South Middle School in the ECASD. A pre-test post-test method was used at the sixth grade level. Descriptive and numerical data about sixth grade keyboarding students' skills and knowledge was collected after administering the survey instrument (see Appendix A). The survey was given at the beginning and the ending of the sixth grade keyboarding course. Because the sample of the population being researched were under eighteen, a letter which included an introduction of the research project, along with a parental consent form, was sent home with the students (see Appendix B). This consent form was written so that if the consent form was not signed and returned, the students' parents/guardians were giving consent that their son/daughter was able to complete the survey instrument. The keyboarding teacher kept an accurate record of the students who returned the non-consent form and only those students whom did not submit the parental non-consent form were permitted to participate in the study. The keyboarding teacher administered and collected the survey. Upon completion of the surveys, the researcher gathered the surveys

and a data analysis was completed by the Computer User Support Services Department at the

University of Wisconsin Stout. The researcher then developed hypothesis about the data.

<u>Unknowns</u>

The researcher attempted to control extraneous and unknown variables. The keyboarding

teacher was instructed to administer the survey in a well-lit computer lab. Teachers read the

directions of the survey to the students and asked them if there were any questions. Students

were given the opportunity to look at their computer keyboard to answer any of the questions

except for number 5 (see Appendix A). Question 5 measures keyboarding speed and teachers

were asked to administer a one minute timing, and the students were instructed to keep their eyes

on either the computer screen or manuscript to ensure that no student was looking at the

keyboard. This control forced students to use the touch keying method. The completed survey

instruments were placed directly in a manila folder, sealed, and given back to the researcher.

<u>Limitations</u>

The limitations to this study included the following:

1. This research was restricted to those students who attended South Middle School in the

   ECASD.

2. The analysis was restricted one randomly selected South Middle School keyboarding

   class in the ECASD.

3. The survey was given to students by their keyboarding teacher.

4. The students, based on their opinions and their keyboarding skills, answered the

   questions that made up the quantitative data.

5. This study was for informational purposes only and did not include the researcher to

   make any revisions to the keyboarding programs in the ECASD.

6. The survey instrument used was created and validated by the researcher.

Chapter IV

Findings

This chapter depicts the data analysis and hypotheses for this study. Frequencies and percentages of responses, along with compiling the students' speed, were used for the data analysis. Sixth grade students were given the surveys at the beginning and the ending of their keyboarding course. The data collected at the beginning of the sixth grade keyboarding class was compared to the data collected at the end of the sixth grade keyboarding class. This data was then evaluated by the researcher.

Hypotheses were derived about the need for re-teaching keyboarding at sixth grade level at South Middle School in the ECASD. The research hypothesis was: because of the increase of the importance of computers and keyboarding in our world today, students must be able to key by touch using the QWERTY keyboard. Thus, the sixth grade business class should spend time to re-teach the QWERTY keyboard and not spend this time on more advanced computer applications. The null hypothesis was: there is not a need for re-teaching the QWERTY keyboard at the sixth grade level and this time should be used to teach more advanced computer applications.

Rate of Response

There were a total of 20 sixth grade keyboarding students in the keyboarding class at South Middle School in the ECASD. Only 15 out of the 20 students surveyed completed both the pre-test survey and the post-test survey. Only the surveys that had both the pre-test and post-test was used for this research, thus usable responses were obtained from 15 students for a rate of response of 75 percent.

Descriptive Statistics

    Question #1: Question number 1 was a demographic multiple choice question which asked the respondents to choose whether they were male or female. This question also asked the respondents if they were in fourth grade or in sixth grade. Because of change in the study, only sixth grade students were surveyed. The nominal data reported is listed in Tables 1-3 detailing the pre-test and post-test results along with the cross tabulation of the first two tables. In both the pre-test and the post-test, there were a total of 15 respondents which included 6, or 40 percent, sixth grade girls and 9, or 60 percent, sixth grade boys.

