A SURVEY OF MICROCOMPUTER USAGE AND THE PERCEPTIONS OF SPECIAL EDUCATORS IN THE INSTRUCTION OF MILDLY HANDICAPPED STUDENTS WITHIN SELECTED SCHOOL SYSTEMS OF GEORGIA

A DISSERTATION

SUBMITTED TO THE FACULTY OF THE SCHOOL OF EDUCATION

ATLANTA UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF EDUCATION

BY

BETTYANNE CLARKE TINSLEY

ATLANTA UNIVERSITY

ATLANTA, GEORGIA

MAY 1986

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RATIONALE

The purpose of the study was to survey the use of microcomputers as instructional assisted tools in the education of mildly handicapped students from selected school systems of Georgia. Specifically, the study addressed the following issues: (1) identified instructional uses of microcomputers in special education; (2) areas of exceptionality wherein instructional microcomputer usage is evidenced; (3) perceptions of special educators toward microcomputer applications; and (4) future implications.

SIGNIFICANCE

The study will greatly expand the literature base and identify factors related to the use of microcomputers in the instructional process of educating mildly handicapped students.

METHODS AND PROCEDURES

Data for the study were generated from Directors of Special Education and Teachers of Mildly Handicapped Students from selected public school systems of Georgia.

The chief data collection method used was the questionnaire with the interview/participant observation technique being secondary. The questionnaire used was a modified version of the instrument developed in 1982 by

Henry Jay Becker to obtain data for his study, "School Uses of Microcomputers." Items for the revised instrument addressed demographic, usage and perception information.

Both descriptive and inferential statistical procedures were used to analyze the data. Sections I and II of the questionnaire stimulated categorical data which produced percentages. The Chi-square statistical method at the .05 level was used to determine the statistically significant difference of the nominal data and to test one hypothesis. The Analysis of Variance statistical method was used at the .05 level to accept or reject five of the hypotheses.

The secondary method of data collection involved the interview/participant observation methods. Items for the interview questions and the observation checklist were original. Sites for the field research were randomly selected to include visitations to the three different size school systems based on student population. Data for this phase of the study were reported in case studies.

RESULTS

The findings from the study reveal from a broad perspective that Directors of Special Education and Teachers of Mildly Handicapped Students demonstrated great support of microcomputer usage in the instruction of mildly handicapped students. Special educators found the most productive use of this strategy in drill and practice and tutorial dialog activities. The area of mathematics was considered strongest with language arts being second relative to fundamental instructional use. Most computer time was scheduled during class periods.

Strengths in the instructional applications included individualization,

alternative approaches to learning, provisions for immediate feedback, flexibility in management, increased student/teacher contact, student motivation, and increased student attention span. Problemmatic concerns include: limited and incompatible software, inadequate inservice, student/computer ratios and human interaction.

The .05 confidence level was used to determine statistical significance. The null hypotheses formulated and tested on the variable groups were accepted at the .05 level.

CONCLUSIONS

Special education administrators (directors/coordinators) and teachers of mildly handicapped students strongly support the use of microcomputers as instructional assisted tools in the education of mildly handicapped students. Increasing use and versatility are evidenced; however, expanded efforts are needed for budgetary support, staff development, time management and scheduling. As improvements are made based on continued research the use of this technology will continue to enhance the educational opportunities of handicapped students.

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I would like to thank my chairperson, Dr. Rollin Carter, for his guidance throughout this undertaking. I am also grateful to the members of my committee, Dr. Brenda Rogers, Dr. Olivia Boggs and Dr. Ganga Persaud, for their assistance and support.

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I am extremely blessed to have my devoted parents, Dr. and Mrs. Morris A. Clarke share in such an experience. Their strength, love and understanding were monumental. Thanks to my brothers, Morris and George, and my entire Clarke, Greer and Tinsley family for being there. I love you all.

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CHAPTER I

THE PROBLEM AND ITS SETTING

Introduction

The futurist, Toffler, observes that the educational process as we know it will change rapidly in the future, becoming dependent on many of the emerging technologies, particularly computer-based instruction.[1] Toffler writes:

> The spread of machine intelligence reaches another level altogether with the arrival of microprocessors and microcomputers, those tiny chips of congealed intelligence that are about to become a part, it seems, of nearly all the things we make and use.[2]

Indeed, the advent of the micro-chip has led to the development of the microcomputer, and opened the computer for many uses.[3] It appears that the adequate educational exposures for any child should have a basic use of this new technology, and perhaps, this new usage of computers could lead to curricular and instructional breakthroughs in programs for exceptional children.

Irvine observes:

> In order to cope with the greatly increased numbers of students, educational systems will need to find ways of bringing educational services to greater numbers of students without a proportional

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[1]Alvin Toffler, The Third Wave (New York: William Morrow Publishers, 1980), p. 168.

[2]Ibid., p. 170.

[3]Paul C. Cozby, Using Computers in the Behavioral Sciences (Fullerton, California: Mayfield Publishing Company, 1984), p. 15.

> increase in manpower and money. Teaching machines and computer-assisted instruction are two examples of technology available today to multiply the effect of human teachers. Greater use of these developments as well as the creation of other innovations will help to stimulate greater learning among more students.[4]

In light of the efforts of the Reagan administration to cut the funds devoted to education in general, and for exceptional children in specific, the use of computer-assisted instruction could help to offset the loss of educational resources for handicapped children. A master teacher could write programs and generate other software that could improve the educational attainment of many more children than could be touched in the regular classroom.

There are problems associated with this new educational technology, however, Coladarci reports:

> The two criticisms, then, are that technology in education often has been an irrelevant intrusion, addressing instructional purposes other than those entertained by a particular school and with assumptions about learners that do not fit the particular learner characteristics confronted by the technology in a given time and place.[5]

Thus, it appears that the emerging computer technology could make improvements in educational programs offered for exceptional children. This new technology could also improve the efficiency of the system and help to alleviate the problems caused by budget restraints by providing instruction to many children from one master program or piece of software. Problems of insensitivity to individual needs, teacher resistance, and faulty assumptions will have to be dealt with, however, before this new technology can be fully implemented.

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[4]David J. Irvine, "Specifications for an Educational System of the Future," in Curriculum Handbook, ed. Louis Rubin (Boston: Allyn and Bacon Company, 1977), p. 290.

[5]Arthur Coladarci, "The Application of Technology to the Educational Process," in Curriculum Handbook, ed. Louis Rubin (Boston: Allyn and Bacon Company, 1977), p. 299.

Becker states:

> We must think clearly about how we want our children's education to improve; what computers can do to help; how that assistance can, in fact, be accomplished; and whether any of this is affordable.[6]

In identifying major instruction-related uses of microcomputers, Becker suggests the following headings: drill and practice, tutorial dialog, management of instruction, simulation and model building, teaching computer related information skills, and teaching computer programming.[7] Research is needed to ascertain which of these uses would be effective as instructional assisted tools in classes for handicapped students. Either in isolation or combination with an additional instructional approach, these uses of microcomputer technology might improve the instructional program for mildly handicapped students in Georgia.

Statement of the Problem

As the drain on educational research continues in the 1980's, the use of microcomputers as instructional assisted tools will grow in importance. A computer equipped with the proper software can serve many more students than one traditional teacher. Economic necessity will lead to more and more primary instruction coming from computer technology.

Perhaps no area of education has been damaged as severely by recent budget cuts and decline in educational resources as special education. It will be increasingly important that the new technologies be integrated in an efficient manner into the curricular plans for handicapped students. The

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[6]Henry Jay Becker, "Microcomputers in the Classroom--Dreams and Realities," in Center for Social Organization of Schools Publication (Report no. 319, January 1982), p. 72.

[7]Ibid., p. 15.

mandates for individualized instruction that are the bases of Public Law 94-142 particularly are adaptable to computer-assisted instruction. The effective utilization of microcomputers in the educational programs for handicapped students could help to offset losses in personnel, supplies and equipment.

Before this new technology can be effectively used, a survey is needed to address issues relative to instructional uses of micros in identified programs for handicapped students. Issues identified with the use of this technology include: access to microcomputers; emergence of student and teacher roles in the use of microcomputers; synthesis of microcomputer instruction in existing curricula; quantity and quality of software; and teacher training in the use of this instructional assisted tool.

Effective planning for the future calls for a survey which focuses on the above mentioned concerns. While it is difficult to determine uses, effects and perceptions of educators toward the use in all phases of the handicapped population, the researcher, supported with a review of pertinent literature, used the mildly handicapped population as a target group.

With the newly established Quality Basic Education Act for the State of Georgia come the concerns of cost efficiency, curriculum appropriateness and student achievement. Such issues must be all inclusive involving the needs of the general and handicapped populations.

The purpose of the study was to survey the use of microcomputers and the perceptions of special educators toward their use to educate mildly handicapped students within selected public school systems of Georgia.

The study examined several variables associated with the use of microcomputers as instructional assisted tools in classes for mildly handicapped students in selected school systems. The examination of current usage will

contribute to the literature on the issue and lead to more beneficial uses of the emerging technology.

Hypotheses

As a means of giving guidance to this study, the following hypotheses were formulated:

H_1 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on years of professional experience.

H_2 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on position levels.

H_3 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on school system size.

H_4 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on achieved educational levels.

H_5 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on their area of mildly handicapped exceptionality.

H_6 There will be no statistically significant difference in the responses of special educators concerning the usage of microcomputers in the instruction of mildly handicapped students of Georgia based on certain demographic variables.

Limitations of the Study

The study was limited because of the size of the sample, and because the researcher restricted the study to the uses of microcomputers in the instructional programs to educate mildly handicapped students in selected public school systems of Georgia. Sources of data were limited to the responses from Teachers of Mildly Handicapped Students and Directors of Special Education of those selected school systems.

The use of the questionnaire, interview and participant observation as data gathering methods is a limitation that was controlled by the appropriate research methodology.

Although the uses of and perceptions of special educators toward microcomputers as instructional assisted tools in programs for educating mildly handicapped students in the selected school systems was examined, no statistical correlation was measured on the relation of these perceptions and uses.

Definition of Terms

For the purpose of this study, the following terms are defined:

1. Above average size school system - The school system with a student population of 4,300 and above.
2. Achieved educational level - Level of educational degree achievement. This is related to questionnaire item I-D and hypothesis 4.
3. Average size school system - The school system representing the ideal size as determined by the Education Review Commission of Georgia. School systems between the student population range of 2,301 and 4,299 comprised this category.
4. Below average size school system - The school system representing a student population range from 1 to 2,300.
5. Computer-Assisted Instruction - The use of computers to present drills, practice exercises, and tutorial sequences to the student, and perhaps to engage the student in a dialog about the substance of the instruction.[8]
6. Director of Special Education - The individual assigned to coordinate and/or direct all programs for exceptional children within a school system.
7. Handicapped children - Those children who are "mentally retarded, hard of hearing, deaf, orthopedically impaired, visually handicapped, seriously emotionally disturbed, or children with specific learning disabilities, who by reason thereof require special

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[8]Anthony Ralston, Encyclopedia of Computer Science (New York: Reinhold Company, 1976), p. 268.

education and/or related services."[9]

8. Field research data - That data obtained from the interview/participant observation technique.

9. Instructional assisted tools - Methods, materials and equipment used to enhance the learning process and assist the teacher in implementing the instructional program.

10. Interrelated unit - The delivery of service model provided for mildly handicapped students in the public schools of Georgia.

11. Microcomputer - A parallel arithmetic and logic processing unit, implemented by using large scale integration and providing a general-purpose data bus for communication with external devices.[10]

12. Mildly Handicapped Areas - For the purpose of this study, Mildly Learning Disabled, Mildly Mentally Handicapped and Mildly Behavior Disordered.

13. Mildly Handicapped Students - Students diagnosed as mildly learning disabled, mildly mentally handicapped or mildly behavior disordered who require modification of the regular curriculum with the purpose of returning them to the regular education mainstream.

14. Participant observation - A process in which the investigator interacts with subjects while observing a particular situation.

15. Perceived use - Perceptions of microcomputer use in the classroom as instructional assisted tools.

16. Position levels - The educational assignment in which one is

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[9]U.S. Department of Health, Education and Welfare, Federal Register (Washington, D.C.: U. S. Dept. of HEW, August 1977), Part II.

[10]Ralston, Encyclopedia of Computer Science, p. 918.

employed. For this study, teachers and directors of special education were used.

17. Professional experience - Those years spent by an individual in an instructional and/or supervisory educational position. This is related to questionnaire I-B and hypothesis 1.

18. Software - The programs that are needed to make the computers perform their intended tasks.[11]

19. Special Education - Specially designed instruction intended to meet the particular needs of exceptional children.[12]

20. Survey data - That data obtained or generated from the questionnaire responses.

21. Teacher of Mildly Handicapped - The individual assigned to provide instruction to students identified as being mildly handicapped.

Assumptions

The use of the microcomputer as an instructional assisted tool is an educational innovation that can improve the educational attainments of handicapped children.

Computer assisted instruction will be the primary mode of direct instruction in the future.

The distribution of the handicapped population in a school system can affect the perceptions of educators in that school system toward the use of microcomputers as instructional assisted tools.

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[11]Ibid., p. 1283.

[12]Rebecca D. Kneedler, "Special Education in Today's Schools," in Special Education for Today (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1984), p. 8.

The number of professional education experience years of educators can affect the perceptions toward microcomputer usage.

The use of microcomputers as instructional assisted tools will be more appropriate for certain exceptionalities than others.

Special Education Teachers and Directors are the key persons in school systems with regards to the special education program, and can provide valid appraisals of the use of microcomputers as actual and potential tools of instruction in programs for mildly handicapped students.

The perceptions of educators toward the use of microcomputers as instructional assisted tools in classes for mildly handicapped students can influence the way this technology is used by these educators.

Scope of the Study

The study examined the use of microcomputers and the perceptions of Special Educators toward the use in instructional programs for mildly handicapped students in selected public school systems of Georgia.

The data for the study were supplied by the Directors of Special Education (or appropriate contact person) and Teachers of Mildly Handicapped Students from selected public school systems of Georgia.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

> Knowledge must be an accumulation of wisdom....Our schools are mirrors of society. Many panic and refute change asking for a return to the past. Information must be and is the ultimate force in the economic cycle. The information age has arrived....[1]

The upsurge of the information age has had an astounding effect on the trends of American life. Like the industrial era, it has forced change, raised concern and apprehension, thus meeting rejection by those who lack confidence in its usefulness and survival. An investigation of the impact that this age has on the educational process yields vast implications for the present and the future. Particularly relevant are the effects that the use of technology has on the instructional responsibilities of schools and the learning of mildly handicapped students.

The literature supporting this research directly addresses an overview of microcomputer usage in American education and its role in the instruction of mildly handicapped students. More specifically, emphasis will be directed toward the identified instructional uses of microcomputers; the use of computer technology in special education; three areas of exceptionality wherein microcomputer use is evidenced; perceptions of educators toward the use and effectiveness; and future implications for educational practices.

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[1]Harold Plumier, "Encounter with the Future," speech delivered at the 1900's Conference, sponsored by Atlanta University and Georgia Learning Resources System, Atlanta, Georgia, 8-10 April 1984.

Microcomputers: Use As An Instructional Technique

Throughout the history of American education, predictions have been molded by the futurists. Education itself is a continuous forecast. In deciding what individuals should learn, we are preparing them for the knowledge and skills that will be needed in the future. The "future" referred to by writers such as Ivan Illich, George Leonard, in Education and Ecstasy and Alvin Toffler in The Third Wave is upon us. Ravitch states:

> School officials and curriculum makers are constantly involved in future thinking, because they must determine what children should study and because they must adapt to changing social and economic trends....[2]

Educators today are charged with the task of becoming involved with the instructional process through planning, management and implementation. Charles Stallard reports:

> A major challenge facing the field today is the need for educators to become involved with the development of interactive technology for educational applications....It is not enough to rely on "experts" within the computer industry to advise us.[3]

The number of computers used in the instructional operation of education is increasing. Many educators believe that computer technology, by way of computer literacy and computer-assisted instruction, is the current trend in American education and should be treated as a basic skill. The more than one million computers in public schools throughout the United States are supposed to be changing the shape of the future. Advocates expect computers to help students learn better than they have ever learned before, and some

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[2]Diane Ravitch, "On Thinking about the Future," Phi Delta Kappan 64 (January 1983):317.

