5-1981

The Status of Computer-Related Elective Courses in Public Secondary Schools in Tennessee

Nancy H. Hickman
East Tennessee State University

HICKMAN, NANCY HUBBLE

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East Tennessee State University ED.D. 1981

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A Dissertation

Presented to

the Faculty of the Department of Supervision and Administration

East Tennessee State University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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by

Nancy Hubble Hickman

May 1981

Abstract

THE STATUS OF COMPUTER-RELATED ELECTIVE COURSES

IN PUBLIC SECONDARY SCHOOLS IN TENNESSEE

by

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The problem was to determine the status of computer-related elective courses in public secondary schools in Tennessee.

A descriptive research design was used for this study. A search was made to locate public secondary schools which housed grade twelve and whose curricula were in keeping with State requirements for a diploma. A search of Preliminary Reports was made of identified schools to determine those which offered a computer-related elective course. A questionnaire was sent to teachers of computer-related course electives.

The data were examined and presented in narrative form with the use of appropriate tables.

The following findings emerged:

1. There were 306 schools in Tennessee in 1979-80 which housed grade twelve and whose curriculum was reflective of State diploma requirements. Twenty-four of these schools (8 percent) offered one or more computer courses. There were twenty-one computer math courses and six computer programming courses. There were thirty-two total class sections of computer-related courses.

2. There were 568 students enrolled in computer-related courses for the first semester of the 1979-80 school year. The average school enrollment was 1254 and the average student-teacher ratio was 1:19.5. The teacher-student ratio in computer-related classes was 1:17.5.

3. There were twenty-seven certified persons teaching computer courses in 1979-80. One held a specialist degree, two held master's plus forty-five hours, fourteen held master's and ten held bachelor's degrees. Twenty-four were endorsed in math, two in science and one in business. Twenty of the twenty-seven held multiple endorsements.

4. The majority of schools awarded both a minimum and a maximum of one-half unit of credit with a range of one-half to two.

5. Computers and terminals were available for student use in computer courses and were primarily housed in the classroom where the course was taught.

6. Software was produced primarily by staff and/or students.

7. No decreases were reported for the 1980-81 offerings of computer-related courses. Increases were reported by less than 25 percent of the respondents in the study.

8. Objectives of computer-related courses were "awareness" and "introductory" in nature. Simple programming was included in schools which offered more than one-half Carnegie unit credit as maximum.

9. In comparison with information gained from opinion survey to forty-nine State Departments of Education, Tennessee ranks in the lower 18 percent of states where less than 10 percent of the secondary schools offer one or more computer-related courses.

DEDICATION

This dissertation, as well as most noteworthy events in my life, happened because of those in my life who believed in me and supported my endeavors. It is to the three most important of these that I dedicate this work: my husband, Bill, and our two daughters, Melissa Nicole and Whitney Renee.

ACKNOWLEDGMENTS

To the members of my doctoral committee, I wish to express my appreciation: Dr. Floyd H. Edwards, Chairman; Dr. Gem T. Greninger, Dr. Albert Hauff, Dr. Jack Higgs and Dr. Robert Shepard. Appreciation is also expressed to Mr. Ronnie Hubble, my brother, and his wife Barbara for their help in gathering data and to Ms. Martha Littleford, my typist.

Above all, I am indebted to Dr. James E. Thomas, former Superintendent of the Bristol Tennessee City School System, whose example of educational leadership and whose belief in the education of the individual encouraged me to pursue the doctoral program. "Thank you, Dr. T."

CONTENTS

Chapter Page

Page

Chapter 1

INTRODUCTION

> In years to come, our age will be known as the age of the computer. The electronic computer is an achievement comparable only to the wheel, the steam engine and the use of nuclear energy in its significance to mankind.[1]

The truth or fallacy of the above statement may become apparent in retrospect. In the interim, an understanding of the computer and its capabilities and limitations is needed in a public school educational program.

> In time, every educated individual in American society will come into contact with computers. He should become acquainted with them early and understand their limitations and potentialities and what they can do and how they accomplish it. For this reason we must give special attention to developing course materials that will bring students not majoring in the sciences into contact with a computer and teach them about its principles and operations.[2]

The Report of the President's Science Advisory Committee of 1967, "Computers in Higher Education," stated that the majority of college students were receiving a second class technical education for the future because computer facilities were not available in all colleges. In 1980 many more colleges have computer facilities, but this does not solve the problem. The majority of people in this country do not attend college, and of those who do attend, a minority are exposed to computer courses. "In order to reach the greatest number of people before their entrance

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[1]William W. Cotterman, Computers in Perspective (Santa Barbara, California: Wadsworth Publishing, 1973), p. 1.

[2]Cotterman, p. 1.

into the computerized work world, the secondary schools will have to present a well organized program of study in computer technology."[3]

Statement of the Problem

The problem of this study was to determine the status of computer-related elective courses in public secondary schools in Tennessee.

Statement of Research Questions

To achieve the purpose of the study, answers to the following questions were sought:

1. Which schools housing any combinations of grades inclusive of grade twelve and having a program leading to a Tennessee diploma, offer computer-related courses?

2. In what organizational structures (disciplines, departments) are computer-related courses offered?

3. What degrees are held by teachers teaching computer-related courses?

4. What areas of endorsement are held by teachers of computer-related courses?

5. What is the student-teacher ratio in schools offering computer-related courses?

6. What is the total enrollment in computer-related electives in Tennessee in the year studied?

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[3]Patricia Nautybyrd Mayer, "A Descriptive Analysis of Computer Education in Texas Secondary Schools and a Proposed Computer Science Program" (Doctoral dissertation, North Texas State University, 1979), p. 1.

7. What are the minimum and maximum number of Carnegie units available to students taking computer-related courses?

8. What is the availability of computers in computer-related courses?

9. How were computers obtained (funding source) for use in computer-related courses?

10. What is the degree of availability of terminals for student use in computer-related courses?

11. What types of software are used by students in computer-related courses?

12. What monies are spent (allocated) in courses pertaining to computers?

13. Has there been a change in number of program offerings for 1980-81 in schools which offered computer-related courses during 1979-80?

14. What curricular goals exist in courses pertaining to computers?

Definitions of Terms

The following terms were defined for the purpose of this study:

Computer

Computer is a programmable device, electronic in nature, that can store, retrieve and process data.

Computer-related Course

Computer-related course is a course whose content deals with computers or computerized systems and whose goals include a knowledge of the computer and its potential and limitations.

Elective

Elective is a course not required by the Tennessee State Board of Education but offered by a public school to the student with Carnegie units awarded for satisfactory completion.

Hardware

Hardware is equipment used in computer-related courses and consists primarily of the computer and terminals.

Preliminary Report

Preliminary Reports are reports required to be filed by each public school in Tennessee on or before October 1 of the year of the report. They include total school staff with endorsements, degree, subjects taught and enrollment in each class.

Public Secondary School

Public secondary school is a school whose organizational pattern includes grade twelve and whose curriculum is so designed to meet the graduation requirements as set forth by the Tennessee State Board of Education.

Software

Software is material, inclusive of programs, used in computer-related courses.

Terminals

Terminals are devices through which a user can communicate with a computer.

Limitations of the Study

The study was limited to the status of computer-related courses in public secondary schools in Tennessee. This limitation included restricting the schools identified to a school whose organizational pattern included grade twelve and whose curriculum was designed to meet Tennessee diploma requirements. The vast majority of schools had an organizational pattern inclusive of grades nine through twelve.

Elective course offerings were limited to those whose content dealt with computers and computer systems. Curricula where computers were used for non-instructional purposes or instructional areas for pacing or programming purposes with the computer used solely as a piece of equipment were excluded from the study.

Basic Assumptions

The following assumptions were made:

1. Access to Annual Preliminary Reports would be permitted at the State Department of Education.

2. Preliminary Reports would be accurate and computer-related elective courses would be identifiable in the reports.

3. Teachers would respond to the questionnaire in a professional manner.

Significance of the Study

The significance of the study of the computer in modern society is of such magnitude that some aspect of an individual's education should include introduction to the computer.

John Diebold said, "For the first time, we can build machines whose operative concerns the processes that make us human, rather than peripheral factors such as the provision of power and transport."[4] He believed that computerization was just as basic a concept as that of electricity and claimed that in future years computer time would be regarded as a public utility in the same way as electricity is regarded.[5]

In 1976, 2.5 percent of the United States' gross national product was expended in the area of computer technology. Diebold predicted that the industry's rate of expansion was such that even if it held relatively constant, the annual expenditures for computer-related products and services would overtake that of the whole electric power industry in the 1980's.[6]

It seems improbable that any individual will remain untouched by computers and computer services. A need exists to determine the status of computer-related courses in public secondary schools in Tennessee.

The information contained in this study will assist Tennessee school personnel, from the Commissioner of Education and State Board of Education to the classroom teacher, in determining the status of computer-related curriculum in Tennessee and provide information for future educational planning and decisions.

Methods and Procedures

The following steps were utilized in conducting a descriptive study

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[4]John Diebold, The World of the Computer (New York: Random House, 1974), p. 5.

[5]Diebold, p. 5.

[6]Diebold, p. 5.

of the status of computer-related electives in public secondary schools in Tennessee.

1. Periodical literature and various other publications pertaining to the problem of the study were reviewed.

2. The 1979-80 Directory of Public Schools in Tennessee was used to identify schools whose organizational structure included grade twelve and whose curriculum was structured to lead to a Tennessee diploma.

3. A manual search of individual school Preliminary Reports filed annually in the Office of the State Department of Education in Nashville, Tennessee was conducted.

4. A questionnaire was developed and mailed to persons who were identified in the Preliminary Reports as having taught computer-related courses during the 1979-80 school year.

5. The data were examined to determine the status of computer-related electives in public secondary schools in Tennessee in 1979-80.

6. Based on the findings of this study, conclusions were drawn and recommendations were made for further study.

Organization of the Study

The study was organized into five chapters. Chapter 1 contains an introduction to the study, a statement of the problem, statement of basic questions, definitions of terms, limitations of the study, significance of the study, methods, procedures and organization of the study.

Chapter 2 contains a review of related literature with a designated section dealing with the computer's relationship to man.

Chapter 3 is the design of the study. It includes the population, sample and procedures.

Chapter 4 includes the presentation, examination and reporting of data.

Chapter 5 includes the summary, findings, conclusions and recommendations of the study.

The dissertation concludes with appendices, containing pertinent information and a bibliography of sources.

Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

This chapter is divided into five sections. The introduction contains an outline of the chapter. The second division, History of the Computer, shows the development of the computer by beginning with the four thousand year old abacus and moving to 1944 and the Mark I Sequence Controlled Calculator, considered to be the first computer. The section continues with computer technology development and predictions for the future.

The third section, The Computer in Education, describes the uses of the computer in the educational environment and shows reasons for its being included as a part of public school curriculum.

Man and the Computer, section four, was made a part of the Review of Related Literature because of the responsibility placed on persons in curriculum decision-making positions. Much of the literature reviewed had a special section which attempted to show the potential of the computer as having dangerous possibilities if its uses were not restricted. This was probably the best justification given for familiarizing public school students with the computer. Because the audience of this research was perceived to be those in education and curriculum decision-making capacities, Man and the Computer was an integral part of the Review of Related Literature.

