THE USE OF COMPUTERS AND TECHNOLOGY IN THE MULTI-HANDICAP CLASSROOM

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ABSTRACT

COMPUTERS AND TECHNOLOGY IN THE CLASSROOM OF THE MULTI-HANDICAP

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Students with multi-handicaps (MH), with both mental and physical disabilities, are beginning to benefit from this computer technology. This study investigated teachers' use of computers within the multi-handicap classroom, specific computer equipment being used, higher student achievement resulting from computer utilized, and whether teachers of the multi-handicap use the computer as a primary means of instruction. The primary purpose of this study was to determine if computer-based instruction in classrooms for the multi-handicap promotes a strong learning environment and higher student achievement. The investigator mailed surveys to 570 State of Ohio teachers of the multi-handicapped and 302 of those teachers completed and returned the survey. Overall, the survey revealed that the majority of teachers of the multi-handicap are using the computer in their classrooms. The survey showed that a significant number of teachers were observing success by their students using this technology.

The teachers were asked if they saw high student achievement in the functional areas of language arts, mathematics, social studies, science, vocational, and daily living. The survey showed that students usually experienced higher levels of achievement in the language arts and mathematics curriculum using the computer. The information from this study can aid in developing computer-based courses or programs vital to the education of the multiple-handicap and to special educators as a whole.

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Special thanks are to Dr. Laurice Joseph, my advisor, for providing the time and support necessary for the work contained herein, and for directing this thesis to its completion.

I would also like to thank my wife Chrissie who has been very supportive to me and has helped me persevere each day as I worked diligently on this work.

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Ear VOIS 136 and since then, his life has become enhanced because he is able to communicate his needs and wants to others (Guzzo, Paula & Bob, 1991).

This example and many others are why this proposed study is taking place. The computer is life changing for students with multi-handicaps and this study will produce relevant information of it uses in the classroom.

Problem Statement

There have been a number of studies conducted which look at various types of computer equipment available to students with multi-handicapping conditions (Pugliese & Davey, 1993; Robins, 1991; Rosenberg, 1986; Hoko, 1986; Gandell & Laufer, 1993; O'Neal, 1992;). This author however, did not find any information that related to the use of this computer equipment, software, hardware, and technology that was used by teachers of the multi-handicap. Therefore, several questions emerged:

1). Do teachers of the multi-handicap, who have computer technology in their classrooms, find great success using the computer hardware with their students?

2). Do teachers of the multi-handicap observe higher student achievement levels resulting from computer usage?

3). Are teachers of the multi-handicap using the computer as a primary instructional technique across disciplines?

Need for the Study

These questions have raised a growing concern in the use of computers with multi-handicap students. The research has found that many types of computer technology are available to teachers of the multiple-handicap who desire to integrate it into their curriculum. It is important that an informative study be prepared to address the issues of computers and the role

they play in meeting the IEP goals and objectives of students with multiple-handicaps. A comparison study, therefore, will be of assistance in formulating a knowledge base for teachers of the multiple-handicap; informing them of available computer technology. In addition, it will investigate the benefits of using various technologies.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Computers are beginning to play an integral role in education as more and more technology becomes available. The computer age has dawned and our schools are attempting to stay informed with the distribution of ever-changing hardware and software technologies. Because of the adaptations necessary to enable students with multiple-handicaps to utilize computers, MH classrooms lag behind in up-to-date technology. Despite this, schools continue to look at computer equipment that is available to students with multiple-handicaps and their needs. Also, companies continue to produce lines of computer equipment and software specifically designed to meet the needs of students with multiple-handicaps. This author has researched computer literature examining types of equipment and its availability to teachers of the multi-handicap. The equipment is called Assistive Technology. Assistive Technology is "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of children with disabilities" (Federal Register, 1992, p. 44801). Assistive Technology is becoming available and making significant differences in the lives of students with disabilities.

Assistive technology is helping students "to be taught new skills, compensate for skills never developed, compensate for skills lost through degeneration, and provide for independent leisure time for persons with severe disabilities" (Dykes & Lee, 1994). This technology is helping students build skills necessary to assist them in vocational and living experiences. The result of using these assistive devices is that students have the potential to excel and achieve in areas of life where they previously had difficulty. Weber and Demchak (1996) explain that the application of assistive devices has the potential to remove and prevent environmental barriers and encourage

community participation, integration, mobility, and self-care skills. In addition, assistive technology is used as teaching aids both in the classroom and in the community. The use of this technology can involve an adapted keyboard, keyguards, gooseneck switches, electronic magnifying viewers, communication software, text to speech programs, etc... Gardner & Ejdyburn (1993) explain using assistive devices as teaching aids can communicate the purpose of a lesson, provide interaction between the material and the learner, enhance the acquisition of information, help increase instructional productivity of the teacher, and increase the personal productivity of the student.

Students with multiple-handicaps have the right to be taught new skills using computers and technology. Many federal laws and regulations have been passed to give these students the right to access and use this technology. The Individuals with Disabilities Act (P.L. 94-142) guarantees the right of all children with disabilities to a free and appropriate education in the least restrictive environment. Thus, this law states that students with multiple-handicaps are given the right to learn in an environment that nurtures and encourages growth and productivity. Because computers enable students with multiple-handicaps to further attain skills, computers should be integrated into the special education curriculum. Another law that has been passed for students with disabilities is the Rehabilitation Act of 1973 (P.L. 99-506). This law was passed to ensure access to computers and other electronic office equipment to individuals with disabilities. These individuals would be able to manipulate data and have access to computer systems (Blackhurst, 1997). This allows students employed in federal employment opportunities to have access to computer equipment. Therefore, schools can prepare students with multiple-handicaps for these types of jobs by integrating computers in the curriculum.

The Americans with Disabilities Act (P.L. 101-336) broadens the definition of those considered to have disabilities (Blackhurst, 1997). This act enhances P.L. 94-142 by giving a larger criteria of students the opportunities to access technology to further develop academic and daily living skills.

Finally, the Technology-Related Assistance for Individuals with Disabilities Act (P.L.100-407) provides "financial assistance to the states to enable them to conduct needs assessment, identify technology resources, provide assistive technology services, and conduct public awareness programs" (Blackhurst, 1997). P.L. 100-407 supplies schools with the funds to purchase supplies which will benefit students with disabilities. This act also provides a clear definition of assistive technology, resulting in ensuring a match between student needs and computer technology.

Students with multiple-handicaps have received many rights and regulations regarding their education. As a result, technology is playing a stronger role in the classroom. Teachers of multi-handicap students are beginning to select technology workshops and in-services to prepare themselves to instruct their students in using computers and technology. Teachers are including the computer in their classroom curriculum. The computer is an asset to the learning of students with disabilities as much as it is to students without disabilities. Diane M. Rotondo says "It seems clear that disabled students need to use the same programs to accomplish the same tasks as their non-disabled counterparts. The computer, however, must be physically modified to allow access to those with physical handicaps" (1992, p.28). In addition, computer software must include adaptations to allow these devices to perform the correct function. As a result, companies continue to make adaptive equipment allowing students with disabilities accessibility to software and computers currently used within the regular education curriculum.