[3]Charles Stallard, "Computers and Education for Exceptional Children: Emerging Applications," Exceptional Children 49 (October 1982):103-104.

say the machines are the biggest development in education since printing.[4]

In April 1984, a survey was conducted by the National School Board Association (NSBA) in collaboration with the National Institute of Education (NIE) to determine home and school computer use. From the 27 percent rate return, findings were that: 92% indicated that superintendents, principals and teachers were the ones who strongly encouraged the use of computers in school districts. Ninety-six percent responded that their districts were currently using microcomputers for instructional purposes including computer-assisted instruction. Only 19% of the respondents reported some handicapped students' involvement in the computer-assisted instruction.[5]

Today there is an average of one microcomputer for every 92 students, although it is estimated that by the end of 1987, there will be one micro for every 23 students in American public schools.[6]

Despite the increased possession, the numbers are still small compared to the total school populations. Many argue that local school boards, while making gains toward acquisition, fail to address the need for increased budgetary support. Thus, the computer/student ratio is far from being ideal. Numerous studies reveal that schools typically acquire computers when a single teacher undertakes a project to promote purchasing. Parent groups and special pilot programs have been most influential in the increased number of computers in education throughout the United States. As a result of the decentralized

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[4]"Schools Keep Buying Computers, But Pupils May Not Benefit Much," Wall Street Journal, 17 April 1985.

[5]"School/Home Computer Survey Report," National School Boards Association Publication (June 1984).

[6]L. H. Morrow, "The Educational Software Market," paper delivered at a conference on educational software sponsored by the National Institute of Education, Washington, D.C., 12 September 1983.

nature of American education, local schools and communities are purchasing and installing computers in accordance with what they consider necessary. This approach often reduces the quantity and quality of technology for instructional purposes.

Computers are generating much excitement and enthusiasm among teachers, and parents alike, even without solid proof of measurable benefits. Becker states:

> Although computers do provide opportunities for individualization, immediate feedback, and summarization of individual student performance that other methods of skills practice may lack, it is not clear that these computers enable skills to be learned so much more rapidly than their investment is worthwhile on these grounds alone.[7]

Reviewed literature reveals limited data to support how computers help people learn or the significant difference that is made as a result of this use.

If the educational system is to adequately prepare mildly handicapped students, particularly for a technologically comfortable future, we must evaluate the motivational quality, ability to individualize instruction, and the adaptability and reliability of this technology in the instructional process. Such expanded use of computers dictates the adaptation of these discoveries to the needs of handicapped students. Eisele contends:

> Computers should be applied to performing those functions, tasks, activities or processes which they can deliver with fidelity to the way in which they would ideally be performed where those processes have demonstrated benefits (such as economy of time, money or human effort), satisfaction among principal users such as learners, teachers, or administrators, or efficiency in attainment of objectives, or even other desired outcomes.[8]

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[7]Becker, "Microcomputers in the Classroom," p. 72.

[8]James E. Eisele, "A Case for Computers in Instruction," Journal of Research and Development in Education 14 (Fall 1980):1.

Computer Technology in Special Education

Education for the handicapped has withstood many challenges over the years. Initially, school systems did little to encourage the attendance of school age children with handicapping conditions. Parents either provided instruction at home or employed private tutors when economically feasible. As each state enforced compulsory attendance laws, such inavailability of services and insensitiveness decreased.

Accompanying compulsory attendance were the concerns of what and how to instruct this new segment of the school's population. Very little was known or understood concerning the nature and needs of handicapped students. Educators soon came to realize that the special needs and abilities varied among individual students.

The mandate of Public Law 94-142, to provide appropriate education for all handicapped children, has caused educators and advocates for this group, to organize educational programs responsive to the individual needs of students. The special skill of the educator is the ability to coordinate and facilitate learning through sensitive utilization of curricula and materials suited to the needs of the individual child.[9] Such instruction must encompass those areas which predict adequate survival for the handicapped.

Today's world, as has been stated, is a high technology society. Indeed, some would argue that we are in the midst of an information revolution.[10] To survive in such a life demands an understanding and use of electronic devices and information. Handicapped individuals possess similar

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[9]Bernard G. Suran and Joseph V. Rizzo, Special Children: An Integrative Approach (Glenview, Ill.: Scott, Foresman Co., 1979), p. 97.

[10]Norma Harrod and Marilyn Ruggles, "Computer Assisted Instruction: An Educational Tool," Focus on Exceptional Children 16 (1983):2.

needs. If the educational system is to prepare the handicapped for the future, special educators must take the lead and act as change agents. Despite the stereotypic image that computers have been given, this instructional operation must be used as an educational tool. Educators must not fear or reject these tools, but act as controllers in providing the needed human leadership and direction.

Numerous studies report outlooks on the use of computers in the instruction of handicapped students. Many procedures found appropriate in regular education can be beneficial to the instructional program of the handicapped. Eisele identifies instructional tasks essential to the learning process and suggests that computers can greatly assist.[11] Wools, in recapitulating the sentiments of Alfred Bork, states: "In education the focus must be on learning rather than technology. If used correctly, computers may re-build the confidence level of the public toward education."[12]

With the growing demand for computer literacy and usage in many aspects of American life, it is necessary to consider what impact this venture will have on the future of public education in relations to the handicapped. It is also necessary to evaluate instructional methods and materials for present and future use in educating the important segment of the human population. Becker believes "we must think clearly about how we want our children's education to improve; what computers can do to help; how that assistance can, in fact, be accomplished; and whether any of this is affordable."[13]

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[11]Eisele, "A Case for Computers in Instruction," p. 6.

[12]Blanche Wools, "Bork's Perspectives on Computers in Education," Instructional Innovations 28 (May 1983):23.

[13]Becker, "Microcomputers in the Classroom," p. 72.

The groundswell of microcomputer enthusiasm has at last hit those in special education. Teachers of exceptional children and other practitioners now realize that microcomputer use is not limited to exotic applications for the severely handicapped, but touches all exceptionalities--learning disabled, mildly handicapped, mentally retarded, gifted....This is a great time of opportunity as special educators begin to recognize the potential for the micro to improve the education and quality of life of handicapped students.[14] As special educators attempt to provide a free and appropriate education, the use of microcomputers becomes key to the learning process. Particularly is this technology essential as a versatile tool in instructing mildly handicapped students. Moyles and Newell believe that the adaptability to the wide range of instructional materials and learning styles, make it relevant in a highly individualized program.[15]

National reports indicate the use and effects of micros in revised curriculum of handicapped instruction. Moyles and Newell further suggest that the introduction of microcomputers into the curriculum was made possible by a receptiveness on the part of the administration and teaching staff to the possibilities of microcomputers in the area of individualized instruction.... For learning disabled students, software provides a novel presentation of material and sharpens and clarifies material they had been unable to master. Computer use gives most a special feeling of self-esteem and a sense of working more independently....Teachers and administrators have become more aware of the growing potential of the microcomputer in the special education

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[14]Margie Mason, "Special Education: A Time of Opportunity," Electronic Learning 2 (May-June 1983):54.

[15]Laura C. Moyles and Jeanne Newell, "Micros in a Post-Secondary Curriculum," Academic Therapy 18 (November 1982):153.

classroom for students with all types of disabilities.[16]

To many, the microcomputer has become teacher, therapist and occupational skills trainer, all rolled into one. To their human teachers and therapists, the micro is the most valuable and versatile aid they have ever seen.[17]

Prior to 1975, computers were considered inefficient and complicated for practical operation by many people who were disabled. Presently, handicapped people are becoming beneficiaries of the easy to operate, inexpensive microcomputer.

Current research is directed toward enabling handicapped people to interact with computers. Such interaction is evidenced on a growing scale in special education classrooms throughout the United States. As previously cited, microcomputers are purchased to supplement existing instruction and as an alternative form of instruction for students who have difficulty learning in traditional educational manners.

Microcomputer technology presents limitless possibilities in the instruction of exceptional students. From the most developmentally involved to the gifted, features of this technique include motivational quality, the ability to afford individualized instruction, adaptability to students' needs, reliability, cost effectiveness and improvement in management and diagnostics.

While much of the literature suggests extensive applications of microcomputer use with gifted students, the focus of this study only involved special needs students identified as mildly handicapped.

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[16]Ibid., p. 155.

[17]Andrew L. Ragan, "Tne Miracle Worker: How Microcomputers Help Handicapped Students," Electronic Learning 1 (January-February 1982):57.

The individualized education plan is the guide in providing an appropriate educational program for special needs students. The development of this program is often time consuming and costly.[18] Available software can significantly aid in the development of the individualized education plan to offset the many repetitive and clerical responsibilities. Such software enables planners to focus toward substantive instructional planning.

Many handicapped students' participation in educational activities is hampered by the inability to gain information from the written texts. For these students microcomputers and associated technology have offered the reading machine which employs microprocessor, optical scanning, and voice synthesis technology to convert printed materials to full-word English speech.[19]

Although individualized instruction is vital to the special education process, it is often hampered by limited personnel resources. Few students are provided one-to-one instruction with the benefits of immediate feedback and reinforcement. This problem is being remedied through the use of videodiscs and other intervention systems.

The use of simulation leads students through a series of real or created situations which would normally be unavailable. These programs allow students to assess and respond to events as if they were actually occurring. General instructions in programming can also assist in reshaping the traditional nature in instruction.

The applications of microcomputer and related technology offer the potential for significant improvements in the delivery of services to special

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[18] M. Price and L. Goodman, "Individualized Education Programs: A Cost Study," Exceptional Children 46 (1980):446-448.

[19] Randy Bennett, "Applications of Microcomputer Technology to Special Education," Exceptional Children 49 (October 1982):109.

education students. The full impact of this potential will neither be immediate nor without cost. Special educators need to become knowledgeable about the existence and operation of various technological applications. In addition, they will have to assess the quality of particular innovations and determine what is suitable for their particular needs.[20]

Instructional Techniques for Mildly Handicapped Students

As national committee reports, task force results and mastery of minimum competency skills continue to impact the dynamics of American education, the accountability of program directors, availability of resources and the appropriateness of methodology become focal issues. The instructional application for mildly handicapped students must be targeted to achieve optimally.

Six instruction related uses of microcomputers are identified for this study. They are listed under the following headings:

(1) Drill and Practice: Using computers for students to practice skills which initially were taught in traditional ways;

(2) Tutorial Dialog: Using computers to present information to students, diagnose misunderstandings and provide remedial instructive communication and individualized practice;

(3) Management of Instruction: Using computers to provide the teacher with automatic reporting of individual student performance and appropriate assignment of skill levels;

(4) Simulation and Model Building: Using the computer programs to demonstrate the consequences of a system of assumptions, or the consequences of varying assumptions, usually in conjunction with instruction in science and social studies;

(5) Teaching Computer Related Information Skills: Using the computer to teach students and have them apply such skills as typing, editing, and retrieving information from computer systems;

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[20]Ibid., p. 112.

(6) Teaching Computer Programming: Having students to learn to program computers to solve problems that are a part of their mathematics curriculum or simply for the understanding of programming itself.[21]

Becker, in identifying instructional uses of microcomputers, categorizes drills and tutorials as variants of a general category called "computer assisted instruction" or CAI. The common elements of both include repetition of similar exercises and immediate reinforcement.[22] Recent advances in microelectronics and computer software have rekindled enthusiasm for applications of computer assisted instruction. The notable features are highly compatible with the instructional principles for mildly handicapped students.

Educational practices in computer technology have increased over the past decades. Initially, CAI was delivered on large mainframed computers. High cost, low reliability and lack of convincing evidence regarding effectiveness resulted in a lack of acceptance by the educational community. As a result of technological advances the microcomputer has produced growth in computer usage.

The expansion of computers into American education has been relatively unguided. Articles and news releases dealing with CAI have been largely based upon speculation and conjecture rather than empirical evidence.[23]

While studies regarding CAI with non-handicapped students have been extensive and relatively positive, the use with handicapped students has been neglected with applications to hearing impaired receiving the most attention.

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[21]Becker, "Microcomputers in the Classroom," p. 15.

[22]Ibid.

[23]R. C. Atkinson, "Computerized Instruction and the Learning Process," American Psychologist 23 (1968):225.

Investigations of CAI with learning disabled are on the increase with most focusing on language arts and mathematics remediation. Chiang compared matched groups of learning disabled students in order to test the effectiveness of CAI in mathematics and reading. Significant differences in favor of the CAI treatment resulted in both achievement areas with junior high school students but not with elementary school students.[24]

Sandals,[25] in 1979, reported the results of a study that provided CAI in arithmetic and spelling to junior high school students with a "wide variety of learning disorders." When compared with non-CAI students, no significant post test differences were noted.

McDermott and Watkins[26] conducted a study involving two hundred and fifty learning disabled students on the elementary level to determine the effectiveness of well designed mathematics and spelling CAI. The results suggested that when using standardized indices of performance, the effectiveness of computerized vs. conventional instruction with learning disabled appears equivalent.

Hasselbring and Crossland[27] documented the successful use of microcomputers in diagnosing spelling problems in learning handicapped students. The research showed that students exhibiting mild learning disabilities can successfully operate microcomputers under diagnostic testing conditions. The

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[24]A. Chiang, Demonstration of the Use of Computer Assisted Instruction with Handicapped Children (Alexandria, Va.: ERIC Document Reproduction Service, ED 166 913, 1978).

[25]L. H. Sandals, "Computer Assisted Applications for Learning with Special Needs Children," paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California, April 1979.

[26]Paul McDermott and Marley Watkins, "Computerized vs. Conventional Remedial Instruction for LD Pupils," Journal of Special Education 17 (Spring 1983):81-88.

[27]T. S. Hasselbring and C. L. Crossland, "Using Microcomputers for Diagnosing Spelling Problems in Learning Handicapped Children," Educational Technology 21 (1981):37-39.

results further indicated that data obtained are as reliable as those obtained from more traditional methods.

In 1981, Hotard and Cortez[28] initiated a research program in Louisiana into the effectiveness of CAI for learning disabled students with mathematical deficits in grades three-six. The results illustrated that CAI added a significant standard score gain above and beyond that made by traditional instruction. Examinations of the achievement by grade and grade equivalent gains imply that CAI is educationally meaningful and valuable.

While continued investigation of CAI effectiveness with learning disabled students exists, current findings remain limited. Scarcity of CAI research with learning disabled is thought to be a result of the parallel of teaching techniques to CAI attributes. Such attributes include individualized pacing, hierarchial curriculum, frequent and immediate feedback and a multisensory learning process.

Microcomputer technology is being used at a less popular rate to teach mildly mentally handicapped. In a recent survey, Klitzke[29] found that there is not a wide selection of software specifically designed for use with mildly mentally handicapped students. One of two major programs addresses survival skills such as money management, home safety, banking and job readiness. Users view the programs as focusing on the deficits of the mentally handicapped which obscures the goal of successful educating.

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[28]Stephen R. Hotard and Marion Cortez, "Computer Assisted Instruction As an Enhancer of Remediation," paper presented to Lafayette Parish Public Schools, 1981.

[29]Pete Klitzke, "Microcomputer Technology Applied to EMR and TMR Students," The Network News 6 (Summer 1984): 6-7.

Miller and Chapman,[30] in researching communicative disorders of mildly mentally handicapped, found the use of microcomputers productive. They offer the potential of significantly reducing the tedious counting, segmenting, and error checking activities which are often time consuming. The system should be maximally user friendly and interactive requiring no degree in computer science or programming skills.

In a study evaluating the effectiveness of CAI for mildly mentally handicapped students in selected Inner City Schools of Indiana, teachers noted significant achievement in the area of mathematics.[31]

Spring and Perry,[32] in researching the effects of CAI in word decoding of mildly mentally handicapped students, found measurable improvement accompanied by high learner motivation which failed to decline during the investigation period.

Although mildly mentally handicapped students have received CAI in several research settings, evaluative efforts have been deficient in both internal and external validity.

The area of Behavior Disorders was found to be the least researched relative to CAI effectiveness and the use of computers in the instructional mode. Most of the literature strongly identifies the use of this technology in the management of behavior and self control.

