1991

# The Ability of the Special Needs Child in Comparison to the Average Child in a Beginning Computerized Keyboarding Class

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# THE ABILITY OF THE SPECIAL NEEDS CHILD IN COMPARISON TO THE AVERAGE CHILD IN A BEGINNING COMPUTERIZED KEYBOARDING CLASS

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A RESEARCH REPORT PROJECT

PRESENTED TO

THE GRADUATE FACULTY OF

THE DARDEN COLLEGE OF EDUCATION

OLD DOMINION UNIVERSITY

---

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTERS OF SCIENCE IN EDUCATION

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BY

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AUGUST 1991

# SIGNATURE PAGE

This project was prepared by Deborah K. Marshall under the direction of Dr. John M. Ritz in OTED 636, Problems in Education. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Master of Science in Education degree.

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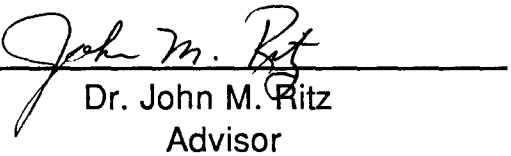

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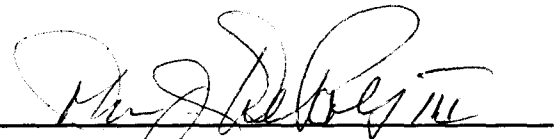

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# ACKNOWLEDGEMENTS

This researcher wishes to express her sincere appreciation to the following:

Dr. John M. Ritz - For his assistance and guidance at Old Dominion University.

David E. Marshall - To whom this thesis and degree are dedicated.

Glenn A. Carver - For his love, understanding, support, patience, and calculations.

Maude W. Marshall - For making phone calls and finding books. I always knew I would make it, I just needed a little help.

And, last but not least, the students and faculty of Peasley Middle School.

# TABLE OF CONTENTS

# TABLE OF TABLES

# CHAPTER I

# INTRODUCTION

The Education for All Handicapped Children Act, was passed by the United States Congress in 1975. This Act required that special needs children receive a free, appropriate public education in the least restrictive educational environment. This does not necessarily mean that the special needs child will be educated in the regular classroom. It does, however, mean that the special needs child will be allowed to participate in regular educational programs such as vocational education programs (Ballard, Ramirez, and Zantal-Wiener, 1987, p. 4).

All special needs children have an IEP (individualized education program). An IEP is not a provision for mainstreaming (Ballard, Ramirez, and Zantal-Wiener, 1987, p. 4). But, if the IEP allows the child to be mainstreamed into a vocational education program, such as Beginning Computerized Keyboarding, will the child be able to keep up?

# STATEMENT OF PROBLEM

The problem of this study was to determine how the ability of the special needs child, when mainstreamed into a Beginning Computerized Keyboarding course, compared to that of the average child. Emphasis will be placed on those special needs children that are being mainstreamed into the Beginning Computerized Keyboarding course for the school year 1990-1991 at Peasley Middle School in Gloucester, Virginia.

# RESEARCH GOALS

The hypothesis of this study was:

$H_o$: There was no significant difference in the learning of special needs students and academically average students when taught Beginning Computerized Keyboarding.

# BACKGROUND AND SIGNIFICANCE

Public law (P. L.) 94-142, passed on November 29, 1975, has helped the special needs child to become a part of some courses in which they would have otherwise not been allowed to participate. The fundamental requirement of P. L. 94-142 was as follows:

> Every State and its localities make available a free appropriate public education for all handicapped children, ages 3 to 18, by the beginning of the school year, September 1, 1978. It further mandated the availability of such education to all children, ages 3 to 21, by September 1, 1980 (Ballard, Ramirez, and Zantal-Wiener, 1987, P. 3).

The law does not require students to be mainstreamed, but it does require that the special needs child receive an education in the "Least Restrictive Environment". This means that educating the special needs child in the same class as the average child should be the governing objective when deciding what is the best environment for the child. If mainstreaming is deemed the least restrictive environment for the child, then the school system should begin mainstreaming that child into regular classrooms that he/she can handle.

The specific policy for identifying a special needs child at Peasley Middle School in Gloucester, Virginia, reads as follows:

> Any child who exhibits significant discrepancy between ability and achievement, significant behavior and/or physical problems, deficits or significant delays in cognitive or psychomotor skills, and other indications or handicapping condition should be referred to their school

> child study committee for review. Diagnostic services will be provided as recommended by the school child study committee (Gloucester County School Board, 1986, p. 6140).

The significance of this study is to show that a special needs child, when mainstreamed into a vocational course with the academically average child, will be able to compete and stay on task.

## LIMITATIONS

The limitations of this study were as follows:

1. The research was limited to Peasley Middle School.
2. The research was limited to the seventh grade.
3. The research was limited to a Beginning Computerized Keyboarding course.

## ASSUMPTIONS

The assumptions of this researcher were as follows:

1. None of the children, whether special needs or average, had been a part of a Beginning Computerized Keyboarding course.
2. All the special needs children in this program were not labeled as one of the following:

A. trainable mentally retarded (TMR) that has been assigned to a self contained classroom.

B. profoundly mentally retarded (PMR) that has been assigned to a self contained classroom.

3. Special needs children as a whole, never succeed in a Beginning Computerized Keyboarding course.

4. All students in Beginning Computerized Keyboarding should be able to type twenty words per minute (wpm) on one 1 minute timed typing and one 3 minute timed tying with three or less errors.

# PROCEDURES

At the beginning of the course, all students were given a pre-test where they typed one 1 minute and one 3 minute timed typing to determine their wpm and errors. Each week, after the initial pre-test, they were to type two 1 minute and two 3 minute timed typings and turn them in. After all timed typings are turned in, all students wpm and errors were written on a chart. At the end of the course, all students were given a post-test which consisted of them typing one 1 minute and one 3 minute timed typing. These timed typings were then turned in and used for research purposes.

# DEFINITIONS OF TERMS

This researcher felt that the following terms needed to be defined in order for the reader not to misinterpret the material:

AVERAGE CHILD - A child with no identified disorders in any of the basic psychological processes involved in understanding or using language spoken or written.

KEYBOARDING - To strike keys to record or display test and data (Robinson, Beaumont, Crawford, Erickson, and Ownby 1989, p. iv).

MAINSTREAMING - To place (as a special needs child) in a regular class (Merriam-Webster, Inc., 1990, p. 718).

SPECIAL EDUCATION - Specially designed instruction at no cost to parents or guardians, to meet the unique needs of a handicapped or learning disabled child (Ballard, Ramirez, and Zantal-Wiener, 1987, p. 3).

SPECIAL NEEDS CHILD - A child who has a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations (Ballard, Ramirez, and Zantal-Wiener, 1987, p. 2).

TIMED TYPING - Given straight-copy materials, keyboard using correct touch techniques at a minimum rate of twenty gross words per minute for three minutes with three errors or fewer per minute (Schmidt, 1985, p. 10)

VOCATIONAL EDUCATION - Training in a skill or trade to be pursued as a career (Merriam-Webster, Inc., 1990, p. 1320).

# OVERVIEW OF CHAPTER I

The researcher, in Chapter 1, has attempted to show that mainstreaming a special needs child into a vocational education course, such as Beginning Computerized Keyboarding, is not just a federal law. Chapter II shows how Public Law 94-142 came into existence and its passing. Chapter III will show the methods and procedures used to collect the data for this research, Chapter IV the findings on the data that was collected, and Chapter V has the researcher's conclusions and recommendations.

# CHAPTER II

# REVIEW OF LITERATURE

The purpose of this study was to determine if special needs children could be mainstreamed into a vocational education course, such as Beginning Computerized Keyboarding, and function as well as the academic average child in the class. A review of literature found that the activities of advocacy groups, changes in state law, decisions in the courts, and political considerations led to the passage of Public Law 94-142.

## ADVOCACY GROUPS

During the period 1940-1960, parent advocate groups were organized both formally and informally on a local, state, and national level. The original question from these groups seemed to be, "Why, as taxpayers who were entitled to send their nonhandicapped children to school, they could not send their handicapped children to school?" (Jones, 1981, p. 19).