The computer has many limitations for individuals with disabilities. Students may be unable to strike a key on the keyboard, control a mouse, or even operate a computer. Many teachers of the multi-handicapped have to prepare curriculum which differs significantly from that which is taught to regular education students. Many of the same lessons can be used; however, the MH teacher will need to make adaptations using assistive technology in order to help students complete assignments and learn new skills.

One limitation to using a computer for a student with a disability is not being able to use a computer keyboard. Many alternatives were researched by Weber and Demchak (1996) concerning the use of keyboards by students. Several adaptations enable students with disabilities to utilize computers. First, a keyboard emulator "allows the user to input information from a source other than a standard keyboard (e.g. switches, alternative keyboards) (Weber & Demchak, 1996). A keyboard emulator consists of an expanded keyboard which has enlarged keys. This allows students with fine and gross motor incapabilities easier access to keys for typing. Secondly, a touch screen helps to input information into the computer by touching a picture or icon on the monitor screen. Students who are unable to learn to type will benefit extensively from this technology. Thirdly, a touch tablet is very similar to the touch screen. The student would touch a finger or stylus to a flat tablet to input information. (Weber & Demchak,1996).

Fourthly, keyguards are "plastic duplications of a specific keyboard with key holes cut out. Individuals are able to press only the desired key using a finger or pointer" (Logwood & Hadley, 1996). Keyguards help those who are unable to type on the standard key size by providing enough space for the student to strike the desired key.

Fifthly, "keylatches are small metal or plastic devices that slide over the key or keys to be held down" (1992, p.30). Most physically disabled students would have trouble holding down

two key combinations such as the shift key and another letter. Keylatches assist by holding down the function key. For example, when a student using a headpointer needs to perform a function operation, he or she can do so by pressing one key. Finally, keyboards can be modified by adding enlarged letters, or cues, such as color or picture cues. These modifications promote recognition of commonly used keys. (1996, p.46) These minimal adaptations enable students with disabilities to successfully use the keyboard.

Students with disabilities may also use additional input devices when they are unable to use a keyboard. Rotondo has found that many types of equipment exist for students with disabilities. She found that there is computer equipment that can be adapted to function in the same role as the keyboard. Input devices used by individuals, other than traditional keyboards, are referred to as "pointing devices" (1986). The roles of these devices are to point out numbers, letters, and objects that appear on the computer screen. Some examples are joysticks that use a small stick and a mounted button to direct the cursor across a computer screen. The role of the cursor is to point out the image desired on the screen. The cursor can be an arrow, square, or diamond shaped object (1992). Also, game paddles and trackballs are used to direct the cursor across letters and numbers to complete specific operations. Both entail the rotation of either a rotary dial (game paddle) or a plastic ball (trackball) to move the cursor. Finally, there is equipment such as light pens and touch-sensitive screens that are used in relation with the monitor. The light pen directs light at the desired response (1992). Hoko believes that these alternatives will give physically disabled students more accessibility to the computer, by overcoming difficulties with the keyboard.

A second limitation of students with disabilities is their difficulty in isolating physical movements. The answer to this limitation comes in the form of various switches which allow

students to activate computers, home appliances, etc... There are a number of switches Weber and Demchak discuss. They are "(a) those operated by controlling breathing (e.g., sip and puff switch), (b) switches strapped to any body part and activated by minimal muscle tension, (c) infrared switches, (d) membrane switches, (e) disc switches, (f) lever switches, (g) mercury switches activated by head movements, and (h) those activated by the individual's voice." (1996) Switches connect to the computer and additional switch software must be installed. Switches are very beneficial to individuals with disabilities because they can enhance daily living. For example, a student is able to run numerous kitchen appliances such as blenders, food processors and mixers through the use of switches. The switches also enable them to run a hair dryer, an electric razor, and other electrical devices used in maintaining personal hygiene. Switches "allow for immediate visual, auditory, or tactile feedback for desired responses, continuous training, more independence in movement and selection, and flexibility in teacher/trainer time and assistance." (1996) Thus, switches give an individual independence by allowing them to participate in their own daily living.

A third limitation to computer use is faced by individuals with visual impairments. These individuals have a major disadvantage when using a computer because they cannot see the screen. However, one very exciting piece of computer technology is called a voice recognition device or a speech synthesizer. Much research has been done in using this software for various handicapping conditions especially those who are visually impaired. A speech synthesizer is a device that allows a person with visual impairments to retrieve previously entered words and data (Rosenberg, 1986; Hoko, 1986). Also, using special software, a word-processing program can read out entire words and sentences for these individuals (1986). The speech synthesizer is improving accessibility for individuals who would not otherwise be able to use a computer. In addition to the voice synthesizer, individuals with visual impairments can use processors that enlarge the print on the

screen. Verbraille systems allow students to be able to write, edit, and file on the computer (1986). Thus, students with visual impairments and other disabilities would benefit form this equipment because it assists them in learning computer skills.

The fourth limitation individuals face is limited mobility in their arms and legs. Computer companies have developed additional equipment and adaptations that can enable these individuals to use a computer. Diane M. Rotondo in her article "Computer Accessibility for Disabled Students" discusses headpointers and mouthsticks (1992). They are instruments that consist of a rubber-tipped stick that could extend from the forehead or are gripped by the student's teeth (1992). The stick is used to press keyboard buttons or touch a screen.

Computer software is a very important area that multi-handicap teachers use. Feichtner points this out in her article and says, "Even good software can pose problems for people who have mental deficits, who can't read, or can't read English well" (1989, p.37). Research recommends that a teacher use software that allows the teacher to control some aspects of the instruction to the student (1989). For example, a teacher can determine if the student may want the sound on or off, or determine the difficulty level at which the student should be practicing. Interactive software provides the student with multiple handicaps with better understanding and control over the software packages because of teacher interaction. As a result, computer software becomes a very exciting area for students with multiple handicaps.

Research indicates that in addiction to hardware adaptations, there are software packages available to assist students in using the computer. Software allows students with disabilities to interface with the computer in more functional and meaningful ways. The goal of using software for students with disabilities is to help them meet their academic and vocational goals. For example, many students without disabilities are able to perform science experiments using hands

on equipment. A computer with adaptive science software will give students with disabilities the opportunity to work out a hypothesis and to gather data. Rotondo shows that students with disabilities were able to experience a science class including dissections and bunsen burner experiments through the adapted use of computer software (1992). Adaptive computer software enable students with multi-handicapping conditions to have opportunities to be included in the aspects of a regular school day.

Overall, students who are multi-handicapped are now able to participate in many learning experiences as a result of computer adaptations. Sheila H. Feichtner says, "the computer can help special needs' students who have come to expect failure to experience success" (1989, p.36). The important part of her statement is that students can experience success. Success will be evident in three areas: participation with non-disabled students in classroom settings, achievement in meeting academic and vocational skills, and giving students more independent living skills (Feichtner, 1989; Hoko, 1986, Robins, 1991; Gandell & Laufer, 1993; Buckley & Eichleay, 1989; O'Neal, 1992; Guzzo, 1991).

Another form of software now available to students with disabilities is music software. This software allows students to "create, arrange, and play music that they could only listen to before" (Rotondo, 1992, p.30). The students' use of music software gives them the opportunity to participate in music class. Computer software gives the multi-handicap teachers the ability to serve their students needs in more accessible, exciting, and measurable means.

