Examination of an attempt to train high school dropouts in computer literacy to fill entry level positions in private industry and provide motivation to take full advantage of this new technology

Dale Nook

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AN EXAMINATION OF AN ATTEMPT TO TRAIN HIGH SCHOOL DROPOUTS IN COMPUTER LITERACY TO FILL ENTRY LEVEL POSITIONS IN PRIVATE INDUSTRY AND PROVIDE MOTIVATION TO TAKE FULL ADVANTAGE OF THIS NEW TECHNOLOGY

by

Dale Nook

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Management
Cardinal Stritch College
December 1983
APPROVAL SHEET

This thesis has been approved by the following committee:

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P.W.A. Director/Representative  Date
Abstract

AN EXAMINATION OF AN ATTEMPT TO TRAIN HIGH SCHOOL DROPOUTS IN COMPUTER LITERACY TO FILL ENTRY LEVEL POSITIONS IN PRIVATE INDUSTRY AND PROVIDE MOTIVATION TO TAKE FULL ADVANTAGE OF THIS NEW TECHNOLOGY

Dale W. Nook

Technological change has impacted almost all of society, particularly the economic and educational sectors. High technology, of which computer technology is a fundamental component, has both destroyed and created jobs at a pace never before seen. The ability to understand and use computers is becoming essential to obtain and keep more and more different types of jobs.

The thesis project was an attempt to address the problem of an increasingly polarized society fueled by the technological revolution. The purpose of this study was to document whether all members of society are sharing in the benefits of high technology, or will we create a world characterized by haves and have nots? The way this was accomplished was to study the impact the information revolution is having on society. Once this survey was completed, an instrument was designed to motivate people to become better educated in order to improve their standing in a technology-oriented economy.
Abstract (continued)

This was done in conjunction with a core group of consultants who represent all phases of the computer industry. Relying upon their vast knowledge and expertise, a computer literacy program was developed.

This thesis documented the effects the information revolution is having on society. Then, it goes on to elaborate upon the development of the computer literacy program and its significance for the disadvantaged participants that it served.
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CHAPTER ONE

Project/Research Report Proposal

Purpose of the Project

This project's purpose was to provide instruction in computer literacy so certain segments of our disadvantaged populace could attain entry level positions in the job market and/or become inspired to continue with further training in this increasingly important area. Since computers only do exactly what they are told, they function as well as those giving the instructions. For this reason, it is paramount that any training for high school dropouts include enhancement of their basic skills. Therefore, any program offering hands-on computer experience to be successful in making this population job ready must be augmented by Basic Skill development.

A high school diploma or General Equivalency Diploma (G.E.D.) certificate is almost becoming a universal minimum requirement for employment. This is especially true in a tight job market. Attempts at vocational training must address this important issue.

The concept of employability development is also an important consideration. This project had emphasized various facets. Sources such as the Encyclopedia of Careers and Occupational Outlook Handbook provided detailed job descriptions offering knowledge of the world of work. Career counseling and employability development was obtained as
in-kind services at the Young Women's Christian Association.

The project was implemented through volunteer resources; because funding was not obtained, the program did not operate on a large scale. Various members of the educational and professional components of the computer industry offered their services as volunteer consultants. In conjunction with them, the writer designed the program and created the necessary curriculum. This source was also a means for training services and job development.

Since the investigator is an active member of Multicultural Community High School, an alternative providing Basic Skill/G.E.D. preparation to Milwaukee's dropouts, he integrated computer training with or adjunct to current ongoing educational processes. To this end, he selected students with good English and Math skills and exposed them to hands-on computer experience. Since the computer is only a tool, this process was viewed as interactive. Hence their basic skills were enhanced by practical application. As Multicultural is essentially a non-funded and non-profit organization all basic skill and computer instruction was provided by volunteers. Additional students were recruited from Journey House, a community-based organization providing similar services in the same area.

If funding had been secured, the project would have been larger and supported by the following staff. A full-
time coordinator would have been responsible for administration, job development, and counseling. A half-time secretary would have been provided for the coordinator's use. In addition, the services of a full-time basic skill and full-time computer instructor would have rounded out the program.

Two testing instruments evaluated project participants. Consultants devised a measurement of computer literacy and G.E.D. test scores reflected the level of basic skill attainment. This criteria provided the proper information for job placement or showed if continuing education was warranted. In either case, the students were tracked and support services provided when necessary.

Statement of Problem
High School dropouts without any marketable skills face a future characterized by high unemployment and underemployment. The following schema summarizes 1981 unemployment statistics for persons 16 to 24 years not enrolled in school as compiled by the Monthly Labor Review, September, 1982.
Table 1.1
1981 Unemployment Statistics for Persons 16 to 24 Not Enrolled in School

<table>
<thead>
<tr>
<th>School Completed</th>
<th>Percentage Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School</td>
<td></td>
</tr>
<tr>
<td>Less than 4 years</td>
<td>26.9</td>
</tr>
<tr>
<td>16 to 19 years</td>
<td>32.9</td>
</tr>
<tr>
<td>20 to 24 years</td>
<td>23.6</td>
</tr>
<tr>
<td>4 years only</td>
<td>13.8</td>
</tr>
<tr>
<td>College</td>
<td></td>
</tr>
<tr>
<td>1 to 3 years</td>
<td>8.6</td>
</tr>
<tr>
<td>4 years or more</td>
<td>5.3</td>
</tr>
</tbody>
</table>

The length of time spent in school also has a marked effect on future employment potential. A report released by the U.S. Department of Labor takes an in-depth look at March, 1982 unemployment statistics. In a study covering persons 25 and over with the national unemployment rate at 7.6% one sees the following results.

---

Table 1.2

Unemployment Statistics per Educational Background
25 Years or Older (March, 1982)
Overall Unemployment - 7.6%

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Percentage Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 8 years of school</td>
<td>13.2</td>
</tr>
<tr>
<td>1 to 3 years of high school</td>
<td>12.1</td>
</tr>
<tr>
<td>High school diploma</td>
<td>8.5</td>
</tr>
<tr>
<td>1 to 3 years of college</td>
<td>6.2</td>
</tr>
<tr>
<td>4 or more years of college</td>
<td>3.0</td>
</tr>
</tbody>
</table>

It is evident that certain segments of society are affected more by the current economic dilemma than others. In addition, those who experience difficulty finding employment in younger years face persistent problems in the future. The solution for them lies in the ability to get back in school, attain G.E.D. certification, or learn a marketable trade.

In an article adapted from their forthcoming book, *Second Thoughts on Work*, Sar Levitan, an economist, and Clifford Johnson, his assistant, discuss the microprocessor.

Today, futurists are discussing the onset of a sweeping technological revolution, one which

---

would rival or surpass the Industrial Revolution of the 19th century in importance. This envisioned social order has been given many names—"post-industrial," "technetronic," or "information" society. At the center of this flurry of interest in technological change is the microprocessor. While computerized automation has been theoretically feasible for more than a decade, large and expensive computer systems could produce cost savings only in the most massive industrial settings, and automated machinery could not be easily adapted to serve various production functions. Now, with the development of the microprocessor, these obstacles have been overcome and the potential uses of computerized machinery at the workplace have dramatically increased.

Addressing a gathering of the World's Futurists Society, Lynne Stitt, a Colorado consultant, states: "the future is between the knows and the know-nots, rather than between the have-s and the have-nots." According to Ann Lewin, Director of Capital Children's Museum, "For me, it's not so much an issue of sex, as it is equality - no matter. By the year 2000 we're going to find computers in every facet of our lives. Those who will be winners will be those who are able to access (computer) information."4

Not only is it important for dropouts to return to school or obtain G.E.D. certification, any practical vocational training should reflect an everchanging workplace. Would it


be prudent to train welders when progress dictates those jobs will soon become robotized? Since most high school dropouts have limited exposure at best to computers, it is crucial that this technology become demystified for them.

Chapter 2 of the report documented the relevance the program has for future job trends. In addition, it elaborated on the importance of individualized and computer-assisted instruction for the disadvantaged. Finally, it compared and contrasted the project with others designed to reach this target population.

Project Title, Location and Duration

The title of the Project is "An Examination of An Attempt to Train High School Dropouts in Computer Literacy to Fill Entry Level Positions in Private Industry and Provide Motivation to Take Full Advantage of This New Technology." Through the auspices of an alternative high school hands-on computer instruction was provided in Data Entry, Word Processing, Basic Accounting and Fundamental Programming.

The Milwaukee Christian Center, located at 2137 West Greenfield, Milwaukee, Wisconsin, was the host facility for all project training and instructional activities. The Christian Center is located in what is commonly referred to as Milwaukee’s Inner City South. On October 25, 1974, the
U.S. Department of Commerce, Economic Development Administration designated this area for Special Federal Assistance because of its high unemployment and persistent economic distress. Excerpts from a Metropolitan Milwaukee Survey done in 1981-82 summarize the demographic characteristics of the city's near southside. (Table on following page.)

The project ran from September, 1982 until July, 1983. In September, the structure of the study was formulated. The design of the program and curriculum was devised between September and December. Instruction began in January and continued until July. Finally, from March until July all qualified students were placed in jobs or tentatively admitted to area colleges when possible.

Participants

The Milwaukee Christian Center sponsored computer training program had a well developed network of volunteer support services. Funding was not obtained, and the project could not serve many participants or employ a full-time staff in addition or adjunct to this core group.

Paul Hardiman is a professional programmer with fifteen years of experience in his field. Mr. Hardiman currently works in the area of artificial intelligence and decision support systems. His past background includes technical programming on large IBM main frames and programming micro-computers, especially the Apple II. In terms of support, he
Table 1.3
Demographic Characteristics City's Near Southside

<table>
<thead>
<tr>
<th>Income (Total Family Before Taxes)</th>
<th>Percentage Total Households (29,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $5,000</td>
<td>13</td>
</tr>
<tr>
<td>$5,000 - $9,999</td>
<td>16</td>
</tr>
<tr>
<td>$10,000 - $14,999</td>
<td>16</td>
</tr>
<tr>
<td>$15,000 - $19,999</td>
<td>14</td>
</tr>
<tr>
<td>$20,000 - $24,999</td>
<td>17</td>
</tr>
<tr>
<td>$25,000 - $34,999</td>
<td>20</td>
</tr>
<tr>
<td>$35,000 - $49,999</td>
<td>4</td>
</tr>
<tr>
<td>$50,000 and Over</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education (Head of Household)</th>
<th>Percentage Total Households (29,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade school or less</td>
<td>16</td>
</tr>
<tr>
<td>1-3 years high school</td>
<td>22</td>
</tr>
<tr>
<td>Graduated high school</td>
<td>41</td>
</tr>
<tr>
<td>1-3 years college</td>
<td>15</td>
</tr>
<tr>
<td>Graduated college</td>
<td>6</td>
</tr>
</tbody>
</table>

has donated an Apple II computer to the Christian Center for training services. He acted as a consultant in program design and curriculum. Mr. Hardiman also provided volunteer training services.