The title "It's 1980: Do You Know Where Your Computer Is?" was used

in a March, 1980 publication of Phi Delta Kappan. It is 1981. Computers influence the lives of practically every individual. No student entering school in kindergarten of 1981 will meet the world of work in 1993 and be able to avoid interacting with services of a computer. To what extent is public school curriculum preparing a student for this "basic life skill?"

Computers are playing an important role in the educational community. In 1977, when the concept of microcomputer-based classroom instruction first gained currency, only 3,000 units were sold in the educational market. In 1978, that figure increased to 25,000, and in 1980 it is estimated that the total number of microcomputer units used for classroom instruction will increase to over 50,000.[1]

The idea that computers are too big, complex and expensive is no longer a valid argument for keeping this tool outside the classroom.[2]

History of the Computer

The electronic computer has been available commercially only for the last twenty-five years; however, man has been searching for a more efficient and faster way of performing calculations, since man began to compute.[3]

One of the first devices used by man as a computing aid was the

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[1]Jamal F. Manji, "Birth of the Microcomputer Age in the Classroom," School Product News, XIX (August, 1980), 19.

[2]Dan Levin, "Microcomputers: Out of the Toy Chest and Into the Classroom," The Executive Educator, II (March, 1980), 19.

[3]Patricia Nautybyrd Mayer, "A Descriptive Analysis of Computer Education in Texas Secondary Schools and a Proposed Computer Science Program" (Doctoral dissertation, North Texas State University, 1979), p. 20.

abacus. Its origin is unknown; however, it was used in China and in the Mediterranean more than four thousand years ago.[4]

The next noteworthy event occurred in 1614 when the Scotsman John Napier (1550-1617) devised rods, called Napier's Bones. These were used for multiplying, dividing and extracting square and cube roots. This was the first device to perform numerical computations without a human operator.[5] During the Renaissance, many calculators and adding machines were developed. Blaise Pascal (1623-1662) is credited with developing the first mechanical calculating device. Pascal's invention was based on the concept of gear-driven counter wheels.[6]

Charles Babbage, a professor of mathematics, developed the analytical engine in the early years of the nineteenth century. The level of machine technology of the day did not provide the necessary precision for reliably operating the machines. With the analytical engine, Babbage "developed many of the concepts that were rediscovered a century later to form the fundamental principles on which present-day computers are based."[7]

As a result of the 1880 census, which took over seven years to complete, the Census Bureau employed Herman Hollerith (1860-1929) to find a means to speed up the process. Mr. Hollerith, a statistician,

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[4]Robert E. Lynch and John R. Rice, Computers--Their Impact and Use (Dallas: Holt, Rinehart and Winston, 1977), p. 33.

[5]John A. Postley, Computers and People (New York: McGraw-Hill, 1960), p. 26.

[6]Robert F. Crawford, Introduction to Data Processing (Englewood Cliffs, New Jersey: Prentice-Hall, 1968), p. 19.

[7]Alton R. Kindred, Introduction to Computers (Englewood Cliffs, New Jersey: Prentice-Hall, 1976), p. 365.

designed a Census Machine which used machine-readable punched cards for tabulating data. This decreased the tabulating time by seven-eighths of that previously required.[8]

The Mark I Automatic Sequence Controlled Calculator, considered to be the first computer, was installed at Harvard University in 1944. It was developed through a grant from International Business Machines (IBM) by Howard Aiken and followed the concepts of Babbage's analytical engine.[9]

The Electrical Numerical Integrator and Computer (ENIAC) is considered to be the first all-electronic computer. It was developed in 1945 by John Mauchly and J. Presper Eckert. The advantages of the concept of the internally stored program which distinguishes a computer from a calculator, were being realized with ENIAC.[10]

The first American computer with the stored-program concept was the Electronic Discrete Variable Automatic Computer (EDVAC), completed in 1952.[11] In 1947, Univac I was developed under the supervision of Eckert and Mauchly, followed in the 1950's by the IBM 701, 650, 704 and 709.[12]

The Nobel Prize was awarded to Bardeen, Brattain and Shockely in 1956 for the development of the "transistor."[13] Advances in technology

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[8]Donald H. Sanders, Computers in Business (New York: McGraw-Hill, 1968), p. 38.

[9]Kenneth P. Swallow and Wilson T. Price, Elements of Computer Programming (New York: Holt, Rinehart and Winston, 1965), p. 11.

[10]Lynch and Rice, p. 38.

[11]Lynch and Rice, p. 38.

[12]Ralph J. Kochenburger and Carolyn J. Turcio, Computers in Modern Society (Santa Barbara, California: John Wiley and Hamilton Publishing, 1974), p. 8.

[13]Kochenburger and Turcio, p. 8.

continued, and the Honeywell 800, Burroughs B5500, IBM 1400, Philco 2000, CDC 1604, IBM 7090 and Univac 1107 are examples of second-generation computers using solid-state circuitry, stored program concepts, and user-oriented programming languages.[14]

The third-generation computer of the mid and late sixties reflected software developments of virtual memory, multiprocessing, multiprogramming, and micro-programming, and further hardware developments in large scale integration, minicomputers and refined terminals.[15]

"'What's next?' asks Peter E. Hart, director of the SRI International artificial-intelligence center. 'More to the point, what's not next?'" Newsweek reported that in 1979, the world market for micro-electronics exceeded $11 billion. The really astonishing fact in the realm of the computer is that neither the industry nor the technology existed thirty-five years ago.[16]

The Computer in Education

The computer is a product of the educational environment. Mark I was developed at Harvard, and ENIAC was developed at the University of Pennsylvania. These were developed at educational institutions as the result of research projects, many of which were funded by business and industry.

In the early 1950's, university personnel began leasing computers

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[14]Kochenburger and Turcio, p. 8.

[15]"And Man Created the Chip," Newsweek, June 30, 1980, p. 50.

[16]"And Man Created the Chip," p. 50.

and stopped building their own. Some technological research is still being done in universities; however, they are no longer the major source in computer hardware development.

In the late fifties and early sixties, educators were not the major developers of computers but were viewed as potential major users of computers by manufacturers.[17]

In 1954, the National Science Foundation began financially to support universities that wanted computers for academic research in science. The United States Office of Education provided financial support for research and demonstrations in education, and the computer became a part of the educational environment.[18]

The computer's first uses in the educational community were not connected with the instructional process. Computers were first used for budgeting and accounting, with later programs including personnel records and student records. These applications were used in business and industry and were easily adaptable for educational use.

The following figures indicate the extent of computer use in the educational environment:

> The United States Office of Education alone spent an estimated $161 million between 1964 and 1969 for the use of computers in education.
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> In the same years, an estimated $685 million was spent by the United States Office of Education on educational technology and related projects.
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> The National Science Foundation has specifically supported the development of computer-related innovational

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[17]Mayer, p. 24.

[18]John I. Goodlad and John F. O'Toole, Jr., Computers and Information Centers in Education (New York: Harcourt, Brace and World, 1966), p. 10.

projects in education with nearly $50 million since 1965.

Private industry has invested millions of dollars in the development of computer systems and curriculum materials for educational use.

A conservative estimate of overall national investment in educational uses of computers may be approximately $2 billion.[19]

James W. Johnson stated that we have come so far from predicting ten computers for the entire country and from machines containing 18,000 vacuum tubes that ran ten minutes a day, that it is easy to believe that we are on the brink of, or in the midst of, a revolution that will force us to adopt new modes of thought and to reshape our basic social institutions.[20]

Johnson, who is Director of CONDUIT at the University of Iowa, surveyed departmental chairpersons and instructors in the disciplines of Higher Education to determine instructional uses of computers in higher education's curriculum. The field of "education" showed the lowest monetary expenditure for computing.[21]

Johnson credited the low level of the use of computing in education and other disciplines outside computer science to the inadequacy of computing equipment for the task.[22] "Even today few people would disagree with the observation that students in the sciences or education should have a moderate level of computing in their courses."[23] The CONDUIT

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[19]Beverly Hunter and others, Learning Alternatives in U.S. Education: Where Student and Computer Meet (Englewood Cliffs, New Jersey: Educational Technology Publications, 1975), p. 4.

[20]James W. Johnson, "Getting from Here to There: The Status of Instructional Computing in Higher Education," Technological Horizons in Education Journal, VII (November, 1980), 48.

[21]Johnson, p. 49.

[22]Johnson, p. 51.

[23]Johnson, p. 53.

questionnaire, however, showed that less than 50 percent of academic departments in all disciplines (except business) report moderate or greater use of computing and a large number of departments report no use.[24]

U.S. News and World Report had a special report in 1978 which stated that computer specialists were among accountants, engineers and physicians in their ranking of promising careers. The article also stated that "any liberal-arts major in this job market would be foolish not to take some courses in economics, accounting, computer science or other marketable skills."[25]

In 1960, PLATO (Programmed Logic for Automatic Teaching Operation) was developed at the University of Illinois. It was the first large-scale computer-assisted instruction package.[26] Computer assisted and computer managed programs continue to be the primary uses of computers for instructional purposes; however, educational institutions began including computer science subjects in the curriculum in the 1960's.

Within the last ten years, the computer has surfaced in the public secondary schools. The 1965 Elementary Secondary Education Act provided funds which could be used for implementing planning and demonstration projects on the uses of computers in instruction.

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[24]Johnson, p. 53.

[25]"Where Tomorrow's Jobs Will Be," U.S. News and World Report, November 13, 1978, p. 49.

[26]Patricia Nautybyrd Mayer, "A Descriptive Analysis of Computer Education in Texas Secondary Schools and a Proposed Computer Science Program" (Doctoral dissertation, North Texas State University, 1979), p. 26.

According to a 1971 study by Charles Darby, Arthur Korotkin and Tania Ramashko, approximately 30 percent of secondary schools in the United States used computers for administrative purposes but only 13 percent used computers for instructional purposes.[27]

Though the use of computers has not as yet been universally introduced in every school, the adoption of computer technology in secondary education has been both steady and stable with more and more schools acquiring computers each year while fewer schools are terminating a previously established computer application.[28]

In 1975, William Bukoshi and Arthur Korotkin conducted a study which showed that 31.5 percent of the secondary schools were using computers for administrative and instructional purposes.[29]

A 1976 study by James Terry revealed that in school systems in Texas with an ADA of less than 5,000 only 25 percent of the schools used the computer. Fifty percent of the schools used computers in systems of 5,000 - 25,000 ADA and 75 percent of schools in systems exceeding 25,000 ADA used computer services. The majority of the computer services were in administration rather than instruction.[30]

"Instructional uses for computers are diversified and have been

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[27]Charles Darby, Jr., Arthur Korotkin, and Tanie Ramashko, The Computer in Secondary Schools--A Survey of Its Instructional and Administrative Usage (New York: Praeger, 1972), pp. 22-23.

[28]William J. Bukoski and Arthur Korotkin, "Computing Activities in Secondary Education," Educational Technology, XVI (January, 1976), 9.

[29]Bukoski and Korotkin, p. 9.