Some teachers use telecommunication packages that allow their students to communicate throughout the world. Research about telecommunications is widely available because of the current changes taking place in the field. Telecommunications can open the classroom to an entire world of on-line information and materials. This provides students with a greater depth of

knowledge about society and the world (Coombs, 1990). Students work on a microcomputer and modem that gives them accessibility to various internets and freenet lines, database centers, and their own electronic mail account (Gandell & Laufer, 1993; Coombs, 1990). Gandell & Laufer recommend a piece of telecommunications software called Blisscom. Blisscom gives people with severe disabilities, who use augmentative communication devices (such as a communication board), the chance to send and receive messages over telephone lines (1993).

The authors set up an on-line program where they gave students with multi-handicapping conditions, who varied in disabilities ranging from severe cerebral palsy to communication disorders, the opportunity to have access to the Blisscom system and to communicate with their friends using electronic mail (1993). The program consisted of adapting the Blisscom system to the fourteen students with disabilities giving them easier access to the electronic mail system. The program then involved the students performing electronic mail operations with their friends in order to teach skill acquisition. The students were evaluated on "skills directly related to the operation of the telecommunication system, rather than subskills" (1993, p.27). The results were astounding because of the positive response that was received from the students who participated in the experiment. Particularly, one student commented after participating in the program by saying, "I felt that this was a wonderful thing to learn and I want to learn more" (1993, p.28). The authors, through this program, showed telecommunications to be a motivational, accessible and productive tool to the student with multiple disabilities.

Students who use computer technology are benefiting from its prominent use in giving them accessibility to software and telecommunication programming. However, computers are also giving older students and adults the skills and talents they need in pursuing vocational careers. Elizabeth A. Buckley & Kristen Eichleay explored this issue and made the statement that

"as our students' repertoire of computer skills increases, we can see a proportional growth in the job opportunities available to them" (1989, p.52). Research found specifically explains that with computer-based instruction in the classroom, students with disabilities are becoming more prepared and ready for the careers they will be working in. Vocational goals and objectives, including computer skills and achievements, can be set for students with multiple handicaps, giving them possibilities and career choices they would otherwise not have (Buckley & Eichleay, 1989; Stein, Oct. 1984;).

Summary

Research found has addressed the necessity of computer technology in three areas: it's availability to teachers of the multi-handicapped, usage in the classroom, and the opportunities provided both academically and vocationally to students with multi-handicaps. The main goal for education of the multi-handicapped is to meet the student's needs and provide services that will make the student as independent in society as possible. By giving students the opportunity to work with computers, the windows of a whole new world will open. Students will grow in academic, social, daily living, and vocational skills because they will be challenged by the computer. Thus computers and technology can have a high impact in student achievement overall.

What appears to be evident through the research found is that computer companies continue to provide new technology for individuals with disabilities. However, the question that arises from the research is: Are multi-handicap teachers aware of this computer technology and are they finding ways to integrate it in their classrooms? Therefore, an experimental study of teachers of the multi-handicapped use of computer technology with their students in primary instruction, would be beneficial in formulating a knowledge base from which to document and implement computers into the MH classroom.

CHAPTER 3

METHODOLOGY

Objectives

The purpose of this study was to look at the use of computers in the classrooms of teachers of the multi-handicapped. The study investigated the frequency of computer technology within the area of the education of the Multi-Handicap. Factors measured included:

1.) Frequency of computer use in the classroom
2.) Areas of curriculum in which teachers integrate computers as primary instructional technique
3.) Student achievement enhanced by computer technology

It also examined teachers' perceptions of the benefits gained by students through the use of using computer technology. In addition, the types of computer software and hardware used by teachers was researched.

Definitions

For this study, the following definitions were used:

Multi-Handicap: The term refers to students labeled MH because they have a mental disability (mental retardation) and one or more physical disabilities resulting from accident, genetic disorders, or prenatal conditions.

Assistive Technology: Assistive Technology is "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of children with disabilities" (Federal Register, 1992, p. 44801).

Telecommunications: "Telecommunications involves the use of a microcomputer and a modem, the hardware that connects the two computers over a telephone line.

Telecommunications makes it possible for two computers to talk to each other" (Gandell & Laufer, 1993, p.26).

Independent variables to be considered will be:

1.) The computer technology used by teachers of the Multi-handicap as a primary means of instruction.

Dependent variables will be:

1). The frequency computer use in classrooms of the multi-handicap.

2.) The teachers' perception of the adequacy of computer instruction as it relates to student achievement in Language Arts, Mathematics, Social Studies, Vocational, Daily Living, and Behavior Modification.

Extraneous variables that could aid in explaining the outcome of the study will be:

1). The means by which computer training (if any) was obtained by teachers.

2). The integration of computers as related to the number of years the teacher worked in the educational setting.

3). The educational setting (public school or County Board of MR/DD) and the grade level in which a teacher instructs.

4.) The region within the state of Ohio in which the teacher works (NE, NW, SE, SW, Central).

The information gathered from the survey allowed the researcher to address the specific information on the extraneous variables listed above. This information was then utilized to assist in drawing conclusions on successful computer integration in the classroom of the multi-handicap.

Limitations

For the purpose of this study, the following limitations were considered:

1). Subjects were drawn from the State of Ohio and the survey addressed teachers of the multi-handicap from primary, middle school, and high schools. In addition, schools were sampled according to the following locations: Northeast, Northwest, Southeast, Southwest, and Central.

2). A random sample population of 570 teachers of the multi-handicap was taken.

3). The use of a survey and the questions used (this will be discussed in the "Instrumentation" section below).

4). The subject's responses could have been subject to recall deficiencies (discussed in "Instrumentation" section below).

5). A portion of the sample population did not return their surveys.

6). A small number (15) of subjects did not completely fill out the survey and their surveys were not included in this study.

Research Questions

The following research questions were posed at the beginning of the study:

1). To what extent are teachers of the multi-handicap using computer technology in their classrooms?

2). Those teachers who are using computer technology, do they use the computer as their primary method of instruction?

3). How are multi-handicap teachers integrating the computer technology in their classrooms?

4). What types of computer technology (hardware & software) are being used by multi-handicap teachers within their classrooms?

5). Does the use of computer technology result in higher student achievement?

Procedures

This section is a description of the methodology that was implemented to obtain the objectives of the study. An overview of the study proceeds the six major sections: (1) sample, (2) design, (3) instrumentation, (4) time factors, (5) data analysis and, (6) general considerations.

Overview: The primary purpose of this study was to determine if computer-based instruction in classrooms for the multi-handicap promotes a better learning environment and higher student achievement. This study produced information and data to support the five previously mentioned hypotheses and is defined throughout the next six sections.

Sample: The target population for this study was teachers of the multi-handicap in grades kindergarten through twelve. The accessible population was State of Ohio teachers of the multi-handicap, of grades kindergarten through twelve, from five different regions.

The Ohio State Department of Special Education provided the researcher with a listing of all multi-handicap classrooms statewide. Schools were randomly selected from the State of Ohio Department of Special Education list. The researcher randomly selected every third school from the list to establish the sample population. The listings from the state department of special education were the sampling frame. In addition, the sample included every County Board of MR/DD school in Ohio.