Through advocacy groups, from 1940 until the passage of Public Law 94-142 in 1975, some states changed their laws so that special needs children would be served. In 1948, the United States Department of Education reported that only twelve percent of the country's handicapped children were receiving a special education. By 1963, the percentage of the country's handicapped children that were being served had only risen to twenty-one percent. By 1967, that percentage had increased to only thirty-three percent. During the academic year 1968-1969, twenty years after the original report was done, the United States Department of Education reported that nineteen states were serving less than thirty-one percent of their handicapped students, eleven states were serving twenty percent or less of their handicapped students, seven states were providing a special education for more than fifty-one percent of their handicapped students, and thirty states were serving less than eleven percent of their emotionally disturbed school-aged children (Zettel and Abeson, 1978, p. 234). State laws were being changed, but the school districts still were not developing programs for any

type of special needs child. Therefore, parents of special needs children were having to operate their own schools. These schools ranged from people's homes to low-rent facilities (Jones, 1981, p. 19).

In 1950, the National Association for Retarded Citizens (NARC), was charted. Local, as well as, state groups were formed to help in finding a formal approach to the various government groups. The purpose of this group was to fight for the rights of all retarded citizens, and eventually it began to fight for the rights of all special needs citizens (Jones, 1981, p. 19).

## CHANGES IN STATE LAWS

The NARC first approached state legislatures for mandates to serve mentally retarded children. Even these bills, when first introduced, usually did not pass in the first or second session (Jones, 1981, p. 19). At this time, educating special needs citizens was not a major political issue.

States were very slow in passing mandates regarding special needs children. Reports done by the NARC and the National Education Association (NEA) showed this to be true. The reports indicated that by 1949 Hawaii had passed a full mandate for handicapped children aged 5 through 20, by 1954 New Jersey had passed a mandate that was subsequently amended to include all handicapped children aged 5 through 20, and by 1956 Pennsylvania had passed a full planning and programming mandate (Jones, 1981, p. 19).

During the 1960's, nine states followed suit: 1962, Kentucky (trainable mentally retarded only) amended to full programs in 1970; 1963, Idaho (all except trainable mentally retarded) amended to the full program in 1972; 1965, Illinois; 1966, Connecticut; 1968 Georgia; and in 1969, Indiana, Texas, Utah and Wyoming. By July 1, 1975, forty-eight states had varying forms of special education mandates. With the exception of Ohio and Mississippi, all states were under mandates by statute or court order (Jones, 1981, p. 19).

By 1972, almost seventy percent of the states had adopted mandatory legislation requiring the education of all eligible special needs children as defined by their own statutes. By 1974, twelve states had laws requiring due process procedures, thirteen states required due process procedures through their regulations, six states had legislative language requiring special needs children to be educated in the least restrictive environment, and eleven states stipulated by regulation that special needs children had to be educated in the least restrictive environment. In October of 1975, the NEA reported that twenty-two or half of their state affiliates reported having statutory or regulatory language requiring that special needs children be placed in regular classes for at least some of their instructional time (Zettel and Weintraul, 1978, p. 11-12).

Advocacy groups were still not satisfied. Even though there had been state laws made and amended, parents were still frustrated. There was no pressure by state education agencies

being put on the local school districts to implement state laws (Jones, 1981, p. 20).

## DECISIONS IN STATE LAW

Advocacy groups, like the NARC and the Pennsylvania Association for Retarded Citizens (PARC), turned to the federal court system in their efforts to implement state laws in local school districts. These groups utilized the 1954 landmark decision made by the Supreme Court in the Brown *vs.* Board of Education case. This case stated:

> In these days it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be available to all on equal terms (Jones, 1981, p. 21).

According to NARC, the Brown decision suggests that a guarantee of rights to education of special needs persons should never even have been an issue needing separate state or federal statutes or litigation (Jones, 1981, p. 21).

The first of two precedent setting cases was filed in federal district court by the PARC on January 7, 1971. This suit was filed:

> On behalf of all mentally retarded persons, residents of the Commonwealth of Pennsylvania, who have been, are being, or may be denied access to a free public program of education and training while they are, or were, less than twenty-one years of age (Jones, 1981, p. 21).

The final agreement in the PARC case came sixteen years after the Commonwealth of Pennsylvania had passed a full program special education mandate. Education and training were to be provided to all mentally retarded children - regardless of severity - as opposed to the typical provision of programs for educable and trainable mentally retarded children (Jones, 1981, p. 22).

The second precedent setting case was Mills *vs.* Board of Education of the District of Columbia in 1972. Where as the PARC case only represented the mentally retarded, the Mills case represented all handicapped children. The District of Columbia argued "that inadequate fiscal resources prevented the provision of special education and related services" (Jones, 1981, p. 22).

The judge's decision in this case ended the above excuse used by school districts everywhere. Judge Waddy stated:

> The defendants are required by the Constitution of the United States, the District of Columbia Code, and their own regulations to provide a publicly - supported education for these "exceptional" children. Their failure to fulfill this clear duty to include and retain these children in the public school system, or otherwise provide them with publicly - supported education, and their failure to afford them due - process hearing and periodical review, cannot be excused by the claim that there are insufficient funds (Jones, 1981, p. 22).

In the two cases, their decisions assured nondiscriminatory evaluation, least restrictive environment, timely notice and free public education for the entire handicapped population (Jones, 1981, p. 23).

## POLITICAL DECISIONS

Why then, was it necessary for Congress to take four years to pass a law regarding the education of the special needs population (Jones, 1981, p. 18)? Statistics showed that the need for a law was greater in 1971 than in 1975, when the law was finally passed.

There were three major political considerations for the large time lapse.

First, the law is permanent legislation. Unlike most federal legislations, Public Law 94-142 has no expiration date. Unless Congress repeals the law by amendment, Public Law 94-142 is authorized forever (Jones, 1981, p. 24).

Second, Public Law 94-142 is not a new law. While some items are new in the federal statue, most of the rights and guarantees can be found throughout the forty-eight state mandates in effect at the time (Jones, 1981, p. 24).

Third, every state and every Congressional district could share in the fiscal resources of the bill. This results from the flow-through entitlement of federal funds for local school districts' count of handicapped children served (Jones, 1981, p. 24).

## PROGRAM OPTIONS

By passing Public Law 94-142, the Congress insured that all special needs children are entitled to a free, appropriate education.

This free, appropriate education also includes programs other than academics. According to Public Law 94-142, Section § 300.306, program options for special needs children include: the variety of educational programs and services available to nonhandicapped children in the area served by the agency, including art, music, industrial arts, consumer and homemaking education, and vocational education (Rothstein, 1990, p. 298). The course Beginning Computerized Keyboarding falls under the category of vocational education.

## OVERVIEW OF CHAPTER II

In 1975, Congress overwhelmingly voted in favor of Public Law 94-142. Whatever the reasons, the enactment of Public Law 94-142 was to provide a better education for all special needs children (Jones, 1981, p. 24). This education was to be better in both the academic and nonacademic areas. Chapter III will show the methods and procedures used to collect data while doing this research.

# CHAPTER III

# METHODS AND PROCEDURES

This study was designed to determine if special needs children, when placed in a Beginning Computerized Keyboarding class with the academically average child, can do as well or better. This Chapter will show the methods and procedures used to determine the above.

## POPULATION

The population for this study was comprised of seventh grade students in a Beginning Computerized Keyboarding course at Peasley Middle School in Gloucester, Virginia. There were one hundred and twenty-six average students and ten special needs students.

The average students involved in this research were not classified as either special needs or handicapped students by the County of Gloucester. This means that their reading level was at or above average for their grade level, they wore no prothesis, and they were not in a wheel chair.

The special needs students involved in this research were: one deaf, but not mute; one emotionally disturbed; one severely dyslexic; one moderately retarded; and six mildly mentally retarded children. Based on the individualized education program (IEP) of these children, the reading levels ranged from 3.5 to 8.0. None of these children were considered handicapped by the County of Gloucester, because none of the above children wore any prosthesis or were in a wheel chair of any kind.