[30]James P. Terry, "A Survey of Electronic Data Processing Usage in the Public School Districts in the State of Texas" (Doctoral dissertation, East Texas State University, 1976).

multiplying over the years, sparked by the creative imaginations of educators in the computer field."[31]

Instructional usage of computers can be divided into two main parts. Instruction with computers used as an aid in teaching a subject is found in such areas as Computer Assisted Instruction and Computer Managed Instruction. Computer-related courses are courses where the computer is not a tool toward the instruction but is the object of the instruction.

Gaming is one of the most entertaining of all instructional computer uses. Students can play games against other students or against the computer. Computerized games are not just a means of entertainment. They are a means by which logical processes can be developed and improved. "One of the most exciting applications of computers is their ability to motivate students to constructive thinking through games."[32]

Arthur S. Melmed of the National Institute of Education stated that there was no consensus on the role and importance of modern information technology for education but that there existed widespread agreement on its many potential benefits. Melmed believed that a federal policy should exist in order not to delay the realization of the many benefits of modern technology. He used the computer as an example of an item that is available for home and school use at a fraction of the cost of the item a decade ago. He supported the idea of incorporating microcomputers

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[31]Justine Baker, Computers in Curriculum--PDK Fastback No. 82 (Bloomington, Indiana: Phi Delta Kappa Educational Foundation, 1976), p. 27.

[32]Baker, p. 33.

into television sets and making computer power available in the home to each child.[33]

Computer technology is advancing so rapidly that the National Science Foundation predicts that by the end of the decade most American homes will contain at least one computer. The research agency predicts by the year 2000 virtually every home in America will use a computer for something.[34]

Simulation programs can be used beneficially in the secondary educational programs. These consist of mathematical models for natural processes. The computer makes decisions and suggestions for possible results based on information fed to it. By changing the input-data, different results can be achieved. "Among the many simulation programs that can be written are those which determine whether a stream is polluted, a rocket will reach the moon, or a new business will survive."[35]

The simulator program can also be used in science laboratory experiments. Such use may reduce time required, which could be an advantage to the secondary program where laboratory work must be completed in the allotted time block. It could also reduce the danger of mixing the wrong chemicals, thus reducing both danger and cost.

Problem solving, using the computer much like a calculator, allows the student to concentrate on the process with mundane arithmetic

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[33]Arthur S. Melmed, "Information Technology for Education: An Agenda for the 80's," Technological Horizons in Education Journal, VII (November, 1980), 46.

[34]Al Rossiter, "Computer Invasion," Kingsport Times News, August 31, 1980, p. D-3.

[35]Baker, p. 33.

operations left to the machine. If the student has written the program to solve the problem on the computer, he must understand the computational process.[36]

J. A. Howe, Department of Artificial Intelligence at the University of Edinburgh, Scotland, stated that there was evidence that suggested that computer-based instruction may succeed where conventional teaching methods have failed. He cited as example an experiment at the Australian National University where severely handicapped children had been taught basic handwriting. Handicapped children have been taught word attack skills in an experimental program at the University of Edinburgh, and Howe says, "Indeed, we believe that the time is now ripe for a new deal for the handicapped through the introduction of computers in special education."[37]

Robert P. Taylor proposed Federal support for computers in such areas as "Gifted Students," "Handicapped Students," "Disadvantaged Students," "Home-Based Instruction" and "Research and Development." He said, "We are sitting on the edge of a revolution in the way in which instruction is delivered to students of all ages and varieties."[38]

One of the most recent instructional uses for the computer is in the area of guidance and counseling. The National Center for Research

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[36]R. Levin and others, "The Emerging Technology," Instructional Uses of the Computer in Higher Education (New York: McGraw-Hill, 1972), p. 64.

[37]J. A. Howe, "Computers Can Teach Where Others Fail," Technological Horizons in Education Journal, VIII (January, 1981), 44-45.

[38]Robert P. Taylor, The Computer in the School: Tutor, Tool, Tutee (New York: Teachers College Press, Columbia University, 1980), p. 260.

in Vocational Education held a conference in February, 1981 which emphasized "Technological Alternatives for Delivery of Career Information" which included mainframe computers and minicomputers as a means for informing students on career information.[39] In many high schools, computers are being used to help students select colleges and occupations. The Upper East Tennessee Educational Cooperative in Johnson City, Tennessee is involved in a project whose goals include placing a terminal in a secondary school in each of its member school systems. The terminals are connected to a computer in Nashville, Tennessee which has access to a daily update of job opportunities in Tennessee. The student has current job information available in the school which he attends and makes his (her) career planning objectives more relevant.

Computers in the educational program may encompass areas from literacy of computers to technical science courses to drafting through computer graphics to locating vocational and educational information. The use of the computer in the educational community is limited only by the knowledge and creativity of those directing the curriculum.

A study by James Frank LaSalle concerning business education and its relationship to the computer concluded that an awareness of the computer was an essential aspect of the secondary educational program of the prospective business student.[40]

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[39] Manpower and Vocational Education Weekly, February 5, 1981, p. 10.

[40] James Frank LaSalle, "The Role of the Secondary School Business Education Department in Preparing Students for Employment in Business Offices Using Data Processing Equipment" (Doctoral dissertation, Pennsylvania State University, 1963).

Robert David MacDonald did a study which focused attention on the need for instruction in data processing and the need for teaching materials to be geared to the computer age. His study was restricted, as have been most studies, to the department of business education.[41]

Alfred Ervin Smith, "Survey of Data-Processing Instruction in Selected Secondary Public Schools of the United States," showed that there was a need for more emphasis on computer-related courses in public secondary schools. His study further showed that in 1972, 39 percent of the responding schools offered courses in data processing; 19.4 percent offered one-year programs, 9.9 percent offered two-year programs and more than 50 percent offered units of data processing. Over 25 percent of the respondents anticipated computer instruction in course offerings by 1978. The study reflected that the majority of offerings were in the departments of business and mathematics.[42]

Donald Henderson said that every graduating secondary student should be knowledgeable about computers and therefore a need exists for every teacher and administrator to have a general orientation to computers and computer systems. He suggested that all teachers and educational administrators should complete a minimum of two courses in computer science as a general requirement for certification. These courses should be designed to cover the general orientation of computers and computer

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[41]Robert David MacDonald, "The Development of a Unit of Study in the Principles of Data Processing for Use in the Business Education Curriculum of Secondary Schools" (Doctoral dissertation, University of Northern Illinois, 1964).

[42]Alfred Ervin Smith, "Survey of Data-Processing Instruction in Selected Secondary Public Schools of the United States" (Doctoral dissertation, University of Nebraska, 1974).

systems, and the impact of computers on modern society and school systems. He added that elementary school teachers should not be exempt from the requirement because of the elementary student's familiarity with the computer when he entered school and his exposure to it at home. The secondary teacher must be prepared to contribute new approaches in education and this would require additional computer preparation programs.[43]

R. Lewis, who is in Computer Assisted Education, Chelsea College, University of London and also Director of "Schools Council Project 'Computers in the Curriculum,'" believed that it was important to distinguish between computers used as tools in education and their study as part of a comprehensive education.[44] He saw the study of computers as essential in the educational program of all students with varying degrees of intensity. Lewis stated that the greatest challenge of micro-electronics in education would have to be faced by teachers. "Teachers who are not devoted innovators must be involved, as the curriculum development which takes place must be capable of implementation by all teachers."[45]

The Kiplinger Washington Letter of January 16, 1981 stated that many high school teaching jobs were not being filled because persons with

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[43]Donald L. Henderson, "On the Computer: Implications for Teacher/Administrator Training," Educational Technology, XVIII (August, 1978), 41.

[44]R. Lewis, "Education, Computers and Micro-Electronics," Technological Horizons in Education Journal, VIII (January, 1981), 47.

[45]Lewis, p. 59.

a background in areas such as computer science could earn more money in private industry. A lack of availability of computer teachers has resulted in a slow-down in growth of computer-related courses in public secondary schools.[46]

Manpower and Vocational Education Weekly of January 22, 1981 stated that unless high schools trained more students in mathematics and computer mathematics, the pool of engineers and technical scientists would not be great enough to meet employment demands in the South and the nation as a whole. An example given was that in 1978 there were 16 percent fewer graduates than needed for the 6,150 openings for mathematics and computer specialists in fourteen Southern states.[47]

In April, 1980, the National Council of Teachers of Math released "An Agenda for Action: Recommendations for School Mathematics in the 1980's" inclusive of recommendations and suggestions for implementing identified curricula changes needed.[48]

The third recommendation of the Agenda of NCTM was that mathematics programs must take full advantage of the power of the calculator and computer at all grade levels. The Council stated that it was imperative to recognize the existence of computers in daily life. The Council material stressed "some degree of computer literacy for everyone."[49]

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[46]The Kiplinger Washington Letter, The Kiplinger Washington Editors, January 16, 1981, p. 2.

[47]"Mathematics Key to Boosting Technology Manpower," Manpower and Vocational Education Weekly, January 22, 1981, p. 10.

[48]Marilyn N. Snydam, "Mathematics Education," ASCD Curriculum Update, February, 1981, p. 1.

[49]Snydam, p. 1.

"The influence of governmental policies, the need for educational planning, an emphasis on systems analysis, and new budgetary approaches require the modern school administrator to be prepared in computer utilization."[50]

Andrew R. Molnar of the National Science Foundation said, "Can you imagine an engineer who graduates with honors but doesn't know how to run a computer?" He contended that teaching children basics was not sufficient for them to function in society. Molnar referred to a study by the Secretary of Education that said that Americans were becoming technology-illiterate while other nations advanced. The reason was placed on the educational system for neglecting a phase of the student's education.[51]

Man and the Computer

The social influences that computers have or may have on our world are more than interesting to contemplate; it is essential that they be foreseen so that we may learn to control the consequences. Computers have made serious inroads on a person's individual privacy through the collection and permanent recording of data concerning individual lives.[52]

Bruno Bettelheim stated, in an introduction to Freedom's Edge: The Computer Threat to Society, that the advantages of computers were so

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[50]Henderson, p. 42.

[51]"Computer Education Receives Boost" [AP, Temple, Arizona], Bristol Herald Courier, February 18, 1981, p. 6B.

[52]Ralph J. Kochenburger and Carolyn J. Turcio, Computers in Modern Society (Santa Barbara, California: John Wiley and Hamilton Publishing, 1974), p. 2.

obvious and so desirable, that we tend to become seduced into ignoring the price we pay for their unthinking use. The emphasis is on unthinking use, because they all have their good uses. However, the most careful thinking and planning are needed to enjoy the good use of any technical contrivance without paying a price for it in human freedom.[53]

It was proposed that a Computer Utility Bill of Rights was needed to limit the antisocial effects that could become reality with the computer. Milton Wessel suggested consideration of the following:

> 1. Access to a computer utility system shall not unreasonably be withheld.
> 2. The information disclosed by a computer utility system seeking response must be such as to permit the respondent to provide an intelligent answer.
> 3. The information furnished by a computer utility system must be such as to serve the public interest.[54]

These doctrines of fair access, disclosure and use outline concepts in the broadest and most general terms. However, these doctrines are those that should be made open discussion issues by the citizen--the individual--the person whose life will be served or whose life will serve the computer.