Kathleen Barry is an Editorial Research Assistant of Computer-Assisted Instruction for Raintree Publishers. She is completing an educational degree at the University of Wisconsin-Milwaukee which in part focuses on microcomputers and computer-based instruction. She acted as a consultant to program design and curriculum. Ms. Barry and Mr. Hardiman had helped devise a testing instrument to determine the level of computer literacy program participants acquire. Finally, Ms. Barry provided her training services as additional support.

Joe Krzyzanowski is a certified teacher presently completing a masters degree in reading instruction at Cardinal Stritch College. He has worked in alternative schools for the last ten years. Recently, he was responsible for monitoring a state-funded computer-assisted instruction project using Plato Systems developed by Control Data Institute. His responsibilities included Basic Skill/G.E.D. preparation at the Milwaukee Christian Center. He helped in program development and curriculum design. Mr. Krzyzanowski also provided computer training services.

The reviewer's area of concern addressed coordination and administration of the project. In lieu of funding and
full-time staff, he was also responsible for job development and training services. In conjunction with the core group, he designed the program and developed curriculum.

Nancy Detwiler, Director of all Word Processing Training for Honeywell Information Systems in Milwaukee, offered her services as a consultant to develop a training curriculum that prepared participants to enter the word processing/data processing job market.

Jeff Jagmin has extensive experience marketing computers and course development for The Byte Shop. He provided assistance in program design and curriculum.

James McMahon is the Data Processing Internship Supervisor at Washington High School, Milwaukee's computer specialty school. He supported the Computer Literacy project and relying upon his knowledge and expertise provided advice on job development. Mr. McMahon also contributed to the program design and curriculum development.

Jackie Wille is a certified teacher currently studying for a masters degree in special education at the University of Wisconsin-Milwaukee. She has been a Multicultural coordinator for a number of years. To better serve her students she has researched and devised an employability curriculum. She volunteered her materials and expertise in designing a similar program for Christian Center participants.

Ron Meier is an adjunct admissions counselor at the University of Wisconsin-Milwaukee. He has had extensive
experience working with the disadvantaged student at Milwau­
uee Public School's Demmer Center. Mr. Meier offered to
assist students in applying for admission to the University
of Wisconsin-Milwaukee. For participants whose G.E.D.
scores do not meet minimum requirements he referred them
to the Department of Educational Opportunity for admission
and support services.

Depending on the ultimate size of the program, it
intended to serve from ten to fifty members of Milwaukee's
southside disadvantaged population. The target group is
low income unemployed or underemployed persons seventeen
years or older without a high school education. Because of
the nature of the training and traditional sexual stereo­
typing, the program anticipated serving a majority of
women students. Finally, there is a large Hispanic popu­
lation on Milwaukee's southside and this somewhat reflected
itself in the program's participation.

Developmental Objective 1

By December 1982, an evaluation of the job market and
a survey of detailed descriptions of entry level positions
in computer-related functions was completed. This provided
the basis for program development.

Implementation Activities - The researcher investigated the
topic thoroughly by utilizing printed materials and inter­
views.
a. Literary sources such as The Occupational Outlook Handbook and Encyclopedia of Careers provided pertinent information.

b. Interviews with professionals in the computer industry added additional information.

c. A survey was conducted of those engaged in the teaching or training-related activities of computer-related functions.

**Evidence of Completion** - The objective was met when needs were pinpointed and a program could be developed to address those areas.

**Developmental Objective 2**

As the educational goals became clear for the program, a basic design and curriculum was developed by the end of December 1982.

**Implementation Activities** - To prepare for the formation of the training program, the following steps were taken.

a. Working with consultants in the technical, educational and practicing sectors of the computer industry, the course was designed.

b. The necessary materials were identified and developed.

**Evidence of Completion** - The objective was met when all the software was obtained, the curriculum materials developed, and testing measurements designed.
Developmental Objective 3

By January, the target population was identified and recruitment began through informal networks.

Implementation Activities - With a missionary perspective, disadvantaged participants were recruited.

a. The target population was determined to be the educationally disadvantaged.

b. Students with an interest and the proper basic skills were located.

c. The program also served disadvantaged adults, who were essentially displaced workers and displaced homemakers.

Evidence of Completion - A referral network for participants that proves operational.

Developmental Objective 4

Between January and July, instruction was provided in computer literacy and applications.

Implementation Activities - Provided training in computer literacy and applications.

a. Volunteers were recruited and trained.

b. Three series of computer literacy classes were given.

c. Two advanced programming classes were provided.

d. Hands-on instruction in keyboarding, word processing and accounting were given.
e. Employability development orientation was obtained at the YWCA.

Evidence of Completion - The objective would have been met if all training had been completed.

Evaluation Objective 1

Develop a proposal for a computer literacy course designed for twenty-four students for submission to various government agencies and to other foundations.

Implementation Activities

1. Create a basic format for training activities.
2. Develop each segment of the potential program.
3. Submit basic design to agencies for approval.

Evidence of Completion

This objective was considered completed when funding was secured for continuation of the program.

Evaluation Objective 2

Monitor results of a pilot computer literacy program by counting advanced work and positive terminations

Implementation Activities

1. Test students in BASIC programming through Step by Step lessons.
2. Expose students unable to acquire programming skills to clerical applications on the computer.
3. Use testing instrument to measure student's clerical skills when training is completed.
4. Evaluate student potential through use of G.E.D. test score.
5. Monitor positive terminations for various participants

Evidence of Completion

Provide students the background in programming to go on to higher education or training in clerical applications.

Limitations of Project Findings

The program was not able to successfully secure the appropriate levels of funding to provide all segments of the training. Because of this, the researcher had to rely on only one computer for hands-on experience and volunteers for instructors. In addition, this one computer was stolen before the fifteen students could complete their clerical applications exposure, although the students pursuing programming experience were able to complete their Step by Step lessons. The limitation of equipment also meant that a smaller test population would be served. Time constraints were also an important factor as the program was not fully developed for implementation until January. Adverse economic conditions also played a factor in the ability of participants to secure employment.
Budget
The project had at its disposal free use of facilities and one donated Apple II microcomputer. Multicultural High School and Journey House resources provided Basic Skill/G.E.D. preparation and all necessary curriculum materials. Through the auspices of the Milwaukee Public School System, various software programs were made available for the project's use. The reviewer along with volunteer support services provided training.

If funding would have been obtained, the program proposed twenty-four training slots. The budget for this type of program was projected to be $57,000. Of this, $40,000 was to provide staff salaries and fringe benefits. The remaining $17,000 was to cover cost of materials and supplies for training, administration and support services. Proposals for this type of program were submitted to Comprehensive Employment and Training Act (CETA), Community Development Agency, and Job Training Partnership Act (JTPA).

Timeline
A graphic representation of the timeline is provided on Page 18.

Summary of Project/Research Report
Chapter One of the report defined the project and discussed how it was implemented. In addition, it elaborated on the problems of the target population and described the
<table>
<thead>
<tr>
<th>Steps</th>
<th>Months</th>
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<tbody>
<tr>
<td>1. Design of study.</td>
<td>*</td>
</tr>
<tr>
<td>2. Determine necessary training. Schedule interviews with</td>
<td>*</td>
</tr>
<tr>
<td>proper authorities.</td>
<td></td>
</tr>
<tr>
<td>3. Creation of curriculum consulting with UW-M computer group and</td>
<td>*</td>
</tr>
<tr>
<td>other resources.</td>
<td></td>
</tr>
<tr>
<td>4. Implement pilot program.</td>
<td>*</td>
</tr>
<tr>
<td>Notification of personnel at site.</td>
<td></td>
</tr>
<tr>
<td>5. Monitor results of program.</td>
<td>*</td>
</tr>
<tr>
<td>Administer various testing instruments to students.</td>
<td></td>
</tr>
<tr>
<td>6. Place students in entry level positions at various companies or</td>
<td>*</td>
</tr>
<tr>
<td>positive termination to more training.</td>
<td></td>
</tr>
<tr>
<td>7. Scoring and analysis.</td>
<td>*</td>
</tr>
<tr>
<td>8. Track students after they are placed in various positive</td>
<td>*</td>
</tr>
<tr>
<td>terminations.</td>
<td></td>
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</tbody>
</table>
participants who acted as delivery agents. It also developed objectives and showed the means to evaluate how successful the program became.

Chapter Two of the report elaborated on the historical relevance the program has for job trends. The philosophical, psychological, and social implications of computer literacy for the disadvantaged were discussed at length. Finally, the report investigated other programs designed for the same target population and compared and contrasted them to this project.

Chapter Three provides a brief but complete overview of the purpose, participants, implementation activity, and evaluation design of the project. Additionally, all suppositions have been evaluated and any implications discussed. In conclusion, it offers recommendations for use of the project or future study, as seems appropriate.

The Appendix provides a successful proposal submitted to the Milwaukee Associates in Urban Development (MAUD) for continuation of this project.

There is also a letter from St. Alphonsus Church donating $985 to the project for more computer equipment. The testing instrument to be used for the clerical students is also included along with various materials developed for different segments of the project.
CHAPTER TWO

Introduction

Mankind is at the beginning of a new historical age - the Information Age. Some experts believe that society will undergo more change by the year 2000 than it did during the first 200 years of the industrial revolution. The next 18 years are expected to bring change at a speed and scale never before seen. The Information Age is being ushered in by a revolution in the way we store, transmit, manipulate and use information. And almost every aspect of culture and our perceptions of ourselves and the world are likely to be affected.