The number of subjects drawn for the study was 570 subjects which provided a large enough representation of teachers of the multi-handicap . Randomization of the sampling frame was appropriate for this study.

Design: The research design was a descriptive study based on the objective presented above. The subjects completed a biographical data sheet and survey form identifying dependent variables which were measured using a six point Likert scale. This study did not have a control group,

however, the randomization of the sample reduced internal validity. External validity factors were not questionable and not pertinent to this study.

Due to the objective of the study concerning the use of computer technology by teachers of the multi-handicap, a descriptive study was most appropriate in testing the hypotheses.

Instrumentation: Two types of instruments were used to collect data:

1). A biographical data sheet that asked such information as:

a. number of years teaching multi-handicap education,

b. setting (public school, County Board of MR/DD)

c. preservice/inservice training in computer technology,

d. number of years working in an educational setting

e. present level of teaching

f. region of State of Ohio

2). A survey that included a six point Likert response scale was designed. The survey measured the subjects' perceptions of computer technology in the classroom for the multi-handicap as it relates to the type of the equipment, integration of computers in instruction, and student achievement. The response was: 1) "Never or Almost Never", 2) "Not Usually", 3) "Occasionally", 4) "Usually", and 5) "Always or Almost Always", and 6) "Not Applicable." In completing the questionnaire, subjects were asked to respond to 17 items which focused on:

1) type of computers used in school,

2) student success with computer hardware,

3) computer software aiding in higher student achievement,

4) computers being used as a primary source of instruction,

5) computer time used as a reinforcement for a behavior modification plan,

6), additional uses of computer technology in the classroom.

The survey was created through research done by Sheldon D. Rosenberg (1986), Terry S. Gandell, and Sheila H. Feichtner (1989). The instrument was examined by other interested teachers. Editing and revisions were made before actual use in the study.

Following the revision, both the biographical data sheet and the survey were mailed to the subjects randomly selected, accompanied by a cover letter explaining the research study. Subjects completed the survey and returned it to the researcher for analysis.

The survey itself could hold some bias since the items were selected and/or developed by the researcher. In addition, the subjects' honesty and ability to recall information could be biased.

Time Factors: Both instruments were mailed simultaneously to the subjects in the study. The biographical data sheet, survey, and cover letter were mailed in late April, 1998. A cross-sectional survey was used to avoid a time delay that would occur using a longitudinal survey.

Data analysis: To analyze this data, a description of each subject's experience using computer technology and reaction to using the technology was given. Descriptive statistics were used to determine the frequency of computer usage. Statistical data were produced by a statistical software package called SPSS v. 8.0.

General Considerations: This study can be replicated by following the procedural information provided. When the study is replicated, educational institutions will enhance the information previously gathered in this study.

CHAPTER 4

RESULTS

A computer survey was developed as the instrument used in collecting data for this study. The survey was created by the researcher to find the frequency of response to each research question. The survey was divided into three sections: a demographic section, a narrative section, and a survey section. The raw scores collected were used by the researcher to calculate frequencies for the following areas:

Demographic Section

A. Gender of participant (male or female)

B. Age of participant (21-29, 30-39, 40-49, 50-59, 60-69)

C. Setting of participate (Public school, County Board of MR/DD)

D. Years of Experience (1-5, 6-10, 11-15, 16-20, over 20 years)

E. Level of teaching (Primary, Middle School, High School)

F. Area the participant teaches (Northeast, Northwest, Central, Southeast, and Southwest)

G. Where participant obtained computer training

This question will be broken down into five categories which are:

1. College
2. In-service training
3. Colleague
4. Self-taught
5. Other

A total frequency will then be taken on the question as a whole to determine how many types of training were obtained by each participant.

H. How often participant uses the computer daily (never, 1/2 hr, 1-2 hrs, 3-4 hrs, 5-6 hrs).

The Narrative section will be included in Appendix C with the many pieces of software described by the participants.

The Survey section results are presented in table form. They are based on a 6 point Likert Scale and can be interpreted as follows:

1 - Never or Almost Never

2 - Not Usually

3 - Occasionally

4 - Usually

5 - Always or Almost Always

6 - Not applicable

Results of Frequencies for:

Gender, Age, Setting, Number of Years Experience,

Present Level of Teaching, Area of Ohio,

Computer Training and Frequency of Daily Use with Computer

Table 1 - Gender of Participant

	Fequency	Percent	Valid Percent	Cumulative %
No Response	2	0.7	0.7	0.7
Females	268	88.7	88.7	89.4
Males	32	10.6	10.6	100
Total	302	100	100	

The table above shows that the number of females greatly outweighed the number of males by 88.7%. This is also significant because it identifies that there were more female teachers of the multi-handicap who participated in the survey than males.

Table 2 - Age of Participant

	Frequency	Percent	Valid Percent	Cumulative %
21-29	52	17.2	17.2	17.2
30-39	98	32.5	32.5	49.7
40-49	109	36.1	36.1	85.8
50-59	36	11.9	11.9	97.7
60-69	3	1	1	98.7
No Response	4	1.3	1.3	100
Total	302	100	100	

Most participants were between the ages of 40-49 years (36.1%) The next largest group of participants were between 30 -39 years of age (32.5%). It is interesting to note that teachers

of the multi-handicap between the ages of 60-69 were only 1.3% of the total participants in the study.

Table 3 - Setting of the Participant

	Frequency	Percent	Valid Percent	Cumulative %
No response	1	0.3	0.3	0.3
County Board of MR/DD	64	21.2	21.2	21.5
Public School	237	78.5	78.5	100
Total	302	100	100	

Overall, the setting that most of the participants work in is a public school setting (78.5%). The County Board of MR/DD participants only account for 21.2% of the survey results.

Table 4 - Number of Years Experience

	Frequency	Percent	Valid Percent	Cumulative %
1-5 years	62	20.5	20.5	20.5
6-10 years	59	19.5	19.5	40.1
11-15 years	61	20.2	20.2	60.3
16-20 years	94	31.1	31.1	91.4
over 25 years	24	7.9	7.9	99.3
No response	2	0.7	0.7	100
Total	302	100	100	

Table 4 shows that most teachers surveyed ranged between 16-20 years of experience. The ranges of 1-5, 6-10, and 11-15 are very close in percentages and make up a total of 60.2% of participants surveyed. Thus, it is an interesting finding that a majority of less experienced (15 years or less) teachers are teaching within the multi-handicap setting.

Table 5 - Grade Level of Participant

	Frequency	Percent	Valid Percent	Cumulative %
No Response	1	0.3	0.3	0.3
High School	82	27.2	27.2	27.5
Middle School	78	25.8	25.8	56.6
Primary	131	43.4	43.4	100
Pre-school	10	3.3	3.3	30.8
Total	302	100	100	

Participants in the primary grade levels accounted for 43.4% of those surveyed. The participants in high school and middle school grade levels resulted in 27.2% and 25.8%, respectively. This is showing that the majority of teachers of the multi-handicap surveyed work in the primary grade levels throughout the State of Ohio.