Table 1: Pre-test Grade of Respondent

	Number	Percent
Grade 6 Girl	6	40%
Grade 6 Boy	9	60%
Total	15	100%

Table 2: Post-test Grade of Respondent

	Number	Percent
Grade 6 Girl	6	40%
Grade 6 Boy	9	60%
Total	15	100%

Table 3: Cross Tabulation of Pre-test and Post-test Grade and Gender of Respondent

		Post-test: Grade and Gender of Respondent		
		6th Grade Girl	6th Grade Boy	Total
Pre-test: Grade and Gender of Respondent	6th Grade Girl	6 100%		6 100%
	6th Grade Boy		9 100%	9 100%
Total		6 40%	9 60%	15 100%

Question #2: Question number two asked respondents to indicate correct home row finger placement for their left hand. Table 4 reports students' pre-class knowledge of their left-hand placement on the keyboard, while Table 5 reports students' post-class knowledge of their left-hand placement on the keyboard. Table 6 details the cross tabulation results between the two. All 15 students, or 100 percent of the students, correctly answered this question on both the pre-test and post-test. The multiple choice results are as follows.

Table 4: Pre-test Home Row Keys for Left Hand

	Left Hand Placement	Percent
Q W E R		
A S D F	15	100%
Z X C V		
G F D S		
Total	15	100%

Table 5: Post-test Home Row Keys for Left Hand

	Left Hand Placement	Percent
Q W E R		
A S D F	15	100%
Z X C V		
G F D S		
Total	15	100%

Table 6: Cross Tabulation of Pre-test and Post-test Home Row Keys for Left Hand

		Post-test: Home Row Keys for Left Hand	
		A S D F	Total
Pretest: Home Row Keys for Left Hand	A S D F	15 100%	15 100%
Total		15 100%	15 100%

Question #3: Question three asked respondents to indicate correct home row finger

placement for their right hand. Table 7 reports students' pre-class knowledge of their right-hand

placement on the keyboard, while Table 8 reports students' post-class knowledge of their right-

hand placement on the keyboard. Table 9 details the cross tabulated results for this multiple

choice question. All 15 students surveyed, or 100 percent of the students, correctly answered

this question on both the pre-test and the post-test. The multiple choice results are as follows.

Table 7: Pre-test Right Hand Placement

	Right Hand Placement	Percent
U I O P		
J K L ;	15	100%
H J K L		
B N M ,		
Total	15	100%

Table 8: Post-test Right Hand Placement

	Right Hand Placement	Percent
U I O P		
J K L ;	15	100%
H J K L		
B N M ,		
Total	15	100%

Table 9: Cross Tabulation of Pre-test and Post-test Home Row Keys for Right Hand

	Post-test: Home Row Keys for Left Hand		
Pre-test: Home Row Keys for Right Hand		J K L ;	Total
	J K L ;	15 100%	15 100%
Total		15 100%	15 100%

Question #4: Question four asked respondents to indicate correct finger placement for specified keys. Table 10 through 24 reports students' pre-test and post-test knowledge of the finger placement for specified keys. Also included in these tables are the cross-tabulated results between the pre-test and post-test. The multiple choice results are as follows.

Table 10: Pre-test: Which finger should be used for "x" key?

	"x" key	Percent
1 left pinky finger		
2 left ring finger	9	60%
3 left middle finger	6	40%
4 left pointer finger		
5 left thumb		
6 right thumb		
7 right pointer finger		
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 11: Post-test: Which finger should be used for "x" key?

	"x" key	Percent
1 left pinky finger		
2 left ring finger	15	100%
3 left middle finger		
4 left pointer finger		
5 left thumb		
6 right thumb		
7 right pointer finger		
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 12: Cross Tabulation of Pre-test and Post-test—Which finger should be
used for "x" key?

	Post-test: Which finger should be used for "x" key?		
Pre test: Which finger should be used for "x" key?		Left Ring Finger	Total
	Left Ring Finger	9 60%	9 60%
	Left Middle Finger	6 40%	6 40%
Total		15 100%	15 100%

Results for "x" key (correct answer "ring finger left hand"):

Pre-test—60 percent of students correctly answered this question while 40 percent

answered incorrectly.

Post-test—100 percent of students correctly answered this question while zero percent

answered incorrectly.

Table 13: Pre-test: Which finger should be used for "c" key?

	"c" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger	6	40%
4 left pointer finger	9	60%
5 left thumb		
6 right thumb		
7 right pointer finger		
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 14: Post-test: Which finger should be used for "c" key?

	"c" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger	14	93.3%
4 left pointer finger	1	6.7%
5 left thumb		
6 right thumb		
7 right pointer finger		
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 15: Cross Tabulation of Pre-test and Post-test—Which finger should be used for "c" key

	Post test: Which finger should be used for "c" key?		
Pre-test: Which finger should be used for "c" key?		Left Ring Finger	Left Pointer Finger	Total
	Left Middle Finger	6 40%	0 0%	6 40%
	Left Pointer Finger	8 53.33%	1 6.67%	6 60%
Total		14 93.33%	1 6.67%	15 100%

Results for "c" key (correct answer "middle finger left hand"):

Pre-test—40 percent of students correctly answered this question while 60 percent answered incorrectly.