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[30]Jan Miller and Robin Chapman, "Using Microcomputers to Advance Research in Language Disorders," Theory into Practice 22(Autumn 1983):301-309.

[31]"Evaluating and Providing Feedback on the Effectiveness of Instruction for Handicapped Children Integrated in Inner City Schools," Final Report, Indiana University Press, 1983.

[32]Carl Spring and Linda Perry, "Computer Assisted Instruction in Word Decoding for Educationally Handicapped Students" (Carmichael, Calif.: San Juan School District, 1980).

Carman and Koshberg[33] explain that while the idea of using microcomputers to improve instruction of behavior disordered has been given little attention, it does increase the attention span and provides increased individual attention to task.

Berthold and Sachs[34] report that computers have proven successful in providing clearly defined expectations; can be programmed to sequence material; call for active responses from the learner; provide immediate reinforcement; minimize social stress and have infinite patience.

In a study designed to examine whether the Individual Education Plan could be computerized and if the Behavior Disordered students could learn math at a faster rate, Carman and Koshberg discovered that the math learning rate could be accelerated by CAI but failed to determine that the rate would be maintained. In the same study, attention to task was significantly influenced by CAI.[35]

Fisher[36] notes that CAI is increasingly being used as an intervention strategy to change anti-social behaviors and outlooks of students. Additionally, he reports that microcomputers are introduced in bibliotherapy and as motivators for self-improvement and analysis. Studies reveal that students respond to the computer as a device that gives them much needed power and control for self-management.

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[33]Gary Carman and Bernard Koshberg, "Educational Technology Research: Computer Technology and Behavior Disordered Children," Education Technology 20 (November 1980):26-30.

[34]H. C. Berthold and R. H. Sachs, "Education of the Behavior Disordered Child by Computer and by Teacher," Educational Technology 22 (May 1982):3-11.

[35]Carman and Koshberg, "Educational Technology Research," p. 28.

[36]Glenn Fisher, "Where CAI is Effective: A Summary of the Research," Electronic Learning 3 (December 1983):82-84.

...If there is a bottom line to the microcomputer's value as an aid for the mildly handicapped, most seem to agree: The micros allow many mildly handicapped people degrees of independence that they might not otherwise be able to achieve.[37] The computer demonstrates to these handicapped individuals that they can control their own environment and their own learning.

In addition to the student related uses, computers are becoming more useful in the area of management. Programs are designed to monitor attendance and student progress, compute grades and summarize where a student is relative to a planned program at any given time. Information retrieval of instructional materials, objectives and student data is an additional valuable feature.

Word processing is used extensively for editing, deleting, inserting and reformatting. In the area of assessment, the micro can administer tests and provide detailed results regarding performance, norms and comparative analysis across skill areas which depict various types of learning problems and styles.

Perceptions of Teachers and Administrators

Numerous issues surround the use of computer technology in the instruction of mildly handicapped students. For many teachers and administrators, computers are the latest in a family of instructional technology yielding widespread use as purveyors of computer assisted instruction in the basic skills areas. There are others who believe that these machines are very poor teachers.

While possibilities for the use of microcomputers in instruction seem limitless, continuous controversy and uncertainty exist among educators relative to cost effectiveness, appropriateness and availability of software and

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[37]Ragan, "The Miracle Worker," p. 83.

a reduced need for interpersonal relations in schools. Becker posits:

> There are also important organizational and curricular problems to solve before the technology may be effectively used to increase learning efficiency....Schools typically purchase microcomputers in very small quantities. One must ask whether providing a new method for having students practice applications of rote is more important than using the school resources to develop more higher-level intellectual skills of students....Some people have questioned whether increased computer assisted instruction will replace rather than supplement the learning time that is spent in an interpersonal context.[38]

Thus, it is important to understand the skepticism among educators toward accepting this new approach to learning. Skeptics remember educators' earlier enthusiasm for such new technologies as film and television. They feel that such excitement will be short lived. Some educators believe that even with the inservice training that is provided, computers in instruction are a waste of time. They key complaint is the inability to purchase adequate quantities of hardware, software and the needed peripherals as a result of budgetary constraints.

Literature addressing perceptions of special educators toward the use of microcomputers in the instructional areas suggests:

Drill and practice - Reinforces skills that have already been taught rather than introduce new skills. Such a powerful intellectual tool is wasted on drill and practice benefiting underachievers only. Only when an automatized approach in learning is needed is this essential.

Tutorial - By presenting information in a sequenced format, this provides instruction of new skills and provides appropriate levels of skill mastery through evaluation.

Instructional games - Provide a change in format of the drill and practice program; allows use of problem solving skills and refinement of motor

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[38]Becker, "Microcomputers in the Classroom," pp. 2-3.

development. Winning is dependent upon mastery of cognitive skills; motivational qualities enhance learning and stimulate personal growth.

Simulation - Presents a system that represents the way real events work; students learn as they effect various aspects of these models. Many question the learning advantages despite the improvement in student attitudes.

Problem Solving - Students are able to use programming in solving real problems; provides more advanced use which is not appropriate for all instructional levels.

Other issues surrounding the use of microcomputers in the instruction of mildly handicapped students include:

Software - Drill and practice programs are over stocked; many lack the potential for adaptation; inappropriate for various skill development; too expensive and not proven to be more cost effective than traditional methods used in supplementing instruction; inability to legally copy programs.

Limited Financial Support - Budget allocations restrict the purchasing of necessary hardware and software in proportion with student needs.

In-service Training - Sessions are capsuled often into non-laboratory settings; limited and restricted time defeats the purpose of profitable gain.

Lack of Standards - No standard has been established to determine what an effective program is.

Replacement - The eventual replacement of the human interaction between teacher and student; diminishing creativity producing zombies of the next century.

Preparations for a high tech future demand quality models from which to learn. Educators, in providing instruction to mildly handicapped students, must not refute change but identify and implement innovative ways of instruction in successfully meeting students' needs and concerns.

In refining the ability to manage change, Special Education Administrators are finding expanded uses of computer technology. Individualized Education Programs (IESs) are used in the development of the official document. The administrative input varies according to the programs which can monitor students' progress against the identified goals and objectives.[39]

There is a clarion call for administrators to become computer literate-sufficiently literate to be able to ask those who program information to do it in a way that will enable them to answer the necessary questions; sufficiently literate to know the full range of capabilities of computers so that they can plan to use them for access to information bases, teleconferences; automatic data transmission and receipt after hours; database management, scheduling, and word processing.[40]

Special education administrators are increasingly turning with frequency to the use of automated systems to meet information management needs. Such increased knowledge and use convinces them of the need to expand computer technology in the instructional phase of the school program. While many perceptions held about the benefits are accurate, misconceptions do exist. Bennett suggests that misconceptions about the use of computer technology must be corrected if decision makers are to weigh the benefits of automated systems.[41]

Future Implications

As rapid technological advances are turning classrooms into centers of electronic gadgetry, many special educators find themselves far from

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[39]George White, "Micros for the Special Education Administrator," Electronic Learning 3 (February 1984):39.

[40]Nolan Estes, "Implications of the Microcomputer for Educational Administrators," Educational Leadership 41 (September 1983):28.

[41]Randy Bennett, "Myths and Realities in Automating Special Education Information," Journal of Learning Disabilities 17 (January 1984):52.

achieving the revolution expected from computer technology.

While studies support the advantages and disadvantages of computer technology as an instructional technique, there is limited evidence to support measurable differences noted in the education of mildly handicapped students.

Research must continue to explore the effectiveness of computer assisted instruction and compare results of computer use in the various subject areas and skill related areas with traditional instructional results.

As the outcry for computer literacy continues, school systems throughout the nation will further their competition. Improvement will be manifested in the provisions of staff development, inservice, and budgetary allocations. Special educators will better understand and discover more practical uses of microcomputers and through careful investigation, secure and demand appropriate software. Enhanced understanding of programming will allow teachers to produce materials that will better meet the individual needs of their students. Measurable success will influence the increased supply of hardware and peripherals for classroom use.

Educators will use the fruits of the technique to help students attain greater academic competencies and skills either as the main strategy or to supplement existing traditional methods of instruction. Schiffman, Tobin and Bronson postulate:

> Nowhere are the benefits of learning with personal computers more dramatic than with the handicapped whose physical, cognitive and learning limitations have been a barrier to an education and a productive life. The potential for computer instruction with mildly handicapped students will not be reached until computers are as handy and available as telephones and typewriters. Computers must be perceived by teachers and administrators as routine tools, rather than as sophisticated high technology.[42]

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[42]Gilbert Schiffman, Diane Tobin, and Susan Bronson, "Personal Computers for the Learning Disabled: The State of the Art and the Problem," Journal of Learning Disabilities 15 (August-September 1982):422-423.

The challenge that faces educators is to develop and implement ways of using computers to improve the educational process of handicapped students. Becker believes that through appropriate research, well organized strategies of educational program development, and careful policy-making and staff development by school systems, we may be able to make today's dreams about computers and kids into tomorrow's realities.[43]

Summary

This chapter focused on the literature supporting microcomputer usage in the instruction of mildly handicapped students. Specifically, emphasis was placed on the role of technology in American education; the use of microcomputers in Special Education; uses of microcomputers in the education of mildly handicapped students; microcomputer usage with three identified areas of exceptionality; perceptions of educators toward the use and effectiveness; and future implications.

The impact of the information age is having a profound effect on the educational process. American education is by no means negligent in providing instructional modes which will prepare students for profitable futures. Numerous computers have been placed in public schools throughout the country over the past ten years with projections for at least one for every fifteen students as a goal for 1990.

With the growing enthusiasm over microcomputer usage in the instructional program come concerns of efficiency, program adaptability, cost effectiveness, appropriateness and availability of software, and human replacement.

Special educators are as anxious as ever to involve mildly handicapped students in this integral part of learning. While research with nonexceptional

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[43]Becker, "Microcomputers in the Classroom," p. 72.

students exceeds that of exceptional students, studies are increasingly focusing on the handicapped population. Of the three concern groups, more literature was available for the learning disabled with the mildly mentally handicapped group being second.

Research findings indicate that most special educators use microcomputers for computer assisted instruction. The areas of drill and practice, tutorial dialog, and management of instruction were documented as being the most popular with mildly handicapped students. Most of the instructional approaches addressed remediation of mathematics and language arts skills. Recent emphasis has been in the areas of vocational education and career awareness and development.

While problems relative to software, financial support, in-service training, human replacement and lack of standards continue to perplex the decision makers, most special educators are convinced that microcomputer use with mildly handicapped students can and is making a difference in the attainment of essential skill areas.

In recent years our entire system of special education has come under harsh scrutiny. Public Law 94-142 has forced change in the educational practices for handicapped. In guaranteeing a free and appropriate education for all, educators are forced to explore strategies that are used in regular education and implement, with necessary adaptations, in classes for the handicapped. Computer assisted instruction is a learning technique that is being used increasingly to better meet the individual needs of mildly handicapped students.

As special educators continue to investigate the effectiveness of microcomputers in the instructional process, predictions are that new and varied uses and results will be discovered. In addition, current problems associated with usage will diminish and eventually become nonexistent.

CHAPTER III

METHODOLOGY

Introduction

The study analyzed the use of microcomputers in the instruction of mildly handicapped students in selected public school systems within the State of Georgia. This chapter contains a description of the methodology of the study. Data related to the specific hypotheses for this problem were analyzed to complete the study.

Two types of data were involved, primary and secondary. The primary data were original data generated by the questionnaire, interview and participant observation, detailing the use of microcomputers in the instruction of mildly handicapped students in the selected school systems and the perceptions of educators toward them. The secondary data were generated by a review of related literature and research on the subject.

Research Design (Descriptive Survey)

Because this study made observations about the use of microcomputers, the research methodology was based on the survey research method. Leedy observes:

> The method of research that simply looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees is called the survey, the descriptive survey, or the normative survey method of research.[1]

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[1]Paul D. Leedy, Practical Research: Planning and Design (New York: Macmillan Publishing Company, Inc., 1974), p. 79.

Leedy also indicates some components of the basic structure of the descriptive survey as a research method and indicates some of the characteristics of this method of research. He states:

1. The descriptive survey method deals with a situation that demands the technique of observation as the principal means of collecting the data.
2. The population for this study must be carefully chosen, clearly defined, and specifically delimited in order to set precise parameters for ensuring discreteness to the population.
3. Data in descriptive survey research are particularly susceptible to distortion through introduction of bias into the research design. Particular attention should be given to safeguard the data from the influence of bias.
4. Although the descriptive survey method relies upon observation for the acquisition of its data, those data must be organized and presented systematically so that valid and accurate conclusions may be drawn from them.[2]

This study carefully observed the guidelines and characteristics as outlined by Leedy. Much of the data gathered in the descriptive survey research method come by way of the questionnaire.[3] This was the chief method of data collection for this research; the interview and participant observation methods were secondary.

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[2]Ibid., p. 80.

[3]Joel A. Gold, Principles of Psychological Research (Homewood, Ill.: The Dorsey Press, 1984), pp. 42-44.

The project design was based on the survey method using the questionnaire as the main data collection instrument for several reasons. First, the population and resulting sample for this study was large, and the survey is a particularly efficient method to gain data from large groups of subjects. Second, this study was designed to ascertain how microcomputers are being used in the selected public school systems in programs for mildly handicapped students, and did not attempt to analyze resulting variables or variable relationships, but was merely an effort to observe usage and perceptions toward this usage. The survey method is particularly appropriate for research dealing with this type of problem. Finally, the study was partially conducted by mail; thus, a survey was called for.

The second method of data collection for the study was the use of the interview. The interview involved verbal interaction between the researcher and the respondent. Black and Champion state that some of the disadvantages of the interview are questionable validity of verbal responses, interviewer variability, variations inherent in the interviewing context, time and recording, but that a skilled interviewer armed with properly phrased questions can overcome these limitations.[4] Careful considerations were given to the advantages and disadvantages of the interview during the actual process. Such information from the interviews augmented the data generated from the use of the questionnaire.

The final method of data collection involved participant observations from the three different size school systems. The major purpose of observation was to capture human conduct as it actually happened to permit us to view behavior in progress.[5] It is fairly easy to see both the strengths and

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[4]James A. Black and Dean Champion, Methods and Issues in Social Research (New York: John Wiley and Sons, 1976), p. 399.

[5]Ibid., p. 332.

weaknesses of the observed activities. This research is very appropriate in documenting actual usage and variations in the usage of microcomputers as instructional assisted tools.

Selection of Subjects/Sample

The sample consisted of two groups: group one representing Directors of Special Education and group two representing Teachers of Mildly Handicapped Students. Both groups represented subjects from below average, average and above average size school systems.

The Director of Special Education is that state certified individual who is assigned the administrative responsibility of directing/coordinating the Program for Exceptional Children within a given public school system. The Director of Special Education was chosen for the study for several reasons. First, the Director is the key person in a school system in regard to programs for exceptional children, and should be aware of all curricular and instructional approaches and strategies being used in the school system. Second, the Director should be aware of national trends in the education of handicapped students, and should be cognizant of the importance and implications of computer technology as an instructional assisted tool. In this regard, the Director of Special Education should be eager to cooperate in an effort to establish a data base around this emerging educational issue.

The Teacher of Mildly Handicapped Students is a state certified individual assigned to instruct mildly handicapped students in a resource or interrelated delivery model. Modifications of the regular curriculum are provided in an effort to eventually return these students to the total mainstream of regular education.

Much of the reviewed literature yielded information relative to the use of microcomputers in the instruction of mildly handicapped students;

therefore, teachers of such students were selected for the following reasons. As actual users of this technology in the instructional program, teachers are aware of the various effects, strengths, weaknesses and other factors essential to the findings of this study. Additionally, teachers should be more than willing to participate in research which will add to the literature.

The investigator mailed a questionnaire to each Director of Special Education and selected teachers of mildly handicapped students in Georgia. One hundred and forty-three questionnaires were returned. Of the total, seventy-four represented Directors/Coordinators; one represented Other (Instructional Coordinator); and sixty-eight represented Teachers' responses. This total was obtained after mailing the questionnaires twice and making several telephone contacts. In this regard, the study was based on a random, probability sample, and the hypotheses were tested by means of statistical analysis.