Time magazine gushes about the "whiz kids" of the "computer revolution." Pop sociologist Alvin Toffler hits us with future shocks and third waves. California's Jerry Brown wants to augment the three R's with the three C's - computing, calculating, and communications through technology. For more than a quarter of a century, the rhetorical trumpets of business, government, journalism, and bargain-basement sociology have all been heralding a computer revolution in America. For almost as long, they have promised a technological revolution in the schools, one that would change the nature of learning and the organization of education. For Toffler and Time, and even for those with a more tempered enthusiasm for the so-called computer age, computer literacy will make science fiction a reality not only in education but in work as well.

The purpose of this project/research report is to investigate the importance of computer literacy for all members of our society. A particular emphasis will be

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placed on the needs of those who are most likely to be disad-advantaged by technology, those who are already economically and educationally disadvantaged.

Sensing the need for a formal study, the Office of Technology Assessment prepared a report on Informational Technology which it presented to Congress in the Fall of 1982. The report titled Informational Technology and Its Impact on American Education is a summary of the affects the information revolution is having on our society. The report emphasizes computer literacy as computers are the fundamental component of the "technetronic" era. This study, along with booklets prepared by the Association for Educational Data Systems and International Council for Computers in Education, represents the authorities on computer literacy presented in the project/research report. In addition, an evaluation of all current CETA training projects involving informational technology will be presented.

The information revolution is having a pervasive affect on all aspects of our society. As change is occurring so rapidly, the researcher used current newspapers and periodicals as the best source to represent public opinion and sentiment.

The project/research report will document the educational needs of our new age. It will emphasize the importance of making informational technology available for all members of our society. Finally, it will describe the
sweeping changes now occurring and the implications for our society.

Historical

The history and evolution of computer technology represent examples of not only human ingenuity and inventiveness in a single area, but also the abilities of people to traverse the boundaries between many fields. Progress in computer technology is representative of progress in electronics, communications, control systems, psychology, pedagogy, mathematics, engineering, and many other areas.8

The information revolution anticipated for so long has finally arrived through the advent of new technology that is not only relatively inexpensive but extremely efficient as well. A glance through history will unfold just as to how many divergent forces have come together to foster the coming of the information age.

Although there are a number of sources from which the origin of computing may be derived, automatic computing began in 1812 with Charles P. Babbage. The technology of his era was not advanced enough to make his analytical engine totally successful, but it is able to add, subtract, multiply and divide.

So the wait for the needed technology begins and progression in the computer process parallels the rate at which innovations arise.

The first major innovation was Herman Hollarith's system of punched cards. This process was so effective at speeding up the handling of data that the 1890 census was completed in one-third the time of the 1880's. Hollarith's company later becomes absorbed by IBM. The age of the modern computer was begun.

In the 1930's a young engineer named Konrad Zuse, using the German equivalent of an erector set for parts, builds a simple computer. Its descendants later are used to calculate wing designs for the German aircraft industry during World War II. As throughout the course of history, drastic times call for heroic efforts. Putting into practice some of the ideas of Alan Turing, the British build a computer called Colossus 1, which helps to break German military codes.

The war effort also spawns the first fully electronic computer. But Electronic Numerical Integrator and Calculator (ENIAC) was completed too late to be of any help. This device also proves to possess many severe technical problems.

ENIAC and its successor, UNIVAC, are examples of First Generation Computers. They are characterized by the use of vacuum tubes and never overcome their maintenance and reliability handicaps.

The development of high level programming languages, along with the advent of the transistor, fosters the growth
of Second Generation Computers. They were able to achieve increased efficiency, speed, and reliability.

Rapid technological advances continue in both hardware and software. Timeshared computing and interactive BASIC can allow for personalization in computing. The discovery of the process to manufacture integrated circuits onto silicon chips marks the birth of Third Generation Computers. Thus, minicomputers become an everyday tool for hundreds of thousands of people.

The era of personal computing began with the introduction of microcomputers in the late 1970's. By 1983, computers with telecommunications capacity are marketed for as low as $79. These innovations have made personal computing available for all. Computer manufacturers could conceivably produce a microcomputer for every home, office, and student desk. In addition, each separated unit could be connected to larger computers through our telephone or cable television systems. Not only is this possible, but it is quite likely to occur in the next ten to twenty years.

If cars had improved as much as computers during the last 20 years, a Rolls-Royce would cost $1, get 10 million miles per gallon and have a 200,000-horsepower engine, enough power for an aircraft carrier.9

With the coming of the long awaited technological breakthroughs, the information age arrives in the 1980’s. Its

effects are already so pronounced that *Time* Magazine deems 1982's Man of the Year, the Computer. As transformations begin to take place, it is certain education will play a fundamental role.

A number of the early computers were built at university campuses and were immediately used for both research and instruction. But first generation computers were relatively expensive, so their use in education was limited.

The 1960's saw a rapid proliferation of computers in education, especially in colleges and universities. Hundreds of computer science and data processing degree programs were started. Computers were easy enough to use so that college undergraduates could take a few computer courses and emerge from college with well paying jobs as computer programmers or system analysts.10

In the late 1960's the concept of Computer-Assisted Instruction (CAI) becomes very popular. Many viewed it as the educational wave of the future. Its initial promise did not materialize at that point for many reasons. First, the available hardware was very expensive and this made it difficult to obtain equipment. The software was very limited in scope and quality. In addition, except in rare instances, resources were not fully developed for educational purposes. Success then depended upon large expenditures of money which often was not available especially for an unproven concept. There was also some question as to whether CAI could provide a viable alternative or just suffice as an adjunct to normal educational processes.

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Computer-assisted learning (CAL), the use of computers as an aide to learning, can be divided into two major parts. In one part, frequently called computer-assisted instruction (CAI), the computer acts upon the student. Whether the mode is drill and practice, tutorial or simulation, the computer has the knowledge and it is the student who is to acquire the knowledge.

A second form of CAL puts the student in charge - the student acts upon a computer as an aid to learning. Learning environments created using a LOGO language-based computer system provide a good example. After a few minutes of instruction, even an elementary school student can learn enough LOGO programming to begin encountering interesting and challenging geometry problems. Immediately the emphasis then switches from learning LOGO to problem solving in the domain of geometry.

The basic issues involve what students should learn about computers and the ways they should learn about or use them. When a computer acts upon a student in a computer-assisted learning mode, the student need not learn much about computers. But when a student acts upon a computer, developing programs and solving a variety of problems, more knowledge of computers is required - on the part of both the student and the teacher.\textsuperscript{11}

In one sense the general population can acquire enough skill to use computers as application. This reflects a future characterized by a myriad of jobs de-skilled through technology. On the other hand, can the computer phenomenon provide the means for people to become dynamic and creative? Many feel indeed the shape of the future will include a technological elite supported by an army of increasingly semi-skilled workers.

\textsuperscript{11} Moursund, pp. 5-6.
Sociological

The prevailing medium of communication throughout history has profoundly affected each society. This phenomenon has even prompted scholars such as Marshall McCluhan to purport that indeed the "medium is the message." Inventions such as writing, the printing press, and television have dramatically changed and shaped culture over time.

Contemporary society is beginning to undergo profound technological and social change brought about by the improvements in the manner in which we are able to communicate. This is not only impacting individuals, but also how they may relate to institutions and to one another.

Experts predict that most of our social institutions - schools, monetary and banking systems, corporations, postal systems and even governments - will be drastically changed in a few decades.

And, they say, the Information Age - sometimes called the post-industrial age - may never end, because information is an infinite resource. In a way, the information revolution is just an explosively rapid phase of man's continuing effort to throw off the burden of work.

During the industrial revolution, machine power replaced human and animal muscle. The essence of the information revolution is that machine intelligence will supplant most mental work by humans.

The main engine of the information revolution is the computer. Experts believe it is a "fundamental" technology - like the wheel.

Until recently, computers were big and were for big jobs. Now, miniaturization has made them small enough to fit anywhere. Just as the wheel and its cousins (gears, bearings, etc.) are found
in most machines, computers will be put in almost everything we build.\textsuperscript{12}

It is this diversity of applications for microprocessor technology which distinguishes it from less significant innovations, and which has led futurists to predict a societal transformation "comparable with the agricultural revolution that began about 10,000 years ago, and with the industrial revolution."\textsuperscript{13}

These improvements in the quantitative and qualitative aspects of information handling will profoundly affect individuals and organizations that communicate and use information in some of the following ways:

First, it will create a need for mass literacy in order for people to fully participate in economic, political and social activities. Any definition of this new literacy must include the ability to communicate through information technologies.

The question of participation also arises. The printing press in no small way fostered the development of mankind. Communication technologies might provide a new means by which organizations could mode social thought and cultural mores.

Technological change can also effect the decision-making processes in a society. New patterns of decision making may


affect relationships between organizations and between organizations and their clients and employees.

Recently there has been a trend toward centralization in our society. However, access to low-cost computers and data communications provide people with unlimited ability to communicate freely. The "Global Village" coined by Marshall McCluhan becomes a reality.

One of the more interesting facets may be the effects on intellectual processes. Some people feel informational technology may provide a new form of consciousness which will offer novel means to deal with our complex and difficult problems.\(^{14}\)

In 1982 a cascade of computers beeped and blipped their way into American office, the American school, the American home. The "information revolution" that futurists have long predicted has arrived, bringing with it the promise of dramatic changes in the way people live and work, perhaps even in the way they think. America will never be the same.\(^{15}\)

One of the most profound effects may be on the traditional concepts of work. Answering a *Time* Yankelovich poll, 73% of the people felt the computer revolution would enable more people to work at home. Though only 31% said that they would prefer to do this themselves. Sociologist Robert


Schrank states, "The workplace performs the function of community." Can people function well without the people factor; that is just how important is the stimulation of personal contact? One way to address this concern is to get employees out of the house but not all the way downtown. Experiments such as Continental Illinois Bank's suburban "satellite work station," prove the versatility of telecommuting. This process promises an infinite array of creative and innovative options for the future.\textsuperscript{16}

High technology will also undoubtedly have an effect on de-skilling jobs now and in the future. Not only are robots becoming more prevalent in manufacturing, computers are making most clerical jobs less demanding. Many are concerned that this will allow employers to pay lower wages to fewer and lower skilled workers.