Post-test—93.33 percent of students correctly answered this question while 6.67 percent answered incorrectly.

Table 16: Pre-test: Which finger should be used for "y" key?

	"y" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger		
5 left thumb		
6 right thumb	4	26.7%
7 right pointer finger	11	73.3%
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 17: Post-test: Which finger should be used for "y" key?

	"y" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger		
5 left thumb		
6 right thumb	7	46.7%
7 right pointer finger	8	53.3%
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 18: Cross Tabulation of Pre-test and Post-test—Which finger should be used for "y" key?

Pre-test: Which finger should be used for "y" key?	Post-test: Which finger should be used for "y" key?		
		Right Thumb	Right Pointer Finger	Total
	Right Thumb	2 13.33%	2 13.33%	4 26.67%
	Right Pointer Finger	5 33.33%	6 40%	11 73.33%
Total		14 46.67%	1 53.33%	15 100%

Results for "y" key (correct answer "right pointer finger"):

Pre-test—73.3 percent of students correctly answered this question while 26.7 percent answered incorrectly.

Post-test—53.3 percent of students correctly answered this question while 46.7 percent answered incorrectly.

Table 19: Pre-test: Which finger should be used for "m" key?

	"m" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger		
5 left thumb		
6 right thumb	3	20%
7 right pointer finger	9	60%
8 right middle finger	3	20%
9 right ring finger		
10 right pinky		
Total	15	100%

Table 20: Post-test: Which finger should be used for "m" key?

	"m" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger		
5 left thumb		
6 right thumb	3	20%
7 right pointer finger	8	53.3%
8 right middle finger	3	20%
9 right ring finger	1	6.7%
10 right pinky		
Total	15	100%

Table 21: Cross Tabulation of Pre-test and Post-test—Which finger should be
used for "m" key?

		Post-test: Which finger should be used for "m" key?				
Pre-test: Which finger should be used for "m" key?		Right Thumb	Right Pointer Finger	Right Middle Finger	Right Ring Finger	Total
	Right Thumb	1 6.67%	1 6.67%	1 6.67%		3 20%
	Right Pointer Finger	1 6.67%	6 40%	2 13.33%		9 60%
	Right Middle Finger	1 6.67%	1 6.67%		1 6.67%	3 20%
Total		3 20%	8 53.3%	3 20%	1 6.67%	15 100%

Results for "m" key (correct answer "right pointer finger"):

Pre-test—60 percent of students correctly answered this question while 40 percent

answered incorrectly.

Post-test—53.3 percent of students correctly answered this question while 46.7 percent

answered incorrectly.

Table 22: Pre-test: Which finger should be used for "b" key?

	"b" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger	7	46.7%
5 left thumb	1	6.7%
6 right thumb	2	13.3%
7 right pointer finger	5	33.3%
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 23: Post-test: Which finger should be used for "b" key?

	"b" key	Percent
1 left pinky finger		
2 left ring finger		
3 left middle finger		
4 left pointer finger	11	73.3%
5 left thumb	3	20%
6 right thumb		
7 right pointer finger	1	6.7%
8 right middle finger		
9 right ring finger		
10 right pinky		
Total	15	100%

Table 24: Cross Tabulation of Pre-test and Post-test—Which finger should be used for "b" key?

		Post-test: Which finger should be used for "b" key?			
		Left Pointer Finger	Left Thumb	Right Pointer Finger	Total
Pre-test: Which finger should be used for "b" key?	Left Pointer Finger	6 40%	1 6.67%		7 46.67%
	Left Thumb		1 6.67%		1 6.67%
	Right Thumb	1 6.67%	1 6.67%		2 13.33%
	Right Pointer Finger	4 26.67%		1 6.67%	5 33.33%
Total		11 73.33%	3 20%	1 6.67%	15 100%

Results for "b" key (correct answer "left pointer finger"):

Pre-test—46.7 percent of students correctly answered this question while 53.3 percent answered incorrectly.

Post-test—73.3 percent of students correctly answered this question while 26.7 percent answered incorrectly.