Realistically and flexibly defined and applied, these doctrines of access, disclosure and use can channel the computer ability's power into directions which will serve man's needs and enrich his life. Without them, he may find that the computer utility has created material wealth but destroyed the intangibles which make life worth living.[55]

Frances Bacon said "Knowledge is power" and Lord Acton added that

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[53]Bruno Bettelheim, "Introduction," Freedom's Edge: The Computer Threat to Society, Milton R. Wessel (Boston, Massachusetts: Addison-Wesley Publishing, 1974), p. 8.

[54]Wessel, p. 14.

[55]Wessel, p. 15.

"power tends to corrupt and absolute power corrupts absolutely." The greatest single danger posed by the mass data bank is the power it vests in the government.[56] The question that must be answered is how to make it possible to enjoy the tremendous benefits of data collection without endangering persons' freedom and privacy in the computer era. A number of computer professionals, legislators, educators, social scientists and others are aware of and concerned with the social problems of the computer era. The National Academy of Sciences' three-year study and 1972 report entitled Databanks in a Free Society, led by Columbia Professor Alan F. Westin, is an outstanding analytical effort, and Harvard Professor Arthur R. Miller's 1971 book, The Assault on Privacy, helped greatly to focus attention on the problem.[57] The problems encountered by the data bank are not new. However, the computer, with its vast potential, so compounds the danger that it creates issues of a different kind as well as of a more serious degree.

The possibility exists that new concepts in computer use may not present themselves in a way beneficial to mankind. Unless man uses the computer with wisdom and self-control, the computer could become a tool for standardization and suppression rather than individualization. Computer aided instruction could be used to brainwash children into rigid social and philosophical patterns rather than to promote flexibility of thought. Instead of assisting educators, the computer might be used to replace them, both depersonalizing the learning process and depriving the child of certain insights that only a human teacher can provide.[58]

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[56] Wessel, p. 32.

[57] Wessel, p. 33.

[58] Wessel, p. 33.

The future depends not on the computer itself but on man's use of the computer. Computers can be the key to positive change or they can be used to destroy mankind. Students must be educated to the computer so that they can make intelligent decisions concerning its uses.

On June 11, 1958, at the meeting of the Council of the Association for Computing Machinery at Urbana, Illinois, the President was authorized to appoint a committee to consider the social responsibilities of computer people to advance socially desirable applications of computers and to help to prevent socially undesirable applications.[59]

The committee of four met and the findings and recommendations basically reflected the idea that man must be responsible for his actions both moral and legal.

> There is the hope that man has matured emotionally as well as technologically. And since mankind is composed of individuals, the hope for the world rests on the shoulders of people with conscience. The schism between those in humanities and those in the sciences must be mended. The two are no longer isolated fields, and if we treat them as such, we run the danger of letting people who have highly restrictive views of the world rule our destinies. There are too many computer scientists and technologists who envision the computer and technology in general as ends in themselves, and too many humanities scholars who distrust technology to the point of wishing to revert to an irrecoverable past. The former group does not see that the computer is at best a useless, and at worst a dangerous, hunk of hardware unless it can be applied properly to man's problems, whereas the latter group fails to consider that the problem lies now (and always has) not in the tools themselves, but in man's self-awareness, wisdom, self-discipline, and maturity in using these tools. Knowledge is futile without wisdom, as is science without conscience.[60]

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[59]Edmund C. Berkeley, The Computer Revolution (New York: Doubleday, 1962), p. 220.

[60]Kochenburger and Turcio, p. 238.

I. A. Richards, Professor Emeritus at Harvard University, stated in an introduction to The Computer in American Education that we can at least be sure, as several of the contributors of this book remark, that the computer requires of those who serve it a deep consideration of what they are doing--a consideration that may be worth much more than the machines. Herein is a fountain of hope. "The programmer, willy-nilly, is in the role of one of Plato's guardians sent back down into the cave, to serve its inmates and 'get used again to seeing the dark.'"[61]

> In thinking of the programmer and the instructor we may keep in mind a sentence from Alexander Dumas' The Count of Monte Cristo in which the hero is approaching another sort of treasure: "He then began to climb down into the cave with a smile of doubt on his lips, murmuring that ultimate word of human wisdom: Perhaps."[62]

Summary

Interest in the uses of the computer as an aid in the educational program continues to rise, but "ambiguities and confusion as to 'where the computer is' in terms of its instructional role" keep educators from making full and confident use of it.

There is still no concrete evidence of how successful computers are. A need exists for a consistent framework for evaluating the use of computers for instruction. This evidence must be gained through class evaluations of computers in use in schools.[63]

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[61] Don D. Bushnell and Dwight Allen, The Computer in American Education (New York: John Wiley, 1967), p. 137.

[62] Bushnell and Allen, p. 137.

[63] Robert J. Seidel, "It's 1980: Do You Know Where Your Computer Is?" Phi Delta Kappan, LXI (March, 1980), 481.

Seidel reported that nearly three-fifths of all secondary schools were using computers in 1975, compared to one-third in 1970. Federal funding from the U.S. Office of Education and the National Science Foundation totaled $230 million for programs and equipment from 1965 to 1975.[64]

To sacrifice a whole generation of kids would be a big mistake, said Marilyn Spencer, coordinator of instructional computing for the Ridgewood, New Jersey School System. She continued by saying that educational systems must begin immediately to teach the fundamentals of computing.[65]

Computers can be made to be exactly observant and critical of their own routines; to collect the evidence of their inefficiency, analyze it, and indicate the needed redesign of their operations. In essence, computers appropriately programmed can become almost self-corrective.[66]

Working closely with the computer is the teacher-guide, mentor, and partner in the learning process. There is an undefinable magic in the human presence that no computer can ever duplicate. Our schools, facing the challenge of teaching twice as much to twice as many, will be resorting more and more to technology in education. They also will need greater numbers of human and responsive teachers. The problem for the schools, as for society as a whole, is mechanizing without dehumanizing.[67]

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[64] Seidel, p. 481.

[65] Dan Levin, "Microcomputers: Out of the Toy Chest and Into the Classroom," The Executive Educator, II (March, 1980), 19.

[66] Bushnell and Allen, p. xix.

[67] Bushnell and Allen, p. xix.

The problems associated with the social effects of computers need to be evaluated carefully. Computer professionals are not necessarily competent social scientists, but they are currently in the best position to ask significant questions. Although it is inherently dangerous to give technologists a key role in the evaluation of technology, we currently have little choice in the area of computer technology. Computer technologists must take the lead in developing an awareness of and evaluating the social implications of computer systems.[68]

The review of related literature showed that the computer has made tremendous strides in the past decade and that its potential in the educational community is limited only by the knowledge and funding resources of those in decision-making positions. The review also reflected the social implications that the computer age might have on the citizenry. Educators must be well-versed in the social implications and knowledgeable in computer potential in order to make curriculum decisions which affect the academic community.

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[68]William W. Cotterman, Computers in Perspective (Santa Barbara, California: Wadsworth Publishing, 1973), p. 202.

Chapter 3

RESEARCH, METHODOLOGY AND PROCEDURES

The purpose of this study was to determine the status of computer-related courses in public secondary schools in Tennessee through their identification and description.

The study was limited to those schools whose organizational pattern included grade twelve. The study was further restricted to those schools whose curriculum was designed to lead to a State approved diploma. The 1979-80 Directory of Public Schools, published by the State Department of Education, was used to identify schools.

A letter was written to the Commissioner of Education explaining the purposes of the study and requesting his support of the project. A copy of the letter is included in Appendix C. A response of approval from the Commissioner is included in Appendix D.

A list was made of schools which met the criteria stated above. There were 306 qualified schools in 128 school systems. The schools were divided between thirty-two city school systems and ninety-six county systems. This list is included in Appendix A.

The Preliminary Reports required annually by the Commissioner of Education were searched. They were filed by school systems in alphabetical order and alphabetically by schools within the school system. Information was taken from these reports and placed on reporting forms. A copy of the reporting form is included in Appendix B of this study. The information taken from the Preliminary Reports included name of course, name of teacher, enrollment in course, number of sections

taught, highest degree held by teacher and endorsements held by teacher. Collected data is given in Table 1. Computer-related courses were identified by the use of the word "computer" or "data processing" in the course title.

A letter was sent to superintendents of school systems which had one or more schools offering one or more computer-related courses for elective credit as part of the curriculum. The letter is found in Appendix E of this study. The letter requested support for the study by the superintendent if he/she were asked for direction as to whether or not to complete the questionnaire and return it. This letter was mailed on September 12, 1980.

A letter of introduction and a questionnaire were sent to persons who were identified as having taught a computer-related course during the 1979-80 school year. An 80 percent return from school systems was chosen as acceptable considering both the transience of teachers and the possible lack of interest in the project.

The questionnaire was developed after consultation with teachers, administrators, computer programmers and college professors. A search was unable to locate a validated questionnaire suitable for the study. The developed questionnaire was pilot tested with a class of graduate students at East Tennessee State University. The class consisted of persons who had teaching experience with at least 50 percent having also had administrative experience. The purpose of this procedure was to determine clarity and usability of the instrument. The questionnaires and appropriate cover letters were mailed on September 25, 1980. Each questionnaire had a self-addressed and stamped envelope enclosed.

Table 1

Preliminary Report Information

School System	School	Staff Enrollment	Grades Served	Student Enrollment	Computer-Related Course	Teacher's Degree	Teacher's Endorsements*	Computer-related Course Enrollment
Chattanooga City	Brainerd	49	10-12	917	Computer Math	M.A.	13, 07	12
	Hixon	57	10-12	1280	Computer Math	B.A.	13	21
Davidson County	Glencliff	104	9-12	1995	Computer Programming	B.A.	10, 11, 13, 36	19
	Overton	96	10-12	1772	Computer Math	M.A. + 45	13, 92	10
					Computer Programming	M.A.	30, 31, 32, 33, 34, 35, 36, 37, 39, 41, 53, 57	21
	Whites Creek	89	9-12	1783	Computer Math	B.S.	13	25
Greeneville City	Greeneville	54	10-12	955	Computer Math	M.A.	13, 17	12

Table 1 (continued)

School System	School	Staff Enrollment	Grades Served	Student Enrollment	Computer-Related Courses	Teacher's Degree	Teacher's Endorsements*	Computer-related Course Enrollment
Hamilton County	Central	46	9-12	1010	Computer Math	B.S.	13, 25, 33, 34, 35, 39	10
	Red Bank	49	10-12	1120	Computer Math	M.A.	13, 14, 15, 21	11 & 18
	Soddy Daisy	33	10-12	872	Computer Math	M.A.	13, 14, 15, 16, 17	6
Hickman County	Hickman	40	9-12	984	Computer Math	M.A.	13, 21, 23, 24, 26	32
Johnson City City	Science Hill	86	10-12	1360	Computer Programming	B.S.	13, 15	11
					Computer Programming	M.A.	13, 16	13
Kingsport City	Dobyns-Bennett	117	9-12	1876	Computer Math	M.A.	13, 21	22 & 19

Table 1 (continued)

School System	School	Staff Enrollment	Grades Served	Student Enrollment	Computer-Related Courses	Teacher's Degree	Teacher's Endorsements *	Computer-related Course Enrollment
Knox County	Karns	49	9-12	1123	Computer Math	Ed.S.	14, 16, 17, 51, 92, 93, 13	20
	Powell	46	9-12	1013	Computer Math	M.A.	13, 21, 23	28 & 23
Knoxville City	Bearden	58	10-12	1128	Computer Math	B.S.	13, 15, 16, 17	3
Memphis City	Overton	45	10-12	811	Computer Math	M.A.	13	12
Oak Ridge City	Oak Ridge	89	10-12	1515	Computer Programming	M.S.	1, 13, 16, 17	21
					Computer Programming	B.S.	13, 14, 15	19

Table 1 (continued)

School System	School	Staff Enrollment	Grades Served	Student Enrollment	Computer-Related Courses	Teacher's Degree	Teacher's Endorsements *	Computer-related Course Enrollment
Rutherford County	Oakland	73	9-12	1505	Computer Math	M.Ed.	13, 19	24 & 17
	Riverdale	74	9-12	1530	Computer Math	M.S.T.	13, 14, 15	14
	Smyrna	53	10-12	1143	Computer Math	M.A. + 45	13	25
Tullahoma City	Tullahoma	68	9-12	1148	Computer Math	M.A.	13	15
Warren County	Warren	75	10-12	1407	Computer Math	B.S.	14, 15, 16, 17	32 & 24
Weakley County	Westview	34	9-12	725	Computer Math	B.S.	13	12
White County	Sparta White	56	10-12	1117	Computer Math	B.S.	13	17

* See key to interpretation of endorsement areas in Appendix F.