## CONDITIONS

This research was conducted in the computer classroom at Peasley Middle School in Gloucester, Virginia. The classroom consisted of twenty-two Macintosh SE computers. Each student was assigned their own computer. Each student was given the same amount of time on the same day to complete each one minute and three minute timed typing test. During the week, all students had the last ten minutes of each class period to be timed on practice paragraphs.

# INSTRUMENT

Two types of typing tests, designed by Bytes of Learning Incorporated, were utilized to collect data for this research. One of the tests consisted of a set of paragraphs that each student used to see how many words per minute they could accurately type on a one minute timed typing (see Appendix A). The other test consisted of a set of paragraphs that each student used to see how many words per minute they could accurately type on a three minute timed typing (see Appendix B). Once the paragraph(s) were typed, the computer would then calculate how many words per minute were typed, what the mistakes were, and what percent was typed accurately.

# DATA COLLECTION

While conducting the research, this researcher taught six Beginning Computerized Keyboarding courses to the seventh grade at Peasley Middle School in Gloucester, Virginia. Every Friday all students were tested on their individualized computerized keyboarding skills. The test consisted of all students being given

two one minute timed typings on the same paragraph. After each class on Friday, all timed typings were collected and the class average for wpm and errors was obtained.

For the researchers purposes, the average of wpm and the errors for the special needs students and the academically average students were obtained. This information was not given out to the class in any way. This information was used to compare the average of the special needs students to the average of the academically average students on a one minute timed typing.

At the end of the course, each student typed one 1 minute and one 3 minute timed typing. They were then collected and the wpm and errors were averaged. The information was used in this research to compare the special needs student to the academically average student.

## OVERVIEW OF CHAPTER III

By giving all students the same tests under the same conditions, each child is being given the same opportunity to either

pass or fail. The special education child was being given the opportunity to compete on the same level at the same time as the academically average child. The results of these tests will be analyzed in Chapter IV.

# CHAPTER IV

# FINDINGS

The findings that will be presented in this chapter are the results of two types of timed typings given to all seventh grade students in a Beginning Computerized Keyboarding course at Peasley Middle School in Gloucester, Virginia. The results of these timed typings compare the special needs students to that of the academically average students in the course (see table 1).

One hundred and twenty-six academically average and ten special needs seventh grade students participated in the Beginning Computerized Keyboarding course. The seventh grade class as a whole consisted of two hundred and thirty students, with fourteen of these students being classified as special needs students. Therefore, fifty-nine percent of the whole seventh grade class participated in the course. Seventy-one percent of the special needs students and fifty-eight percent of the academically average students.

# TABLE I

## TIMED TYPING COMPARISONS

| | ONE MINUTE | | THREE MINUTE | |
|---|---|---|---|---|
| | Errors[1] | WPM[2] | Errors | WPM |
| Special Needs Students | 0.4 | 24.8 | 0.8 | 21.1 |
| Academically Average Students | 0.8 | 34.9 | 1.4 | 25.5 |

1. Errors = The goal of each student was to type correctly for the specified amount of time with three or less errors. Errors consisted of a wrong key, a missed key, or an extra key being typed.

2. WPM = Words Per Minute - The goal of each student was to type at least twenty words per minute in the specified amount of time.

The purpose of this study was to show that special needs students, when mainstreamed into a Beginning Computerized Keyboarding Course, have the ability to keep up with academically average students. The goal of the program was to ensure that all students could type at least twenty words per minute with three or less errors on a one and three minute timed typing at the end of the twelve week course.

# RESULTS

On a one minute timed typing for wpm, the resulting t-test was -2.1 (see Appendix C). The degree of freedom *(df)* on both sets was 134. The t-value minus 2.1 does exceed .05 percent , but not .01 percent. Therefore, the group fell within the ninety-fifth percentile range. On errors, the resulting t-test was -1.29 (see Appendix E). The t-value minus 1.29 exceeds both the .05 percent and the .01 percent. Therefore, the group fell within the ninety-ninth percentile range

On a three minute timed typing for wpm, the resulting t-test was -1.5 (see Appendix D). The *df* on both sets was 134. The t-value minus 1.5 exceeds both the .05 percent and the .01 percent. On errors, the resulting t-test was -1.07 (see Appendix F). The t-value minus 1.07 exceeds both the .05 percent and the .01 percent. Therefore, both groups, fell within the ninety-ninth percentile.

## OVERVIEW OF CHAPTER IV

The results of the t-test on a one minute timed typing showed that there was no significant difference between the special needs students and the academically average students on wpm or errors. The results on a three minute timed typing also showed that there was no significant difference on wpm or errors between the two types of students. Chapter V summarizes Chapters I-IV, makes conclusions based on the results of the t-tests, and makes recommendations.

# CHAPTER V

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## SUMMARY

This study was done to determine if special needs students, when mainstreamed into a Beginning Computerized Keyboarding course, have the ability to stay on task with the academically average students. Their keyboarding skills were tested by having them type one 1 minute and one 3 minute timed typing at the end of the course. The program's goal was to have students type twenty words per minute with three or less errors on both types of timed typings. The intent of carrying out this research was to compare the special needs child to the average child in a Beginning Computerized Keyboarding course.

By reviewing the literature, it was discovered that the special needs student was guaranteed, by Public Law 94-142 Section §300.306, the right to the same education as that of the average

student. This education includes: art, music, industrial arts, consumer and homemaking education, and vocational education. The course Beginning Computerized Keyboarding falls under vocational education.

The sample population was comprised of fifty-nine percent of the seventh grade class at Peasley Middle School in Gloucester, Virginia. There were one hundred twenty-six academically average and ten special needs students in the course. The study was based on a comparison of wpm and errors typed on one 1 minute and one 3 minute timed typing between the special needs students and academically average students in the course.

On the one minute timed typing, it was found that the special needs students typed an average of 24.8 wpm with and average of 0.4 errors. The academically average students typed an average of 34.9 wpm with an average of 0.8 errors. On the three minute timed typing, the special needs students typed an average of 21.1 wpm with an average of 0.8 errors. The academically average students typed an average of 25.5 wpm with an average of 1.4 errors.

A t-test was done to determine if there was a significant difference between the special needs students and the academically average students on the one 1 minute and one 3 minute timed typing. The results of the t-test on the one 1 minute timed typing showed that there was no significant difference between the two groups of students. On the one 3 minute timed typing, there was also no significant difference between the groups.

# CONCLUSIONS

This study tested the hypothesis that:

$H_0$: There was no significant difference in the learning of special needs students and academically average students when taught Beginning Computerized Keyboarding.

Results strongly support this hypothesis. The t-tests showed that there was no significant difference between the special needs and the academically average students on one 1 minute or one 3 minute timed typing. Therefore, the hypothesis is accepted.

# RECOMMENDATIONS

This researcher recommends that Peasley Middle School continue to mainstream special needs students into the Beginning Computerized Keyboarding course. It is also recommends that research be conducted to see how special needs students perform with academically average students in other vocational courses such as Living Skills, Art, Music, and Technology 2000.

# BIBLIOGRAPHY

Ballard, Joseph; Ramirez, Bruce and Zantal-Wiener, Kathy. Public Law 94-142, Section 504, and Public Law 99-457: Understanding What They Are and Are Not. Reston, VA: Department of Governmental Relations, The Council For Exceptional Children, 1987.

Business Education Service. Keyboarding: Task Analysis. Richmond, VA: Department of Education, 1985.

Gloucester County School Board. The Gloucester County School Board Rules and Regulations. Gloucester, VA: 1990.

Jones, Philip R. A Practical Guide to Federal Special Education Law - Understanding and Implementing PL 94-142. New York: CBS College Publishing, 1981.

Mish, Frederick C. The New Merriam-Webster Dictionary. Springfield, MA: Merriam-Webster Inc., 1990.

Payne, James and Patton, James R. Mental Retardation. Columbus, OH: Charles E. Merril Publishing Co., 1981.

Robinson, Jerry W.; Beaumont, Lee R.; Crawford, T. James; Erickson, Lawrence W.; and Ownly, Arnola C. Basic Keyboarding. Cincinnati, OH: South-Western Publishing Co., 1989.