Question #5: Question five asked respondents to take a one minute keyboarding speed timing and to numerically state their results. Table 25 reports students' WAM for their pre-test timing, while Table 26 reports these same post-test results. Table 27 reports students' pre-test timing in WAM while Table 28 reports the post-test statistics in WAM including the statistics on WAM gained from pre-test to post-test. The mean score gained 10.33 WAM from pre- to post-test while the median score gained 10.00 WAM from pre- to post-test scores.

Table 25: Pre-test WAM Results

WAM	Frequency	Percent	Valid Percent	Cumulative Percent
9	1	6.7	6.7	6.7
10	1	6.7	6.7	13.3
13	1	6.7	6.7	20.0
18	1	6.7	6.7	26.7
19	2	13.3	13.3	40.0
21	1	6.7	6.7	46.7
23	1	6.7	6.7	53.3
25	1	6.7	6.7	60.0
29	1	6.7	6.7	66.7
32	1	6.7	6.7	73.3
34	2	13.3	13.3	86.7
37	2	13.3	13.3	100.0
Total	15	100.0	100.0	

Table 26: Post-test WAM Results

WAM	Frequency	Percent	Valid Percent	Cumulative Percent
13	1	6.7	6.7	6.7
15	1	6.7	6.7	13.3
20	1	6.7	6.7	20.0
26	3	20.0	20.0	40.0
30	1	6.7	6.7	46.7
32	1	6.7	6.7	53.3
33	1	6.7	6.7	60.0
41	1	6.7	6.7	66.7
42	1	6.7	6.7	73.3
43	1	6.7	6.7	80.0
44	1	6.7	6.7	86.7
61	1	6.7	6.7	93.3
63	1	6.7	6.7	100.0
Total	15	100.0	100.0	

Table 27: Pre-test WAM Results Statistics

		One-Minute Keyboarding Speed in WAM
N		15
Mean		24.00
Median		23.00

Table 28: Post-test WAM Results Statistics Including WAM Gained

	One-Minute Keyboarding Speed in WAM	WAM Gained from Pre-test to Post-test
N	15	15
Mean	34.33	10.33
Median	32.00	10.00

Tables 29-32 details the cumulative results of survey looking at the total number of correct answers on both the pre-test and the post-test. The mean score increased by .93 from pre-test to post-test while the median score increased by 1.00.

Table 29: Pre-test Total Score (Total Number of Correct Answers)

Number of Correct Answers	Frequency	Percent	Valid Percent	Cumulative Percent
3	2	13.3	13.3	13.3
4	4	26.7	26.7	40.0
5	5	33.3	33.3	73.3
6	3	20.0	20.0	93.3
7	1	6.7	6.7	100.0
Total	15	100.0	100.0	

Table 30: Post-test Total Score (Total Number of Correct Answers)

Number of Correct Answers	Frequency	Percent	Valid Percent	Cumulative Percent
4	1	6.7	6.7	6.7
5	7	46.7	46.7	53.3
6	2	13.3	13.3	66.7
7	5	33.3	33.3	100.0
Total	15	100.0	100.0	

Table 31: Pre-test Total Score Statistics

	Pre-Test Total Score
N	15
Mean	4.8
Median	5

Table 32: Post-test Total Score and WAM Statistics

	Post-Test Total Score	Total Gained in Total Number of correct answers Pre-Test/Post Test
N	15	15
Mean	5.73	.93
Median	5	1

Chapter V

Summary, Conclusions and Recommendations

This chapter will provide a summary of the research, conclusions and recommendations.

Summary

The purpose of this study was to survey sixth grade students regarding their keyboarding skills in order to determine the necessity of re-teaching keyboarding at the sixth grade level, specifically at South Middle School in the ECASD. Keyboarding in the Eau Claire School District is currently taught at the fourth grade level for six weeks and then again at the sixth grade level for nine weeks. There are parents, students, and teachers that question the necessity of re-teaching keyboarding at the sixth grade level. After researching much keyboarding literature, a pre-test/post-test survey was developed by the researcher and focused on students' finger placement and WAM to determine their keyboarding knowledge.

Data was gathered by administering a pre-class and post-class survey to one class of sixth grade keyboarding students. There were a total of 20 students in the class of which both the pre-test and the post-test was completed by 15 students. Only the surveys were used in which there was a pre and a post-test pair for the student. The small sample size is a limitation to this study.

Conclusions

The results of the study help to make many conclusions. One hundred percent of sixth grade students know what the home row keys are for both the left and the right hand. This basic keyboarding concept does not need to be re-taught at the sixth grade level.