Data obtained on the Preliminary Report form found in Appendix B were analyzed to give an overview of school systems, schools, grade levels examined, enrollments in schools offering computer-related courses, pupil-teacher ratios in such schools, degrees held by teachers and general types of endorsements held by those teaching the courses. Total computer-related course enrollments were also taken from this form. These data were examined to report total city and county school systems, individual and total schools represented, average enrollment, average pupil-teacher ratios, and grades served. The data were also used to report teacher characteristics of degrees held and areas in which endorsed by the Office of Teacher Certification. Appendix H is a list of Teacher Certification Endorsement Areas.

The data were reviewed and the number of courses which offered one-half, one, two and other specified minimum and maximum Carnegie units were reported.

The questions concerning the availability of the computer and terminals for student use were examined and reported in percentages of availability by computer and numbers of terminals available per class period.

The locations of the computers in the schools which housed the computer-related courses were grouped to the extent that grouping was practical and reported by groupings. Where grouping was not practical, a report was made of the computer location.

Questions concerning how the computer was obtained were examined and grouped or reported by individual school.

The data gathered concerning the number of years the computer-related

course had been a part of the secondary curriculum were stated in terms of average number for the total number of courses. Years were also reported by the number of first year, second year, third year, and other specific years listed.

Data on software availability were reported in paragraph form in generalities.

Annual budget data showed the lowest budgeted amount, highest budgeted amount and average amount. Pertinent comments from participating instructors were listed.

The status of computer-related electives for 1980-81, as perceived by those who instructed computer-related courses in 1979-80, was shown by tallying the responses of "No change," "Increase in offerings" and "Decrease in offerings." Additional information was given as compiled in the explanations of these categories.

Computer-related courses were grouped into such areas as computer science, computer math, and computer graphics. Objectives within these broad categories were analyzed in determining general objectives of the courses. These were presented in paragraph form. Available curriculum guides and courses of study were also reviewed to gain information on course content and objectives. Data from these were made a part of the Appendices.

Textbook and material sources were compiled and frequently used materials listed.

Other information viewed by questionnaire participants as being helpful was analyzed and presented in narrative if it appeared pertinent in determining and reporting the status of computer-related elective courses in public secondary schools in Tennessee.

Chapter 4

DATA AND FINDINGS

The problem of this study was to determine the status of computer-related elective courses in public secondary schools in Tennessee.

There were 306 schools in Tennessee identified as housing grade twelve and offering a curriculum which would meet the requirements for a State diploma. These schools were located by searching the 1979-80 Directory of Public Schools in Tennessee. The identified schools were located in 128 school systems. Thirty-two city systems and ninety-six county systems were represented. A listing of the population for this study is included in Appendix A. A search of Preliminary Reports of the 306 schools revealed twenty-four schools offering computer-related elective courses. These schools are listed in Table 1, Chapter 3.

A letter of introduction to the study was mailed to the Commissioner of Education. A copy of the letter is included in Appendix C. The Commissioner responded with a letter supporting the project and granting permission for the Preliminary Report files to be searched to identify computer-related course offerings. This response is included in Appendix D.

A letter was mailed to each of the superintendents of school systems which had one or more qualified schools offering one or more computer-related elective courses. The purpose of the letter was to make the superintendent aware of the study in the event that the classroom teacher asked for direction whether to participate in the survey. A response from the superintendent was not requested; however, one superintendent

replied that the person to whom the letter and questionnaire were sent was no longer teaching the course. He included the names of five other individuals who were teaching computer-related elective courses during the 1980-81 school year. This information is included in this section to show that in one school system in Tennessee computer-related courses increased 500 percent within a twelve-month period, assuming that each teacher taught only one course and one session of it.

Data were gathered on schools and school systems from individual Preliminary Report forms and the Public School Directory. The charts in Table 1 of Chapter 3 report specific information gathered from the Preliminary Reports. The information missing is the name of the teacher, which was collected for the purpose of correspondence but was omitted by reason of professional courtesy.

Because of the limited amount of literature available on computer-related courses in public schools in the United States, a letter was sent to each of forty-nine State Departments of Education. The letter contained four basic questions concerning the status of computer-related education in the State. The letter asked that "opinion" be given based on knowledge of State curriculum rather than statistical information. This differentiation was made because it was believed that most states would not have the information requested available in specific numbers, but that a state curriculum person should have a valid and reasonable idea of the status.

The information gathered was used as a comparison standard for the facts gathered on Tennessee.

The four questions and percentages based on the thirty-six returns

are listed. Percentages were rounded to the nearest percent.

A. The State Board of Education recognizes computer-related courses as acceptable toward State graduation requirements.

YES 89%

NO 11%

B. An "awareness or introduction" to the computer is taught to all students at some level of the instructional program in this State.

YES 11%

NO 89%

C. An estimation of the percentage of secondary schools in this State offering one or more computer-related courses is:

0-10% 18%

11-25% 32%

26-50% 20%

51-75% 15%

76-99% 14%

D. In my opinion, computer-related courses will:

Increase in the 1980's: 97%

Reflect no noticeable change in the next ten years: 3%

Decrease in the next ten years: 0%

In order to solve the problem of the study, answers were sought to certain basic research questions pertaining to the study as identified in Chapter 1. These answers were derived from the information gathered from the Preliminary Reports and responses from the questionnaires to teachers of computer-related courses. Responses received represented thirteen of sixteen school systems, sixteen of twenty-four identified schools and were from eighteen of the twenty-seven teachers to whom the

questionnaire was sent. The return represented an enrollment of 405 students as compared to 568 total enrollment in computer-related courses in Tennessee.

First Research Question

Which schools housing any combinations of grades which include grade twelve and offer a program leading to a Tennessee diploma, offer computer-related elective courses?

Twenty-four schools were identified as offering one or more computer-related courses. These schools were:

Chattanooga City:	Brainerd
	Hixon
Davidson County:	Glencliff
	Overton
	Whites Creek
Greeneville City:	Greeneville
Hamilton County:	Central
	Red Bank
	Soddy Daisy
Hickman County:	Hickman
Johnson City City:	Science Hill
Kingsport City:	Dobyns-Bennett
Knox County:	Karns
	Powell
Knoxville City:	Bearden
Memphis City:	Overton

Oak Ridge City:	Oak Ridge
Rutherford County:	Oakland
	Riverdale
	Smyrna
Tullahoma City:	Tullahoma
Warren County:	Warren
Weakley County:	Westview
White County:	Sparta White

Second Research Question

In what organizational structure (disciplines, departments) are computer-related courses offered?

Information gained from Preliminary Reports filed in the State Department of Education in Nashville showed that there were twenty-one computer math courses and six computer programming courses taught in 1979-80. The computer math courses were taught in the mathematics departments. Computer programming was also listed in the mathematics departments except for those students who requested business education credit in one school and whose teacher was endorsed in the area of business education. Student enrollment in these courses in September, 1979 was 104 in computer programming and 464 in computer math. A total of 568 students were enrolled in computer-related course electives for the first semester of the 1979-80 school year. There were thirty-two class sessions and five staff members taught more than one section per day.

Third Research Question

What degrees are held by teachers teaching computer-related courses?

There were twenty-seven persons identified by the Preliminary Reports as teaching one or more computer-related courses during 1979-80. Of these twenty-seven, one held a specialist degree, two held master's plus forty-five hours, fourteen held master's degrees and ten held bachelor's degrees.

Fourth Research Question

What endorsements are held by teachers of computer-related courses?

Twenty-four teachers were endorsed in mathematics, two teachers in science, and one in business, and twenty of the twenty-seven held multiple endorsements. The multiple endorsements were in subject-matter areas with the exception of two who held multiple subject matter endorsements as well as administrative endorsement.

The Tennessee Office of Teacher Certification grants endorsements in mathematics, science and business education, but criteria have not been established to grant specific endorsements for teachers of computer-related courses.

Fifth Research Question

What is the student-teacher ratio in schools offering computer-related elective courses?

The student-teacher ratio in schools offering electives in computer-related courses was 1:19.5. The average school enrollment was 1254 and the grade spans were 9-12 or 10-12. The ratio in computer-related

courses was 1:17.75. The Tennessee State Board of Education restricts the number of students in secondary classes to a student-teacher ratio of 1:35.

Sixth Research Question

What is the total enrollment in computer-related electives in Tennessee in the year studied?

It was found that the total enrollment for the fall semester of the 1979-80 school year in computer math was 464 and in computer programming was 104. Total enrollment in computer-related elective courses was 568.

Seventh Research Question

What are the minimum and maximum numbers of Carnegie units available to students taking computer-related courses?

The majority of courses were set up on a semester basis with a minimum and maximum of one-half unit of credit. One school offered a maximum of one-half unit of credit as part of the regular school program and allowed students to gain an additional unit through an Independent Studies program.

Eighty-two percent of the schools provided a minimum of one-half unit of credit and a maximum of one-half unit of credit was provided in 50 percent of the schools. Six percent required a minimum of one unit while 6 percent required a minimum of two units. One school offered nine-weeks courses; however, two nine-week terms were required for any Carnegie unit credit. One school did not restrict the maximum number of elective units and 44 percent had a maximum of one unit allowance.

Table 2

Carnegie Units Available for Computer-Related Electives

Carnegie Units	Minimum Units	Maximum Units
One-half	82%	50%
One	6%	44%
Two	6%	0%
Other	6%	6%

Eighth Research Question

What is the availability of computers in computer-related courses?