Rothstein, Laura F. Special Education Law. New York: Longman, New York and London, 1990.

Willer, Art; Dreyer, Ken; Thomas, Paul. Ultrakey - A Keyboarding Tutor. Ontario, Canada: Bytes of Learning, Inc., 1990.

Zettel, Jeffrey T. and Abeson, Alan. "Litigation, Law, and the Handicapped: A Study of the judicial and legislative accomplishments of the handicapped, culminating with the passage of Public Law 94-142," School Media Quarterly (Summer, 1978), 234.

Zettel, Jeffrey T. and Weintraul, Frederick J. "PL 94-142 It's Origins and Implications," National Elementary Principal (October, 1978), 11-12.

## APPENDICES

APPENDIX A - A One Minute Timed Typing

APPENDIX B - A Three Minute Timed Typing

APPENDIX C - t-test Results For Words Per Minute On One 1 Minute Timed Typing

APPENDIX D - t-test Results For Words Per Minute On One 3 Minute Timed Typing

APPENDIX E - t-test Results For Errors On One 1 Minute Timed Typing

APPENDIX F - t-test Results For Errors On One 3 Minute Timed Typing

# APPENDIX A

A One Minute Timed Typing

Name: Student's Name Date: Mon, Jul 8, 1991 — 12:29 PM

SKILL CHECK 9 RESULTS

Keys: Q Z Number of paragraphs requested: 1

What you were asked to type:

> I coaxed Trixie to sit on my bed. Trixie and I quietly snoozed. Mother was quite puzzled by her. She said Trixie was crazy.¶

What you typed:

> I coaxed Trixie to sit on my bed. Trixie and I quietly snoozed. Mother was quite puzzled by her. She said Trixie was crazy.¶

Accuracy: 100% (improved by 5%)

Speed: 50 WPM (no increase)

Wrong Keys: 0 Missed Keys: 0 Extra Keys: 0 Total Errors: 0

Comments:

PERFECT! You had no errors in your typing.

Recommendations:

You can continue to build your speed using Skill Check 9. If you

feel ready for more difficult material, return to LESSONS and take the next recommended lesson.

# APPENDIX B

A Three Minute Timed Typing

Name: Student's Name Date: Mon, Jul 8, 1991 — 12:25 PM

SKILL CHECK 4 RESULTS

Keys: H E P Number of paragraphs requested: 3

What you were asked to type:

KEN SAID HE HAD TO SEE PAT. JOE LET
KEN HIDE IN THE HALL. KEN PRETENDED
TO LOOK THERE.¶

THE DENTIST IS ON THE PHONE. THIS
DENTIST DRILLS TEETH. HE SAID IT IS
HARD TO LEARN.¶

ROPES HELD FRED ON THE ELEPHANT.
TENSION AND TERROR FILL THE AIR.
FRED FELL OFF THE POOR ELEPHANT.¶

What you typed:

KEN SAID HE HAD TO SEE PAT. HOE LET
KEN HIDE IN THE HALL. KEN PRETENDED
TO LOOK THERE.¶

THE DENTIST IS ON THE PHONE. THIS
DENTIST DRILLS TEETH. HE SAID IT IS
HARD TO LEARN.¶

ROPES HELD FRED ON THE ELEPHANT.
TENSION AND TERROR FILL THE AIR.
FRED FELL OFF THE POOR ELEPHANT.¶

Accuracy: 99%

Speed: 75 WPM

Wrong Keys: 1 Missed Keys: 0 Extra Keys: 0 Total Errors: 1

Comments:

Well done! You had very few errors in your typing.

Recommendations:

Keep good hand and body position as you build your speed in Skill Check 4. If you feel ready for more difficult material, return to LESSONS and take the next recommended lesson.

# APPENDIX C

t-test Results For Words Per Minute On One 1 Minute Timed Typing

# t-TEST RESULTS FOR WORDS PER MINUTE ON ONE 1 MINUTE TIMED TYPING

The following t-test was done to determine if there was a significant difference between the special needs student and the academically average student on words per minute (WPM) on one 1 minute timed typing.

**Set One:** WPM on one 1 minute timed typing of the special needs students.
**Set Two:** WPM on one 1 minute timed typing of the academically average students.

---

SET ONE

M = mean, d = Set - M M = 24.8

| Student | Set 1 | d of 1 | $d^2$ of 1 |
|---|---|---|---|
| 001 | 26 | +01.2 | 0001.44 |
| 002 | 17 | -07.8 | 0060.84 |
| 003 | 16 | -08.8 | 0077.44 |
| 004 | 24 | -00.8 | 0000.64 |
| 005 | 18 | -06.8 | 0046.24 |
| 006 | 24 | -00.8 | 0000.64 |
| 007 | 26 | +01.2 | 0001.44 |
| 008 | 16 | -08.8 | 0077.44 |
| 009 | 23 | -01.8 | 0003.24 |
| 010 | 58 | +33.2 | 1102.24 |
| SUMS | 248 | 00.0 | 1371.60 |

SET TWO

M = 34.9

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 001 | 70 | +35.1 | 1233.9 |
| 002 | 21 | -13.9 | 0192.5 |
| 003 | 20 | -14.9 | 0221.2 |
| 004 | 20 | -14.9 | 0221.2 |
| 005 | 60 | +25.1 | 0631.4 |

*Appendix C continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 006 | 52 | +17.1 | 0293.3 |
| 007 | 55 | +20.1 | 0405.1 |
| 008 | 67 | +32.1 | 1032.1 |
| 009 | 40 | +05.1 | 0026.3 |
| 010 | 20 | -14.9 | 0221.2 |
| 011 | 48 | +13.1 | 0172.3 |
| 012 | 43 | +08.1 | 0066.0 |
| 013 | 40 | +05.1 | 0026.3 |
| 014 | 48 | +13.1 | 0172.3 |
| 015 | 48 | +13.1 | 0172.3 |
| 016 | 21 | -13.9 | 0192.5 |
| 017 | 23 | -11.9 | 0141.0 |
| 018 | 76 | +41.1 | 1691.4 |
| 019 | 29 | -05.9 | 0034.5 |
| 020 | 34 | -00.9 | 0000.8 |
| 021 | 43 | +08.1 | 0066.0 |
| 022 | 49 | +14.1 | 0199.6 |
| 023 | 51 | +16.1 | 0260.1 |
| 024 | 50 | +15.1 | 0228.8 |
| 025 | 57 | +22.1 | 0489.6 |
| 026 | 28 | -06.9 | 0047.2 |
| 027 | 20 | -14.9 | 0221.2 |
| 028 | 18 | -16.9 | 0284.7 |
| 029 | 44 | +09.1 | 0083.3 |
| 030 | 33 | -01.9 | 0003.5 |
| 031 | 32 | -02.9 | 0008.3 |
| 032 | 24 | -10.9 | 0118.2 |
| 033 | 29 | -05.9 | 0034.5 |
| 034 | 55 | +22.1 | 0405.1 |
| 035 | 28 | -06.9 | 0047.2 |
| 036 | 27 | -07.9 | 0062.0 |
| 037 | 28 | -06.9 | 0047.2 |
| 038 | 31 | -03.9 | 0015.0 |
| 039 | 23 | -11.9 | 0141.0 |
| 040 | 41 | +06.1 | 0037.5 |
| 041 | 21 | -13.9 | 0192.5 |
| 042 | 21 | -13.9 | 0192.5 |
| 043 | 21 | -13.9 | 0192.5 |