In addition to the home row key knowledge, there was a question that looked at some of the more difficult keys and which finger should be used for those keys. The keys researched in

the study were the following: x, c, y, m, and b. The results of the student's surveyed for each of

the keys are as followed:

The "x" Key

Forty percent of the students surveyed choose the incorrect finger to use for the "x" key

on the pre-test while 60 percent choose the correct finger for the key. By the end of the nine

week sixth grade keyboarding class 100 percent of the students surveyed answered correctly.

When looking at the "x" key, the sixth grade keyboarding class benefited all 40 percent of the

students whom answered this question incorrectly on the pre-test.

The "c" Key

Sixty percent of the students surveyed choose the incorrect finger to use for the "c" key

on the pre-test while 40 percent choose the correct finger for the key. By the end of the nine

week sixth grade keyboarding class 93.3 percent of the students surveyed answered correctly

while only one student, or 6.7 percent still answered this question incorrectly. When reviewing

the research results for finger placement for the "c" key, 53.3 percent of students whom

answered incorrectly on the pre-test answered correctly on the post-test.

The "y" Key

Twenty six point seven percent of the students surveyed choose the incorrect finger to use

for the "y" key on the pre-test while 73.3 percent choose the correct finger for the key. By the

end of the nine week sixth grade keyboarding class 46.7 percent if the students surveyed

correctly answered this question while only 53.3 percent incorrectly answered this question.

This results in a loss of knowledge for this particular key.

<u>The "m" Key</u>

Forty percent of the students surveyed choose the incorrect finger to use for the "m" key on the pre-test while 60 percent choose the correct finger for the key. By the end of the nine week sixth grade keyboarding class 53.3 percent of the students surveyed correctly answered this question while 46.7 percent incorrectly answered this question. This results in a loss of knowledge for this particular key.

<u>The "b" Key</u>

Fifty three point three percent of the students surveyed choose the incorrect finger to use for the "b" key on the pre-test while 46.7 percent choose the correct finger for the key. By the end of the nine week sixth grade keyboarding class 73.3 percent of the students surveyed correctly answered this question while 26.7 percent incorrectly answered this question. The result of the study shows a 20 percent gain in knowledge for this particular key.

The "x", "c", and "b" keys all show that the percentage of students answering these questions correctly increased from pre-test to post-test. However, the percentage of students answering the "y" key and the "m" key question correctly, decreased from pre-test to post-test. There may have been some confusion on these two questions as to which number on the diagram of the survey (see Appendix A) represents the right pointer finger. Another survey would have to be administered to determine if this was the cause. Another survey was not given to the students.

The results of the WAM question showed significant gains between pre- and post-test WAM scores. Out of the 15 students surveyed, the increase in the mean WAM score was 10.33 WAM while the median WAM score increased by 10.00 WAM. These increases indicated that

the sixth grade keyboarding class has benefited students by helping them to become faster keyboarders.

The total correct answers stated by the students were also studied by the researcher. There were 7 multiple choice questions in the survey in which both the mean and the median were computed as to how many questions the students answered correctly on both the pre-test and the post-test. The total questions correctly answered increased when looking at both the mean and the median scores. The mean score increase by .93 and the median score increased by 1. This indicates that even though there may have been some confusion on the number in which coincides with the right pointer finger for question #4, there was still an increase in the number of questions that students answered correctly on the survey from pre- to post-test. When taking the paired samples for the WAM, p is .001 which is less than .05. This result indicates that the hypothesis of this study is true. The research hypothesis was: because of the increase of the importance of computers and keyboarding in our world today, students must be able to key by touch using the QWERTY keyboard. Thus, the sixth grade business class should spend time to re-teach the QWERTY keyboard and not spend this time on more advanced computer applications. When taking the paired samples for the total score of the multiple choice questions of the survey, p is also .001 which is less than .05. This result also indicates that the hypothesis of this study is true.

Recommendations

Following the review of the survey results, the following recommendations are made to the Eau Claire Area School District curriculum administrator.

Because the results of this study indicates that the sixth grade business education class should spend time to re-teach the QWERTY keyboard, the sixth grade business education class

should continue to teach keyboarding to the sixth graders. Students better know the correct finger placement on the QWERTY keyboard and they also can key faster at the end of the sixth grade keyboarding class.