Computers were available for student use. Only one respondent indicated that a computer was not available for student use and that textbooks and media served to acquaint the student with the instrument. Computers were housed in a variety of locations. Fifty-two percent of the schools housed the computer in the classroom where the course was taught, and 12 percent of the schools had a separate toom for the computer with the room in the school building where the course was taught. Six percent of the schools shared a computer with another school, with the computer housed in the other school. Thirty percent of the schools used the computer services, including hardware, of neighboring colleges and universities.

Ninth Research Question

How were computers obtained (funding source) for use in computer-related courses?

Computers were obtained for the computer-related courses primarily by the school system's purchasing the computer for the course. One school had a computer which was a gift purchased by business persons and other interested citizens. One school shared a computer with the local governmental agency.

Tenth Research Question

What is the degree of availability of terminals for student use in computer-related courses?

One terminal was available per class period in 67 percent of the schools, two terminals were available in 12 percent of the schools, six in 6 percent, eight in 6 percent and a range of six to nine in 6 percent of the schools.

Eleventh Research Question

What types of software (means of production) are used by students in computer-related courses?

Most software was produced by the instructor and/or the students. No individual reported that the software was purchased exclusively.

Software used in computer-related courses was produced through several sources. Most programs used more than one source of software, usually a combination of purchased, student produced, or instructor produced. In 65 percent of the responding schools, students were directly involved in software production. Eighteen percent of the schools used software made available by neighboring colleges and universities. Percentages were based on number of responses to the

question in comparison to total returns. Some respondents marked more than one major source of software availability. Comments from the respondents indicated that student-produced software was a major emphasis of the instructional program and that such production was reflected in the student evaluations.

Textbooks used in computer-related courses as reported by classroom teachers included:

A First Course in Data Processing, Cougar, John Wiley

BASIC, Boilliot and Horn, West Publishing

BASIC, Maratek, Academic Press

Basic, BASIC, Coan, Hayden

Computer Concepts, Bolhl, Science Research Associates

Introduction to Computer Science, Bonks and Duonik, John Wiley

Introduction to Data Processing, Robichaud, McGraw-Hill

Introduction to EDP, Spencer, Merrill

Programming in the BASIC Language, Golden, Harcourt, Brace, Jovanovich

Programming in the BASIC Language, published by Harcourt, Brace, Jovanovich, was the only textbook used in more than one school.

Curriculum guides were not available in most school systems; however, a sample guide was made available by the Hamilton County School System.

Twelfth Research Question

What monies are spent (allocated) in courses pertaining to computers?

The range of budgeted amounts of money for computer-related courses was $0 to $2,000. An average could not be determined because of the variety of methods of budgeting. One school system allocated $4.00 per

pupil enrolled in the course. Comments from respondents included:

"I do not know."

"Budget depends on the telephone bill which is a part of the computer course."

"Budget is part of mathematics departmental budget and is not specified till end of year many times."

"Budget for computer course is in central administration and is not a part of the local school budget."

Thirteenth Research Question

Has there been a change in program offerings for 1980-81 in schools which offered computer-related course electives during the 1979-80 school year?

Seventy-six percent of the schools in the study reflected no change in computer-related offerings from the offerings of 1979-80; 24 percent of the schools reflected increases. There were no decreases reported.

Computer-related courses were rare in Tennessee in 1979-80; however, those that existed were not new to the curriculum in the schools. Only 12 percent of the schools offered computer-related courses new to the 1979-80 curriculum. Twelve percent had had computer courses for two years, 24 percent had a three year history and 52 percent had been in existence over three years.

Fourteenth Research Question

What curricular goals exist in courses pertaining to computers?

There was no differentiation between the goals of computer-math and

computer-programming courses. The most common goals of the courses were the following:

1. Introduction to and appreciation of computer-technology.
2. Awareness of computer-related career opportunities.
3. Uses of computers as problem-solving tools.
4. History of the computer and computerization.
5. "Hands-on" experiences with computers and terminals.
6. Instruction in writing simple programs.
7. Introduction to computer language: BASIC and FORTRAN were listed.
8. Familiarization with computer technology.
9. Development of flow charts and simple system designs.
10. Computer instruction used to develop logical thinking processes.

Chapter 4 presented an analysis of data gathered concerning computer-related elective courses in identified public secondary schools in Tennessee. Chapter 5 presents a summary of findings, conclusions and recommendations.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

In this study the problem was to determine the status of computer-related elective courses in public secondary schools in Tennessee.

A descriptive research design was followed by identifying schools, collecting information from Preliminary Reports, corresponding with teachers who taught the courses and examining and reporting data. Answers were sought to fourteen major research questions.

Conclusions

There were 306 schools in Tennessee in 1979-80 which housed grade twelve and whose curriculum reflected State diploma requirements. Twenty-four of these schools (8 percent) offered one or more computer-related course electives in the curriculum. Twenty-one computer-math courses and six computer-programming courses were offered. There were thirty-two class sections.

There were 568 students enrolled in the thirty-two computer-related class sessions for the first semester of the 1979-80 school year. The average class size was 17.75. The average school enrollment was 1254 and the average teacher-student ratio was 1:19.5.

The Tennessee Department of Education has supported consolidation of schools because research has shown that schools with a population equal to or exceeding 1,000 students offered more of a variety of course

selections than was feasible for smaller schools. The required maximum class size in Tennessee in grades seven through twelve remains thirty-five; however, schools whose curricula go beyond the limits of minimum requirements have smaller classes in many cases and the total student-teacher ratio is reduced.

Objectives of computer-related courses were "awareness" and "introductory" in nature. Simple programming was included in schools which offered more than one-half Carnegie unit credit as a maximum. The majority of schools offered only one-half unit minimum and maximum credit.

Computers and terminals were available for student use in computer courses and were primarily housed in the classroom where the course was taught. Software was produced by staff or staff and students in most schools with a minimum of purchased software.

There were twenty-seven certified persons teaching computer courses in 1979-80. One held a specialist degree, two held master's plus forty-five hours, fourteen held master's and ten held bachelor's degrees. Twenty-four were endorsed in math, two in science and one in business. Twenty of the twenty-seven held multiple endorsements.

The data reported for 1980-81 reflected no decreases in computer-related elective courses. Increases were reported by less than 25 percent of the schools reporting in this study. In comparison with information gained from opinion survey to forty-nine State Departments of Education, Tennessee ranks in the lower 18 percent of states where less than 10 percent of the secondary schools offer one or more computer-related courses.

Recommendations

Based on the findings and conclusions of this study, the following recommendations were made:

1. More research is needed on computer-related curriculum and curricular offerings in Tennessee with emphasis on methods, materials and objectives.

2. There is a need for in-depth studies in computer education on a national basis, beyond the range of a single researcher. This should entail not only curriculum whose purpose is study of the computer but also areas where computers are used as a piece of equipment, such as Computer-based Instruction, Computer Assisted Instruction and Computer Managed Instruction.

3. There is a need for State Department personnel to be designated who are specialists in the field of computer curricula and for these persons to act in an advisory capacity to school systems which offer computer-related courses.

4. The State Textbook Adoption Committee should review textbooks for computer courses and make recommendations.

5. Colleges and universities which provide teacher preparation programs should study the feasibility of including computer curricula in the teacher training program.

6. The Tennessee Office of Teacher Certification should study the feasibility of establishing criteria for endorsement for teachers of computer-related courses.

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APPENDICES

APPENDIX A

LISTING OF TENNESSEE SECONDARY SCHOOLS WHICH COMPOSE POPULATION OF STUDY

Public Secondary Schools in Tennessee Which House Grade Twelve and Whose Curriculum Reflects State Diploma Requirements

County System	School	Grade Spread	No. Teachers
Anderson	Clinton	10-12	45
	Lake City	9-12	28
	Norris	9-12	19
Bedford	Cascade	7-12	18
	Central	9-12	42
Benton	Big Sandy	7-12	15
	Central	9-12	24
	Holladay	7-12	8
Bledsoe	Bledsoe	9-12	27
Blount	Heritage	9-12	95
	William Blount	9-12	85
Bradley	Bradley	10-12	109
	Charleston	7-12	18
Campbell	Campbell County	10-12	59
	Jacksboro	9-12	26
	Jellico	9-12	26
	Stoney Fork	7-12	1
	Wynn Habersham	7-12	15
Cannon	Cannon County	9-12	26
Carter	Cloudland	7-12	23
	Hampton	9-12	20
	Happy Valley	9-12	32
	Unaka	9-12	21
Cheatham	Central	10-12	57
Chester	Chester County	9-12	32
Claiborne	Claiborne County	9-12	39
	Forge Ridge	9-12	7
	Powell Valley	9-12	28
Clay	Celina	9-12	18
	Hermitage Springs	7-12	12
Cocke	Cocke County	9-12	40

County System	School	Grade Spread	No. Teachers
Coffee	Central	10-12	53
Cumberland	Cumberland County	10-12	54
Davidson	Antioch	10-12	56
	Bellevue	7-12	73
	Cohn	9-12	45
	Dupont	10-12	53
	East	9-12	74
	Glencliff	9-12	104
	Goodlettsville	7-12	60
	Hillsboro	9-12	56
	Hillwood	9-12	54
	Hume Fogg	10-12	43
	Joelton	7-12	38
	John Overton	10-12	96
	Madison	10-12	44
	Maplewood	9-12	86
	McGavock	9-12	153
	Pearl	10-12	42
	Stratford	9-12	75
	Whites Creek	9-12	89
Decatur	Riverside	9-12	27
	Scotts Hill	7-12	10
Dekalb	Dekalb County	9-12	39
Dickson	Dickson County	10-12	70
Dyer	Dyer County	9-12	26
Fayette	Fayette Ware North	11-12	31
Fentress	Clarkrange	7-12	22
Franklin	Franklin County	10-12	60
	Huntland	7-12	19
Gibson	Dyer	7-12	16
	Gibson	7-12	6
	Medina	7-12	7
	Rutherford	7-12	10
	Spring Hill	7-12	8
	Yorkville	7-12	6
Giles	Giles County	9-12	55
	Richland	9-12	20

County System	School	Grade Spread	No. Teachers
Grainger	Rutledge	9-12	33
	Washburn	9-12	10
Greene	Chuckey-Doak	9-12	25
	North Greene	9-12	23
	South Greene	9-12	33
	West Greene	9-12	28
Grundy	Grundy County	9-12	36
Hamilton	Central	9-12	46
	East Ridge	10-12	45
	Ooltewah	9-12	41
	Red Bank	10-12	49
	Sale Creek	7-12	17
	Soddy Daisy	10-12	33
Hancock	Hancock County	8-12	25
Hardeman	Central	10-12	39
	Middleton	7-12	29
Hardin	Hardin County	10-12	36
Hawkins	Bulls Gap	7-12	17
	Church Hill	8-12	37
	Clinch	9-12	8
	Rogersville	8-12	38
	Surgoinsville	7-12	26
Haywood	Haywood	9-12	72
Henderson	Lexington	9-12	34
	Sardis	7-12	7
	Scotts Hill	7-12	8
Henry	Henry County	9-12	59
Hickman	Hickman County	9-12	40
Houston	Houston County	8-12	23
Humphreys	McEwen	7-12	18
	Waverly Central	9-12	44
Jackson	Central	9-12	22
Jefferson	Jefferson County	9-12	91
Johnson	Johnson County	9-12	38