Table 6 - Area of Ohio Participant is Teaching

	Frequency	Percent	Valid Percent	Cumulative %
Northeast	97	32.1	32.1	32.1
Northwest	34	11.3	11.3	43.4
Southeast	39	12.9	12.9	56.3
Southwest	63	20.9	20.9	77.2
Central	58	19.2	19.2	96.4
No response	11	3.6	3.6	100
Total	302	100	100	

Table 6 shows that overall the majority of participants who completed the survey were from the Northeastern part of Ohio (32.1%). It is interesting to note that the next largest group of participants is from Southwestern Ohio (20.9%). And thirdly, participants from central Ohio make up 19.2% of the participants. It can be ascertained from these results that the three largest cities in Ohio, Cleveland, Cincinnati, and Columbus are within the top three areas that the majority of participants are teaching.

Table 7 - A Breakdown of how many Participants

Gained Computer Training through College

	Frequency	Percent	Valid Percent	Cumulative %
No	197	65.2	65.2	65.2
Yes	105	34.8	34.8	100
Total	302	100	100	

The majority of teachers (65.2%) of the Multi-Handicap did not gain computer training through college experience.

Table 8 - A Breakdown of how many Participants

Gained Computer Training through In-Service

	Frequency	Percent	Valid Percent	Cumulative %
No	120	39.7	39.7	39.7
Yes	182	60.3	60.3	100
Total	302	100	100	

In table 8 the majority of participants did receive computer training from In-service training either through their school district or on their own. The number of participants receiving this training was 182 or 60.3% of the participants taking the survey.

Table 9 - A Breakdown of how many Participants

Gained Computer Training through a Colleague

	Frequency	Percent	Valid Percent	Cumulative %
No	238	78.8	78.8	78.8
Yes	64	21.2	21.2	100
Total	302	100	100	

The 238 participants surveyed did not receive computer training from colleagues' suggestions and advice. There were 21.2% of teachers of the Multi-Handicap who did learn to use computers and technology from their fellow colleagues.

Table 10 - A Breakdown of how many Participants Gained Computer Training by themselves

	Frequency	Percent	Valid Percent	Cumulative %
No	122	40.4	40.4	40.4
Yes	180	59.6	59.6	100
Total	302	100	100	

Table 10 shows that participants did teach themselves the computer training they use within their classrooms. The number of participants out of 302 were 180 (59.6%). There were 122 participants who did not teach themselves computer training (40.4%).

Table 11 - A Breakdown of how many Participants Gained Computer Training through other means

	Frequency	Percent	Valid Percent	Cumulative %
No	272	90.1	90.1	90.1
Yes	30	9.9	9.9	100
Total	302	100	100	

Overall, the majority of participants who took the survey did not use other means to obtain their computer training (272 participants or 90.1%). The majority of participants obtained computer training through college, in-service, colleagues, or themselves.

Table 12 - The Breakdown of Responses given by each Teacher Participant for the Category of Teacher Experience

	Frequency	Percent	Valid Percent	Cumulative %
No Response	12	4	4	4
College	119	39.4	39.4	43.4
In-Service	93	30.8	30.8	74.2
Colleague	60	19.9	19.9	94
Self-Taught	13	4.3	4.3	98.3
Other	5	1.7	1.7	100
Total	302	100	100	

The above table shows the breakdown of all responses given by the participants. Some subjects answered this question with more than one response. Thus, table 12 displays the number of responses overall given by the teachers. It shows that a significant number of teachers received computer training in college in addition to other selections they have made. The next highest total was In-service training the teachers had signed up for either in their district or outside of it. The overall perspective on teacher training in computers and technology is shown to be received in college and in-service training.

Table 13 - The frequency of Computers and Technology within Teacher Classrooms per Daily Basis

	Frequency	Percent	Valid Percent	Cumulative %
Never	27	8.9	8.9	8.9
1/2 hour	81	26.8	26.8	35.8
1-2 hours	137	45.4	45.4	81.1
3-4 hours	36	11.9	11.9	93
5-6 hours	7	2.3	2.3	95.4
No Response	14	4.6	4.6	100
Total	302	100	100	

The daily use of computer and technology in the teachers' classrooms was surprising in that most teachers used them routinely for 1-2 hours daily (45.4% of the teachers). The survey results also show that those teachers who used the computer for 1/2 hour a day and 1-2 hours a day, combined, accounted for 218 out of 302 participants, and 72.2% of those surveyed. Thus, teachers are using computers and technology on a regular basis in their classrooms.

Table 14 - How often do Teachers use

Their IBM Computers

	Frequency	Percent	Valid Percent	Cumulative %
Never	135	44.7	44.7	44.7
Not Usually	3	1	1	45.7
Occasionally	8	2.6	2.6	48.3
Usually	23	7.6	7.6	56
Almost Always	62	20.5	20.5	76.5
Not Applicable	66	21.9	21.9	98.3
No Response	5	1.7	1.7	100
Total	302	100	100	

Table 14 shows the frequency of computer use by teachers who are presently using an IBM computer in their classrooms. Most teachers never use an IBM (44.7%) which stipulates that they may not have one present in their classrooms. That is almost half the teachers who returned completed surveys. Teachers also marked non-applicable which was 21.9% of those surveyed. Combined, teachers who never used an IBM computer or felt the question was not applicable was 66.6%.

Table 15 - How often do Teachers use

Their Macintosh Computers

	Frequency	Percent	Valid Percent	Cumulative %
Never	74	24.5	24.5	24.5
Not Usually	7	2.3	2.3	26.8
Occasionally	17	5.6	5.6	32.5
Usually	11	3.6	3.6	36.1
Almost Always	143	47.4	47.4	83.4
Not Applicable	44	14.6	14.6	98
No Response	6	2	2	100
Total	302	100	100	

The teachers surveyed almost always use their Macintosh computer in their classrooms (47.4%). Secondly, there were 74 teachers (24.5%) surveyed that said they never or almost never use their Macintosh. This was very interesting to see that there were teachers at both ends of the Likert scale.

Table 16 - Is There Student Success in

Using Computer Hardware?

	Frequency	Percent	Valid Percent	Cumulatvie %
Never	22	7.3	7.3	7.3
Not Usually	5	1.7	1.7	8.9
Occasionally	46	15.2	15.2	24.2
Usually	120	39.7	39.7	63.9
Almost Always	87	28.8	28.8	92.7
Not Applicable	19	6.2	6.2	98.3
No Response	3	1	1	100
Total	302	100	100	

Table 16 shows the student success rate in using the computer hardware in the teachers classrooms. A significant percentage (39.7%) of the teachers that said their students usually had

success using the computers. And, 87 participants, or 28.8% of them, said that their students show success using computer hardware almost always. This means that participants who marked usually and almost always totaled 68.5% of the teachers surveyed. Thus, students are showing successful use of computers in the multi-handicap classroom.

Table 17 - Computer Software Aids Higher Student Achievement in Language Arts

	Frequency	Percent	Valid Percent	Cumulative %
Never	26	8.6	8.6	8.6
Not Usually	19	6.3	6.3	14.9
Occasionally	82	27.2	27.2	42.1
Usually	89	29.5	29.5	71.5
Almost Always	43	14.2	14.2	85.8
Not Applicable	37	12.3	12.3	98
No Response	6	2	2	100
Total	302	100	100	

Table 17 shows that 29.5% (89 participants) of teachers said that usually their students have higher student achievement using the computer in language arts curriculum. However, 27.2% of teachers said only occasionally their students experienced higher student achievement. Overall, combined percentages for teachers who marked occasionally, usually and almost always shows that 70.9% of the participants believe there is some degree of high student achievement in language arts with their students.