An advanced information age will also place a premium on skills oriented toward the creation of new knowledge and the design of new technologies. The important factor to remember is that there will be constant change. In fact, lifelong retraining is expected to become the norm for many people.

If education is to meet the challenge of the next decade it must create a computer-literate community and institutionalize the use of these new intellectual tools. Education will have

\textsuperscript{16} Friedrich, p. 21.
achieved this goal only when computers and information technology are no longer viewed as an educational luxury for the small elite, but as a necessary tool for all.\textsuperscript{17}

This important concern brings us to the question of who should be literate in our society. In addition, it will be important to define the scope of literacy. It would seem that skills in the use of information technology will not only be of value but a necessity as well. Finally, education should focus on learning how to learn rather than on learning facts if lifelong retraining becomes a reality.\textsuperscript{18}

Futurists predict that two new social classes will arise: the information rich and the information poor. Those who can use and afford computers will have access to information and will prosper. Others will be at a severe disadvantage.\textsuperscript{19}

There is grave concern that our society will become increasingly stratified. One thought is a technological elite is developing that will be for the most part upper class white and male.

One reason is that people economically or educationally disadvantaged now are likely to become even more so in a technologically orientated society. Native intelligence, street smarts, and muscles are not going to be skills sought


\textsuperscript{18} \textit{Informational Technology}, p. 8.

after by employers, indeed, skills such as computer literacy are in the ascendency.

Even the disadvantaged students who remain in school might face difficulties. A survey by Market Data Retrieval Inc. found that 80% of the country's 2,000 largest and richest public high schools have at least one microcomputer, while 60% of the 2,000 poorest have none. Even the disadvantaged students who remain in school might face difficulties. A survey by Market Data Retrieval Inc. found that 80% of the country's 2,000 largest and richest public high schools have at least one microcomputer, while 60% of the 2,000 poorest have none.20

Feminists, among others, are concerned that women's traditional math anxiety and early tracking will put them at a grave disadvantage. Most video arcades are crowded with males and the less aggressive females are often pushed off the microcomputers in schools fortunate enough to have computer labs. There is no reason for this to have to happen and it is important to understand the implications of early computer exposure for both women and the economically and educationally disadvantaged.

So the revolution has begun, and as usually happens with revolutions, nobody can agree on where it is going or how it will end. Nils Nilsson, director of the Artificial Intelligence Center at SRI International, believes the personal computer, like television, can "greatly increase the forces of both good and evil." Marvin Minsky, another of M.I.T.'s computer experts, believes the key significance of the personal computer is not the establishment of an intellectual ruling class, as some fear, but rather a kind of democratization of the new technology. Says he: "The desktop

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revolution has brought the tools that only professionals have had into the hands of the public. God knows what will happen now."

Perhaps the revolution will fulfill itself only when people no longer see anything unusual in the brave New World, when they see their computer not as a fearsome challenger to their intelligence but as a useful linkup of some every-day gadgets: the calculator, the TV and the typewriter. Or as Osborne's Adam Osborn puts it: "The future lies in designing and selling computers that people don't realize are computers at all."

Sherry Turkle, a sociologist now finishing a book titled The Intimate Machine: Social and Cultural Studies of Computers and People, sees the prospect of change in terms of perceptions and feelings. Says she: "Children define what's special about people by contrasting them with their nearest neighbors, which have always been the animals. People are special because they know how to think. Now children who work with computers see the computer as their nearest neighbor, so they see that people are special because they feel. This may become much more central to the way people think about themselves. We may be moving toward a re-evaluation of what makes us human."21

The near future poses a kaleidoscope of predictions or visions. There is no doubt that the information revolution will dramatically change our lives. It only remains to be seen just how rapidly and where the impact will unfold.

Economical

Until a few decades ago the information industry, the industry concerned directly with the producing and selling of information, was relatively small in economic terms. It is now becoming a major component of the U.S. economy.

Not only has it established its own identity apart from the traditional sectors, if defined broadly it accounts for over 60 percent of the economic activity of the U.S. To offer further evidence of this transition, in 1950 the employment of U.S. workers in information jobs actually surpassed that of workers in the industrial sector. In this decade, information workers will outnumber workers in all the other sectors combined.

According to a Position Paper on computer literacy, "Within a very few years, it will be necessary to be able to use the capabilities and output of computers effectively in order to get and hold most jobs."\(^2^2\)

An increase in job skill requirements could take place in three ways: 1) industrial growth and sectoral shifts in the economy could create more jobs demanding higher skill levels; 2) the availability of a more highly trained labor pool could encourage employers to raise their performance expectations, even if the basic job classifications remain the same; and 3) rapidly changing job requirements could place a premium on employees' flexibility and on their ability to be retrained in new skills.

Justifiably or not, education is, generally speaking, a major factor in the competition for jobs, and those lacking the requisite educational level are less employable. Unemployment rates by education level are shown in Table 2.1. Two conclusions are suggested by the data:

Education is an important selection criterion for employers.

More sensitive to fluctuations in overall employment rates than their more skilled counterparts, less educated workers are more likely to lose their jobs when unemployment rises, and less likely to get them back when it drops.\(^2^3\)

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\(^2^2\) Hamilton, p. 1.

\(^2^3\) Informational Technology, pp. 27-28.
In fact OTA has found that, "The growing use of information technology throughout society is creating major new demands for education and training in the United States and is increasing the potential economic and social penalty for not responding to those demands."  

Table 2.1
Unemployment Rates by Sex and Number of Years of Education Completed

<table>
<thead>
<tr>
<th></th>
<th>1970</th>
<th>1979</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School, 1-3 years</td>
<td>4.8</td>
<td>8.3</td>
</tr>
<tr>
<td>High School, 4 years</td>
<td>3.4</td>
<td>5.5</td>
</tr>
<tr>
<td>College, 1-3 years</td>
<td>3.8</td>
<td>4.2</td>
</tr>
<tr>
<td>College, 4 years or more</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School, 1-3 years</td>
<td>6.6</td>
<td>10.4</td>
</tr>
<tr>
<td>High School, 4 years</td>
<td>4.6</td>
<td>6.0</td>
</tr>
<tr>
<td>College, 1-3 years</td>
<td>4.0</td>
<td>4.3</td>
</tr>
<tr>
<td>College, 4 years or more</td>
<td>2.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

24 Informational Technology, p. 4.
Many of the major effects of the information revolution will be felt in the clerical and related fields. The U.S. Department of Labor makes the following projections.

According to the U.S. Bureau of Labor Statistics, clerical occupations (bank tellers, bookkeepers, cashiers, secretaries, and typists) will be the largest and fastest-growing group of white collar jobs during the 1980’s. There will be 4.8 million new jobs created in this area by 1990. New developments in computers will have a profound effect on these classifications. 26

The current shortage of entry level office employees across the country continues to grow. Business must have the typists, bookkeepers, receptionists, office machine operators, and others necessary to operate the offices of the country. A projected need exists for 16.6 million new and replacement entry-level clerical workers during the 1978 through 1990 period. This number is the largest growth projected for any job cluster. 27

The Department of Labor reports that, out of 300 work classifications, more jobs are opening up in the secretarial field than in any other. New positions are being created at the rate of 440,000 per year in public and private sectors. About 20 percent of these new jobs are going unfilled because of lack of qualified candidates. Statistics show that secretarial needs may exceed the supply by as much as 250,000 by 1985. 28


Locally, the Wisconsin Job Service has predicted that by 1985, there will be 39,530 secretarial positions in the four-county metropolitan area, an increase of approximately 6,600 jobs over the past 11 years.29

The computerization of America is moving at breakneck speed. There are more than one million systems operating, a sevenfold increase from only six years ago. Last year alone, one million computers or data terminals were added to the four million already in use. These numbers are expected to swell by 25% each year for at least another decade.

The microprocessor supported by increasingly sophisticated software is capable of an infinite variety of applications. Management information systems have become a way of life in many large offices. Since this new technology does not require knowledge of specialized computer languages, its growing use will raise productivity among clerical workers. In addition, instead of merely easing routine tasks, the very means by which information is transcribed and made available will change.

As Table 2.2 compiled by Data Resources Inc. clearly shows, most new jobs in high tech may not be technical. In fact a survey of the industry in the Boston and Worcester area, one of the regions rivaling the silicon valley, shows

that 80 percent of entry level jobs did not require college training.

Table 2.2
Most New Jobs in High Tech Will Not Be Technical

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Growth 1980-93</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Jobs</td>
</tr>
<tr>
<td>Operatives</td>
<td>226,183</td>
</tr>
<tr>
<td>Managers &amp; Clerical Workers</td>
<td>149,650</td>
</tr>
<tr>
<td>Engineers</td>
<td>110,930</td>
</tr>
<tr>
<td>Craft &amp; Related Workers</td>
<td>96,121</td>
</tr>
<tr>
<td>Engineering &amp; Science Technicians</td>
<td>70,693</td>
</tr>
<tr>
<td>Professionals, except Managers &amp; Clericals</td>
<td>33,305</td>
</tr>
</tbody>
</table>

There does exist a growing demand for professionals trained specifically in computer skills. According to a Bureau of Labor Statistics study 685,000 new jobs and 250,000 replacement positions will evolve in the next decade. These estimates concern themselves with the traditional computer fields, but in reality the information revolution is spawning many other types of related jobs. The need for information specialists, management personnel, and industrial engineers.

will cause employers to compete for this same group of professionals, thus making these future estimates very conservative. Even without considering these other areas, by 1990 the BLS predicts a demand of 2,140,000 specialists. Table 2.3 offers a summation of these statistics.

Table 2.3

<table>
<thead>
<tr>
<th>Occupation</th>
<th>1980</th>
<th>Projected 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems Analysts</td>
<td>243</td>
<td>400</td>
</tr>
<tr>
<td>Programers</td>
<td>341</td>
<td>500</td>
</tr>
<tr>
<td>Equipment Operators</td>
<td>522</td>
<td>850</td>
</tr>
<tr>
<td>Data Entry Technicians</td>
<td>266</td>
<td>230</td>
</tr>
<tr>
<td>Service Technicians</td>
<td>83</td>
<td>160</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,455</td>
<td>2,140</td>
</tr>
</tbody>
</table>

A Wall Street Journal article states there were only 50,000 college graduates available to fill 115,000 computer-related jobs last year. It goes on to reiterate that present resources are severely strained and more facilities are desperately needed.  