There are many variables associated with the educational provisions for mildly handicapped students. Of particular interest is the effect that school system size may have on services and instructional trends for mildly handicapped students. During recent legislation, the State of Georgia, based on the Educational Service Commission, established the ideal school system (relative to enrollment) as having three thousand three hundred students.[6]

Three system size categories were used. An established range of plus/minus ten set the limits for the average (ideal) group with the remaining groups falling as they naturally would. It was therefore determined that below average represented a student population range from one to two thousand three hundred; average represented a student population from two thousand three hundred and one to four thousand two hundred and ninety-nine; and above average

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[6]"School and System Size," a report submitted by the Educational Service Delivery Commission during the 1985 Georgia General Assembly to be included in the Basic Educational Reform Act, February 1985, p. 38.

represented four thousand three hundred and above.

From the survey data generated by the questionnaire results, indicating classes wherein microcomputers are actually being used as instructional assisted tools, the investigator developed a pool for each of the system sizes and randomly selected one site from each pool to conduct the interview/participant observation technique. In order for a sample to be appropriate for scientific research, it must meet three criteria: it must be random, it must be representative of the population, and it must be numerically adequate.[7] The sampling plan devised for this study met the above criteria.

Demographic (respondent) data representing the questionnaire subjects are presented and discussed in the following tables.

The data in Table 1 shows that of the 187 questionnaires sent to Directors of Special Education, seventy-four questionnaires were returned. Of the 187 instruments mailed to Teachers of Mildly Handicapped Students, sixty-eight were returned. One questionnaire was completed by an instructional coordinator.

The data in Table 2 indicates that the largest number of Directors had between eleven and twenty years of experience, had a Specialist degree, and worked in an average size school system. The smallest number had from one to ten years of experience, had a Bachelor's degree, and worked in an above average size school system.

In examining the demographic data for teachers, the table reflects that most had from one to ten years of experience, had a Master's degree, serve in Interrelated Units, and work in below average size school systems. The smallest group of teachers had over twenty years of experience, had a Specialist degree, serve Behavior Disordered students, and worked in an above

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[7]Leedy, Practical Research, pp. 93-94.

TABLE 1

RESPONDENT DATA

Positions	Number Sent	Number Returned	Percent Returned	Percent of Sample
Director	187	74	40	51.7
Teacher	187	68	36	47.6
Other		1	.5	.7
TOTAL		143		

TABLE 2

DEMOGRAPHIC DATA

	Directors		Teachers		Total	
	N	%	N	%	N	%
Years of Experience						
1-10 Years	12	16.2	39	57.4	51	35.7
11-20 Years	39	52.7	23	33.8	63	44.1
Over 20 Years	23	31.1	6	8.8	29	20.3
Degree Levels						
Bachelor's	2	2.7	19	27.9	21	14.7
Master's	25	33.8	42	61.8	68	47.6
Specialist	39	52.7	7	10.3	46	32.2
Doctorate	8	10.8	0	0	8	5.6
School System Size						
Below Average	25	33.8	38	56.7	64	44.8
Average	29	39.2	16	23.9	45	31.5
Above Average	20	27.0	13	19.4	33	23.1
Area of Exceptionality Served by Teachers						
Learning Disabilities			13	20.0	13	20.0
Behavior Disorders			4	6.2	4	6.2
Mildly Mentally Handicapped			21	32.3	21	32.3
Interrelated			27	41.5	27	41.5

average size school system.

The examination of the demographic data between Directors and teachers indicates that the responses were returned in a random manner, with all segments of the population represented in appropriate proportions. As might be expected for an administrative position, those persons who served as Directors have higher degree levels than teachers, and more years of experience as a group. While most of the responses for teachers came from persons in below average systems, the largest number of responses for Directors came from average size school systems.

Totally, the largest number of educators had from eleven to twenty years of experience, had a Master's degree, and worked in an average size school system. The smallest number of educators had over twenty years of experience, had a Doctorate degree and worked in an above average size school system.

Instrumentation

There were two instruments used in the study. They were the questionnaire and the interview/participant observation technique.

Instrument 1 - The Questionnaire

A questionnaire entitled, "School Uses of Microcomputers," was conducted by Becker to determine how elementary and secondary schools were using the microcomputers that they had obtained over several years. The Becker questionnaire contained sixty items of the following categories: (1) who is using microcomputers; (2) how are they being used; and (3) what the results are. The survey data were gathered between December 1982 and February 1983 from computer-using teachers at approximately 1,600 public, private, and parochial elementary and secondary schools in the United States. This national

survey was based on a probability sample of 2,209 public, parochial and private elementary and secondary schools in the United States. The sample was conducted for a sampling frame of all public and over 90% of the private and parochial schools in the United States provided by Quality Education Data of Denver, Colorado.

The questionnaire for this study represented a modified version of the instrument developed by Henry Jay Becker (1982) (Appendix B-1). The researcher made the following changes in modifying the Becker questionnaire for use. Section I of the instrument solicited demographic data from the subjects that were later used for variable analysis. The seven items for this section were not modified. Section II surveyed the subjects on the current usage levels (based on the respondents' acquired knowledge and/or experience) of microcomputers as instructional assisted tools. These ten items were taken from the Becker instrument but adapted minimally (word changes, etc.) to address the concerns of the study. Some items from this section of the instrument were deleted due to their inappropriateness for the study. Section III examined the perceptions of the subjects toward microcomputers as instructional assisted tools in classes for mildly handicapped students. A Likert-type scale was used for recording subject responses ranging from 5 (for strongly agree) to 4 (for agree), to 3 (for undecided), to 2 (for disagree) to 1 (for strongly disagree). Thus a response of (5) on an item indicated that the respondent demonstrated a perception that was strongly favorable toward that item. The ten items for this section were not modified and were generated from research in the area of microcomputer use in the instruction of mildly handicapped students, interviews with educators associated with the use of microcomputers in instruction and from university professors.

The questionnaire was field tested for research efficiency. Appropriately selected special educators (teachers and administrators) were used to field test the instrument during the Spring 1985 State Conference of the Georgia Federation of the Council for Exceptional Children. Those individuals who field tested the instrument were asked to read each item and to offer their comment about the demographic, usage, and perception items. The researcher reviewed the comments and revised the questionnaire as necessary prior to distribution for use in the study.

Instrument 2 - Interview Questions and Observation Checklist

Authored by the researcher in April 1985, the checklist consisted of two parts: the interview questions and the participant observation checklist. Part A of Instrument 2, the structured interview, consisted of eight questions seeking to corroborate the results obtained through the administration of the questionnaire (Appendix B-2). The questionnaire served as a guide for the development of the selected set of interview questions used in gathering information from the selected Special Educators within the three different size school systems. Case studies reflecting interview findings were developed and are included in the study (Appendix C).

The interview questions were field tested. The interview and participant observation items were field tested by special educators during the meeting of the Council for Exceptional Children, Chapter 007 and by selected special education teachers from the Dekalb County School System. Persons were asked to read each item and comment on the appropriateness for use in the study. The items were revised as needed prior to use in the research. Interview items were closed ended to allow for corroboration and consistent quantification across questionnaire results and the field research.

Part B of Instrument 2 is the participant observation checklist which contained seven items (Appendix B-3). In this procedure, the investigator was part of the natural setting in which the observations were made. Observational data related to specific concerns were gathered from the field work to substantiate some of the questionnaire results.

This data-gathering method is a segment of the interpretive educational research which has been extensively used in social research for more than seventy years. Frederick Erickson explains:

> Field research involves...careful recording of what happens in the setting by writing field notes and collecting other kinds of documentary evidence (e.g., memos, records, examples of student work) and reporting by means of detailed descriptions, using narrative vignettes and direct quotes from interviews, as well as by more general descriptions in the form of analytical charts and summary tables....[8]

School systems from each of the population sizes (below average, average, and above average) where microcomputers were used in the instruction of mildly handicapped students comprised the three pools for site selections. One system from each of the three system groups was randomly selected from the pools. Appropriate school system personnel were contacted to ascertain permission to conduct the field research. The building administrator for each site was then contacted and the visitation time scheduled. These sites were visited to conduct the field research. The interview questions and observation checklist were used to generate data. Case studies reflecting the findings were also developed and included in the study (Appendix D).

General Procedures

The following procedures were used in the data collection process.

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[8]Frederick Erickson, "Qualitative Research on Teaching," in Handbook of Research on Teaching (New York: Macmillan, 1985), pp. 7-8.

The researcher secured a list of all Directors of Special Education or Contact Persons in Georgia from the Georgia Department of Education. After field testing the instrument and making necessary revisions, questionnaires were coded to allow for numerical adequacy. The instrument, along with a cover letter which detailed the purpose of the study and general directions, was mailed to each Director of Special Education and one teacher of mildly handicapped students in the one hundred eighty-seven school systems in Georgia. The questionnaires were returned in the self addressed and stamped envelope provided by the researcher to the subjects. As the instruments were returned, the researcher tabulated according to the numerical code to prevent duplicate mailings. After two weeks from the initial mailing date, questionnaires were again mailed to the non-respondents. Follow-up phone calls along with post card reminders were sent to encourage return response to many of the systems. After many attempts were made to encourage participation, the researcher set a cut-off date and began the statistical procedures.

Upon receipt of the data generated from the questionnaire responses, the researcher pooled participating school systems where microcomputers were used in the instructional program of mildly handicapped students into three categories based on school system size. From each of the three pools, one site was randomly selected for the field research. Phone contacts were made to the appropriate school system personnel to secure visitation permission. The researcher was then referred to the building administrator who scheduled the visit. The instruments designed for this part of the research were used to generate data discussed in the case studies.

Analysis of Data

Data used in the study were generated through the employment of two distinct research instruments:

(1) Survey of the Questionnaire

(2) Field Research

a. Interview
b. Participant Observation

Both descriptive and inferential statistical procedures were used to analyze the data.

The responses to the questionnaire used constituted two levels of measurement. The questionnaire was divided into three main parts. The first part gathered demographic data concerning the sample. The second part examined how microcomputers are being used, with what type(s) of exceptionality, what strengths and weaknesses are evidenced, and which instructional situations are most appropriate for computer assisted instruction in classes for mildly handicapped students. The third part of the questionnaire assessed the perceptions of the sample toward the use of microcomputers as instructional assistance tools. In this regard, a Likert-type scale was developed in which the respondents indicated various levels of agreement with statements concerning microcomputers as instructional assistance tools. The responses were 5-Strongly agree, 4-Agree, 3-Undecided, 2-Disagree, and 1-Strongly disagree. A numerical score was generated for each questionnaire. This score was then analyzed using the correct statistical procedure.

Thus, sections one and two stimulated categorical data that were analyzed by placing the responses in categories and the resulting categories producing percentages. Percentages of categories are appropriate vehicles in this survey situation. A nominal scale exists when numbers are assigned to represent categories of a variable.[9] The chi-square statistical method at the .05 level was used for part two of the questionnaire to accept or reject Hypothesis six.

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[9]Fred Fallik and Bruce Brown, Statistics for Behavioral Sciences (Homewood, Ill.: The Dorsey Press, 1983), p. 7.

Freedman, Pisani, and Purves write that a large chi-square value indicates that the observed frequencies are far from the expected frequencies, and that a small chi-square value indicates that the observed frequencies are close to the expected frequencies.[10] Thus, it can be said that the chi-square value does give a measure of the distance between the observed frequencies and the expected frequencies.[11] In this regard the chi-square statistical method can be used to indicate those differences in response that are statistically significant, and would not occur by chance or error at the .05 level of significance.

Section three of the questionnaire yielded interval-ratio level data. This has numerical value resulting from the Likert scale. Anastasi reports:

> Attitude scales are designed to provide a quantitative measure of the individual's relative position along a uni-dimensional attitude continuum....The Likert-type scale, moreover, calls for graded responses for each statement. The response is usually expressed in terms of the following five categories: strongly agree (SA), agree (A), undecided (U), disagree (D), and strongly disagree (SD). The individual statements are either clearly favorable or clearly unfavorable.[12]

The inferential statistical method, Analysis of Variance, was used at the .05 critical value level to accept or reject the hypotheses. Analysis of Variance is appropriate when there are two or more than two groups in the sample, the data are independent, and the data are interval-ratio.[13] The data for this part of the study met this requirement.

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[10]David Freedman, Robert Pisani, and Roger Purves, Statistics (New York: W. W. Norton Co., 1978), p. 472.

[11]Ibid.

[12]Anne Anastasi, Psychological Testing, 4th ed. (New York: Macmillan Publishing Company, 1976), p. 515.

[13]Fallik and Brown, Statistics for Behavioral Sciences, pp. 378-385.

Case studies for the interviews and participant observations were developed based on the researcher's findings providing descriptive data.

Summary

Chapter III included a design of the study, a description of the subjects, the instruments used to gather data, and the general procedures employed in the collection and treatment of the data. There were seventy-four directors of special education, sixty-eight teachers of mildly handicapped students, and one instructional coordinator who participated in generating responses to the questionnaire items. Four teachers of mildly handicapped students and their students supplied data for the field research. The data and an analysis will be presented in Chapter IV.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

This chapter of the study was designed to examine the results of the descriptive survey and analyze data generated from the research approaches. Discussion will be limited to those items which revealed statistical significance at the identified critical value level.

The purpose of the study was to survey the use of microcomputers as instructional assisted tools and the perceptions of Special Educators toward their use within selected public school systems of Georgia. Toward this end, a research strategy was adopted that had three components. First, literature and research dealing with the usage of microcomputers in classes for exceptional children was reviewed and analyzed. Second, a questionnaire, adapted from the instrument previously used by Henry Becker (1983) in conducting a national survey of computer use in schools, was sent by mail to Directors of Special Education and Teachers of the Mildly Handicapped from selected public school systems of Georgia. Finally, a series of focused interviews and observation sessions were conducted in randomly selected school systems wherein microcomputer usage was evidenced. The synthesis of the data gathered from these three components of the research process formed the basis for the results, conclusions and recommendations of the study.

The modified Becker instrument was used in the study. The content of the questionnaire was as follows: Subsection I (Demographic Information) solicited demographic data from the respondents (Directors of Special Education and

Teachers of Mildly Handicapped Students from selected school systems of Georgia) that were later used for variable analysis. Each of the seven items in this section of the questionnaire was original in nature. Subsection II (Usage Information) of the instrument surveyed usage levels based on the respondents' acquired knowledge and/or experience of microcomputers as instructional assisted tools. The ten items in this section of the instrument were adapted. These items addressed reasons for microcomputer usage, related instructional uses, supplemental areas, software, feasible exceptionalities for usage, time allotment, and in-service training.

The chi-square statistical procedure was used to indicate whether the response differences in this section were statistically significant at the .05 level to accept or reject Hypothesis six. Discussion will be limited to Items D and H which were the only items that yielded statistical significance at the .05 level. Subsection III (Perceptions) examined the perceptions of the sample toward microcomputers as instructional assisted tools in classes for mildly handicapped students on a Likert-type scale, with the responses ranging from 5 (Strongly agree), 4 (Agree), 3 (Undecided), 2 (Disagree), to 1 (Strongly disagree). Scale ranges were defined for each of the response areas:

5.0 - 4.2 - SA (Strongly agree) - Responses reported and tabulated from the questionnaire which yielded an average score of 4.2 on a rating scale of 1-5.

4.1 - 3.4 - A (Agree) - Responses reported and tabulated from the questionnaire which yielded an average score of 3.4 on a rating scale of 1-5.

3.3 - 2.6 - U (Undecided) - Responses reported and tabulated from the questionnaire which yielded an average score of 2.6 on a rating scale of 1-5.

2.5 - 2.0 - D (Disagree) - Responses reported and tabulated from the questionnaire which yielded an average score of 2.0 on a rating scale of 1-5.

1.9 - 1.0 - SD (Strongly disagree) - Responses reported and tabulated from the questionnaire which yielded an average score of 1.0 on a rating scale of 1-5. The Analysis of Variance Statistical Procedure was used to determine whether to accept or reject the first five framed hypotheses. The researcher established a critical value of .05 or beyond to indicate a test of significance.