Table 18 - Computer Software Aids Higher

Student Achievement in Mathematics

	Frequency	Percent	Valid Percent	Cumulative %
Never	24	7.9	7.9	7.9
Not Usually	26	8.6	8.6	16.6
Occasionally	81	26.8	26.8	43.4
Usually	85	28.1	28.1	71.5
Almost Always	38	12.6	12.6	84.1
Not Applicable	40	13.2	13.2	97.4
No Response	8	2.6	2.6	100
Total	302	100	100	

Overall, the majority of teachers said either usually(28.1%) or occasionally(26.8) there is high student achievement in mathematics when using the computer. This shows that 204 teachers combined (those who marked occasionally, usually, almost always) agree that the students are having success in mathematics using the computer.

Table 19 - Computer Software Aids Higher

Student Achievement in Social Studies

	Frequency	Percent	Valid Percent	Cumulative %
Never	62	20.5	20.5	20.5
Not Usually	61	20.2	20.2	40.7
Occasionally	42	13.9	13.9	54.6
Usually	24	7.9	7.9	62.6
Almost Always	7	2.3	2.3	64.9
Not Applicable	99	32.8	32.8	97.7
No Response	7	2.3	2.3	100
Total	302	100	100	

The results in Table 19 are very different in comparison to the two previous tables. The results show that most teachers believe the computer was not applicable for social studies. There

were 99 participants who answered not applicable, which is 32.8% of those surveyed. In addition, 123 teachers answered the integration of the computer in their classrooms never or not usually accounted for high student achievement in social studies. This shows that computer use in social studies with students who have multi-handicaps does not result in high student achievement.

Table 20 - Computer Software Aids Higher Student Achievement in Science

	Frequency	Percent	Valid Percent	Cumulative %
Never	71	23.5	23.5	23.5
Not Usually	48	15.9	15.9	39.4
Occasionally	49	16.2	16.2	55.6
Usually	27	8.9	8.9	64.6
Almost Always	8	2.6	2.6	67.2
Not Applicable	91	30.1	30.1	97.4
No Response	8	2.6	2.6	100
Total	302	100	100	

Table 20 is very similar to Table19 because the majority of teachers agreed that the use of computers with their students did not show high student achievement in science. Ninety-one participants answered this question with not applicable which is 30.1% of those surveyed. In addition, 71 other teachers answered that the computer never or almost never showed an increase in high student achievement (23.5%). Combined that is a total of 162 participants and 56.6% of those surveyed. This shows more than half believe they did not see an increase in student achievement with the computer with the science curriculum.

Table 21 - Computer Software Aids Higher

Student Achievement in Vocational Skills

	Frequency	Percent	Valid Percent	Cumulative %
Never	68	22.5	22.5	22.5
Not Usually	39	12.9	12.9	35.4
Occasionally	58	19.2	19.2	54.6
Usually	30	9.9	9.9	64.6
Almost Always	12	4	4	68.5
Not Applicable	88	29.1	29.1	97.7
No Response	7	2.3	2.3	100
Total	302	100	100	

Table 21 shows that most teachers believe using the computer for high student achievement in vocational curriculum is not successful. The majority (88 not applicable and 68 never or almost never) said that they did not believe it advanced their students vocational success. Combined, the teachers mentioned above accounted for 51.6% of the total surveyed. However, it is interesting to note that 58 teachers (19.2%) said the computer occasionally enhanced student achievement.

Table 22 - Computer Software Aids Higher

Student Achievement in Daily Living Skills

	Frequency	Percent	Valid Percent	Cumulative %
Never	72	23.8	23.8	23.8
Not Usually	44	14.6	14.6	38.4
Occasionally	52	17.2	17.2	55.6
Usually	43	14.2	14.2	69.9
Almost Always	24	7.9	7.9	77.8
Not Applicable	61	20.2	20.2	98
No Response	6	2	2	100
Total	302	100	100	

The survey question concerned whether the computer increases student achievement in daily living skills. These results were very contrasting because there is no significant difference between the never and not usually responses and the occasionally and usually responses. The percentage of those teachers never having an increase in student achievement is only a 6.6% difference to those who occasionally observed an increase. Finally, teachers responding not usually were only a 0.4% difference to those who said usually they have an increase in student achievement. Further research will need to be done to broaden the results of this area.

Table 23 - Computer Software As the Primary Instructional Technique in Language Arts

	Frequency	Percent	Valid Percent	Cumulative %
Never	90	29.8	29.8	29.8
Not Usually	84	27.8	27.8	57.6
Occasionally	54	17.9	17.9	75.5
Usually	22	7.3	7.3	82.8
Almost Always	13	4.3	4.3	87.1
Not Applicable	33	10.9	10.9	98
No Response	6	2	2	100
Total	302	100	100	

The results state a very close percentage of teachers agree that they either never or not usually use the computer as a primary means of instruction in language arts curriculum. There were 29.8% of teachers who never use the computer and 27.8% who do not usually use the computer. It is worth noting that 33 teachers answered not applicable to themselves. That number is larger than those teachers who answered almost always and usually. It can be concluded that many of the teachers surveyed do not use the computer as their primary means of instruction in language arts.

Table 24 - Computer Software As the Primary Instructional Technique in Mathematics

	Frequency	Percent	Valid Percent	Cumulative %
Never	91	30.1	30.1	30.1
Not Usually	93	30.8	30.8	60.9
Occasionally	53	17.5	17.5	78.5
Usually	18	6	6	84.4
Almost Always	7	2.3	2.3	86.8
Not Applicable	33	10.9	10.9	97.7
No Response	7	2.3	2.3	100
Total	302	100	100	

Table 24 states that the majority of teachers surveyed answered that either never (30.1%) or not usually (30.8%) did they use the computer as a primary means of instruction in their mathematics classes. This is 60.9% of the overall population surveyed. Those teachers who answered usually or almost always only accounts for 8.3% of the surveyed teachers. This explains that teachers use other instructional strategies as their primary mean to instruct their students in math.

Table 25 - Computer Software As the Primary Instructional Technique in Social Studies

	Frequency	Percent	Valid Percent	Cumulative %
Never	125	41.4	41.4	41.4
Not Usually	81	26.8	26.8	68.2
Occasionally	18	6	6	74.2
Usually	2	0.7	0.7	74.8
Almost Always	2	0.7	0.7	75.5
Not Applicable	67	22.2	22.2	97.7
No Response	7	2.3	2.3	100
Total	302	100	100	

The teachers clearly stated that they never(41.4%) or not usually (26.8%) use the computer as a primary means of instruction in their social studies curriculum. Only 1.4% of teachers answered usually or almost always. That is 4 teachers out of the 302 teachers surveyed. It can be clearly seen that the computer is not used as a primary instructional technique in the multi-handicap social studies curriculum.