31 Informational Technology, p. 32.
This severe manpower crisis has prompted OTA to project that colleges may have to lower admission standards for computer science majors and to require extensive remedial programs at the undergraduate level. It also feels as the number of people of traditional college age will be growing more slowly it may consist of an increasing proportion of educationally disadvantaged students. 33

The production of entry-level computer science and engineering graduates will need to be sustained during a period when the number of people of traditional college age will be growing more slowly and may consist of an increasing proportion of educationally disadvantaged students. 34

"We have a real manpower crisis in our industry," points out Donald J. Reifer, president of Software Management Consultants. Despite the fact that there are now 300,000 programmers working in this country and another 300,000 who work part-time on software, the demand for highly skilled people to write software is 40% greater than the supply, says Robert Curtice, an analyst for Arthur D. Little Inc. 35

Even if advances in programming languages decrease the need for entry level programmers, there will exist an increasing demand for engineers to design state of the art hardware. Applications programmers will still be needed to write compilers for one system to interface with another. Finally, systems analysts will become increasingly important.

33 Informational Technology, p. 33.
34 Informational Technology, p. 33.
as more and more sophisticated technology is used in an infinite variety of applications.

Throughout history, technological change has impacted society. The information revolution threatens to surmount even the tremendous upheavals of the agricultural or industrial revolution. In the past, people replaced old jobs with new modes of work. Some experts tell us that within two decades computers will be so advanced there may not be enough work to go around. Those making estimates predict that at least 60% of the workers in developing nations will lose their jobs or need complete retraining by the year 2000. It is safe to assume in the near future most people will not be able to keep one job for life. The importance of learning how to learn and constant re-education cannot be stressed enough.

It is difficult to predict how rapidly change will occur, as there exists many economic governors which can slow the adoption of automated technologies. Public opinion and sentiment can also play a significant role. These factors will not, in and of themselves, mitigate the impending revolution; but indeed could very well help determine how rapidly it progresses.

CETA Training Programs

This section offers a summation of all Milwaukee County CETA programs utilizing computer technology in some form. As the target population, goals, and time constraints are
similar this format is best reflective of the action thesis project. The information revolution is such a new and dynamic phenomenon educational facilities are experiencing difficulty reacting to it. All the programs studied are new this year and directly result from a response to the many changes now occurring. For this reason, no evaluation can be offered in terms of performance. The researcher will describe each proposed program as presented to him in interviews or materials obtained from the representative coordinators.

Two of the programs studied are very similar in nature. New Concepts Self Development Center and the Council for the Spanish Speaking offer secretarial skills training. The curriculum is structured in three distinct phases. Phase I concentrates on developing basic skills. Phase II focuses on clerical skills and G.E.D. preparation when required. And finally, in each program, Phase III teaches word processing. The objectives for each participant directly relate to their skill level upon entering the program. In this manner only a few complete all phases of the curriculum.\(^{36}\)

International Telephone and Telegraph (I.T.T.) has developed a secretarial program that focuses just on clerical skills and word processing. In addition, there is a special emphasis on the legal and medical clerk areas.

\(^{36}\) Personal Interviews with Matty Smith on April 26, 1983 and Lenor Garrett on May 4, 1983.
This program requires typing ability and well developed basic skills for entry. Its purpose is to just concentrate on clerical training.  

Hoping to address a broader area, Interfaith has created a micro-computer programming course. What they have done was sub-contract five courses from the Milwaukee Area Technical College Computer Science Department. Mike Shanovich, the program coordinator, just had a vague idea about how his curriculum would help participants. He mentioned future employment possibilities such as computer vendor, bookkeeper, or office manager. The researcher received the impression that Mike felt computers were a good idea and any training useful.  

Opportunities Industrialization Center (OIC) offers participants training in computer sciences. The goal is to train students in the use of the Report Program Generator programming language. They feel there is a market for software specialists at small businesses in the area utilizing mini-computers. But the question arises as to whether companies would feel four months training adequate for a full fledged programmer.  

37 Telephone Interview with Barbara Gunn, Midwest Regional Administrator, International Telephone and Telegraph, April 20, 1983.  
38 Personal Interview with Mike Shanovitch, April 26, 1983.  
39 Personal Interview with Neil Helgreen, April 26, 1983.
Finally, the Milwaukee Metropolitan Association of Commerce provides On-the-Job Training Contracts. Through this program, one participant went to work for an area advertising firm. She presently works for this company in full-time unassisted employment. Her duties in the accounting department include operating a cathode ray tube (CRT) terminal. 40

When evaluating the CETA programs, the researcher concludes that the clerical skills training courses are well designed and have a good prognosis for success. Their only failing toward planning for the future is the choice of dedicated word processing systems for training. Trends forecast more and more utilization of integrated software packages by companies. Clerks will be expected to do accounting and data base input in addition to word processing. Sensing this need, the Council for the Spanish Speaking is considering updating their IBM word processing machine with integrated software.

The researcher feels Interfaith and OIC are on the right track but have not planned well. OIC is attempting to address a need in the labor market, but its goals may be too ambitious. Interfaith has not really made a thorough evaluation of the job market, although the training will benefit participants.

The Milwaukee Metropolitan Association of Commerce program is very well developed. In fact it is CETA's intention to precipitate whenever possible the participation of area business in their programs. OJT is really an example of future trends.

Other Training Programs

Two programs from opposite ends of the country have been developed in order to address the same problem; that is the importance of bringing computer awareness and exposure to disadvantaged members of our society. Neither program attempts to be the complete educational experience in and of itself, but instead focuses on providing the background, motivation, and experience for participants to go on to entry level positions or more training.

Playing to Win Inc. is a non-profit organization dedicated exclusively to promoting computer use for the education of minorities, inmates of correctional institutions, juvenile delinquents, and other disadvantaged people. After its founder, Toni Stone, successfully implemented projects at Fortune Society (an organization working with ex-offenders) and Spofford Juvenile Center (a correctional facility), Playing to Win Inc. was established in East Harlem.

Essentially this program conveys a realistic attitude about what computers can do for students, and then provides the background and experience to become more involved with them.
Evergreen Valley College in San Jose, California has developed a ten-week computer and electronics course designed to help displaced workers and displaced homemakers make informed career decisions. While the course's intention is to familiarize students with the field and to lead them toward more training, some students gain enough experience from the program to get entry level jobs in the industry.

Because of the lack of the necessary resources, the thesis project resembled both Play To Win Inc. and Evergreen Valley's programs. If CETA or JTPA funding had been obtained, it intended to provide in depth clerical skills, computer skills, and basic skill development. Instead the computer literacy program focused on computer exposure and awareness and provided lead ins to area colleges or other programs. In addition, some training was provided in BASIC programming, keyboarding, word processing, and accounting.

Another objective was to identify for students, companies offering in-house training and development. Apple Corporation, for instance, provides extensive educational opportunities to their employees. One local example would be Mount Sinai Hospital's medical technologists training provided to their new employees.

**Psychological**

In order to learn to use informational technology effectively an autodidactic process is mandated. The
importance of hands-on experience cannot be emphasized enough. This raises important considerations when one addresses the needs of disadvantaged students, who are often times lost in the traditional education format. According to Bob Baker, a California Business educator:

The computer is an excellent tool for individualized instruction. Since disadvantaged students often need this kind of instruction, it logically follows that the computer will be useful for them. Tutoring and drill in basic skills given by the computer provide an excellent method of training disadvantaged students. The one-to-one instruction given by the computer reinforces student progress with immediate feedback to student responses. Students who often feel threatened or intimidated by traditional teaching methods many times feel comfortable working with computer-assisted instruction (CAI).

Although many participants have been inhibited from partaking in traditional educational programs because they felt self conscious or such programs were too expensive, time consuming, or inconvenient; information technologies offer an infinite array of alternatives in education. These new modes adapt themselves particularly well to individualized instruction. Some examples might include Basic Skills instruction in home-based study, or remedial college classes. In fact many companies have incorporated job training at the work station itself through

particular applications of computers. Perhaps one last model could be that of a neighborhood-based drop-in learning center providing a supportive environment to fragile students.

When resources are available computer-assisted learning (CAL) can be an effective tool for educating disadvantaged young people.

The School District of Philadelphia uses tutorial instruction to help meet the needs of inner-city youth. The major thrust is to help students improve their basic skills through programs that enable each student to work at his or her own rate, providing self-direction for learning, fostering the development of thought processes, and encouraging motivation for learning. Through the use of individualized tutorial computer lessons, students begin at their level of understanding. Material that is not mastered is presented again in a different manner as often or with as much variation as needed to produce sufficient comprehension. A reading program helps the teacher develop and monitor an individualized course of study, building as much on the child's competencies as on defects. Because the student is continuously and actively involved, receiving immediate feedback on responses, he/she becomes an active partner in the learning process and is aware of progress as it occurs. A mathematics tutorial program presents students with highly individualized exercises that reinforce and review material, enabling them to proceed at their own rate.42

Very often CAL fosters within students a sense of control. This concept is extremely important for many of the disadvantaged as they experience helplessness or lack of control in many areas of their lives. With a feeling of accomplishment, the computer can become a tool for exploring

42 Charp, p. 13.
an infinite array of avenues to learning previously denied.

The most ambitious undertaking to date in the use of CAL has been Plato. This computer-based educational system was developed through public and private assistance and is now under the control of Control Data Corporation.

In 1981, 6,000 Plato terminals provided on-line access to a multitude of subject areas made available by the system. In addition, this material has been adapted for use on the Control Data 110, which can be hooked up on-line or used independently making Plato curriculum readily available to all.

This system provides training in almost every conceivable subject area. In fact, a company or agency can have Plato materials written or adapted to their particular needs. Control Data Corporation has developed programs relating to the inner city, low achieving students and prison inmates. Some years ago, Multicultural Community High School, the sponsoring group for the thesis project, was able to participate in a basic skill development program facilitated by Plato.

Despite its enormous success at developing the Plato system, it has not become a profit maker for Control Data Corporation. In fact, it is very expensive to use and is now suffering from competition by the new low cost microcomputers and their software. Nevertheless, it was a
tremendous undertaking that helped foster the acceptance of CAL.