County System	School	Grade Spread	No. Teachers
Knox	Carter	9-12	69
	Doyle	9-12	69
	Farragut	9-12	96
	Gibbs	7-12	46
	Halls	9-12	49
	Karns	9-12	49
	Powell	9-12	46
Lake	Lake County	9-12	27
Lauderdale	Halls	7-12	38
	Ripley	9-12	58
Lawrence	Lawrence County	9-12	58
	Loretto	9-12	32
	Summertown	7-12	23
Lewis	Lewis County	9-12	22
Lincoln	Lincoln County	10-12	62
Loudon	Greenback	7-12	12
	Loudon	9-12	29
McMinn	Calhoun	0-12	26
	Central	9-12	50
	McMinn	9-12	54
McNairy	Adamsville	7-12	24
	McNairy Central	9-12	52
Macon	Macon County	9-12	25
	Red Springs	7-12	15
Madison	North Side	10-12	27
	South Side	10-12	22
	West	10-12	14
Marion	Marion County	9-12	39
	South Pittsburg	7-12	36
	Whitwell	7-12	31
Marshall	Cornerville	7-12	13
	Forrest	7-12	13
	Marshall County	10-12	31

County System	School	Grade Spread	No. Teachers
Maury	Central	10-12	59
	Culleoka	7-12	12
	Hampshire	7-12	6
	Mt. Pleasant	7-12	40
	Santa Fe	7-12	10
	Spring Hill	7-12	16
Meigs	Meigs County	7-12	27
Monroe	Madisonville	9-12	22
	Tellico Plains	9-12	16
	Vonore	7-12	13
Montgomery	Central	7-12	49
	Clarksville	10-12	78
	Northwest	10-12	62
Moore	Moore County	7-12	21
Morgan	Central	9-12	26
	Coalfield	8-12	12
	Oakdale	9-12	12
	Sunbright	9-12	12
Obion	Kenton	7-12	14
	Obion County Central	9-12	35
	South Fulton	9-12	17
Overton	Livingston Academy	9-12	31
	Rickman	7-12	17
Perry	Perry County	9-12	21
Pickett	Pickett County	7-12	20
Polk	Copper Basin	9-12	22
	Polk County	9-12	31
Putnam	Monterey	7-12	24
	Putnam County	10-12	59
	Upperman	7-12	34
Rhea	Rhea County	9-12	67
Roane	Midway	7-12	15
	Oliver Springs	9-12	23
	Roane County	9-12	32
	Rockwood	10-12	17

County System	School	Grade Spread	No. Teachers
Robertson	East Robertson	9-12	20
	Greenbrier	9-12	28
	Jo Byrns	7-12	18
	Springfield	10-12	34
Rutherford	Eagleville	7-12	13
	Holloway	9-12	11
	Oakland	9-12	73
	Riverdale	9-12	74
	Smyrna	10-12	53
Scott	Scott	9-12	40
Sequatchie	Sequatchie County	9-12	23
Sevier	Gatlinburg Pittman	9-12	22
	Sevier County	9-12	53
	Seymour	8-12	30
Shelby	Bartlett	9-12	69
	Bolton	9-12	22
	Collierville	9-12	46
	Germantown	9-12	105
	Millington	9-12	82
Smith	Gordonsville	7-12	19
	Smith County	9-12	30
Stewart	Stewart County	9-12	28
Sullivan	Central	10-12	79
	East	9-12	76
	Ketron	9-12	42
	Lynn View	9-12	39
	Sullivan	7-12	42
Sumner	Gallatin	10-12	60
	Hendersonville	10-12	89
	Portland	10-12	24
	Westmoreland	7-12	33
	White House	9-12	35
Tipton	Brighton	7-12	25
	Covington	9-12	53
	Munford	9-12	33
Trousdale	Trousdale County	8-12	23
Unicoi	Unicoi County	9-12	49

County System	School	Grade Spread	No. Teachers
Union	Horace Maynard	8-12	29
Van Buren	Van Buren County	7-12	17
Warren	Warren County	10-12	75
Washington	Daniel Boone	9-12	66
	David Crockett	9-12	70
Wayne	Collinwood	9-12	17
	Frank Hughes	7-12	9
	Wayne County	9-12	16
Weakley	Dresden	9-12	18
	Gleason	7-12	13
	Greenfield	8-12	18
	Palmersville	7-12	7
	Westview	9-12	34
White	Sparta White County	10-12	56
Williamson	Fairview	7-12	32
	Franklin	9-12	57
	Fred J. Page	7-12	49
Wilson	Lebanon	9-12	73
	Mt. Juliet	10-12	47
	Watertown	9-12	13

City System	School	Grade Spread	No. Teachers
Alamo	Alamo	7-12	22
Alcoa	Alcoa	9-12	26
Atwood	Atwood	7-12	13
Bells	Bells	7-12	14
Bradford	Bradford	7-12	17
Bristol	Tennessee High	9-12	88

City System	School	Grade Spread	No. Teachers
Chattanooga	Brainerd	10-12	49
	Chattanooga	9-12	46
	Hixson	10-12	57
	Howard	7-12	41
	Kirkman Tech HS	10-12	53
	Lookout Valley	7-12	34
	Riverside	10-12	27
	Tyner	10-12	49
Cleveland	Cleveland	9-12	58
Crockett Mills	Hamlett Robertson	7-12	8
Dyersburg	Dyersburg	9-12	64
Elizabethton	Elizabethton	9-12	60
Friendship	Friendship	7-12	5
Gadsden	Gadsden	7-12	12
Greeneville	Greeneville	10-12	54
Harriman	Harriman	9-12	30
Hollow Rock-Bruceton	Central	7-12	18
Humboldt	Humboldt	10-12	32
Huntington	Huntington	9-12	23
Jackson	Jackson Central-Merry	10-12	77
Johnson City	Science Hill	10-12	86
	University High	7-12	18
Kingsport	Dobyns-Bennett	9-12	117
Knoxville	Austin East	10-12	35
	Bearden	10-12	58
	Central	10-12	63
	Fulton	10-12	57
	Holston	9-12	41
	Rule	9-12	43
	South	7-12	45
	South Young	10-12	40
	West	10-12	45

City System	School	Grade Spread	No. Teachers
Lenoir	Lenoir City	9-12	41
Maryville	Maryville	10-12	31
Maury	Maury City	7-12	13
McKenzie	McKenzie	9-12	22
Memphis	B. T. Washington	10-12	51
	Carver	10-12	53
	Central	10-12	41
	Douglass	10-12	25
	East	10-12	24
	Fairley	10-12	54
	Frayser	7-12	59
	Hamilton	10-12	68
	Hillcrest	10-12	42
	Manasses	7-12	24
	Melrose	10-12	60
	Messick	7-12	34
	Mitchell Road	10-12	45
	Northside	10-12	67
	Oakhaven	7-12	25
	Overton	10-12	45
	Raleigh Egypt	9-12	65
	Sheffield	7-12	31
	South Side	10-12	60
	Treadwell	7-12	30
	Trezevant	7-12	38
	West Side	7-12	17
	Westwood	7-12	67
	White Station	7-12	37
	Whitehaven	10-12	52
	Wooddale	10-12	52
Milan	Milan	9-12	39
Morristown	Morristown East	9-12	58
	Morristown West	9-12	66
Oak Ridge	Oak Ridge	10-12	89
Oneida	Oneida	7-12	32
South Carroll	Clarksburg	7-12	12
Trenton	Peabody	9-12	27
Trezevant	Trezevant	7-12	17

City System	School	Grade Spread	No. Teachers
Tullahoma	Tullahoma	9-12	68
Union City	Union City	9-12	32

APPENDIX B

FORM USED TO GATHER PRELIMINARY REPORT DATA

PRELIMINARY REPORT INFORMATION

School System	School	Staff Enrollment	Grades Served	Student Enrollment	Computer-Related Course	Teacher	Degree	Endorsements	Course Enrollment

APPENDIX C

LETTER TO COMMISSIONER OF EDUCATION

Box 274, Route 1
Piney Flats, Tennessee 37686
September 2, 1980

Mr. E. A. Cox
Commissioner of Education
Tennessee State Department of Education
100 Cordell Hull Building
Nashville, Tennessee 37219

Dear Commissioner Cox:

Curriculum is one of the most discussed aspects of the secondary educational program and one of the most neglected in research.

Because of the rapidity with which the use of the computer has grown and the vast numbers of areas of living it involves, I am interested in determining to what extent we are familiarizing our public secondary school students with the computer and its capabilities and limitations.

I have chosen as a research project in my doctoral studies at East Tennessee State University, "The Status of Computer-Related Elective Courses in Public Secondary Schools in Tennessee." Your support of my research as I make a manual search of Preliminary Reports and follow-up with questionnaires to teachers involved in teaching such courses during the 1979-80 school year would be appreciated.

I am most willing and anxious to share my findings with you and your staff.

Sincerely,

Nancy Hubble Hickman

APPENDIX D

LETTER FROM COMMISSIONER OF EDUCATION

TENNESSEE
STATE DEPARTMENT OF EDUCATION
OFFICE OF COMMISSIONER
NASHVILLE 37219

September 11, 1980

Ms. Nancy H. Hickman
Box 274, Route 1
Piney Flats, TN 37686

Dear Ms. Hickman:

In keeping with your letter of September 2, 1980, your request to make a search of Preliminary Reports to obtain information regarding a research project dealing with computer-related instruction at the secondary level is approved.

Sincerely yours,

E. A. Cox
Commissioner

EAC:sh

cc: Dr. Mack Pierce

Mr. Donald Wood

APPENDIX E

LETTER TO SUPERINTENDENTS OF SCHOOLS IDENTIFIED AS OFFERING A COMPUTER-RELATED COURSE

Box 274, Route 1
Piney Flats, Tennessee 37686
September 15, 1980

Name
Superintendent of Schools
School System
, Tennessee

Dear :

You and your school system are to be commended for your curriculum planning and particularly for offering a computer-related elective to your secondary students in 1979-80.

I am a student in the doctoral program at East Tennessee State University and have chosen "The Status of Computer-Related Elective Courses in Public Secondary Schools in Tennessee" as a research project.

As a result of information gained in a manual search of the Annual Preliminary Reports, I have sent a questionnaire to the person or persons in your school system who taught the course during 1979-80.* The questionnaire deals primarily with curriculum goals, budget and minimum and maximum Carnegie units available to students.

Your support of my research would be appreciated if your staff should request your opinion of whether or not to complete the questionnaire.

Thank you for your cooperation, and I wish a prosperous year of learning for your students and staff.

Sincerely,

Nancy Hubble Hickman

* Person(s) to whom questionnaire sent:

APPENDIX F

LETTER AND QUESTIONNAIRES SENT TO 1979-80 TEACHERS OF COMPUTER-RELATED ELECTIVE COURSES

Box 278-A2, Route 1
Piney Flats, Tennessee 37686
September 22, 1980

Dear :

You and your school system are to be commended for your curriculum planning and particularly for offering a computer-related elective to your secondary students.