*Appendix C continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 044 | 24 | -10.9 | 0118.2 |
| 045 | 26 | -08.9 | 0078.7 |
| 046 | 79 | +44.1 | 1947.2 |
| 047 | 32 | -02.9 | 0008.3 |
| 048 | 37 | +02.1 | 0004.5 |
| 049 | 46 | +11.1 | 0123.8 |
| 050 | 52 | +17.1 | 0293.3 |
| 051 | 54 | +19.1 | 0365.8 |
| 052 | 53 | +18.1 | 0328.6 |
| 053 | 60 | +25.1 | 0631.4 |
| 054 | 31 | -03.9 | 0015.0 |
| 055 | 23 | -11.9 | 0141.0 |
| 056 | 21 | -13.9 | 0192.5 |
| 057 | 47 | +12.1 | 0147.1 |
| 058 | 36 | +01.1 | 0001.3 |
| 059 | 35 | +00.1 | 0000.0 |
| 060 | 27 | -07.9 | 0062.0 |
| 061 | 32 | -02.9 | 0008.3 |
| 062 | 58 | +23.1 | 0534.9 |
| 063 | 31 | -03.9 | 0015.0 |
| 064 | 30 | -04.9 | 0023.7 |
| 065 | 31 | -03.9 | 0015.0 |
| 066 | 34 | -00.9 | 0000.8 |
| 067 | 26 | -08.9 | 0078.7 |
| 068 | 44 | +09.1 | 0083.3 |
| 069 | 24 | -10.9 | 0118.2 |
| 070 | 24 | -10.9 | 0118.2 |
| 071 | 24 | -10.9 | 0118.2 |
| 072 | 70 | +35.1 | 1233.9 |
| 073 | 21 | -13.9 | 0192.5 |
| 074 | 20 | -14.9 | 0221.2 |
| 075 | 20 | -14.9 | 0221.2 |
| 076 | 60 | +25.1 | 0631.4 |
| 077 | 52 | +17.1 | 0293.3 |
| 078 | 55 | +20.1 | 0405.1 |
| 079 | 67 | +32.1 | 1032.1 |
| 080 | 40 | +05.1 | 0026.3 |
| 081 | 20 | -14.9 | 0221.2 |

*Appendix C continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 082 | 48 | +13.1 | 0172.3 |
| 083 | 43 | +08.1 | 0066.0 |
| 084 | 40 | +05.1 | 0026.3 |
| 085 | 48 | +13.1 | 0172.3 |
| 086 | 48 | +13.1 | 0172.3 |
| 087 | 32 | -02.9 | 0008.3 |
| 088 | 25 | -09.9 | 0097.5 |
| 089 | 31 | -03.9 | 0015.0 |
| 090 | 23 | -11.9 | 0141.0 |
| 091 | 17 | -17.9 | 0319.4 |
| 092 | 17 | -17.9 | 0319.4 |
| 093 | 23 | -11.9 | 0141.0 |
| 094 | 26 | -08.9 | 0078.7 |
| 095 | 22 | -12.9 | 0165.7 |
| 096 | 23 | -11.9 | 0141.0 |
| 097 | 20 | -14.9 | 0221.2 |
| 098 | 19 | -15.9 | 0252.0 |
| 099 | 21 | -13.9 | 0192.5 |
| 100 | 53 | +18.1 | 0328.6 |
| 101 | 31 | -03.9 | 0015.0 |
| 102 | 24 | -10.9 | 0118.2 |
| 103 | 16 | -18.9 | 0356.2 |
| 104 | 24 | -10.9 | 0118.2 |
| 105 | 24 | -10.9 | 0118.2 |
| 106 | 31 | -03.9 | 0015.0 |
| 107 | 25 | -09.9 | 0097.5 |
| 108 | 74 | +39.1 | 1530.9 |
| 109 | 29 | -05.9 | 0034.9 |
| 110 | 27 | -07.9 | 0062.0 |
| 111 | 25 | -09.9 | 0097.5 |
| 112 | 18 | -16.9 | 0284.7 |
| 113 | 22 | -12.9 | 0165.7 |
| 114 | 41 | +06.1 | 0037.5 |
| 115 | 18 | -16.9 | 0284.7 |
| 116 | 24 | -10.9 | 0118.2 |
| 117 | 31 | -03.9 | 0015.0 |
| 118 | 25 | -09.9 | 0097.5 |
| 119 | 25 | -09.9 | 0097.5 |

*Appendix C continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 120 | 22 | -12.9 | 0165.7 |
| 121 | 30 | -04.9 | 0023.7 |
| 122 | 31 | -03.9 | 0015.0 |
| 123 | 31 | -03.9 | 0015.0 |
| 124 | 40 | +05.1 | 0026.3 |
| 125 | 25 | -09.9 | 0097.5 |
| 126 | 27 | -07.9 | 0062.0 |
| SUMS | 4394 | 00.0 | 27676.0 |

$$t = \frac{24.8 - 34.9}{\sqrt{\left(\frac{(1371.6 + 27676.0)(10 + 126)}{(10 + 126 - 2)\quad (10)\ (126)}\right)}} = \frac{-10.1}{\sqrt{\left(\frac{(29047.6)(136)}{(134)\qquad (1260)}\right)}} =$$

$$\frac{-10.1}{\sqrt{(216.8)(.1)}} = \frac{-10.1}{\sqrt{21.68}} = \frac{-10.1}{4.6} = \quad t = -2.195$$

## APPENDIX D

t-test Results For Words Per Minute On One 3 Minute Timed Typing

# t-TEST RESULTS FOR WORDS PER MINUTE ON ONE 3 MINUTE TIMED TYPING

The following t-test was done to determine if there was a significant difference between the special needs student and the academically average student for words per minute (WPM) on one three minute timed typing.

**Set One:** WPM on one 3 minute timed typing of special needs students
**Set Two:** WPM on one 3 minute timed typing of academically average students.

---

SET ONE

M = 21.1

| Student | Set 1 | d of 1 | $d^2$ of 1 |
|---|---|---|---|
| 001 | 23 | +01.9 | 0003.61 |
| 002 | 13 | -08.1 | 0065.61 |
| 003 | 20 | -01.1 | 0001.21 |
| 004 | 55 | +33.9 | 1149.21 |
| 005 | 23 | +01.9 | 0003.61 |
| 006 | 14 | -07.1 | 0050.41 |
| 007 | 13 | -08.1 | 0065.61 |
| 008 | 21 | -00.1 | 0000.01 |
| 009 | 08 | -13.1 | 0171.61 |
| 010 | 21 | -00.1 | 0000.01 |
| SUMS | 211 | 00.0 | 1510.90 |

SET TWO

M = 25.5

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 001 | 22 | -03.5 | 0012.0 |
| 002 | 29 | +03.5 | 0012.5 |
| 003 | 28 | +02.5 | 0006.4 |
| 004 | 20 | -05.5 | 0029.9 |
| 005 | 14 | -11.5 | 0131.5 |

*Appendix D continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 006 | 14 | -11.5 | 0131.5 |
| 007 | 20 | -05.5 | 0029.9 |
| 008 | 23 | -02.5 | 0006.1 |
| 009 | 19 | -06.5 | 0041.8 |
| 010 | 20 | -05.5 | 0029.9 |
| 011 | 17 | -08.5 | 0071.7 |
| 012 | 16 | -09.5 | 0089.6 |
| 013 | 21 | -04.5 | 0020.0 |
| 014 | 52 | +26.5 | 0703.9 |
| 015 | 28 | +02.5 | 0006.4 |
| 016 | 21 | -04.5 | 0020.0 |
| 017 | 13 | -12.5 | 0155.5 |
| 018 | 21 | -04.5 | 0020.0 |
| 019 | 21 | -04.5 | 0020.0 |
| 020 | 28 | +02.5 | 0006.4 |
| 021 | 22 | -03.5 | 0012.0 |
| 022 | 71 | +45.5 | 2073.1 |
| 023 | 26 | +00.5 | 0000.3 |
| 024 | 24 | -01.5 | 0002.2 |
| 025 | 22 | -03.5 | 0012.0 |
| 026 | 15 | -10.5 | 0109.6 |
| 027 | 19 | -06.5 | 0041.8 |
| 028 | 38 | +12.5 | 0157.0 |
| 029 | 18 | -07.5 | 0055.8 |
| 030 | 21 | -04.5 | 0020.0 |
| 031 | 28 | +02.5 | 0006.4 |
| 032 | 22 | -03.5 | 0012.0 |
| 033 | 22 | -03.5 | 0012.0 |
| 034 | 19 | -06.5 | 0041.8 |
| 035 | 27 | +01.5 | 0002.3 |
| 036 | 29 | +03.5 | 0012.5 |
| 037 | 28 | +02.5 | 0006.4 |
| 038 | 37 | +11.5 | 0133.0 |
| 039 | 22 | -03.5 | 0012.0 |
| 040 | 24 | -01.5 | 0002.2 |
| 041 | 29 | +03.5 | 0012.5 |
| 042 | 20 | -05.5 | 0029.9 |
| 043 | 26 | -00.5 | 0000.3 |