The second phase of data gathering consisted of two parts: the Structured Interview questions and the Observation Checklist (Appendix B-3). A school site from each of the three school system sizes was randomly selected and visited by the researcher to conduct this phase of the study. Case studies revealing the researcher's findings and the interview responses were gathered and included in the study (Appendix D).

Questionnaire Results

To gather data required for the survey portion of the study, a questionnaire was constructed in three parts:

Subsection I. Demographic Data. Part one of the survey generated demographic data from the respondents. Details of the findings were reported and discussed in Chapter III of this study. The sample consisted of seventy-four Directors/Coordinators of Special Education, sixty-eight Teachers of Mildly Handicapped Students and one Other (Instructional Coordinator). This sample was random in nature and was distributed normally, failing to cluster in one variable area. Separate distribution of responses revealed that teachers had from one to ten years experience, a Master's degree, served in interrelated units, and worked in below average size school systems. Directors had between eleven and twenty years of experience, a Specialist degree, and worked in an average size school system. Totally, most of the respondents had between eleven and twenty years of experience, a Master's degree, and worked in a below average size school system.

As a means of giving guidance to the study, six hypotheses were formulated:

H_1 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on years of professional education experience.

H_2 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on position levels.

H_3 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on school system size.

H_4 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on achieved educational levels.

H_5 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on their area of mildly handicapped.

H_6 There will be no statistically significant difference in the responses of special educators concerning the usage of microcomputers in the instruction of mildly handicapped students of Georgia based on certain demographic variables.

Subsection II. Usage Information. Responses were solicited in the second part of the questionnaire in an attempt to ascertain how microcomputers were being used in classes for mildly handicapped students in the State of Georgia, and the factors that promoted and negated their use as instructional tools. The tables that follow will list these responses separately for the Directors/Coordinators and Teachers, then will be followed by a total response and a chi-square value that indicates whether the response differences were statistically significant at the .05 level of significance. The chi-square statistical procedure was used to test for significant differences in subject responses to the items in Part 2 of this survey.

Chi-square results are presented for all items in Table 5. However, only two of the items tested reached the established level of significance and were discussed in this section of the study. All items are presented and discussed in the Appendices because when examined individually the researcher observed some interesting trends occurring with several variables which were felt to be worthy of observing for issue discussion (Appendix C).

Item D indicated that most teachers and directors/coordinators of special education felt that mathematics is the most appropriate instructional area to be supplemented by computer assisted instruction. Almost fifty-nine percent of the teachers and sixty-seven percent of the directors/coordinators of special education felt that mathematics was the most appropriate instructional area to be supplemented by computer assisted instruction. Sixteen percent of the teachers felt that language arts was the most appropriate instructional area for computer assisted supplemental instruction while sixteen percent of the directors/coordinators of special education felt that careers was the most appropriate area. The differences in the sample responses to this question were statistically significant at the .01 level of significance based on the computed chi-square value of 14.293 with 5 degrees of freedom.

TABLE 3

CHI-SQUARE TEST RESULTS ON USAGE INFORMATION
TESTED AT THE .05 LEVEL OF SIGNIFICANCE*

ITEMS	SIGNIFICANCE
A. From your experience/knowledge, which of the following is the most important reason why teachers of handicapped students might want to use microcomputers to assist instruction?	NS
B. From your experience/knowledge, which of the following is the most important reason why teachers of handicapped students might not want to use microcomputers to assist instruction?	NS
C. Which of the following instructionally related uses of microcomputers are appropriate for your classroom?	NS
D. Computer assisted instruction in your class is most appropriate to supplement which of the following instructional areas?	S (.01)
E. Do you feel that the marketed software is appropriate for your instructional purposes?	NS
F. With which area of exceptionality do you feel that the use of microcomputers as teaching tools is most beneficial?	NS
G. How is microcomputer usage by students divided among these four parts of the day?	NS
H. It is widely believed that more training of teachers is essential to using microcomputers effectively in schools. Which of the following kinds of training is important right now at your schools?	S (.05)
I. How much inservice training have you received in microcomputer usage for instruction?	NS
J. Who provided most of your inservice training for microcomputer usage in the instructional program?	NS

* Critical value indicating significance = .05

TABLE 4

ITEM (D) - MOST APPROPRIATE AREA FOR SUPPLEMENTAL CAI

	Teachers		Directors	
	N	%	N	%
Language Arts	11	16.2	3	4.1
Mathematics	40	58.8	49	67.1
Science	2	2.9	4	5.5
Socialization	10	14.7	4	5.5
Career	3	4.4	12	16.4
Social Science	2	2.9	1	1.4

Total Responses: Teachers, 68; Directors/Coordinators, 73

Chi-square	D.F.	Level of Significance
14.293	5	0.0138*

*Item Significance

Response choices indicated the greatest percentages being in the area of mathematics for both respondent groups. Such results may be influenced by the available marketed software. A review of the literature suggested that much of the available software is designed for mathematics instruction. Special educators found the software easier to use and basic enough for most students to function independently with very little teacher intervention. In addition, the literature suggested that in-service training is heavily weighted in the areas of language arts and mathematics skill development. During the interview process, computer assisted instruction was highly supported for remediation of

mathematics skills. Some educators felt that the programs in mathematics are more creative and visually appealing to students especially on the elementary school level.

The percentage gaps between special educators were greatest among the following choices: Language Arts, Socialization and Careers. Teachers supported Language Arts and Socialization as supplemental areas for CAI more strongly than Directors. This may be the result of the direct contact and early identification of students' needs by teachers. This group of educators may be more aware of a need for improved interpersonal, communication and adjustmental skills among students. A review of the literature reported that significant gains have been made in the areas of Reading and Socialization among student users of computer assisted instruction.

Directors agreed stronger than teachers on the choice of Careers as an area to supplement CAI. This response is supported by literature which suggests that teachers do not strongly favor the available software for career awareness, exploration and development. Additionally, directors are continuously making long term projections and plans for the instructional program. As administrators, they, perhaps, view the need for career expansion within the curriculum essentially.

Item H indicated that most teachers and directors/coordinators of special education felt that the most important kind of training that teachers need for CAI usage is to learn to use instructional software with the school's equipment. Almost sixty-eight percent of the teachers and almost seventy-two percent of the directors/coordinators of special education felt that the most important kind of training for teachers was to learn to use instructional software with the school's equipment. The differences in the sample responses to this question were significant at the .05 level of significance based on the

TABLE 5

ITEM (H) - MOST IMPORTANT KINDS OF TRAINING FOR CAI USAGE

	Teachers		Directors	
	N	%	N	%
Use Software with the School's Equipment	46	67.6	53	71.6
Teach Students to Do Simple Programming	8	11.8	1	1.4
Use Computer As a Professional Tool	5	7.4	8	10.8
Understand How Computers Work and Are Used	5	7.4	11	14.9
Not to Fear Computer Replacement	3	4.4	1	1.4
Other	1	1.5	0	0

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
10.64	5	0.05

computed Chi-square value of 10.64 with 5 degrees of freedom. The high percentage of responses may be a result of impractical in-service training which introduces computer literacy in settings that differ from the hardware available or later purchased for school use. Often educators are trained away from the school and are perplexed when attempts are made to transfer the acquired in-service training to the school site. The literature also reported that often a representative from the local school is delegated as the computer literate contact person and is responsible for deciphering information and instructing staff. This technique often creates problems in communication and understanding, thus, contributing to the reported response need. During the field study, those

sites where computer labs or classes were strongly supported financially reported adequacy with in-service training. Perhaps budgetary restraints should be evaluated to assure more sufficient in-service training if computer assisted instruction is to be successful. Item B (Why teachers might not want to use microcomputers), while not yielding a statistically significant difference in responses, revealed a .17 level of significance. Special educators felt that teachers might not want to use microcomputers because of inappropriate levels of preparation. This response supports the aforementioned item relative to insufficient in-service. Thus, educators express uncertainty in the use of microcomputers based on inadequate training. Both of these items can be viewed as relative and would warrant consideration for further investigation.

Special educators reflected a noticeable percentage gap for the choice which dealt with teaching students to do simple programming. Teachers generated greater agreement toward the need for training in this area. The use of programming in a classroom could allow for more individualization of instruction.

The usage information discussed in this subsection of the chapter reported that when items were tested by a chi-square for statistical significance, only two of the ten items tested were significant at the .05 level. These two items related to (1) appropriate instructional areas for supplemental computer assisted instruction and (2) the most important kind of training for CAI use. Thus, one can generally conclude that Teachers of Mildly Handicapped Students and Directors of Special Education were in agreement.

Thus, Hypothesis six, which stated "There will be no statistically significant difference in the responses of special educators concerning the usage of microcomputers in the instruction of mildly handicapped children of Georgia based on certain demographic variables," was accepted.

Subsection III. Perceptions. The perception that an educator has of microcomputers as instructional tools in classes for mildly handicapped students can affect how the educator would use the new technology. In this regard, this section of the questionnaire examined the perceptions of teachers and directors/coordinators of special education toward the use of microcomputers as instructional tools in classes for the mildly handicapped. Ten statements of perception were administered, and respondents were asked to indicate their perceptions of these statements by responding to a Likert-type scale (ranging in response options from 1-5): 5 - Strongly agree, 4 - Agree, 3 - Undecided, 2 - Disagree, or 1 - Strongly agree with the statement. Null hypotheses were tested for these ten perception statements, and were statistically analyzed using the Analysis of Variance Statistical Procedure. These hypotheses were tested for significance using a critical value of .05 level of significance. The ten perceptions are included in Appendix B.

Tables showing the ANOVA values for the variables: position, professional experience, achieved educational levels, school system size, and area of exceptionality follow, indicating the test results for each perception item. Table 6 (Null Hypotheses, F Ratios and F Probabilities) reports statistically significant findings. Table 7 (Perceptions by Variables) lists the critical value level for each referenced perception item based on the established .05 level of significance for discussion.

The F Ratios and F Probabilities for the five framed hypotheses are shown in Table 6. Acceptance/Rejection for each is based on the .05 critical value level as tested by the Analysis of Variance Statistical Procedure. In an effort to further analyze perception responses from the subjects, an Analysis of Variance was also conducted for each of the ten itemized perceptions.

TABLE 6

NULL HYPOTHESES (1-5), F RATIOS AND F PROBABILITIES

H_1 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on years of educational experience.

F Ratio - .8392 F Probability - .4342 Accepted

H_2 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on position levels.

F Ratio - 3.5279 F Probability - .0624 Accepted

H_3 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on school system size.

F Ratio - .3864 F Probability - .6802 Accepted

H_4 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on achieved educational levels.

F Ratio - .1851 F Probability - .9064 Accepted

H_5 There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped

TABLE 6 Continued

students of Georgia based on their area of mildly handicapped exceptionality.

F Ratio - 2.0102	F Probability - .1212	Accepted

TABLE 7

RESULTS OF PERCEPTIONS BY VARIABLES AS TESTED BY ANOVA AT .05 LEVEL OF SIGNIFICANCE

Variable and Referenced Items	Level of Significance	
I. Position		
Five	S	.01
II. Educational Experience		
Three	S	.02
III. Degree Levels	NS	
IV. System Size		
Four	S	.03
V. Exceptionality		
Four	S	.04
Five	S	.04
Seven	S	.04

TABLE 8

F RATIOS AND F PROBABILITIES FOR PERCEPTIONS
BY YEARS OF EDUCATIONAL EXPERIENCE

Perception Number	F Ratio	F Probability
One - Save Money	.1321	.8764
Two - Individualization	1.6150	.2026
Three - Appropriate Software	3.9212	.0220*
Four - Proper Training	1.3062	.2741
Five - Future Success	.1160	.8906
Six - Effective Programs	.6464	.5255
Seven - Eliminate Positions	.5356	.5865
Eight - Motivate	1.6416	.1974
Nine - Management Tools	2.2565	.1085
Ten - Future Services	.4422	.6435

*Item Significance

Item three reflected a statistically significant difference by levels of seniority when analyzed at the .05 level. Perception number three reflected a statistically significant difference in perceptions at the .02 level when analyzed by years of educational experience. Perception number three stated, "Appropriate software programs can be developed so that microcomputer usage can be expanded to most classes for handicapped students." The F value for this perception was 3.9212 and the F Probability was .0220. None of the other perceptions reflected a statistically significant difference at the .05 level when analyzed by seniority.

Perception number three, when tested against the total group of educators, had a mean of 4.53. These data can be broken down for teachers and administrators. The perceptions of Directors/Coordinators yielded a mean of 4.20 which is within the scaled range of Strongly Agree on the Likert scale. Teachers' perceptions generated a mean of 4.15 toward this item which places this response in the range of Agree on the Likert scale.

While both groups were in agreement toward this item, administrators had a slightly higher mean. From the demographic data and further evaluation of the statistics, this could reflect the fact that with more experience (as most administrators had) comes more training, a greater awareness of the complexities of problems facing special educators, and the necessity of developing appropriate software for use in the instructional programs.

Interestingly, when the means for both groups are examined separately, one can observe that those teachers with less experience reflected the highest mean perception. This could indicate that less experienced teachers are more aware of possible software expansions and applications in classes for mildly handicapped students because of recent college or inservice training that may have been required for employment or training. These less experienced teachers may also be more open to instructional software applications.

Although perception three was statistically significant at the .02 level, the null hypothesis was accepted.

The statistically significant difference noted in this table at the .05 level relates to Hypothesis number 1 which states: "There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on educational experience." In the instance (perception three) where the probability is equal to or greater than .05, thus the null hypothesis 1 is accepted.

TABLE 9

F RATIOS AND F PROBABILITIES FOR PERCEPTIONS BY POSITION

Perception Number	F Ratio	F Probability
One - Save Money	.2432	.6227
Two - Individualization	.0802	.7774
Three - Appropriate Software	.0001	.9911
Four - Proper Training	2.9614	.0875
Five - Future Success	6.0486	.0151*
Six - Effective Programs	1.1835	.2785
Seven - Eliminate Positions	.7980	.3732
Eight - Motivate	1.4020	.2384
Nine - Management Tools	.1582	.6914
Ten - Future Services	.2076	.6493

*Item Significance

Item five was the only perception that was statistically significant at the .05 level based on position. Perception number five stated, "Learning to use computers is an essential feature of every child's education for future life successes." The F value for this perception was 6.0486 and the F probability was .0151 for this perception. None of the other differences in perception by position was statistically significant at the .05 level.

For the total group of special educators, there was a mean of 3.57. These data can also be broken down into two groups of administrators and teachers. Teachers of mildly handicapped students had a mean of 3.36 (U) while

administrators had a mean of 3.80 (A).

Directors had a slightly higher mean than teachers for this perception five. This result could reflect the experience base of most administrators and the ability to project in making long range plans for the system's program. Administrators might also be convinced that the need for training in this technology and the advances made will be lasting and not immediately replaced by another trend. Educators on this level are often exposed to futuristic projections and plans which might influence their perceptions.

Teachers had a lower mean for this perception. This difference might be contributed to teachers experiencing changes in trends and being forced to try various instructional strategies which often are replaced or extinguished. A review of literature reported that often teachers are negative in their acceptance of educational innovations based on previous disappointing brief periods of existence.

Although perception five was statistically significant at the .01 level when examined individually, the null hypothesis for this variable was accepted.

The statistically significant difference noted in this table at the .05 level relates to Hypothesis number 2 which states: "There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on position levels." In the instance (perception five) where the probability is equal to or greater than the .05 level of significance, thus the null Hypothesis number 2 is accepted.

TABLE 10

F RATIOS AND F PROBABILITIES FOR PERCEPTIONS BY SYSTEM SIZE

Perception Number	F Ratio	F Probability
One - Save Money	2.8645	.0604
Two - Individualization	.4522	.6371
Three - Appropriate Software	.8266	.4397
Four - Proper Training	3.5478	.0314*
Five - Future Success	.9068	.4062
Six - Effective Programs	.8269	.4395
Seven - Eliminate Positions	.2188	.8038
Eight - Motivate	.6226	.5380
Nine - Management Tools	1.2120	.3007
Ten - Future Services	.2853	.7523

*Item Significance

Item four reflected a statistically significant difference at the .05 level when analyzed by school system size. Perception number four stated, "Through proper training opportunities, most teachers can learn to use micro-computers as teaching assisted tools in classes for handicapped students." The F value for this perception was 3.5478 and the F probability was .0314. None of the other perceptions reflected a statistically significant difference at the .05 level.