Table 26 - Computer Software As the Primary Instructional Technique in Science

	Frequency	Percent	Valid Percent	Cumulative %
Never	132	43.7	43.7	43.7
Not Usually	70	23.2	23.2	66.9
Occasionally	22	7.3	7.3	74.2
Usually	5	1.7	1.7	75.8
Almost Always	2	0.7	0.7	76.5
Not Applicable	64	21.2	21.2	97.7
No Response	7	2.3	2.3	100
Total	302	100	100	

Teachers surveyed show that 66.9% of them never or do not usually use the computer as a primary instructional technique. That is a total of 202 of the 302 who answered this survey question. It is clear that teachers are using other means to teach their science curriculum in their classrooms.

Table 27 - Computer Software As the Primary Instructional Technique in Vocational Skills

	Frequency	Percent	Valid Percent	Cumulative %
Never	123	40.7	40.7	40.7
Not Usually	73	24.2	24.2	64.9
Occasionally	27	8.9	8.9	73.8
Usually	8	2.6	2.6	76.5
Almost Always	4	1.3	1.3	77.8
Not Applicable	61	20.2	20.2	98
No Response	6	2	2	100
Total	302	100	100	

It is evident in table 27 that the majority of teachers answered that they never or did not usually use the computer as the primary instructional technique of vocational skills. There were 123 teachers who said they never use it (40.7%) and 73 who did not usually use it (24.2%). The total of teachers not using the computer is 196 and they make up 64.9% of those surveyed. Many decided the computer did not apply to vocational curriculum (61 teachers and 20.2% of those surveyed). It can be concluded that most teachers are not using the computer as a primary means of instruction in vocational skills.

Table 28 - Computer Software As the Primary Instructional Technique in Daily Living Skills

	Frequency	Percent	Valid Percent	Cumulative %
Never	120	39.7	39.7	39.7
Not Usually	73	24.2	24.2	63.9
Occasionally	38	12.6	12.6	76.5
Usually	8	2.6	2.6	79.1
Almost Always	7	2.3	2.3	81.5
Not Applicable	50	16.6	16.6	98
No Response	6	2	2	100
Total	302	100	100	

Table 28 shows that 120 teachers agreed that they never use the computer as a primary instructional technique for daily living skills. There were 73 teachers who answered that they do not usually use the computer for daily living skills as their primary form of instruction. These two categories of teachers makes up 63.9% of those surveyed. The majority of teachers are not using the computer to primarily instruct their students in daily living skills.

Table 29 - Use of the Computer as a Reinforcer for a Behavior Plan

	Frequency	Percent	Valid Percent	Cumulative %
Never	51	16.9	16.9	16.9
Not Usually	27	8.9	8.9	25.8
Occasionally	98	32.5	32.5	58.3
Usually	53	17.5	17.5	75.8
Almost Always	45	14.9	14.9	90.7
Not Applicable	20	6.6	6.6	97.4
No Response	8	2.6	2.6	100
Total	302	100	100	

The use of computer as a behavior plan reinforcer varies among the participants who responded to the survey. There were 98 participants(32.5%) who answered that they use the computer occasionally as a reinforcer for positive behavior. Some participates answered that usually they will use the computer as a reinforcer (53 participants or 14.9%). It is surprising to see two very positive responses to the use of the computer. However, there were 51 teachers who said they never use the computer as a reinforcer (makes up 16.9%). Overall, 64.9% of teachers answered that they either occasionally, usually, or always use the computer as a reinforcer.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Educators of the multi-handicap continue to gain interest in whether to incorporate the computer within their classrooms. In this study, the researcher investigated the frequency of computer use taking place in the multi-handicap classroom. The study covered what type of computers teachers are using, if students are able to use computer hardware, is high student achievement being obtained in various academic/vocational areas, do teachers use the computer as a primary instructional technique in areas such as academic/vocational, are teachers using the computer as a behavior modification reinforcer, and what types of computer software are teachers using in their classrooms. The computer has become more common placed among multi-handicap classrooms because of its effective use in assisting students with severe disabilities. The frequency of teachers using the computer continues to grow as more training becomes available, computer hardware is built and adapted towards students with disabilities, and computer software is produced which continues to meet the needs and IEP goals/objectives of students. Students with multi-handicaps are important when it comes to using the computer, and with the help of technology students are more capable to do the skill building activities they might have once not been able to do.

Overall, the survey showed that the majority of teachers of the multi-handicap are using the computer in their classrooms. It also showed that teachers are using the Macintosh computer rather than the IBM. However, the number of teachers using an IBM computer is significantly higher than previous research has shown. In addition, teachers have been learning about new computer hardware through in-service training and college coursework. The survey showed that

a significant number of teachers are seeing success from their students using this technology. Thus, student overall ability levels can be seen to improve in various academic and vocational areas as a result of computer technology.

The teachers were asked if they saw high student achievement in the functional areas of language arts, mathematics, social studies, science, vocational, and daily living. The survey showed that students experienced higher levels of achievement in the language arts as a result of using the computer. In addition, students also demonstrate high levels of achievement in mathematics as a result of using the computer. Thus, students can gain valuable experience and skill building by using the computer in both language arts and mathematics functional curriculum.

The survey showed that teachers did not see high student achievement in the areas of social studies and science. The majority even answered not applicable to their classrooms. The majority of teachers are using alternative instructional strategies with their students in these two areas of curriculum. In addition, the majority of teachers stated that they never see the computer resulting in high student achievement in both vocational and daily living functional curriculum. Teachers are using hands-on instruction in these two areas and thus, are not using technology with their students.

The teachers surveyed showed a wide variety of attitudes in using the computer in their classrooms. It is interesting to see how many of these teachers are using the computer as their primary means of instruction in the areas of language arts, mathematics, social studies, science, vocational, and daily living. The teachers surveyed either never or did not usually use the computer as their primary means of instruction in all academic or vocational areas. Teachers showed that they were using other instructional techniques to primarily instruct students.

However, some of the teachers as stated above are using the computer as additional resources to integrate into lessons and use as secondary means of instruction.

Finally, teachers were asked to rate whether they are using the computer as a reinforcer to behavior modification plans. The survey showed that teachers occasionally used the computer as reinforcer. However the results were not significant enough to show that computer use with behavior plans is consistent across multi-handicap classrooms.

Conclusion

The findings of this study provide direction for further research in computer technology within the multi-handicap classroom. As a descriptive study, the researcher found pertinent evidence concerning the use of computers by students with multi-handicaps in the areas of language arts and mathematics curriculum. In addition, it showed how teachers are able to implement computers into their instructional methods. The researcher also studied how student achievement is aided by using computers. Finally, the researcher conducted this study to determine the benefits of using computers as a primary source of instruction and as a behavior plan reinforcer in the multi-handicap classroom.

Recommendations

Suggestions for further research would be to carry out experimental research specifically using unique computer technology such as software, hardware, or telecommunications packages with students who have multiple disabilities. In addition, longitudinal case studies may also prove to be interesting descriptive research in this area. They may show further evidence of what computer technology teachers are using and how they are implementing it in their classrooms.

The researcher discovered two interesting findings. First, although the teachers surveyed did not observe high student achievement in science, social studies, vocational, and daily living

they also rarely used computers as a primary means of instruction. There is probably a direct relationship present here. Further research could address the high student achievement in these disciplines when computers are implemented as primary means of instruction. Second, the researcher found that those teachers who observed high student achievement in language arts and mathematics were not using the computer as their primary instructional technique. They were using computers as secondary instructional techniques. Thus, further research could show evidence of a greater increase in student achievement by using computers as a primary instructional technique.