*Appendix D contiued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 044 | 36 | +10.5 | 0110.9 |
| 045 | 34 | +08.5 | 0072.8 |
| 046 | 37 | +11.5 | 0133.0 |
| 047 | 25 | -00.5 | 0000.2 |
| 048 | 35 | +09.5 | 0090.9 |
| 049 | 20 | -05.5 | 0029.9 |
| 050 | 21 | -04.5 | 0020.0 |
| 051 | 31 | +05.5 | 0030.6 |
| 052 | 24 | -01.5 | 0002.2 |
| 053 | 31 | +05.5 | 0030.6 |
| 054 | 29 | +30.5 | 0012.5 |
| 055 | 18 | -07.5 | 0055.8 |
| 056 | 22 | -03.5 | 0012.0 |
| 057 | 18 | -07.5 | 0055.8 |
| 058 | 22 | -03.5 | 0012.0 |
| 059 | 33 | +07.5 | 0056.7 |
| 060 | 25 | -00.5 | 0000.2 |
| 061 | 15 | -10.5 | 0109.6 |
| 062 | 30 | +04.5 | 0020.5 |
| 063 | 25 | -00.5 | 0000.2 |
| 064 | 26 | +00.5 | 0000.3 |
| 065 | 23 | -02.5 | 0006.1 |
| 066 | 23 | -02.5 | 0006.1 |
| 067 | 29 | +03.5 | 0012.5 |
| 068 | 14 | -11.5 | 0131.5 |
| 069 | 22 | -03.5 | 0012.0 |
| 070 | 21 | -04.5 | 0020.0 |
| 071 | 17 | -08.5 | 0071.7 |
| 072 | 52 | +26.5 | 0703.9 |
| 073 | 25 | -00.5 | 0000.2 |
| 074 | 18 | -07.5 | 0055.8 |
| 075 | 20 | -05.5 | 0029.9 |
| 076 | 20 | -05.5 | 0029.9 |
| 077 | 30 | +04.5 | 0020.5 |
| 078 | 22 | -03.5 | 0012.0 |
| 079 | 19 | -06.5 | 0041.8 |
| 080 | 18 | -07.5 | 0055.8 |
| 081 | 28 | +02.5 | 0006.4 |

*Appendix D continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 082 | 21 | -04.5 | 0020.0 |
| 083 | 18 | -07.5 | 0055.8 |
| 084 | 14 | -11.5 | 0131.5 |
| 085 | 29 | +03.5 | 0012.5 |
| 086 | 33 | +07.5 | 0056.7 |
| 087 | 22 | -03.5 | 0012.0 |
| 088 | 31 | +05.5 | 0030.6 |
| 089 | 25 | -00.5 | 0000.2 |
| 090 | 29 | +03.5 | 0012.5 |
| 091 | 22 | -03.5 | 0012.0 |
| 092 | 22 | -03.5 | 0012.0 |
| 093 | 21 | -04.5 | 0020.0 |
| 094 | 16 | -09.5 | 0089.6 |
| 095 | 28 | +02.5 | 0006.4 |
| 096 | 21 | -04.5 | 0020.0 |
| 097 | 21 | -04.5 | 0020.0 |
| 098 | 20 | -05.5 | 0029.9 |
| 099 | 19 | -06.5 | 0041.8 |
| 100 | 37 | +11.5 | 0133.0 |
| 101 | 37 | +11.5 | 0133.0 |
| 102 | 71 | +45.5 | 2073.1 |
| 103 | 27 | +01.5 | 0002.3 |
| 104 | 25 | -00.5 | 0000.2 |
| 105 | 21 | -04.5 | 0020.0 |
| 106 | 22 | -03.5 | 0012.0 |
| 107 | 37 | +11.5 | 0133.0 |
| 108 | 36 | +10.5 | 0110.9 |
| 109 | 22 | -03.5 | 0012.0 |
| 110 | 22 | -03.5 | 0012.0 |
| 111 | 29 | +03.5 | 0012.5 |
| 112 | 21 | -04.5 | 0020.0 |
| 113 | 20 | -05.5 | 0029.9 |
| 114 | 35 | +09.5 | 0090.9 |
| 115 | 20 | -05.5 | 0029.9 |
| 116 | 28 | +02.5 | 0006.4 |
| 117 | 34 | +08.5 | 0072.8 |
| 118 | 24 | -01.5 | 0002.2 |
| 119 | 35 | +09.5 | 0090.9 |

*Appendix D continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 120 | 24 | -01.5 | 0002.2 |
| 121 | 24 | -01.5 | 0002.2 |
| 122 | 28 | +02.5 | 0006.4 |
| 123 | 21 | -04.5 | 0020.0 |
| 124 | 26 | +00.5 | 0000.3 |
| 125 | 26 | +00.5 | 0000.3 |
| 126 | 31 | +05.5 | 0030.6 |
| SUMS | 3209 | 00.0 | 10027.4 |

$$t = \frac{21.1 - 25.5}{\sqrt{\left(\frac{(1510.9 + 10027.4)(10 + 126)}{(10 + 126 - 2)\quad(10)\quad(126)}\right)}} = \frac{-4.4}{\sqrt{\left(\frac{(11538.3)\quad(136)}{(134)\qquad(1260)}\right)}} =$$

$$\frac{-4.4}{\sqrt{(86.1)(.1)}} = \frac{-4.4}{\sqrt{8.61}} = \frac{-4.4}{2.9} = t = -1.517$$

# APPENDIX E

t-test Results For Errors On One 1 Minute Timed Typing

# t-TEST RESULTS FOR ERRORS ON ONE 1 MINUTE TIMED TYPING

The following t-test was done to determine if there was a significant difference between the special needs student and the acadecmically average student on errors on one 1 minute timed typing.

**Set One:** Errors on one 1 minute timed typing of special needs students.
**Set Two:** Errors on one 1 minute timed typing of academically average students.

---

SET ONE

M = 00.4

| Student | Set 1 | d of 1 | $d^2$ of 1 |
|---|---|---|---|
| 001 | 02 | -01.6 | 0002.56 |
| 002 | 02 | -01.6 | 0002.56 |
| 003 | 00 | -00.4 | 0000.16 |
| 004 | 00 | -00.4 | 0000.16 |
| 005 | 00 | -00.4 | 0000.16 |
| 006 | 00 | -00.4 | 0000.16 |
| 007 | 00 | -00.4 | 0000.16 |
| 008 | 00 | -00.4 | 0000.16 |
| 009 | 00 | -00.4 | 0000.16 |
| 010 | 00 | -00.4 | 0000.16 |
| SUMS | 04 | 00.0 | 0006.40 |

SET TWO

M = 00.8

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 001 | 01 | +00.2 | 0000.1 |
| 002 | 00 | -00.8 | 0000.6 |
| 003 | 00 | -00.8 | 0000.6 |
| 004 | 00 | -00.8 | 0000.6 |
| 005 | 00 | -00.8 | 0000.6 |
| 006 | 01 | +00.2 | 0000.1 |