For the total group of special educators based on school system size, responses to perception four generated a mean of 4.38. When the data was

analyzed separately, Directors/Coordinators had a mean of 4.28 (SA) and Teachers had a mean of 4.48 (SA). Both means placed the responses in the Strongly Agree range of the Likert scale.

Of the total group, those special educators who worked in an above average size school system had the highest mean. This might reflect the success as well as the promise that these educators have experienced in the use of this instructional tool.

A favorable response toward this perception might also suggest that in large school systems more resources and time allocations are available. During the field research, the site within the above average size school system was part of a pilot project, wherein inservice training was extensive. Perhaps many systems of this size have additional resources provided to further extend training. Many sizable systems are able to use resources from the business and higher education communities to expand educational approaches. Administrators are also key in the identification, planning, development and implementation of the needed training.

Although perception four was statistically significant at the .03 level, the null hypothesis was accepted.

The statistically significant difference revealed in this table at the .05 level relates to Hypothesis number 3 which states: "There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on school system size." In the instance where the probability is equal to or greater than .05, (perception four), thus the null hypothesis 3 is accepted.

TABLE 11

F RATIOS AND F PROBABILITIES FOR PERCEPTIONS
BY ACHIEVED EDUCATIONAL LEVELS

Perception Number	F Ratio	F Probability
One - Save Money	.8977	.4442
Two - Individualization	.6677	.5732
Three - Appropriate Software	.1517	.9285
Four - Proper Training	.9959	.3968
Five - Future Success	.3967	.7556
Six - Effective Programs	1.1871	.3170
Seven - Eliminate Positions	.1339	.9397
Eight - Motivate	.7917	.5004
Nine - Management Tools	.0450	.9873
Ten - Future Services	.3391	.7971

None of the perceptions reflected a statistically significant difference at the .05 level of significance when analyzed by achieved educational levels.

No difference was noted in this table at the .05 level of significance which relates to Hypothesis number 4 which states: "There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on achieved educational levels." The null hypothesis 4 in this case is accepted.

TABLE 12

F RATIOS AND F PROBABILITIES FOR PERCEPTIONS BY AREAS SERVED

Perception Number	F Ratio	F Probability
One - Save Money	2.5620	.0624
Two - Individualization	1.4524	.2358
Three - Appropriate Software	.6340	.5958
Four - Proper Training	2.7527	.0496*
Five - Future Success	2.8881	.0422*
Six - Effective Programs	.8075	.4943
Seven - Eliminate Positions	2.9306	.0401*
Eight - Motivate	2.0588	.1143
Nine - Management Tools	2.4827	.0686
Ten - Future Services	.6929	.5597

*Item Significance

Items four, five, and seven in the above table reflected statistically significant differences at the .05 level when analyzed by area of exceptionality served. Perception number four states, "Through proper training opportunities, most teachers can learn to use microcomputers as teaching assisted tools in classes for handicapped students." Perception number five stated, "Learning to use computers is an essential feature of every child's education for future life successes." Perception number seven stated, "The use of microcomputers can save money for school systems by enabling that system to eliminate some instructional positions." None of the other perceptions reflected a statistically significant difference at the .05 level.

For the total group of teachers, the mean was 4.46 for perception four. Broken down by areas of exceptionalities, Teachers of LD students had a mean of 4.23 (SA); Teachers of BD students had a mean of 4.00 (A): Teachers of MMH students had a mean of 4.37 (SA); and Interrelated Teachers had a mean of 4.71 (SA). While all teachers were in agreement, teachers of LD, MMH and Interrelated agreed strongly.

Interrelated teachers had the highest mean toward this perception. Those teachers generally instruct students in each of the first three areas (LD, BD and MMH). The mean result might be influenced by educators' understanding the needs of each area and from experience, the realization of CAI influence on the instructional process. Interrelated teachers might also view the potential effects of proper training effectively; wherein other teachers would view individual groups. Perhaps the delivery model itself may have allowed interrelated teachers to experience or project some common influences that students in each group have on one another.

For the total group of teachers, the mean for perception five was 3.79. Reported by areas of exceptionality, LD teachers had a mean of 3.76 (A); BD teachers had a mean of 4.50 (SA); MMH teachers had a mean of 3.37 (U); and Interrelated teachers had a mean of 4.07 (A). The highest mean was from Teachers of BD students. Many students in this area are not limited in their cognitive development and have average to above average intelligence. Generally, teachers are able to provide instruction on an individual basis. Teachers of BD students may view the use of microcomputers as instructional tools in more advanced terms to include programming and other approaches. These students are not always limited to the remedial activities as some in other classes might be. A review of literature also suggested that much success with this group of students has been in the areas of self-management and self-control.

For the total group of teachers, the mean for perception seven was 2.26. Separately, the responses means were LD teachers, 3.07 (U); BD teachers, 3.00 (U); MMH teachers, 2.08 (D); and Interrelated teachers, 1.92 (SD). Although none of the respondents was in agreement, teachers of LD had the highest mean for this perception.

The remaining teachers perceived the use of microcomputers to save money and eliminate some instructional positions as being very dim. Perhaps experiences and observed limitations of this technology influenced their responses. While many teachers found the use effective, there was still a concern for human replacement. Despite the advantages and promise that this approach holds, most educators felt that CAI should not replace but rather supplement the traditional educational efforts. The need of human interaction is still key when perceived by special education teachers.

The statistically significant difference indicated in this table at the .05 level relates to Hypothesis number 5 which states: "There will be no statistically significant difference in the perceptions of special educators concerning the use of microcomputers in the instruction of mildly handicapped students of Georgia based on their area of mildly handicapped exceptionalities." In those instances where the probability is equal to or greater than .05 (perceptions four, five and seven), thus the null hypothesis 5 is accepted.

This section of the study reported and analyzed perceptions of the selected special educators toward the use of microcomputers in the instruction of mildly handicapped students. Of the six hypotheses tested, all were accepted.

Field Research

Three sites were visited to conduct this phase of the study. The sites represented below average, average and above average size school systems

in the State of Georgia. On site visitations included an interview with the teachers of mildly handicapped students who currently use microcomputers in the instructional program and actual observations.

Two instruments were utilized during the above mentioned phase: (1) Structured Interview Questions and (2) The Observation Checklist.

Interview Questions

The purpose of the Interview Questions (Appendix B-2) was to present questions and issues which would corroborate results found in the questionnaire responses. Eight questions were formulated and used which generated the following summary responses.

1. How are microcomputers used in classes for mildly handicapped students?

Microcomputers in each setting were used mainly for drill and practice and tutorial dialog with emphasis in programming directed toward the more advanced students.

2. What are the strengths of this instructional tool?

Strengths were reported in the area of providing individual instruction and productivity based on learning rates and styles, supplementing the traditional mode of instruction and the gratification felt by students when success was experienced.

3. What are the weaknesses of this instructional tool?

Weaknesses were only related to inappropriate, incompatible and often unavailable software. In view of the limited manufactured software, teachers felt forced to develop programs that lack creativity, attractiveness and stimulation.

4. Are the software packages that are available adequate for your instructional needs?

Response to this question indicated that much is to be desired in evaluating the available software. While the software proved acceptable, most felt that it basically served their instructional purposes and provided a means for extension and development of additional programming.

5. Are teachers adequately prepared to effectively utilize this instructional tool? If not, what type of in-service programs would address this need?

Although in-service has been provided, those sites wherein the laboratories were designed as pilot projects received the greatest support. The non-pilot project had limited training provided by school system personnel. Training was also strongly influenced by outside sources including higher education personnel as opposed to the special or regular education staff.

6. Do you have any special success stories regarding the use of microcomputers in classes for mildly handicapped?

Success stories revealed that when other instructional techniques seemed hopeless, computerized instruction provided increased motivation toward achievement.

7. What impact has the use of this tool had in the areas of reading and mathematics?

The impact in both areas was phenomenal. Significant gains were evidenced in both areas but more prevalent in reading comprehension, written expression and mathematical reasoning. These areas generally appear problematic to this population.

8. What implications for future educational programs for mildly handicapped students do the uses of microcomputers as instructional tools suggest?

All interviewed teachers viewed microcomputers in the instructional program as the new trend in educational innovations. They viewed this instructional tool as an aid supplementing the traditional program which will prepare students for a profitable future. Teachers expressed a need for more familiarity and knowledge of the varied instructional as well as management uses of this technology.

Observation Checklist

The observation checklist (Appendix B-3) was developed and used as a guide in recording observable findings. The results are reported in the following chart with a discussion which follows.

Most computer laboratories had a sufficient number of microcomputers for the scheduled special education classes. Emphasis was placed in the areas of language arts and mathematics with socialization and career awareness placing third in order of subject area usage. Computer time was available on a scheduled basis during the class time with some opportunities for before and after school involvement.

Each site utilized a different manufactured product. The interviewed subjects felt that the hardware and accompanying peripherals sufficiently met the needs of their students. There have been limited requests for repairs; however, a service contract is in effect at each site.

There were no distinct differences in the item responses and observations based on school system size. In each instance, microcomputers have been used in the instruction of mildly handicapped students for a brief period of time. Sites where the computer labs were part of a pilot program displayed sufficient in-service, abundant software and adequate hardware for mildly handicapped students.

TABLE 13

OBSERVATION CHECKLIST RESULTS

Observation Sites	No. of Computers	No. of Users	Micro-Usage	Subject Area(s)	Computer Time	Hardware	Peripherals
A	12	8 LD	Drill and Practice	Reading Mathematics	1½ hours per week	Apple II E	12 color monitors 12 disk drives 5 printers
B Two classes a. b.	15	a. 10 b. 13 LD, BD and MMH	Drill and Practice	a. Mathematics b. Career Development	3 periods per week	Commodore 64	10 color monitors 5 black/white monitors 15 disk drives 6 cassette players 10 printers
C	14	7 MMH	Tutorial and Drill	Written Expression	2½ hours per week	12 IBM P.C. Jrs. 2 IBM Personals	10 disk drives 4 printers

The common attitude among the interviewed teachers was that microcomputers accentuate the existing instructional program of mildly handicapped students and will play a substantial role in their future undertakings.

The field research provided the researcher an opportunity to further examine the survey results and the status of microcomputer use and its effectiveness in the instruction of mildly handicapped students.

In examining the survey results (phase one) against the field research findings (phase two), many commonalities were found. Microcomputers were mainly used for drill and practice and tutorial dialog. Some emphasis from the survey indicated that more advanced students are involved with programming. In both phases, the results suggested that most teachers felt a need for additional and/or more appropriate in-service in the use of microcomputers as instructional assisted tools. Findings also reflected the impact that pilot projects have on the adequacy of provisions for in-service, ample software and hardware. Evidence also suggested that most of the in-service was provided by persons other than special educators. Such an observation might affect the receptiveness of special educators in utilizing this instructional approach to learning. Most of the positive effects were reported in the areas of mathematics and reading. Findings from the survey results report that over sixty-five percent of the respondents found the available software appropriate. However, a major concern of those individuals observed was the need for some additional software to specifically address more curriculum needs. Teachers felt forced to make adaptations with the available software which often was time consuming and lacked creativity.

Both phases of the research revealed satisfaction among users relative to the effectiveness of microcomputer use in the instruction of mildly handicapped students.

Summary

The study examined the use of microcomputers as instructional assisted tools in the education of mildly handicapped students in selected school systems of Georgia.

To gather necessary data for the survey portion of the study, a questionnaire was administered to special educators to determine usage and perceptions toward its usage. The instrument was adapted from the Becker questionnaire previously discussed.

Of the one hundred and forty-three respondents, a total of seventy-four were Directors/Coordinators of Special Education, sixty-eight were Teachers of Mildly Handicapped Students and one was an Instructional Coordinator.

Demographic data reported that of the educators surveyed, the largest number had between eleven and twenty years of educational experience, had a Master's degree, currently use computers in the instructional program, and worked in an average size school system.

Usage information reported that most special educators felt that microcomputers motivate students for drill and practice exercises, was most appropriately used in mathematics, needed improved in-service/training and viewed the learning disabled student as being the greatest benefactor of this approach. Only two items from this section were statistically significant at the .05 chi-square critical level. Thus, Hypothesis six was accepted.

Ten statements of perception were addressed and analyzed using the Analysis of Variance statistical method at the .05 level of significance. Only one item, based on position, educational experience and school system size was significant at the .05 level. None of the perceptions was significant based on degree legels. Three perceptions were significant based on areas of exceptionality. Each of the five framed hypotheses (numbers one-five) was accepted.

Field research which involved the structured interview and participant observation techniques generated results used to further corroborate the questionnaire findings. Results from both methods of data collection revealed satisfaction among special educators toward the use and effectiveness of microcomputers in the instruction of mildly handicapped students.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary

This chapter presented a summary of the major findings, conclusions, implications, and recommendations generated from the data.

The purpose of the study was to examine the use of microcomputers as instructional assisted tools and the perceptions of Special Educators toward the use in the education of mildly handicapped students within selected school systems of Georgia. Five hypotheses were framed and tested with the results reported in terms of supported or not. Three methods of data collection were used during the study. A modified version of a questionnaire by Becker consisting of three parts: Demographic, Usage Information, and Perceptions including twenty-seven items, was used to examine the perceptions of one hundred and forty-three special education teachers and Directors/Coordinators of Special Education toward the use of micros for the above stated purpose. The data from the questionnaire were also used to identify instructional strategies as presented by the special educators. To facilitate an examination of the usage data, the chi-square statistical method at the .05 level of significance was used. Additionally, categorical data for this section was reported in terms of percentages. To provide an analysis of the perceptions of the subjects and further create a statistical base, the Analysis of Variance was employed to point out statistically significant differences in the perceptions of special educators from variable groups toward the use of microcomputers in the instruction of mildly handicapped students at the .05 level. Field research involving

interviewing and classroom observations furnished data to corroborate the survey results, and was reported in case studies. Finally, data from all parts of the study were synthesized to arrive at the implications of the findings of this study.

Major Findings

The findings of the study revealed that, generally, Directors of Special Education and Teachers of Mildly Handicapped Students supported the use of microcomputers as instructional assisted tools in the education of mildly handicapped students.

Specifically, the major findings of the study were:

1. Teachers used microcomputers to motivate students to do exercises and to promote individualized instruction.
2. Inadequate training and limited software were limitations in the use of microcomputers.
3. Mathematics was the most appropriate area for supplemental CAI with drill and practice being the most appropriate area for classroom use.
4. Of the mildly handicapped population, learning disabled students benefited most from microcomputer instruction.
5. Most of the computer time for students was provided during the scheduled class period.
6. Special educators viewed the use of software with the school's equipment as a training need.
7. More than six hours of in-service was received; however, most was provided by regular and higher education personnel.

8. Disagreement was reflected in the perceptions of educators toward the expanded use of appropriate software and the essence of CAI for future success among educators.
9. Interview and participant observation findings supported the survey results.

Conclusions

The following conclusions were gathered by the researcher as a result of the study:

1. Microcomputers are continuously being purchased and used in the instruction of mildly handicapped students. Such instructional practices, while providing individualization, included drill, practice and tutorial strategies designed to remediate deficit areas.
2. Although in-service training for computer use was accessible to teachers, an intense demand for provisions to include education personnel was noted. Meeting this need would address issues and concerns relative to exceptional services.
3. Manufacturers should involve more special educators in the development and dissemination of instructional software.
4. The largest portion of computer time was provided during the scheduled class period. Students were not reported to devote a significant amount of voluntary time in the computer labs. Perhaps mini-sessions and computer club activities would create additional motivation among special education students in the use of microcomputers.

5. Special educators found computer assisted instruction most effective as a supplement to rather than a replacement for the existing traditional methods of instruction. Such results may relax those educators who equate the human replacement factor to this emerging technology.
6. The common perception among special education administrators and teachers was that microcomputers play an essential role in the education of mildly handicapped students. Specifically, this instructional tool has proven most beneficial in classes for learning disabled. The instructional approaches sighted have provided much in terms of remediation and problem solving skills.