There are multiple applications in which this study could be replicated. Pre and post test assessment could, and should, be conducted using a larger sample. In addition, this study should be replicated in multiple locations to provide greater data for generalization. This would be beneficial to the profession of business education and school district administrators when determining course offerings and staffing needs.

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Appendix A

Name _____   Date _____

## 4th Grade and 6th Grade Keyboarding Survey	

Keyboarding Students: Please answer the following questions listed on both the front and backside of this survey to the best of your ability. Place an "X" on the line that best answers the question. You may look at your keyboard to answer any question. You are asked not to put your name anywhere on this survey. Thank you!

1. Place an "X" on the line that describes you.
   _____ 4th Grade Girl   _____ 4th Grade Boy
   _____ 6th Grade Girl   _____ 6th Grade Boy

2. Which keys are considered home row keys for your **left hand**?
   _____ Q W E R   _____ A S D F
   _____ Z X C V   _____ G F D S

3. Which keys are considered home row keys for your **right hand**?
   _____ U I O P   _____ J K L ;
   _____ H J K L   _____ B N M ,

Use the following picture to answer question 4. Write the correct finger number in the space provided to answer the questions. You may look at the keyboard for help. <u>Answer the questions based on which fingers you actually use, not which fingers you think you should use.</u>

Left Hand   Right Hand
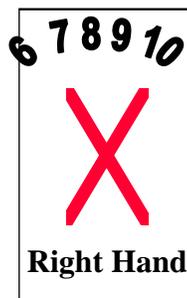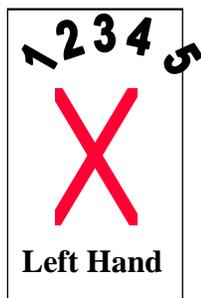
4. Which finger do you use for the following keys. If you don't use the same finger consistently to key this letter, write the word "any" in the blank. Thus, you should either have ONE number, or the word ANY in the blank.
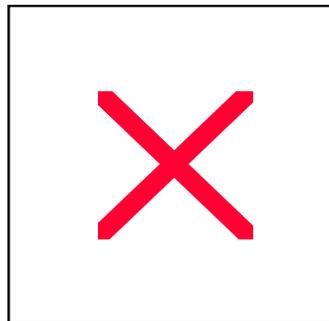
   _____ "x" key   _____ "y" key   _____ "b" key

   _____ "c" key   _____ "m" key

5. Your teacher will give directions on how to take a one-minute keyboarding speed timing. Put the number in the blank that represents your touch-typing speed.
   _____ Speed in WAM (words a minute)

Thank you! ☺☺☺

Appendix B

Mrs. Lisa Skifstad
Graduate Student
University of Wisconsin Stout
Menomonie, WI 54751

Current date

Dear Parent(s)/Guardian(s):

For the 2001-2002 school year, I taught keyboarding and business exploration courses at both Northstar and South Middle Schools. I am also a graduate student at the University of Wisconsin Stout. As part of my graduate program in Career and Technical Education, I am required to conduct a research study and publish a research paper on my findings.

I am very interested in students keyboarding needs at both the elementary and the middle school levels and started researching this topic last summer. Because of the popularity of technology and personal computers, I feel that learning to key correctly is a necessity. Your son/daughters class was randomly selected to be a part of this research project. I need your permission to allow me to survey your son/daughter regarding their keyboarding abilities.

The survey will be given to sixth grade students who are currently taking, or will be taking keyboarding. It will be administered at both the beginning and the end of the keyboarding course. The results of the survey will be confidential and will help keyboarding teachers to better understand the keyboarding needs of students. The potential risks for your son/daughter taking this survey are exceedingly small. The survey will consist of multiple-choice questions and a one-minute keyboarding skills timing. The answers to the survey questions will be used for informational purposes only.

If you have any questions or concerns regarding participation in this research you can first contact me, the researcher, at 715-833-9078. Secondly, you may contact my University of Wisconsin Stout research advisor, Dr. Carol Mooney, at 715-232-1444. Or, you may also contact Sue Foxwell, Human Protections Administrator at UW-Stout. Her contact information is, 11 Harvey Hall, UW-Stout, Menomonie, WI, 54751; phone 715-232-1126.

Please complete the bottom of this letter and return with your child by (include date) if you **do NOT** want your son/daughter to participate in the survey.

Student's Name: _____

_____ My son/daughter **can not** participate in keyboarding research.

Parent/Guardian Signature: _____

Student Signature: _____