*Appendix E continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 007 | 00 | -00.8 | 0000.6 |
| 008 | 02 | +01.2 | 0001.6 |
| 009 | 00 | -00.8 | 0000.6 |
| 010 | 01 | +00.2 | 0000.1 |
| 011 | 00 | -00.8 | 0000.6 |
| 012 | 00 | -00.8 | 0000.6 |
| 013 | 00 | -00.8 | 0000.6 |
| 014 | 00 | -00.8 | 0000.6 |
| 015 | 00 | -00.8 | 0000.6 |
| 016 | 02 | +01.2 | 0001.6 |
| 017 | 00 | -00.8 | 0000.6 |
| 018 | 02 | +01.2 | 0001.6 |
| 019 | 00 | -00.8 | 0000.6 |
| 020 | 02 | +01.2 | 0001.6 |
| 021 | 00 | -00.8 | 0000.6 |
| 022 | 01 | +00.2 | 0000.1 |
| 023 | 01 | +00.2 | 0000.1 |
| 024 | 03 | +02.2 | 0005.0 |
| 025 | 03 | +02.2 | 0005.0 |
| 026 | 01 | +00.2 | 0000.1 |
| 027 | 00 | -00.8 | 0000.6 |
| 028 | 00 | -00.8 | 0000.6 |
| 029 | 00 | -00.8 | 0000.6 |
| 030 | 00 | -00.8 | 0000.6 |
| 031 | 01 | +00.2 | 0000.1 |
| 032 | 00 | -00.8 | 0000.6 |
| 033 | 01 | +00.2 | 0000.1 |
| 034 | 01 | +00.2 | 0000.1 |
| 035 | 00 | -00.8 | 0000.6 |
| 036 | 02 | +01.2 | 0001.6 |
| 037 | 00 | -00.8 | 0000.6 |
| 038 | 00 | -00.8 | 0000.6 |
| 039 | 00 | -00.8 | 0000.6 |
| 040 | 01 | +00.2 | 0000.1 |
| 041 | 02 | +01.2 | 0001.6 |
| 042 | 00 | -00.8 | 0000.6 |
| 043 | 01 | +00.2 | 0000.1 |
| 044 | 00 | -00.8 | 0000.6 |

*Appendix E continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 045 | 00 | -00.8 | 0000.6 |
| 046 | 02 | +01.2 | 0001.6 |
| 047 | 00 | -00.8 | 0000.6 |
| 048 | 02 | +01.2 | 0001.6 |
| 049 | 00 | -00.8 | 0000.6 |
| 050 | 01 | +00.2 | 0000.1 |
| 051 | 01 | +00.2 | 0000.1 |
| 052 | 02 | +01.2 | 0001.6 |
| 053 | 01 | +00.2 | 0000.1 |
| 054 | 00 | -00.8 | 0000.6 |
| 055 | 02 | +01.2 | 0001.6 |
| 056 | 02 | +01.2 | 0001.6 |
| 057 | 03 | +02.2 | 0005.0 |
| 058 | 03 | +02.2 | 0005.0 |
| 059 | 02 | +01.2 | 0001.6 |
| 060 | 00 | -00.8 | 0000.6 |
| 061 | 02 | +01.2 | 0001.6 |
| 062 | 05 | +04.2 | 0018.0 |
| 063 | 01 | +00.2 | 0000.1 |
| 064 | 00 | -00.8 | 0000.6 |
| 065 | 00 | -00.8 | 0000.6 |
| 066 | 00 | -00.8 | 0000.6 |
| 067 | 00 | -00.8 | 0000.6 |
| 068 | 01 | +00.2 | 0000.1 |
| 069 | 00 | -00.8 | 0000.6 |
| 070 | 02 | +01.2 | 0001.6 |
| 071 | 00 | -00.8 | 0000.6 |
| 072 | 01 | +00.2 | 0000.1 |
| 073 | 00 | -00.8 | 0000.6 |
| 074 | 00 | -00.8 | 0000.6 |
| 075 | 00 | -00.8 | 0000.6 |
| 076 | 00 | -00.8 | 0000.6 |
| 077 | 00 | -00.8 | 0000.6 |
| 078 | 00 | -00.8 | 0000.6 |
| 079 | 00 | -00.8 | 0000.6 |
| 080 | 01 | +00.2 | 0000.1 |
| 081 | 00 | -00.8 | 0000.6 |
| 082 | 00 | -00.8 | 0000.6 |

*Appendix E continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 083 | 03 | +02.2 | 0005.0 |
| 084 | 00 | -00.8 | 0000.6 |
| 085 | 00 | -00.8 | 0000.6 |
| 086 | 00 | -00.8 | 0000.6 |
| 087 | 00 | -00.8 | 0000.6 |
| 088 | 00 | -00.8 | 0000.6 |
| 089 | 00 | -00.8 | 0000.6 |
| 090 | 00 | -00.8 | 0000.6 |
| 091 | 01 | +00.2 | 0000.1 |
| 092 | 00 | -00.8 | 0000.6 |
| 093 | 02 | +01.2 | 0001.6 |
| 094 | 00 | -00.8 | 0000.6 |
| 095 | 00 | -00.8 | 0000.6 |
| 096 | 00 | -00.8 | 0000.6 |
| 097 | 00 | -00.8 | 0000.6 |
| 098 | 00 | -00.8 | 0000.6 |
| 099 | 00 | -00.8 | 0000.6 |
| 100 | 01 | +00.2 | 0000.1 |
| 101 | 02 | +01.2 | 0001.6 |
| 102 | 00 | -00.8 | 0000.6 |
| 103 | 00 | -00.8 | 0000.6 |
| 104 | 00 | -00.8 | 0000.6 |
| 105 | 03 | +02.2 | 0005.0 |
| 106 | 02 | +01.2 | 0001.6 |
| 107 | 02 | +01.2 | 0001.6 |
| 108 | 00 | -00.8 | 0000.6 |
| 109 | 01 | +00.2 | 0000.1 |
| 110 | 02 | +01.2 | 0001.6 |
| 111 | 00 | -00.8 | 0000.6 |
| 112 | 03 | +02.2 | 0005.0 |
| 113 | 00 | -00.8 | 0000.6 |
| 114 | 00 | -00.8 | 0000.6 |
| 115 | 01 | +00.2 | 0000.1 |
| 116 | 03 | +02.2 | 0005.0 |
| 117 | 01 | +00.2 | 0000.1 |
| 118 | 01 | +00.2 | 0000.1 |
| 119 | 00 | -00.8 | 0000.6 |
| 120 | 01 | +00.2 | 0000.1 |

*Appendix E continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 121 | 00 | -00.8 | 0000.6 |
| 122 | 00 | -00.8 | 0000.6 |
| 123 | 01 | +00.2 | 0000.1 |
| 124 | 00 | -00.8 | 0000.6 |
| 125 | 02 | +01.2 | 0001.6 |
| 126 | 00 | -00.8 | 0000.6 |
| SUMS | 95 | 00.0 | 0131.4 |

$$t = \frac{00.4 - 00.8}{\sqrt{\left(\frac{(6.4 + 131.4)}{(10 + 126 - 2)}\right)\left(\frac{(10 + 126)}{(10)\ (126)}\right)}} = \frac{-0.4}{\sqrt{\left(\frac{(137.8)}{(134)}\right)\left(\frac{(136)}{(1260)}\right)}} =$$

$$\frac{-0.4}{\sqrt{(1.02)(.10)}} = \frac{-0.4}{\sqrt{0.102}} = \frac{-0.4}{0.31} = t = -1.290$$

# APPENDIX F

t-test Results For Errors On One 3 Minute Timed Typing

# t-TEST RESULTS FOR ERRORS ON ONE 3 MINUTE TIMED TYPING

The follwoing t-test was done to determine if there was a significant difference between the special needs student and the academically average student on errors on one 3 minute timed typing.

**Set One:** Errors on one 3 minute timed typing of special needs students.
**Set Two:** Errors on one 3 minute timed typing of academically average students.