An important factor when viewing the psychological affects of the information revolution on society at large is that of ignorance.

The standard home computer is sold only to somebody who wants one, but the same machine can seem menacing when it appears in an office. Secretaries are often suspicious of new equipment, particularly if it appears to threaten their jobs, and so are executives. Some senior officials resist using a keyboard on the ground that such work is demeaning. Two executives in a large firm reportedly refuse to read any computer printout until their secretaries have retyped it into the form of a standard memo. "The biggest problem in introducing computers into an office is management itself" says Ted Stout of National Systems Inc., an office design firm in Atlanta. "They don't understand it, and they are scared to death of it."

But there is an opposite fear that drives anxious executives toward the machines: they worry that younger and more sophisticated rivals will push ahead of them. "All you have to do," says Alexander Horniman, an industrial psychologist at the University of Virginia's Darden School of Business, "is walk down the hall and see people using the computer and imagine they have access to all sorts of information you don't."

Argues Harold Todd, executive vice president at First Atlanta Bank: "Managers who do not have the ability to use a terminal within three to five years may become organizationally dysfunctional. That is to say, useless."

Computers may also contribute to new forms of stress. The Technology Review states since computers can monitor workers far more closely than human supervisors, the

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43 Friedrich, p. 18.
resulting stress (from being monitored by computers) represents a qualitatively new kind of work place problem.  

It is apparent that public attitudes will be an important force limiting the expansion of computer technology. Robots are met with fear and suspicion at the factory by the workers they threaten to replace. In the same manner, clerical workers are not entirely sure informational technology will ease their burden and provide greater opportunity for them. Finally, would one really want to listen to a sophisticated music synthesizer produce flawless Bach or is the aura of the local symphony orchestra more appealing? 

Higher level programming languages are constantly developed attempting to make computers user friendly. Will their success insure that computers are demystified and become a tool for everyone? This is one means to address the fear and suspicion change can sometimes foster. 

Political 

The United States has traditionally treated education as a public good. Public goods are defined as services or goods whose benefits are available to everyone and from which no one can be excluded. There are few pure public goods such as national defense, but an abundance of impure public goods exists. These services such as education combine aspects of both public and private goods. If decisions

about something as important as education are personal choices made in the market place, society could be very adversely affected. The government must assume responsibility in order that education be efficiently produced and equitably distributed.\textsuperscript{45}

Through time, most educational decisions have been made in the political arena. In addition, if these activities were not financed by the government, they were in some way supported by it. This view of education reflects the belief Americans have in the importance education plays in socializing its members. To insure that this becomes a reality, they have established a broad spectrum of educational institutions which are supported and regulated by the government.

According to one educator though the government is failing to meet or successfully address the dilemma new technology has placed on our existing facilities.

But Mr. Gillespie at the University of Washington questions whether colleges and universities, even with industry help and the factor of time, will effectively absorb changes the computer is bringing to education, without some sort of national agenda. "The computer affects the foundations of American education in a way that means we should reexamine how we provide that education," Mr. Gillespie says. "We're floundering right now because there's a need for the federal government to provide resources and information..."

\textsuperscript{45} Informational Technology, pp. 68-69.
policies. That lack of direction on a national level has us standing at the edge of a cliff.46

But Congress is well aware of the crisis and is beginning to respond.

Not since Sputnik and the space race in the 1950's has Congress been as concerned about revitalizing U.S. technology. Since last January over 200 separate high tech bills have been introduced. They range from the "High Technology Morrill Act," which would use monies from oil leases to support education, to the "Apple Bill," which would give computer companies special tax credits for donating computers to schools. Even the Reagan administration has backed down from an earlier stance and supports more educational funding.

Indeed the Federal Government has traditionally supported higher education. Recently this involvement has been increasing. In the late 1960's funds were provided to assure that all qualified students would have access to higher education. In the Fiscal Year 1978-79 approximately $14 billion was spent to achieve this goal. Today, nearly 40 percent of all students receive Federal aid, and 75 percent of scientific research is federally funded. The Civil Rights Act of 1964, the National Education Act of 1965, and the Educational Amendments of 1972 give license for government intervention in academic affairs. The Federal Government views higher

46 Phillips, p. 12.
education as a vital national resource to which all Americans should have equal access.  

When focusing directly on informational technologies, the following options exist for federal action. Congress could decide to adopt a policy of direct intervention. This would involve tax incentives for donation of equipment to schools, a program to subsidize software development, or directly funding technology acquisition.

Another direction could entail adopting a general education policy, which would support research and development and eliminate unintended regulatory barriers. A concrete example is the importance of providing copywrite protection so companies are more willing to spend money in developing new technologies.

The information revolution also raises other important political issues for society as a whole. Relationships with all our institutions are becoming increasingly complex. The inability to successfully communicate in all arenas will severely hamper people's ability to prosper.

There are also many grave security issues. Are other countries preparing their students better as many studies show? How successfully do foreign powers make use of espionage to steal our scientific and technological information? Although defense officials have traditionally been

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47 Informational Technology, p. 79.
48 Informational Technology, pp. 11-12.
concerned with military information, this more general leakage of knowledge could supply countries with differing ideologies the ability to achieve economic or military goals that are in contrast to our own.

**Philosophical**

Since informational technology is so powerful and its effects on society very pervasive, it holds the potential for great good or evil. One of the most obvious concerns is the possibility of creating a society similar to the one described by George Orwell in 1984. Indeed, with so much data available and not enough safeguards, privacy is hard to maintain.

The information age will also bring new vices. How many of our television-saturated children are now becoming video arcade junkies? There is also a question of giving children the tools, but not the maturity to use them properly. The recent fever raised by Milwaukee 414’s, a group of young computer users who broke into government-restricted data bases, attest to the potential dangers inherent in computer misuse.

Computers will also be used by management to control workers. It remains to be seen how effective they will be and if this phenomenon can avoid serious dehumanizing affects.

These issues lead James Martin to the following remarks:
There's a constant fear of technology getting out of control. It's rather like W. W. Jacob's *The Monkey's Paw* - where you make a wish, have it granted, and then the unfortunate byproducts of that wish will come true too!

That's true of technology also. People, politicians, industrialists, great engineers are making wishes about what we'd like to build and we're acquiring the capability to make those wishes come true. If we're not careful, the mere fact that the wish comes true might have all sorts of undesirable consequences.

The computer itself has enormous positive benefits for all mankind and it's only just started! But, the computer can also lead to the abuse of people - treating them as numbers instead of human beings, keeping too much information on individuals resulting in an invasion of privacy, making mistakes, making incredible weapons systems, or making bureaucratic insanities possible.

There are all sorts of possibly dangerous byproducts of computer technology, but this is true with any technology. Some are more obvious, such as nuclear energy. I think it's very important for people in creating new technologies to think out the long range consequences and to anticipate the possible side effects.

Then it's very important to communicate this to the public for a better understanding of technology. Scientists are never going to think of every implication, so it's really necessary to get the issues understood by sociologists, historians, politicians. In short, anyone who communicates with the mass public.49

These are some of the more far-reaching issues affecting our society and should be considered very carefully by everyone.

Many studies predict we are going to suffer severe massive automation-induced unemployment. This will be only a temporary problem, as change will produce new avenues of

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employment. These new jobs though are going to require a more sophisticated workforce. In fact, lifelong retraining is expected to become the norm for many people. This could lead us to a society further characterized by the "haves and the have nots."

Considerable evidence exists that most young people exposed to computers are white and middle class. One reason is the suburban tax base allows for better equipped schools. Well-off, aware, and motivated parents are buying home computers and exposing their children to them. In addition, they are sending them to private computer schools and camps.

One train of thought purports that an increasingly stratified society is not the fault of the computer per se, but indeed how society might use this technology. The position of this thesis is that the computer would be a powerful means to help empower the economically and educationally disadvantaged members of our society and every effort should be brought forth to insure this happens.

Summary

The Information Revolution has had a pronounced affect on the manner in which we live, think, learn and work. Additionally, the information sector is already a major component of our economy and will be the source of most jobs in the future. In order for people to have a participatory role in our new society, literacy in high
technologies will be mandated. There is a great deal of concern that those disadvantaged now are destined to become more so in a technetronic era.

Since the "information" society will require lifelong retraining, any education must stress learning how to learn. The ability to be computer literate may very much determine whether one joins the technological elite or the army of semi-skilled support workers. In any case, some form of computer literacy will be required for most jobs. Those who are not able to obtain this training will be at a severe disadvantage.

Computer-assisted instruction (CAI) lends itself particularly well to the educational needs of disadvantaged students. In addition to providing immediate feedback, it can be adapted to many alternative modes of education. Programs utilizing PLATO systems attest to proven success with this population.

The target population for this research project is those most likely to be disadvantaged by technology, those who are already economically or educationally disadvantaged. Since many of these people are poorly motivated, any program, to be successful, must adopt a missionary attitude.

The purpose of this project was to develop a CETA formatted training program in microprocessing for high school dropouts. Since CETA, JTPA, or CDA funding was not obtained, the project evolved somewhat differently. The actual program
offered participants computer literacy, career orientation, and some practical applications. The final goal was lead-ins to other programs or entry level jobs.

Chapter Three will emphasize the importance of reacting to the information revolution by creating new educational programs that are able to reach everyone in our society. It will also detail the direction the researcher's work has taken to address this need and offers recommendations for future goals and objectives.
CHAPTER THREE

Historical Review of Project

Technological change has impacted almost all of society, particularly the economic and educational sectors. High technology, of which computer technology is a fundamental component, has both destroyed and created jobs at a pace never before seen. The ability to understand and use computers is becoming essential to obtain and keep more and more different types of jobs.

People who, because of economic or educational problems, are unaware of this situation, or are unable to improve their position relative to it, are likely to become permanently disadvantaged.