Because of the rapidity with which the use of the computer has grown and the vast number of areas of living that it involves, I have chosen as a research project in my doctoral studies at East Tennessee State University "The Status of Computer-Related Elective Courses in Public Secondary Schools in Tennessee."

I have completed a manual search of the Preliminary Reports filed with the State Department of Education in Nashville. It was through this search that I became aware that you taught a computer-related course during the 1979-80 school year.

Your help is vital to the continuance of my study. Would you please take time from your busy schedule to complete the enclosed questionnaire and return it to me at your earliest convenience?

Sincerely,

Nancy Hubble Hickman

COMPUTER-RELATED ELECTIVE COURSES IN PUBLIC SECONDARY SCHOOLS IN TENNESSEE DURING THE 1979-80 SCHOOL YEAR

School _____ Name of Course _____

I. Please answer the following questions concerning the computer-related elective which you taught during the 1979-80 school year.

A. What were the minimum and maximum number of Carnegie units a student could earn in the course?

Minimum:		Maximum:	
1/2	_____	1/2	_____
1	_____	1	_____
2	_____	2	_____
Other	_____	Other	_____

B. Is there a computer readily available to the student? Yes__ No__

C. If there is a computer available to the student, where is it located? _____

D. If you have direct access to a computer, how was it obtained?

_____ It was purchased for the school system for accounting and made available for the course.
_____ It was purchased for the school and made available for the course.
_____ It was purchased for the computer course.
_____ It was a gift, please explain: _____
_____
_____ Other, please explain: _____
_____
_____

E. Are there terminals available for student use? Yes__ No__

F. If there are terminals, how many terminals are available per class period? _____

G. How long has this computer-related course been a part of your secondary curriculum?

_____ 1979- 80 was the first year
_____ 2 years
_____ 3 years
_____ more than 3 years, please specify

H. Please describe the major source of software available for student use.

_____ purchased
_____ produced by the instructor
_____ produced by the student
_____ other, please explain: _____

I. What is the annual budget for this course not including instructor's salary? _____

J. What is the status of computer-related elective courses in your school for the 1980-81 school year?

_____ No change
_____ Increase in offerings. Please explain: _____

_____ Decrease in offerings. Please explain: _____

II. Please list briefly three to five (3-5) objectives of the computer-related course.

_____

_____

_____

_____

_____

III. Please provide any additional information which you feel would be helpful to the study and/or of interest to people concerned with computer-related elective courses in Tennessee. _____

_____

_____

_____

IV. Please list the main text or source of material used in your class and available individually to the student. (textbook, etc.)

_____

Text

_____

Publisher

V. If you have curriculum guides or course outlines that you are willing to share with me, please send these under separate cover and I will reimburse you for these.

_____ Guides or outlines are not available for distribution
_____ Guides or outlines are being sent with instructions for reimbursement

Thank you in advance for your help in completing this study. If you are interested in having the results of the study shared with you, please give your name and mailing address.

_____

Name

_____

Mailing address

_____

City State Zip Code

APPENDIX G

SURVEY LETTER SENT TO STATE DEPARTMENTS OF EDUCATION

Box 278-A2, Route 1
Piney Flats, Tennessee 37686
September 25, 1980

Dear Colleague of Secondary Education:

The age in which we live will probably be known as "The Age of the Computer." I have great concerns about the variety of ways in which our lives are influenced daily through computer services.

As a result of my interest in computer services, I have chosen as a doctoral research project at East Tennessee State University "The Status of Computer-related Elective Courses in Public Secondary Schools in Tennessee."

Would you please aid me in gaining a "general impression" of the status of computer course offerings in other states by completing the questions below and returning them to me in the enclosed envelope?

Please base your answers on your knowledge and not necessarily on founded statistics. You are assured that your answers will be compiled with those from other states and nowhere in the study will they be identified individually.

Sincerely,

Nancy Hubble Hickman

- -

A. The State Board recognizes computer-related courses (computer science, math, data processing, et al.) as acceptable toward graduation requirements. yes _____ no _____

B. An "awareness or introduction" to the computer is taught to all students at some level in the educational program in this State. yes _____ no _____

C. An estimation of the percentage of secondary schools in this State offering one or more computer-related courses is: less than 10% _____, 11-25% _____, 26-50% _____, 51-75% _____, 76-99% _____.

D. In my opinion the computer-related educational courses will: Increase in the 80's _____, Show no noticeable difference in the next few years _____, Decrease as a result of a national trend to "return to basics" _____.

APPENDIX H

LIST OF TEACHER CERTIFICATION ENDORSEMENT AREAS AS IDENTIFIED ON TENNESSEE TEACHING CERTIFICATE

State of Tennessee

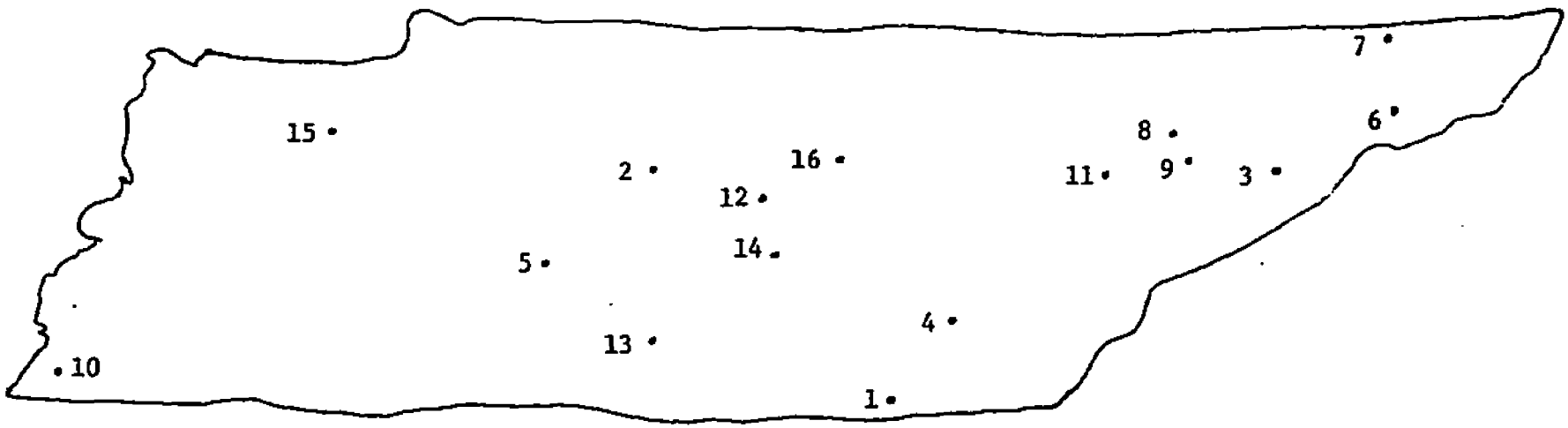
Teacher Certification Endorsement Areas

01 Elementary Grades (1-9)
02 Kindergarten-Grade 3
06 Russian
07 English
08 Speech
09 Spanish
10 Latin
11 French
12 German
13 Mathematics
14 General Science
15 Biology
16 Chemistry
17 Physics
18 Aeronautics
19 Health and P.E.
20 Health Instruction
21 History
22 Geography
23 Government
24 Economics
25 Sociology
26 Bible
27 Art (1-12)
28 School Music (1-12)
29 Instrumental Music
30 Bookkeeping
31 Shorthand
32 Typewriting
33 Business Arithmetic
34 Business English
35 Business Law
36 Business Machines
37 Clerical or Office Practice
38 Consumer Education
39 General Business
40 Salesmanship
41 Secretarial Practice
42 Graphic Arts
43 Woods and Construction
44 Metals
45 Electricity-Electronics
46 Crafts/Art Appreciation
47 Power Mechanics
48 Vocational Agriculture
49 General Agriculture
50 Vocational Home Economics
51 Home Economics
52 Distributive Education
53-57 Trade Shop
58 Care and Guidance of Children
59 Clothing Management
60 Food Management
61 Home Furnishings
62 Inst. and Home Management Ser.
63 Deaf (1-12)
64 Blind (1-12)
65 Partially Seeing (1-12)
66 Crippling & Special Health Conditions
67 Educable Mentally Retarded (1-12)
68 Speech and Hearing (1-12)
69 Multiple Disabilities (1-12)
70 Industrial Arts
71 Physical Education (1-9)
72 Physical Education (7-12)
73 Librarian (1-12)
74 Teacher Librarian (1-12)
75 Special Teacher of Reading (K-9)
76 Special Teacher of Reading (7-12)
77 Ceramics
78 Drafting
79 Plastics
80 Psychology
81 Earth and Space Science
82 Driver Education
83 Principal, Initial (1-9)
84 Principal, Initial (9-12)
85 Guidance Associate
86 Guidance Counselor (K-9)
87 Guidance Counselor (7-12)
88 School Psychological Services Worker
89 School Psychologist
90 Superintendent
91 Principal (K-9) Advanced
92 Principal (7-12) Advanced
93 Supervisor of Instruction (1-12)
94 Supervisor of Attendance
95 Supervisor of Instruction, Initial (1-9)
96 Supervisor of Instruction, Initial (7-12)
97 Supervisor of Instruction, Advanced (1-9)
98 Supervisor of Instruction, Advanced (7-12)
99 Health (K-12)

APPENDIX I

MAP OF TENNESSEE SHOWING SCHOOL SYSTEMS WHICH OFFER COMPUTER-RELATED COURSES

Map of Tennessee Showing Locations of School Systems Offering One or More Computer-Related Courses in the Secondary Curriculum



School System

1. Chattanooga City
2. Davidson County
3. Greeneville City
4. Hamilton County
5. Hickman County
6. Johnson City City
7. Kingsport City
8. Knox County
9. Knoxville City
10. Memphis City
11. Oak Ridge City
12. Rutherford County
13. Tullahoma City
14. Warren County
15. Weakley County
16. White County

VITA

NANCY HUBBLE HICKMAN

Personal Data:	Date of Birth:	December 23, 1945
	Place of Birth:	Russell County, Virginia
	Marital Status:	Married to William Edward Hickman
	Children:	Two daughters, Melissa Nicole and Whitney Renee

Education:

Public Schools, Lebanon, Virginia and Bristol, Tennessee

King College, Bristol, Tennessee; English, history, B.A., 1968.

East Tennessee State University, Johnson City, Tennessee; Secondary education, English, M.A., 1972.

East Tennessee State University, Johnson City, Tennessee; Supervision and Administration, Ed.D., 1981.

Professional Experience:

Teacher, Bristol Tennessee School System; Bristol, Tennessee, 1968-71.

Director of Public Relations, Bristol Tennessee School System; Bristol, Tennessee, 1971-74.

Supervisor of Secondary Education, Bristol Tennessee School System; Bristol, Tennessee, 1974-81.

Professional Organizations:

National Education Association
Tennessee Education Association
East Tennessee Education Association
Bristol Tennessee Education Association
East Tennessee Supervisor's Study Council
Association for Supervision and Curriculum Development
Tennessee Association for Supervision and Curriculum Development

Other Organizations:

Board of Directors of the Bristol Junior Achievement
Member, Education Committee, Chamber of Commerce
Member, Wheeler United Methodist Church