Implications

The implications of the findings of this study appear to predict positive news for the education of mildly handicapped students in the State of Georgia. In a time of national school budgetary decline and fiscal conservancy, the Georgia legislature has implemented an educational reform package proposed to ensure a quality basic education for all students. Such an effort can only enrich the efforts of P.L. 94-142 which provides for a free and appropriate education for handicapped students.

1. Special educators must act as change agents in facilitating the use of microcomputer technology in the instruction of mildly handicapped students. Administrators, understanding the impact that such technology can have in the special education process, must re-evaluate budgetary priorities so that problems associated with the current use might be rectified.

2. Although from the sample responses most school systems were using computer technology in the instruction of mildly handicapped students, a greater

statewide endorcement from the Georgia Department of Education is needed to promote the inclusion of computer literacy and computer assisted instruction in the curriculum for mildly handicapped students.

3. Whereas the respondents felt that teachers might not want to use computers as instructional assisted tools, due to inappropriate levels of preparation, school system administrators and higher education personnel should evaluate the extent in which they can provide training and assistance in this area. Special education personnel ranked last in providing in-service to the subjects, which might suggest inadequate training of administrators in this area on a higher level.

4. The discrepancy between survey responses and the field research relative to the appropriateness and availability of software may be founded on the teachers' understanding of the financial restraints and their willingness to adapt and recreate programs to meet their classroom needs.

Recommendations

As a result of the research process and findings of this study, the following recommendations are made. These recommendations call for further research in the use of microcomputers as instructional assisted tools in the education of mildly handicapped students.

1. This study should be replicated on a larger sample that involves students' and parents' perceptions toward the use of microcomputers in the instruction of mildly handicapped students.

2. A similar study should be conducted using matched groups of samples to compare variables and variable relations.

3. Budgetary allotments for school systems should increase provisions for adequate in-service, maintenance of sufficient computer programs and ongoing evaluation for effectiveness.

4. School administrators should include computer technology in their list of top instructional priorities.

5. If this study is replicated, the instrument should be refined to include more usage and perception information.

6. Research designed to evaluate the results of computer assisted instruction with controlled groups should reveal interesting results.

Summary of the Study

A review of the related literature addressed the expanded use of microcomputers as instructional assisted tools throughout the educational arena and particularly in the education of mildly handicapped students. While many educators expressed mixed feelings relative to use and effectiveness, most were convinced that the potential and observed effects that this instructional strategy has on the educational process is phenomenal. The widespread applications are more societal than educational and are increasingly being embraced by many conservative elements. As microcomputers become entrenched in the vocational aspects of society, school administrators must take serious steps to include them in curriculum revisions.

Special educators have increased substantially their use of this exciting technology. In an effort to provide a free and appropriate education for handicapped students, advances are being made toward involving handicapped and gifted students in the understanding and operation of computer related instruction. While the focus of this study addressed the use of this technology in the instructional program of mildly handicapped students, the acquired data supported positive and negative effects. For some, the level of enthusiasm was altered when questions of cost effectiveness, availability and appropriateness of software, and reliability prevailed. Such concerns caused many to

wonder whether microcomputer instruction is as widespread and productive as the advocates claim. Current users appeared more comfortable and convinced that microcomputer assisted instruction will continue to have a positive effect on the mildly handicapped population.

In the area of instruction, the greatest portion of the sampled subjects as well as the supportive literature endorsed the use of this technology in the areas of drill and practice and tutorial dialog in the instruction of mildly handicapped students. It was strongly suggested that this approach be used to supplement rather than replace traditional methods of instruction. While limited research exists to validate many effects that the technology has on student achievement with this target group, mathematics was considered the most beneficial instructional area. In general, the quality of available manufactured software is disappointing; however, survey responses indicated that the majority deemed it sufficient. It is believed that most educators accept this limitation and make the necessary adaptions to meet individual needs.

Using a survey instrument, this study described and analyzed the perceptions and understandings of sampled Special Educators toward the concerns of microcomputer use as an instructional assisted tool to educate mildly handicapped students. On this effort, such use was viewed as a positive instructional application by a majority of the respondents.

From the field research conducted through interview responses and on-site observations, the researcher gained data to support the survey responses. There was only one outstanding discrepancy in the findings which suggested that perceptions and actions do not always mix.

Many questions about the effectiveness of microcomputer use as an instructional assisted tool will remain unanswered. Special educators must

become more knowledgeable of and comfortable with the practical instructional applications of this technology. Computer technology will be used in special education with mildly handicapped students more extensively as their versatility becomes obvious. School system administrators must act as facilitators of change and make every effort to promote the budgetary, humanistic and professional support needed in creating successful outcomes with this instructional tool. Then and only then will the receptiveness and maximum utilization of this educational device be displayed.

APPENDICES

APPENDIX A

LETTER SOLICITING PARTICIPATION

2464 Ozark Trail, SW
Atlanta, Georgia 30331
May 10, 1985

Dear Educator:

I am a doctoral student currently pursuing my dissertation research in the area of computer assisted instruction. I am also employed as a Special Educator with supervisory responsibility over special education units at the secondary level.

My research involves an examination of the uses of microcomputers in the instruction of mildly handicapped students in selected school systems of Georgia and the perceptions of Special Educators toward their usage.

The study will involve two phases. Phase one will consist of the questionnaire implementation. Phase two will involve on-site classroom observations and interviews of Directors where microcomputers are being used in the instructional program.

I would like for you to participate in this study by completing the enclosed questionnaire which should only take about ten minutes. In addition, I would like for you to send the additional questionnaire to a teacher of Mildly Handicapped Students, in your system, who is interested in or currently using microcomputers in the instructional program.

May I assure you that the responses will be kept in the strictest of confidence. The research is only interested in group data and not individual school system data. When the study is completed, you may request a copy of the results.

Thank you for your cooperation and consideration.

Sincerely,

Betty C. Tinsley

APPENDIX B

QUESTIONNAIRE, INTERVIEW AND OBSERVATION CHECKLIST

APPENDIX B-1

QUESTIONNAIRE **Date**

Dear Educator:

Please help me gather information for a study that I am conducting concerning the uses of microcomputers as instructional assisted tools in classes for Mildly Handicapped Students in selected public school systems of Georgia by supplying the requested information.

I. **DEMOGRAPHIC INFORMATION** (Directions—Please respond to each item by placing a check or requested information as appropriate.

A. What position do you occupy in your school system?

____ Director/Coordinator of Special Education

____ Teacher of Special Education

____ Other (Please Specify) _____

B. Total years of professional education experience

____ 1—10 years, ____11—20 years, ____over 20 years.

C. In what school system do you serve?

_____

D. What is your highest earned degree?

____ Bachelors ____Masters ____Specialist ____Doctorate

E. If you have classroom duties, with which area of exceptionality do you work?

_____

F. Are microcomputers used as instructional assisted tools for Mildly Handicapped Students in your classroom/system?

____ Yes ____No

G. Which school system size best resembles yours based on current student population?

_____1—2, 300 ____2301 to 4299 ____4300 and over

II. **USAGE INFORMATION** (Directions—Please respond to each as requested.)

A. From your experience/knowledge, which one of the following is the most important reason why teachers of handicapped students might want to use microcomputers to assist instruction?

A.1 _____ Microcomputers motivate students to do necessary drill exercises.

A.2 _____ Microcomputers enable students to receive individualized instruction.

A.3 _____ Computers will be an important part of students' future lives.

A.4 _____ Other (please specify) _____

_____

B. From your experience/knowledge, which of the following is the most important reason why teachers of handicapped students might not want to use microcomputers to assist instruction?

B.1 _____ It is impractical to teach a class of students with only a few microcomputers.

B.2 _____ Microcomputers could be useful as teaching aids, but not enough good and appropriate software is available.

B.3 _____ Using microcomputers encourages teachers to give too many repetitive drills.

B.4 _____ Computers cannot provide the personal communication that young children need to understand math and language concepts.

B.5 _____ Teachers do not have adequate and appropriate training to effectively use computers as teaching tools.

B.6 _____ Other, (please specify) _____

_____

C. Which of the following instructionally related uses of microcomputers are appropriate for your classroom?

C.1 _____ Skill and Practice

C.2 _____ Tutorial Dialog

C.3 _____ Management of Instruction

C.4 _____ Simulation and Model Building

C.5 _____ Teaching computer related information skills

C.6 _____ Teaching computer programming

C.7 _____ Other (please specify) _____

_____

D. Computer assisted instruction in your class is most appropriate to supplement which of the following instructional areas?

D.1 ____ Language Arts
D.2 ____ Mathematics
D.3 ____ Science
D.4 ____ Socialization
D.5 ____ Career
D.6 ____ Social Science

E. Do you feel that the marketed software is appropriate for your instructional purposes?

E.1 ____ Yes
E.2 ____ No

F. With which area of exceptionality do you feel that the use of microcomputers as teaching tools is most beneficial?

F.1 ____ Mildly Mentally Handicapped
F.2 ____ Moderately Mentally Handicapped
F.3 ____ Severely Mentally Handicapped
F.4 ____ Orthopedically Handicapped
F.5 ____ Speech and Language Disordered
F.6 ____ Hearing Impaired
F.7 ____ Learning Disabled
F.8 ____ Behavior Disordered
F.9 ____ Other (please specify) _____

G. How is microcomputer usage by students divided among these four parts of the day? (The percentage should add up to 100%.)

G.1 ____ Before school
G.2 ____ During classes
G.3 ____ At lunch
G.4 ____ After school

H. It is widely believed that more training of teachers is essential to using microcomputers effectively in schools. Which of the following kinds of training is important right now at your school? It is MOST important that teachers be taught to:

H.1 ____ Use instructional software with the school's equipment
H.2 ____ Teach students how to do simple programming
H.3 ____ Use the computer as a professional tool (tests, etc.)

H.4 ____ Understand how computers work and how they are used

H.5 ____ Not to fear that the computer will take away their job

H.6 ____ Other (please specify) _____

I. How much inservice training have you received in microcomputer usage for instruction?

I.1 ____ 1 hour

I.2 ____ 2–3 hours

I.3 ____ 4–6 hours

I.4 ____ more than 6 hours

J. Who provided most of your inservice training for microcomputer usage in the instructional program?

J.1 ____ Special Education Personnel

J.2 ____ Regular Education Personnel

J.3 ____ Other (please specify)

III. **PERCEPTIONS** (Directions–Please indicate your degree of agreement or disagreement in response to the following items by circling:

5–Strongly Agree; 4–Agree; 3–Undecided; 2–Disagree; 1–Strongly Disagree)

1. The use of microcomputers as teaching aids will save money for school systems in the future by allowing a teacher to serve many more students than is now possible.

5 4 3 2 1

2. By using microcomputers in the classroom, a teacher can individualize to meet the needs of specific handicapping conditions in a more effective manner than by using traditional instructional methods.

5 4 3 2 1

3. Appropriate software programs can be developed so that microcomputer usage can be expanded to most classes for handicapped students.

5 4 3 2 1

4. Through proper training opportunities, most teachers can learn to use microcomputers as teaching assisted tools in classes for handicapped students.

5 4 3 2 1

5. Learning to use computers is an essential feature of every child's education for future life successes.

   5 4 3 2 1

6. The effective use of microcomputers in classes for handicapped students will enable educators to plan and implement much more effective educational programs for these students.

   5 4 3 2 1

7. The use of microcomputers can save money for school systems by enabling that system to eliminate some instructional positions.

   5 4 3 2 1

8. Having microcomputers in the classroom can motivate handicapped students to become more involved with computers.

   5 4 3 2 1

9. Microcomputers can be used as management tools by teachers of handicapped students by simplifying the records required on each child by P.L. 94-142.

   5 4 3 2 1

10. In the future, the majority of the educational services provided to exceptional or handicapped students will be delivered through microcomputers.

    5 4 3 2 1

Please use this space to expand on any of your answers to the questions in this instrument and to tell me about any other unexpected consequences—either GOOD or BAD that having a microcomputer has had at your school.

APPENDIX B-2

PROPOSED INTERVIEW QUESTIONS

1. How are microcomputers used in classes for Mildly Handicapped students?
2. What are the strengths of this instructional tool?
3. What are the weaknesses of this instructional tool?
4. Are the software packages that are available adequate for your instructional needs?
5. Are teachers adequately prepared to effectively utilize this instructional tool? If not, what type of in-service programs would address this need?
6. Do you have any special success stories regarding the use of microcomputers in classes for Mildly Handicapped?
7. What impact has the use of this tool had in the areas of: a. Reading b. Mathematics?
8. What implications for future educational programs for Mildly Handicapped students do the uses of microcomputers as instructional tools suggest?

APPENDIX B-3

CLASSROOM OBSERVATION CHECKLIST

1. Number of microcomputers in classroom:

   _____1 _____2-5 _____6-10 _____more than 10

2. Number of students observed using the microcomputer(s):

   _____1-3 _____4-6 _____7-10 _____more than 10

3. Microcomputers were used for the following instructional purpose(s):

   _____Skill and Practice

   _____Tutorial Dialog

   _____Management of Instruction

   _____Simulation and Model Building

   _____Teaching Computer Related Information Skills

   _____Teaching Computer Programming

4. Microcomputers were used to cover the following subject area(s):

   _____Language Arts _____Mathematics _____Science _____Careers

   _____Socialization _____Social Science _____Other _____

5. Computer time is available to students:

   _____Before school

   _____During the scheduled class time

   _____After school

6. What type of hardware was in use?:

   _____Apple _____Commodore _____Zenith

   _____IBM _____Atari _____Other _____

7. What peripherals were available for instructional use?:

   _____Monitor _____Disk drive _____Cassettes _____Printer

   _____Modem _____Other _____

APPENDIX C

USAGE INFORMATION TABLES

TABLE 14

ITEM (A) - WHY TEACHERS MIGHT WANT TO USE MICROCOMPUTERS

	Teachers		Directors	
	N	%	N	%
Motivate Students to Do Drill Exercises	36	52.9	31	41.9
Promotes Individualized Instruction	22	32.4	30	40.5
Prepare Students for Future Lives	8	11.8	9	12.2
Other	2	2.9	4	5.4

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
2.079	3	0.5561

Item A indicated that most teachers and directors/coordinators of special education feel that teachers might want to use microcomputers as instructional tools because they will enable and motivate students to do drill exercises. Almost fifty-two percent of the teachers and forty-two percent of the directors/coordinators felt that microcomputers would motivate students to participate in necessary drill exercises. Forty percent of the directors/coordinators and thirty-two percent of the teachers felt that microcomputer usage would promote individualized instruction. These two answers suggest that the respondents in this sample favored the two instructional usage options as outlined in the questionnaire. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 2.079 with 3 degrees of freedom.

TABLE 15

ITEM (B) - WHY TEACHERS MIGHT NOT WANT TO USE MICROCOMPUTERS

	Teachers		Directors	
	N	%	N	%
Impractical to Teach with Only a Few Computers	6	8.8	5	6.8
Not Enough Appropriate Software Available	14	20.6	6	8.1
Encourages Too Many Repetitive Drills	2	2.9	3	4.1
Limited Personal Communication	20	29.4	17	23.0
Inadequate Training for Utilization	25	36.8	41	55.4
Other	1	1.5	2	2.7

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
7.706	5	0.1732

Item B indicated that most teachers and directors/coordinators of special education felt that teachers might not want to use microcomputers as instructional tools because of inappropriate levels of preparation. Almost thirty-seven percent of teachers and fifty-five percent of directors/coordinators felt that inappropriate training would prevent teachers from using microcomputers as instructional tools. Twenty-nine percent of teachers and twenty-three percent of directors felt that teachers might not want to use microcomputers as instructional tools because of the limited personal communication that this usage would permit between the teacher and student. Although there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 7.706 with 5 degrees of freedom.