The project was undertaken to design an instrument to motivate people to become better educated in order to improve their standing in a technology-oriented economy. This included providing the proper background to go on for more education at various higher level institutions. For other students, who for reasons of ability and self motivation were not interested in this objective, the program provided computer exposure and experience in application of various software programs. The goal of this portion of the project was to give them enough computer skills to obtain entry-level positions.
The target population for this program were those who were most likely to be disadvantaged by technology - those who were already economically or educationally disadvantaged. This entailed a missionary attitude for the program, since many people in the target population were poorly motivated for reasons related to their overall situation. Although initially the program's target population was to be relatively young high school dropouts, the recent economic dilemma has created a new class of disadvantaged. In order to help the displaced worker and/or the displaced homemaker, the program enlarged its participants to include this segment of the disadvantaged. In addition, the program allowed the general public to participate, especially Milwaukee Christian Center staff.

All training for the project took place at the Milwaukee Christian Center, 2137 West Greenfield Avenue. This is a community-based organization funded by United Way offering a variety of services to residents in low income neighborhoods on Milwaukee's near southside.

Multicultural Community High School which is a non-profit alternative school, provides educational services to the thesis project target population at various centers throughout the city and surrounding suburbs. One center was located at the Milwaukee Christian Center and this served as the sponsoring agency for the program. All proposals that were submitted to various foundations and government agencies
were sponsored by Multicultural through the auspices of the Milwaukee Christian Center.

It is important to note that the Milwaukee Christian Center's presence in the community is an integral factor in any successful attempt to provide training such as computer literacy to people who are generally unaware of the tremendous changes occurring in society. In addition, the on-going educational opportunities offered by Multicultural provide the proper lead-in for students to become involved in the project that had been developed. An article in The Milwaukee Journal detailed Multicultural's growth as an organization.

One of the most interesting facts brought out by the article was that the average age of the students had changed over the years. Especially in difficult economic times, more and more older students were feeling the necessity to go back and get more education and training in order to obtain gainful employment or better sense of self. This coincided with the attempt of the researcher to offer the program to displaced homemakers and displaced workers.

The researcher was responsible for program development, coordination, and some training for the project. In order to accomplish all these duties, he relied extensively on a core group of volunteers who were specialists in many areas of the professional and educational components of the computer industry. The researcher had acted as a resource person for Multicultural for nine years. His background as
an instructor, fund raiser, and administrator proved benefi-
cial in developing and implementing the program.

For program development, the researcher worked closely
with James McMahon, Jeff Jagmin, Kathleen Barry, Paul Hardi-
man, Matt Brzeski, Fred Obbenberger, and Robin Phillips.

James McMahon, the Data Processing Internship Supervisor
at Washington High School, recommended various software such
as the accounting and keyboarding programs. In addition, he
provided his general expertise toward program development.

Jeff Jagmin, who is responsible for development of
educational programming at the Byte Shop, acted as a consul-
tant in program length, feasibility and materials.

Kathleen Barry, Editorial Research Assistant of Computer-
Assisted Instruction for Raintree Publishers, recommended
various software programs for the project. Of these, Step
by Step was chosen to teach BASIC programming. She also
assisted in designing the format for the classes and helped
with training activities.

Paul Hardiman, professional programmer with fifteen
years experience, developed initial computer literacy classes
and designed and taught the advanced programming classes.

Matt Brzeski, a programmer with Allen Bradley, taught
along with the researcher, the beginning computer literacy
classes. In addition to adding to Paul Hardiman's and the
researcher's curriculum, he was able to demonstrate various
applications for microcomputers. Among the many things were use of a modem, word processing, and VisiCalc.

Fred Obbenberger, McGraw Hill-Gregg's Southeastern Wisconsin sales representative, played an active role in formulating the basic design and curriculum for a broad based microprocessing training program. This format was submitted to JTPA for approval.

Robin Phillips, a Business Education teacher at Brookfield Central High School, acted as a consultant to developing the clerical training portion of the program. She utilized materials developed by McGraw Hill-Gregg to teach accounting principles at her high school, the same materials that were to be used in the CETA or JTPA format of clerical skills training programs that the project hoped to facilitate if the funding would have been obtained. This curriculum is designed for programmed learning. In this manner, it could have been adapted, with Robin's help, for students returning to complete their clerical skills portion of the thesis project. The particular reason this course was chosen was the fact that it allowed for individualized instruction. Therefore, students could progress at their own speed studying various applications on the microcomputer and reinforcing their clerical background with individualized instruction in accounting principles.

Judy Hansen, who was also a Business Education teacher at Waukesha County Technical Institute, acted as a consultant
to the clerical portion of the project as she was familiar with the same materials.

In order to familiarize students with operation of a microcomputer, a number of volunteers acted as tutors. Ralph Kurowski, a retired engineer, assisted the program in this manner. In addition, he began writing software programs that would review basic skills for the students. Two displaced workers, who had some computer background, in addition to taking our classes helped the program as tutors. Carter Case, who has a degree in engineering and has taught at Laubach Literacy Center, assisted as a volunteer tutor. Dan Fehrer, a computer hobbyist, was able to instruct students on how to operate the microcomputer.

In order to demonstrate word processing applications, Sandra Hunter, a professional secretary utilizing integrated software in her place of employment, was available to instruct students in the use of Apple's Word Handler II (a sophisticated word processing program for microcomputers that has many of the features of a dedicated word processing machine). In addition, she developed course materials relating to this topic. Finally, Wendy Elliott, Director of the YWCA's Career Counselling Center, developed an employability skills course for use by the participants. If JTPA funds would have been obtained, a staff person would have been added to her career counselling center with sole responsibility for the project's students.
The project served forty participants. The students roughly divided equally among three categories - high school dropouts, displaced workers and homemakers, and the general public. The high school dropouts were referred to the program through Multicultural High School and Journey House, an organization offering similar training to area high school dropouts in G.E.D. preparation. The displaced workers and displaced homemakers were generally referred to the program through the Milwaukee Christian Center's informal channels. Often times, they were friends and relatives of Multicultural students. Members of the general public who took part in the program were mostly Multicultural and Milwaukee Christian Center staff.

In the Fall of 1982, the researcher made a thorough evaluation of the job market and detailed descriptions of entry-level positions in the computer field. Foremost, he discovered the impact that the microcomputer is having on society and the importance of exposing everyone to its many uses. The biggest change occurring in data processing had to do with the impact of the silicon chip. No longer was keypunch considered the norm, indeed data entry by CRT terminals was becoming more pronounced. This information provided the basis for focusing on microcomputers in program development.

As the researcher began to realize the significance of exposing people to basic computer literacy, he developed the
project to focus on providing training in fundamental pro-
gramming and applications on microcomputers. In order to
accomplish this, working with the technical, educational,
and practicing sectors of the computer industry, the basic
course was designed. This involved developing the curriculum
materials and identifying, locating, and obtaining funds for
the necessary software packages to do applications on the
computer.

In November, the essential elements of the program were
developed sufficiently to apply for CETA funding. When this
attempt was not successful, various foundations were approached
with the hope of obtaining more equipment. Apple and Tandy
Corporations educational foundations were two such avenues
that proved unsuccessful. Locally, letters were sent to
foundations with the goal of obtaining more computers. This
attempt was finally successful in late summer, when a grant
was obtained for $985.

In January, with the help of his core group of volunteers,
the materials were ready for the researcher to begin the pilot
program. In addition, through Milwaukee Public School
System Title 2 funding, all the software packages were
obtained. Realizing the necessity for more volunteers, a
Milwaukee Journal "Volunteers Wanted" ad provided the program
with the services of Robin Phillips, Dan Fehrer, Carter Case,
and Sandra Hunter. Matt Brzeski was recruited through a
message on a computer bulletin board explaining the project
and asking for help. Also, by January, the targeted populations were identified and recruitment began through the Milwaukee Christian Center and Multicultural informal networks. This involved referrals from Multicultural's southeast center and Journey House. In addition, the general public was also invited to partake of the classes. This meant identifying and contacting displaced workers and homemakers. This also entailed training of organizational staff and some members of the general public at large. Between January and June, instruction was provided at the Milwaukee Christian Center in computer literacy and its applications. Three series of beginning computer literacy classes were given, two advanced programming classes were also provided, and computer lab sessions focused on BASIC programming, keyboarding, word processing, and accounting. Before all the clerical training could be completed, the computer utilized for these purposes was stolen. All training was stopped because by the time the insurance company made funds for restitution available and the computer arrived from Apple Company, it was to be the end of August.

Participants who identified their objective as more training were able to complete their Step by Step lessons and the advanced programming classes. For students who chose to take the clerical training option of the project, time constraints of having only one computer and then
having that computer stolen made it impossible to complete that segment of the project in the proposed time frame. If this training would have been completed, classes in employability development were arraigned to be provided for at the YWCA's Career Counselling Center. These classes were to be adapted from their basic program to fit the particular needs of our population.

By the beginning of summer, all segments of the program were fully developed. Congress, in its attempt to react to the adverse economic conditions and changes brought about by the information revolution, made money available for retraining by restructuring the old CETA act into JTPA and through JOBS bill funding. In early summer, through the auspices of the Milwaukee Christian Center, JOBS bill money was requested through the process set forth by the Community Development Agency. This attempt also proved unsuccessful; therefore, in late summer another proposal was put to the private industrial council for JTPA funding. Again, the Milwaukee Christian Center was unsuccessful in their attempts.

Through the sponsorship of Multicultural, in July, the researcher was able to obtain funding for a full time VISTA volunteer position. In addition, he also was able to obtain the necessary funds for more computer equipment to expand this program to the Salvation Army, 1645 North 25 Street, in Fall of 1983. The researcher will also continue
the project started at the Milwaukee Christian Center, again relying on the help of his core group of volunteers. He anticipates that the students will be able to complete their clerical skills training in microprocessing at the Milwaukee Christian Center this year as a replacement computer is now available. When students complete their training, they will be able to take advantage of the employability development program at the YWCA. As a result of his work, the researcher has been in close contact with the program directors at the Salvation Army and Children's Outing Association, working as a consultant to develop computer literacy programs at Multicultural centers within their agencies. The YWCA has also approached the researcher about similar assistance. The La Farge Lifelong Learning Institute and University of Wisconsin-Extension have contacted the researcher about the possibility of teaching computer literacy classes there. At a recent job interview for Alverno College, among other things, responsibilities for developing programming for their Telesis Institute were mentioned to the researcher during his attempt at securing employment.