These results are significant to teacher education institutions. The information from this study can aid in developing computer-based courses or programs vital to the education of the multiple-handicap and to special educators as a whole. By continuing to enhance and develop the area of computer technology to educators through college courses and in-service training, students with multiple-handicaps will continue to benefit in academic/vocational skill building and become productive citizens in society.

APPENDIX A

May 1, 1998

To the Multi-Handicap Teacher:

My name is Richard Cola and I am working on my Master's Degree in Education from the University of Dayton. I completed certification classes in the areas of Multi-handicap and Elementary education in 1995. For the last three years I have worked as a teacher of the Multi-Handicapped in Northeast Ohio.

I am completing a Master's Thesis on "Computer Technology in the Multi-Handicap classroom." In order to complete this thesis I am sending out surveys to MH teachers statewide. Please take approximately five minutes to complete the enclosed survey and return it to me in the self-addressed stamped envelope. I appreciate your assistance in the completion of my thesis. Please return the survey to me by **Monday, June 1, 1998**.

Thank you for your time and consideration in completing the survey. Please accept the free gift as a thank you for your time.

Sincerely,

Richard N. Cola
Master's Graduate Student at
the University of Dayton
Dr. Laurice Joseph, Ph.D
Assistant Professor
Department of Teacher Education

"A Child's life is like a piece of paper on which every passerby leaves a mark."

Ancient Chinese Proverb

APPENDIX B

Computer Technology in the Multi-Handicap Classroom

A Teacher's Perspective

This Survey is part of a statewide study being conducted through the University of Dayton Master's Program. This survey is to investigate the types of Computer technology being used and implemented in the Multi-Handicap classroom throughout the state of Ohio.

Thank you for completing this survey. Your responses are confidential. **Please respond by Monday, June 1, 1998 using the attached self-addressed, stamped envelope.**

I. Demographics: Please place an X in space for each of your responses.

1. Gender Male _____ Female _____

2. Age 21-29 _____ 30-39 _____ 40-49 _____ 50-59 _____ 60-69_____

3. Setting Public School _____ County Board of MR/DD _____

4. Number of Years Working in Educational Settings:
   1-5 _____ 6-10 _____ 11-15_____ 16-20 _____ Over 25 Yrs. _____

5. Present level your teaching:
   Primary _____ Middle School _____ High School _____

6. Area of Ohio you teach in:
   Northeast ____ Northwest ____ Southeast ____ Southwest____ Central ____

7. Where did you obtain your computer training:
   College ____ In-service ____ Colleague ____ Self-taught ____ Other _____

8. How often do you use the computer in your classroom per day:
   never ____ 1/2 hour ____ 1-2 hours ____ 3-4 hours ____ 5-6 Hours ____

II. Narrative

What types of Computer hardware and software do you use in your classroom (please list):

_____
_____
_____
_____
_____
_____

How do you use each piece of hardware and software listed above with your students:

_____
_____
_____
_____
_____
_____

III. Survey

Read the following questions and rate each characteristic using the Likert Scale. Place the number that corresponds to your response in the blank space.

Never or Almost Never	Not usually	Occasionally	Usually	Always or Almost Always	Not Applicable
1	2	3	4	5	6

How often do you use Computer Technology in your classroom?

Rating	Survey Questionnaire
_____	1. Use an IBM computer in your classroom
_____	2. Use a Macintosh computer in your classroom
_____	3. Students are able to demonstrate success in using computer hardware (mouse, joystick, adapted keyboard, touchscreen, foot pedal, etc...)
_____	4. Computer Software has aided in higher student achievement in Language Arts curriculum
_____	5. Computer Software has aided in higher student achievement in Mathematics curriculum
_____	6. Computer Software has aided in higher student achievement in Social Studies curriculum
_____	7. Computer Software has aided in higher student achievement in Science curriculum
_____	8. Computer Software has aided in higher student achievement in Vocational curriculum
_____	9. Computer Software has aided in higher student achievement in Daily Living curriculum
_____	10. Use a computer as the primary instructional technique in Language Arts instruction
_____	11. Use a computer as the primary instructional technique in Mathematics instruction
_____	12. Use a computer as the primary instructional technique in Social Studies instruction
_____	13. Use a computer as the primary instructional technique in Science instruction
_____	14. Use a computer as the primary instructional technique in Vocational instruction
_____	15. Use a computer as the primary instructional technique in Daily Living instruction
_____	16. Use a computer as a reinforcer for a behavior modification plan
	17. Describe any other use's of computer within your classroom

APPENDIX C

The following is a list of the most commonly used pieces of software by the teachers of the multi-handicap who responded to the survey. The most commonly used software is:

Edmark Reading Program	Intellikeys	Clarisworks 5.0
Intellitalk	Microsoft Office	Intellipics
Boardmaker 3.3	Preschool Parade	Learn to Read
Hyperstudio	Creature Feature	Creature Chorus
Carmen San Diego	Kidsworks	Thinking Things
Goldenbook Encyclopedia	Reader Rabbit	Kidstime
Math Blaster	First Money	Dollar and Cents
Touch Window Software	Math Rabbit	MacWriter II
Sammy's Science	Living Books	Millies Math House
Mighty Math Carnival Countdown	Thinkin Things	The Writing Center
Baily's Bookhouse	Amazing Writing Machine	Print Shop Deluxe
Imangination Express	Early Learning	Creature Antics
Oregon Trail II	Science Blaster	Spelling Blizzard
Crayola Studio 2	Write Out Loud	Mubby's Quiz Show
Trudy's Place and Time	Pre-School Success Starter	Mr. Potato Head
Simon Sounds (Spells) it Out	Picture Cue Dictionary	Kid Pix

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CHAPTER 1

INTRODUCTION

The future of education is ever-changing for the students of today. The classroom is becoming a center for new curriculum, equipment and technology that will enhance and further the development of students. The computer age has slowly been making its way into education and with it comes the excitement and anticipation of more productive and beneficial strategies for teaching children. Throughout the last ten years, schools have begun to integrate computers into the classroom. Computers are typically used as secondary instruction to reinforce all subject matters. As society relies more on computer technology, schools have become concerned about their students preparing to meet this fast paced world of technological innovations.

Computer technology is being implemented more frequently within the special education curriculum. The category of student with multi-handicaps (MH), with both mental and physical disabilities, is beginning to benefit from computer technology. What are students with multi-handicaps chances of succeeding in an ever-changing, technological world? Research has shown that children with physical disabilities experience a rise in self-esteem and self-confidence when using computer-assisted instruction (Rotondo, 1992).

The use of computers by students with multiple-handicaps has been increasing in schools, especially with students who have severe disabilities. The effects are incredible, especially in the life of a young boy named Scott, who lives in Indiana. After undergoing various tests, over 16 surgeries, endless exams, and therapy sessions, Scott was diagnosed with a congenital abnormality. His life, however, is being changed by computers that allow him to better communicate with his teachers and therapists. Scott uses a piece of equipment called a Phonic