---

SET ONE

M = 00.8

| Student | Set 1 | d of 1 | $d^2$ of 1 |
|---|---|---|---|
| 001 | 02 | +01.2 | 0001.44 |
| 002 | 02 | +01.2 | 0001.44 |
| 003 | 00 | -00.8 | 0000.64 |
| 004 | 03 | +02.2 | 0004.84 |
| 005 | 00 | -00.8 | 0000.64 |
| 006 | 00 | -00.8 | 0000.64 |
| 007 | 00 | -00.8 | 0000.64 |
| 008 | 00 | -00.8 | 0000.64 |
| 009 | 01 | +00.2 | 0000.04 |
| 010 | 00 | -00.8 | 0000.64 |
| SUMS | 08 | 00.0 | 0011.60 |

SET TWO

M = 1.4

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 001 | 01 | -00.4 | 0000.2 |
| 002 | 03 | +01.6 | 0002.5 |
| 003 | 02 | +00.6 | 0000.3 |
| 004 | 00 | -01.4 | 0002.0 |
| 005 | 01 | -00.4 | 0000.2 |

*Appendix F continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 006 | 01 | -00.4 | 0000.2 |
| 007 | 00 | -01.4 | 0002.0 |
| 008 | 00 | -01.4 | 0002.0 |
| 009 | 02 | +00.6 | 0000.3 |
| 010 | 00 | -01.4 | 0002.0 |
| 011 | 09 | +07.6 | 0057.6 |
| 012 | 02 | +00.6 | 0000.3 |
| 013 | 03 | +01.6 | 0002.5 |
| 014 | 01 | -00.4 | 0000.2 |
| 015 | 02 | +00.6 | 0000.3 |
| 016 | 02 | +00.6 | 0000.3 |
| 017 | 06 | +04.6 | 0021.0 |
| 018 | 00 | -01.4 | 0002.0 |
| 019 | 00 | -01.4 | 0002.0 |
| 020 | 00 | -01.4 | 0002.0 |
| 021 | 01 | -00.4 | 0000.2 |
| 022 | 02 | +00.6 | 0000.3 |
| 023 | 03 | +01.6 | 0002.5 |
| 024 | 00 | -01.4 | 0002.0 |
| 025 | 01 | -00.4 | 0000.2 |
| 026 | 00 | -01.4 | 0002.0 |
| 027 | 05 | +03.6 | 0012.9 |
| 028 | 00 | -01.4 | 0002.0 |
| 029 | 02 | +00.6 | 0000.3 |
| 030 | 00 | -01.4 | 0002.0 |
| 031 | 03 | +01.6 | 0002.5 |
| 032 | 01 | -00.4 | 0000.2 |
| 033 | 02 | +00.6 | 0000.3 |
| 034 | 08 | +06.6 | 0043.4 |
| 035 | 01 | -00.4 | 0000.2 |
| 036 | 01 | -00.4 | 0000.2 |
| 037 | 00 | -01.4 | 0002.0 |
| 038 | 05 | +03.6 | 0012.9 |
| 039 | 00 | -01.4 | 0002.0 |
| 040 | 00 | -01.4 | 0002.0 |
| 041 | 00 | -01.4 | 0002.0 |
| 042 | 00 | -01.4 | 0002.0 |
| 043 | 00 | -01.4 | 0002.0 |

*Appendix F continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 044 | 00 | -01.4 | 0002.0 |
| 045 | 03 | +01.6 | 0002.5 |
| 046 | 03 | +01.6 | 0002.5 |
| 047 | 00 | -01.4 | 0002.0 |
| 048 | 01 | -00.4 | 0000.2 |
| 049 | 02 | +00.6 | 0000.3 |
| 050 | 00 | -01.4 | 0002.0 |
| 051 | 01 | -00.4 | 0000.2 |
| 052 | 02 | +00.6 | 0000.3 |
| 053 | 00 | -01.4 | 0002.0 |
| 054 | 03 | +01.6 | 0002.5 |
| 055 | 00 | -01.4 | 0002.0 |
| 056 | 00 | -01.4 | 0002.0 |
| 057 | 01 | -00.4 | 0000.2 |
| 058 | 00 | -01.4 | 0002.0 |
| 059 | 03 | +01.6 | 0002.5 |
| 060 | 01 | -00.4 | 0000.2 |
| 061 | 01 | -00.4 | 0000.2 |
| 062 | 00 | -01.4 | 0002.0 |
| 063 | 00 | -01.4 | 0002.0 |
| 064 | 01 | -00.4 | 0000.2 |
| 065 | 00 | -01.4 | 0002.0 |
| 066 | 00 | -01.4 | 0002.0 |
| 067 | 00 | -01.4 | 0002.0 |
| 068 | 01 | -00.4 | 0000.2 |
| 069 | 00 | -01.4 | 0002.0 |
| 070 | 00 | -01.4 | 0002.0 |
| 071 | 09 | +07.6 | 0057.6 |
| 072 | 01 | -00.4 | 0000.2 |
| 073 | 00 | -01.4 | 0002.0 |
| 074 | 01 | -00.4 | 0000.2 |
| 075 | 00 | -01.4 | 0002.0 |
| 076 | 04 | +02.6 | 0006.7 |
| 077 | 00 | -01.4 | 0002.0 |
| 078 | 02 | +00.6 | 0000.3 |
| 079 | 05 | +03.6 | 0012.9 |
| 080 | 00 | -01.4 | 0002.0 |
| 081 | 03 | +01.6 | 0002.6 |

*Appendix F continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 082 | 00 | -01.4 | 0002.0 |
| 083 | 02 | +00.6 | 0000.3 |
| 084 | 00 | -01.4 | 0002.0 |
| 085 | 01 | -00.4 | 0000.2 |
| 086 | 03 | +01.6 | 0002.5 |
| 087 | 01 | -00.4 | 0000.2 |
| 088 | 01 | -00.4 | 0000.2 |
| 089 | 00 | -01.4 | 0002.0 |
| 090 | 03 | +01.6 | 0002.5 |
| 091 | 01 | -00.4 | 0000.2 |
| 092 | 01 | -00.4 | 0000.2 |
| 093 | 00 | -01.4 | 0002.0 |
| 094 | 02 | +00.6 | 0000.3 |
| 095 | 00 | -01.4 | 0002.0 |
| 096 | 00 | -01.4 | 0002.0 |
| 097 | 00 | -01.4 | 0002.0 |
| 098 | 00 | -01.4 | 0002.0 |
| 099 | 02 | +00.6 | 0000.3 |
| 100 | 05 | +03.6 | 0012.9 |
| 101 | 05 | +03.6 | 0012.9 |
| 102 | 02 | +00.6 | 0000.3 |
| 103 | 01 | -00.4 | 0000.2 |
| 104 | 01 | -00.4 | 0000.2 |
| 105 | 00 | -01.4 | 0002.0 |
| 106 | 00 | -01.4 | 0002.0 |
| 107 | 03 | +01.6 | 0002.5 |
| 108 | 00 | -01.4 | 0002.0 |
| 109 | 00 | -01.4 | 0002.0 |
| 110 | 01 | -00.4 | 0000.2 |
| 111 | 03 | +01.6 | 0002.5 |
| 112 | 03 | +01.6 | 0002.5 |
| 113 | 00 | -01.4 | 0002.0 |
| 114 | 01 | -00.4 | 0000.2 |
| 115 | 02 | +00.6 | 0000.3 |
| 116 | 02 | +00.6 | 0000.3 |
| 117 | 03 | +01.6 | 0002.5 |
| 118 | 00 | -01.4 | 0002.0 |
| 119 | 02 | +00.6 | 0000.3 |

*Appendix F continued*

| Student | Set 2 | d of 2 | $d^2$ of 2 |
|---|---|---|---|
| 120 | 00 | -01.4 | 0002.0 |
| 121 | 02 | +00.6 | 0000.3 |
| 122 | 02 | +00.6 | 0000.3 |
| 123 | 02 | +00.6 | 0000.3 |
| 124 | 00 | -01.4 | 0002.0 |
| 125 | 03 | +01.6 | 0002.5 |
| 126 | 00 | -01.4 | 0002.0 |
| SUMS | 178 | 00.0 | 0406.5 |

$$t = \frac{00.8 - 01.4}{\sqrt{\left(\frac{(11.60 + 406.5)}{(10 + 126 - 2)}\right)\left(\frac{(10 + 126)}{(10)\ (126)}\right)}} = \frac{-0.6}{\sqrt{\left(\frac{(418.1)}{(134)}\right)\left(\frac{(136)}{(1260)}\right)}} =$$

$$\frac{-0.6}{\sqrt{(3.12)(.10)}} = \frac{-0.6}{\sqrt{.312}} = \frac{-0.6}{.56} = t = -1.071$$