TABLE 16

ITEM (C) - MOST APPROPRIATE CLASSROOM USES OF MICROCOMPUTERS

	Teachers		Directors	
	N	%	N	%
Skill and Practice	30	44.1	33	44.6
Tutorial Dialog	12	17.6	15	20.3
Management of Instruction	11	16.2	15	20.3
Simulation and Model Building	4	5.9	5	6.8
Teaching Computer Related Information Skills	6	8.8	3	4.1
Teaching Computer Programming	3	4.4	1	1.4
Other	2	2.9	2	2.7

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
2.954	6	0.8145

Item C indicated that most teachers and directors/coordinators of special education felt that skill and practice activities are the most appropriate uses for microcomputers in the classroom. Forty-four percent of teachers and almost forty-five percent of directors/coordinators of special education felt that skill practice activities were the most appropriate uses of microcomputers.

Almost eighteen percent of teachers and twenty percent of directors felt that tutorial dialogue was the most appropriate use of microcomputers in the classroom. Twenty percent of the directors/coordinators of special education and sixteen percent of teachers felt that management of instruction was

the most appropriate use of microcomputers in the classroom. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 2.954 with 6 degrees of freedom.

TABLE 17

ITEM (E) - IS THE MARKETED SOFTWARE APPROPRIATE FOR INSTRUCTION

	Teachers		Directors	
	N	%	N	%
Yes	45	66.2	51	68.9
No	23	33.8	23	31.1

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
0.028	1	0.8655

Item E indicated that most teachers and directors/coordinators of special education felt that the marketed software is appropriate for instructional purposes. Sixty-six percent of teachers and almost sixty-nine percent of directors/coordinators of special education felt that the marketed software was appropriate for instructional purposes. Almost thirty-four percent of teachers and thirty-one percent of directors felt that the marketed software is not appropriate for instructional purposes. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 0.028 with 1 degree of freedom.

TABLE 18

ITEM (F) - MOST BENEFICIAL AREA OF EXCEPTIONALITY FOR CAI

	Teachers		Directors	
	N	%	N	%
Mildly Mentally Handicapped	19	27.9	15	20.3
Moderately Mentally Handicapped	1	1.5	1	1.4
Severely Mentally Handicapped	2	2.9	0	0
Orthopedically Handicapped	5	7.4	10	13.5
Speech and Language Disordered	3	4.4	4	5.4
Hearing Impaired	3	4.4	3	4.1
Learning Disabled	25	36.8	29	39.2
Behavior Disordered	6	8.8	2	2.7
Other	4	5.9	10	13.5

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
8.910	8	0.3499

Item F indicated that most teachers and directors/coordinators of special education felt that most benefits of computer assisted instruction would go to the Learning Disabled. Almost thirty-seven percent of the teachers and thirty-nine percent of directors/coordinators felt that Learning Disabled was the area of exceptionality that could most benefit from computer assisted instruction. Almost twenty-eight percent of the teachers and twenty percent of the directors/coordinators of special education felt that Mildly Mentally Handicapped was the area that could most benefit from computer assisted

instruction.

Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 8.910 with 8 degrees of freedom.

TABLE 19

ITEM (G) - TIME ALLOWANCE FOR COMPUTER USAGE

	Teachers		Directors	
	N	%	N	%
Before School	14	20.6	11	14.9
During Classes	23	33.8	41	55.4
At Lunch	14	20.6	8	11.6
After School	17	25.0	14	18.1

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
4.643	3	0.1836

Item G indicated that most teachers and directors/coordinators of special education allow computer usage during classes. Thirty-three percent of the teachers and fifty-five percent of the directors reported this as the greatest portion of the day devoted to computer time. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level based on the computed chi-square value of 4.643 with 3 degrees of freedom.

TABLE 20

ITEM (I) - AMOUNT OF IN-SERVICE TRAINING RECEIVED IN COMPUTER USAGE

	Teachers		Directors	
	N	%	N	%
1 Hour	11	16.2	11	14.9
2-3 Hours	14	20.6	9	12.2
4-6 Hours	17	25.0	13	17.6
More than 6 Hours	26	38.2	41	55.4

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
4.733	3	0.1924

Item I indicated that most teachers and directors/coordinators of special education have had over six hours of in-service training in microcomputer usage. Thirty-eight percent of the teachers and fifty-five percent of the directors have had over six hours of in-service training in microcomputer usage. Twenty-five percent of teachers and almost eighteen percent of directors/coordinators of special education have had from four to six hours of in-service training in microcomputer usage. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 4.733 with 3 degrees of freedom.

TABLE 21

ITEM (J) - WHO PROVIDED IN-SERVICE TRAINING IN MICROCOMPUTER USAGE

	Teachers		Directors	
	N	%	N	%
Special Education Personnel	15	22.1	10	13.5
Regular Education Personnel	27	39.7	31	41.9
Higher Education Institutions	26	38.2	33	44.6

Total Responses: Teachers, 68; Directors/Coordinators, 74

Chi-square	D.F.	Level of Significance
1.856	2	0.3953

Item J indicated that most teachers received their in-service training in microcomputer usage from regular education personnel while most directors/coordinators received their in-service training from institutions of higher education. Almost forty percent of teachers received their in-service training from regular education personnel, while almost forty-five percent of directors received their in-service training at institutions of higher education. Thirty-eight percent of teachers received in-service training at institutions of higher education while almost forty-two percent of directors/coordinators received in-service training from regular education personnel. Though there were differences in the sample responses to this question, they were not statistically significant at the .05 level of significance based on the computed chi-square value of 1.856 with 2 degrees of freedom.

APPENDIX D

CASE STUDIES

CASE STUDIES

In an effort to ascertain additional information which would collaborate the questionnaire results, the investigator conducted field research through the interview and participant observation methods.

From the questionnaire responses, indicating the use of microcomputers in the instruction of mildly handicapped students, the investigator randomly selected three sites for field study wherein computer assisted instruction is evidenced. One class from each of the three school system sizes (below average, average, and above average) were chosen and visited. Interview questions (see Appendix B-2) and the Classroom Observation Checklist (see Appendix B-3) were used to acquire necessary information. Each teacher of mildly handicapped students chosen was interviewed prior to the observation. For the purpose of identification, a letter was assigned to each site. The following findings are reported.

Interview - Site A

Site A was an Interrelated unit within a high school population of five hundred ninety-three students (grades seven through twelve) and a school system student population of one thousand one hundred and four. There are several special education units housed there with a majority handicapped population of learning disabled.

The interviewee indicated that microcomputers are mainly used for drill and practice exercises; however, a few more computer knowledgeable students are beginning to program. The main strength was cited as allowing students to work at their own rate with a sense of success. No particular weaknesses were noted.

The software available meets the classroom needs; however, much of what is used has been developed by the teacher due to limited funds. It was felt that the teacher-made software, being less attractive and stimulating, was not as motivating as the manufactured product.

Teachers in the special education department are not adequately in-serviced for computer assisted instruction. The total faculty has received roughly six complete hours of training with only two hours alloted for hands-on experience. Microcomputers have been used for two years in classes for the mildly handicapped. The interviewee took two summer courses, independent of the school system, in computer assisted instruction and management. General success stories were revealed which proved the beneficial use of microcomputers to further remediate problem areas of students.

The interviewee uses profiles from various standardized tests to identify deficits in reading and mathematics. Assignments are then matched to remediate these skills. Students have shown remarkable gains in the area of basic reading comprehension and mathematics reasoning.

The subject views the use of microcomputers as the "going thing" in education. She states, "Students must begin to feel comfortable with and understand some of the ways in which this technology will influence their lives now and in the future. As for teaching handicapped students, using computers gives the teacher an added dimension in addressing individual needs. With more in-service, money and understanding, special education teachers should become more receptive to this new trend. I love it."

Observation - Site A

The special education class reported to the computer laboratory which is used by all Chapter Two students. A paraprofessional is assigned to

assist each teacher and the students using it. The lab, in its second year of operation, contains twelve Apple IIE microcomputers, color monitors and disk drives and five printers.

Eight students, each classified as learning disabled, were observed in the computer lab. There was no indication of difficulty or great unfamiliarity exhibited by the students. Each student was able to begin the assigned task and work at the individual performance rate.

The instructional technique of drill and practice was used throughout the observed period. Assignments addressed deficits in the areas of reading and mathematics as determined by the students' needs.

Little interaction existed between the teacher and students. On three occasions assistance was sought by students. Reviewed assignments in the individual folders revealed continuous student progress in skill mastery.

Interview - Site B

Site B was an Interrelated unit involving mildly mentally handicapped, learning disordered and behavior disordered students within a school population of six hundred twenty-seven from grades kindergarten through seventh. The school system population is comprised of four thousand seventy-five students. The major handicapped student population is Mildly Mentally Handicapped.

The interviewed teacher explained that all of the mildly handicapped students in the school have scheduled computer time during the week. The lab is part of a pilot project in the school system designed to promote computer assisted instruction among handicapped students. The purchase of the computers and additional peripherals was made available through PTSA funds which were matched by a grant from a nearby institution of higher education. The grant provides for in-service training and volunteer assistance from university personnel.

Microcomputers in this setting are used mainly for drill and practice, tutorial dialog and minimal programming. Students generally work on refining weak skill areas and reinforcing, through supplemental materials, what is taught in the resource classroom. Those students who are considered advanced and/or computer knowledgeable, have begun exercises in programming. Several of the students have computers at home.

The interviewee views the ability to use computers to supplement regular class instruction as the greatest strength, "It makes the difficult easy and often clearer to some students." There were no reported weaknesses mentioned with regard to the instructional tool; however, there was concern about the limit that this technology places on communication and interpersonal development.

The software packages were thought to be sufficient at this time. Because of the positive financial circumstances, software is abundant. There was expressed anxiety over the unavailability of specific software to address some skill areas. Many of the packages either lack areas of concern or are too cumbersome. This problem is currently being approached through the development of programs by the university personnel.

Teachers at Site B have been given extensive in-service in computer use for the instructional program. Emphasis in computer assisted instruction and computer management were both attended. Each teacher in the special education department completed the required training in computer literacy and presently demonstrates efficiency in the use of microcomputers as an instructional assisted tool based on a survey conducted by the university's evaluation team. Several teachers have also taken additional courses to enhance their expertise.

There were no extraordinary success stories reported. Remarkable progress has been made by students as a result of the use of microcomputers. The university is conducting a study which involves non-computer users and computer users on the elementary level to determine the difference in mathematics achievement within a given period of time. Data from this study should be available in September 1986.

The use of this technology in instruction has had an astounding effect in both reading and mathematics. In reading, evidence supports improvement in literal comprehension and basic reading development. "The practice of reinforcement and drill in problem areas causes students to better understand the taught skills," the interviewee stated. Progress was also reported in mathematics. For students who are quite comfortable and familiar with microcomputer use, new skills are introduced and mastered with success in mathematics.

The interviewed teacher sees microcomputers as the key to our future. The need for all students and teachers (educators in general) to become computer comfortable was expressed. It was not felt that computers in education would replace teachers nor diminish the responsibilities of educating students. The interviewee contends that computers just assist us in doing the numerous tasks involved in the educational process. "Computer assisted instruction will play a greater role than educational television has because general computer use is more widespread and extends beyond the realm of entertainment. Teaching computer literacy, programming and other related skills has vast implications for our future and the directions that our students as well as educators will follow," she said.

Observation - Site B

The Special Education Computer Lab is housed next to one of two special education resource rooms. All mildly handicapped students have access

and are scheduled to the laboratory for three class periods per week. Additional time is awarded when needed on an individual basis. Some students, usually Behavior Disordered, can gain computer time as a reward for exhibiting appropriate behavior, self-management and control.

The lab, in its third year of existence, has fifteen Commodore 64 computers, ten color monitors, five black and white monitors, fifteen disk drives, six cassette players and ten printers.

Two classes were observed during the visit. The first class, consisting of ten students, worked on mathematics skills requiring drill and practice. Each student used an identified program to address specific needs. The activities ranged from simple subtraction, requiring re-grouping, to problems in mathematical reasoning. It was apparent to the observer that a great deal of emphasis had been placed on mastery of the math skills and competition among classmates to reach a projected goal prevailed. Expressions of dismay were displayed by several students when skills were not mastered. On each occasion, the teacher offered encouragement and assistance.

The second class, composed of thirteen students, engaged in activities relating to career awareness and exploration. The vocabulary used was on a functional reading level and seemingly suitable for the students. Various career areas were represented with an interest inventory/activity culminating the assigned task.

Both classes appeared comfortable with the instructional tool and the operation of the microcomputer. The teacher was available to assist and to offer directions when necessary. Little interaction or communication evolved between the teacher and students during the observed period.

Interview - Site C

Site C was a Mildly Mentally Handicapped unit within an elementary school population of five hundred thirteen and a school system student population of approximately seventy thousand. There are several special education units housed in the school with the majority handicapped population being learning disabled.

Each special education class is scheduled to the computer laboratory twice each week. Microcomputers with these students are primarily used for tutorial dialog, drill and practice. The interviewee stated that many of the regular education students are learning to program.

The greatest strength mentioned was the opportunity for students to witness success with work that was once considered difficult. The idea of providing feedback and review when the need arises was an additional strength. The teacher feels that students appear comfortable when mistakes are made if the class is not alerted and there is no verbal embarrassment or reprimand.

No significant weaknesses were reported. Students have been very receptive to the use of microcomputers. Limited software was a viable concern. Often the available software is not appropriate for the identified skill development. Some programs that seem adequate (via catalogues, etc.) are not compatible with the hardware in use or with the curriculum.

Teachers in the building were adequately in-serviced when the lab was first set up, four years ago. All teachers, including special educators, were trained by a team of "Computer Literates" from the central office. Each elementary school in the system has had some computers used in the instructional program for at least eight years; therefore, knowledge of and an appreciation for this instructional assisted tool is massive. Many of the teachers are using the computers for management of instruction as well as to assist in classroom

instruction.

The interviewee elaborated on the difference microcomputer use in instruction has made with some students. Observable improvement in self-management along with enhanced understanding of the subject matter were cited. It was reported that students who create discipline problems are beginning to treasure the computer time which is often used as a reward for classroom productivity and time on task. Eagerness and excitement from students to participate and achieve has increased. For special education students, a sense of belonging prevails when provided the same opportunities as students in the regular education program, thus improving their self-image.

In the areas of reading and mathematics, students have reported growth in understanding various assignments and concepts which proved problematic. Many students enjoy the assignments more through the computer assisted approach. Language arts activities have received increased attention with the mildly mentally handicapped students. They reportedly have greatly improved writing skills and creative thinking abilities.

The interviewed teacher perceives computer use as a controlling factor in the future. The contention was that computers are and will continue to affect many areas of our existence, saving time and money. It was believed that more educators need to become user friendly, understanding the various functions and operations microcomputers can perform relative to the instruction of special education students. As stated by the interviewee, "When more teachers become comfortable with this tool, the threat of replacement will be dismissed. This technology will contribute greatly to the education of students including the mildly handicapped."

Observation - Site C

The computer laboratory is housed in a room adjacent to the library with two entrances. During the visitation, a section of the lab was also used by the gifted teacher with a group of five students. No significant distractions were observed.

The laboratory is used by all students on a scheduled basis. Access time for each special education class covers a period of two and one-half hours twice per week.

There were fourteen microcomputers available for use: twelve IBM PC Jrs., and two IBM Personal Computers with disk drives for each computer and four printers. The laboratory was donated by IBM as a pilot project to encourage the use of microcomputers in the instructional program of elementary age children.

Seven mildly mentally handicapped students were observed. One student was denied participation in the lab as punishment for unacceptable behavior; however, he did report to the lab with the class.

The teacher conducted the group activity which allowed individual attention and work paced according to the learning rate and needs of each student. The activity involved a writing exercise wherein simple composition and grammatics were addressed. Students created paragraphs from questions presented. The exercise encouraged much creativity and imagination.

The participants appeared relaxed and familiar with the hardware which has been in operation for two years. Occasionally, assistance was secured from the teacher who moved freely among the students, checking for accuracy and supplying directions. One student, appearing to be less familiar with the operation of the computer, appeared frustrated at times when she did not know what to do on a given assignment.

Great satisfaction and fascination was displayed when the activity was printed. Most students expressed a feeling of excitement and reward. Several commented on the brief time it took to receive a finished product.

A computer club has been organized for students in the school, although only four of the special education students have joined. Computer time for the club members is available before and after school.

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RESUME

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