The Milwaukee Christian Center's intention is to continue its attempts at attaining funding. Late Fall of 1983, saw the researcher continuing his attempt to secure monies for retraining of displaced workers vis a vis the Governor's Employment & Training Office.
Development of Computer Literacy Program

The intention of the researcher was to develop a micro-processing training program to be submitted to various government agencies and foundations to secure funding. In order to achieve this goal, extensive research was done in the area of education and application of computers.

Relying upon the expertise of many volunteers and valuable consulting information obtained from computer vendors and curriculum sales representatives, the researcher was able to develop the basic format for a computer literacy program. The intention of this project was to offer participants, not only computer awareness, but also go further and develop literacy capabilities.

Using the limited resources available in terms of capital equipment and the abundant resource of volunteers, a pilot program was implemented at the Milwaukee Christian Center, the agency which also sponsored various proposals submitted to agencies through the Milwaukee area offices.

Evaluation Objective 1:

Develop a Proposal for Submission to Various Government Agencies and to Other Foundations

Working with Jeff Jagmin, James McMahon, Kathy Barry, and the other consultants, a basic format for training activities was developed in fall. This included the essential design of the program, especially things like time frames and areas of study to be covered.
At this time, a proposal was submitted to CETA which described a microprocessing training program which utilized computers to not only teach applications but to be used to review basic skills. This attempt was not successful and in lieu of a program of this sort, arrangements were made to develop a pilot project to be run at the Milwaukee Christian Center.

The program at the Milwaukee Christian Center was designed to provide participants computer awareness, and as much as possible, to give them hands-on experience on the computer itself. As there was only one computer available for the project's use, exposure was somewhat limited. When students worked during computer lab sessions, they utilized various software programs recommended by the numerous consultants to the project. Each program was chosen for a particular reason. Typing Tutor familiarized participants with the keyboard. Step by Step taught students BASIC programming. Word Handler II and Accounting materials were also available for students to enhance their clerical abilities.

In addition to the computer lab sessions, two different classes were available to students. In a basic computer literacy course developed by Paul Hardiman, computer awareness was emphasized.

Matt Brzeski and the researcher were also able to add to this segment of the program. A copy of the outline for
this class and other materials developed for it are included in the Appendix.

Paul Hardiman wrote descriptions of various terminology and principles pertinent to the computer phenomenon. Matt Brzeski contributed numerous articles that explored the topics covered in the course. Among many things were the use of modems, Visicalc, computers in education, and computer careers. Sandy Hunter also contributed materials written on word processing principles which were also utilized in this beginning orientation. In addition, the researcher developed job trends and further offered information on career orientation.

At the conclusion of this computer literacy course, certificates were awarded. It was the intention to also have provided students the necessary information to determine how they would best become involved in the forthcoming technological revolution. For students who showed the aptitude and desire to continue in programming, Paul Hardiman developed an advanced concepts course. Although this class focused primarily on BASIC, it was designed to provide students an overall understanding of all programming principles. The ultimate goal was to provide a foundation in order for students to go on for more training either to intensify their understanding BASIC at large or other programming languages. A copy of this course is included in the Appendix.
Many students felt they would be more comfortable as just users of computers. For these students, there were various software programs available to enhance their clerical skills. The researcher also provided counseling to them as to where they could obtain additional training and to this end, some students chose to enroll in CETA training programs. The Milwaukee Christian Center feels there is a definite need for an indepth microprocessing training program, especially for the disadvantaged people on the near southside. It was their intention to continue their efforts to obtain the appropriate levels of funding to provide this necessary service.

Through the auspices of the Milwaukee Christian Center and Multicultural Community High School, the researcher was successful in only two attempts at raising additional funds. A proposal submitted for a VISTA volunteer was approved in July. In addition, in August the researcher was able to obtain a grant of $985 to purchase more computer equipment. These attempts will be continued and close attention will be paid to any Congressional reactions to the restructuring of the nation's workforce that is resulting in temporary massive unemployment.
Evaluation Objective 2:
Monitor Results of a Pilot Computer Literacy Program

Each student was exposed to Step by Step programming lessons on the computer. Their ability to assimilate this material determined whether they would go on to advanced programming classes or clerical skills training. In all, seventeen participants went on to the advanced programming classes, fifteen members of the program chose the clerical skills training option and the remaining eight participants did not go on for any more training. If the clerical training would have been completed, a testing instrument was devised to determine typing speed, word processing skills, and general accounting and computer knowledge. This information would have been helpful in job placement. When applicable, G.E.D. test scores would provide additional criteria in evaluating participants. This is especially important for those who want to go to college. It also is a gauge of the grammar and English ability of the clerical students. Table 3.1 offers descriptive data on participants.

The final evaluation was to see how successfully the program placed people in additional training programs or entry-level jobs.
Table 3.1
Descriptive Data on Project's Forty Participants

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Conclusions

The first evaluation objective was to develop a proposal to submit to various government agencies and other foundations. In order to do this, the researcher had to first identify where the need exists for training programs of this sort. Realizing that there is tremendous upheavals occurring in data processing due to the information revolution, the researcher interviewed educators responsible for developing new programs that are responding to these changes. At Washington High School, the Business Education Department is creating a word processing program utilizing Wang Systems. At MATC's West Allis Campus, they are currently developing a one year microprocessing course which emphasizes the use of microcomputers.

Upon consulting with numerous computer specialists and curriculum representatives, the researcher was able to identify what type of training would be necessary in a more technologically orientated society. It was on this basis that various proposals were formulated for submission to Milwaukee area governmental agencies.

Although for the most part his attempts were not successful, the proper foundation has been developed in order to continue this quest in the future and hopefully at some point, obtain sufficient levels of funding to fully develop this course.
If the resources are obtained, all segments of the program are fully developed. This includes essentially all the curriculum materials that would be needed. Relationships have been established with numerous community-based organizations which are excited about participating in this type of programming. In order to address areas that are not generic to a microprocessing training course, but are important to any successful retraining program, the proper linkages have been established with agencies such as the YWCA and area colleges.

The second evaluation objective was to determine how students progressed in the training program. Step by Step lessons in BASIC were provided to all students. Twenty-one out of forty participants successfully completed the majority of these ten lessons, which included self-tests at the conclusion of each segment. Table 3.2 summarizes this portion of the program. Seventeen of this number went on to the advanced programming option of the project. Fifteen members of the program, who for the most part had difficulty with this material or were not interested in pursuing programming further, chose the clerical option. The remaining eight participants did not go on for any more training.

If all clerical training had been completed, a testing instrument was designed to monitor skill attainment. This was to be used as criteria in helping determine proper job placement. A copy of this is included in the Appendix.
For students completing either segment of the program, G.E.D. test scores also provided important criteria in determining proper placement for students. This is one measure that is looked at when determining college entrance requirements and also would suffice to give a profile of the English skills of potential clerical employees.

Table 3.2

<table>
<thead>
<tr>
<th>Lessons Completed</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

Upon completion of the program, the following placements occurred for participants. These outcomes will be presented by group. There were fifteen high school dropouts in the program. During the training period, two became pregnant and joined one other student as full-time homemakers. Two participants went on to area colleges for more training. One decided to pursue additional clerical training at the Counsel for the Spanish Speaking's CETA program and another went on to Cosmetology School. Two students got jobs in offices and will come back to finish their training and improve their clerical skills. Another two have gotten low
level paying jobs in child care and at McDonald's. Four are still out of work and have indicated a willingness to complete the program this year. Table 3.3 summarizes terminations for high school dropouts.

Table 3.3

<table>
<thead>
<tr>
<th>Positive or Negative Terminations</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homemakers</td>
<td>3</td>
</tr>
<tr>
<td>College</td>
<td>2</td>
</tr>
<tr>
<td>Vocational Training</td>
<td>2</td>
</tr>
<tr>
<td>Employment</td>
<td>4</td>
</tr>
<tr>
<td>Unemployed</td>
<td>4</td>
</tr>
</tbody>
</table>

The project thesis program was able to help, in some way, the majority of these students. For those going on to college, it provided the proper background in computer science for them to go on for more training. Those deciding to develop clerical skills were hampered by the fact that there was only one computer for hands-on experience. As the program will continue, one of its goals is to obtain more equipment. Another way to solve this problem is by having the students stay in the program longer until they
finish all the exercises and develop expertise in micro-
processing.

In all there were eleven displaced workers and home-
makers in the program. In computer-related areas, partici-
pants obtained jobs as a data entry clerk, computer vendor,
and VISTA volunteer. One student became a new car sales
person and another got called back to work as a steamfitter.
Two went on to get low level jobs at a Milwaukee Public School
lunch program and the Milwaukee County Stadium. Two decided
it was best to remain full-time housewives for the time
being. A laid-off factory worker is now manufacturing build-
ing materials. Finally, a student enrolled in Interfaith
CETA training program hoping to get more experience with
microcomputers. Table 3.4 shows terminations for displaced
workers and homemakers.

Table 3.4

<table>
<thead>
<tr>
<th>Positive or Negative Terminations</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homemakers</td>
<td>2</td>
</tr>
<tr>
<td>Employment</td>
<td>8</td>
</tr>
<tr>
<td>Vocational Training</td>
<td>1</td>
</tr>
</tbody>
</table>
The program generally benefited all of the students, even if they decided that computer careers may not be for them. Those who had an interest in the computer-related fields have begun to develop careers through entry-level positions. As all these students are in mid-life, many of them did not feel they wanted to invest the time in more training, but were glad they were able to find out about the computer phenomenon and how it affects their daily lives. Those most interested in computer careers seemed to be the male students. Generally, the female participants did not feel that at this time they wanted to develop a new career if it involved a substantial investment in more training.

Fourteen members of the general public took the classes with the anticipation of becoming more computer literate. They were all employed at the time and their job status did not change as a result of the project. For the most part, they wanted to learn about computers and become better users of them.

Implications

A recent Milwaukee Journal article titled, "The Computer Advantage" by staff reporter Margaret Thale reiterated the following conclusions. Many educators feel computers will be the dividing line between the haves and the have nots. Also, there is much confusion on the best way to utilize them. One issue is that in wealthy schools, students who have had
previous exposure to computers are writing sophisticated programs and doing problem solving, as compared to disadvantaged students who generally use computers for simple drill and practice exercises. There is much concern that this will lead to an increasing polarization of society. One problem that may lead to this is the lack of planning by school administrators. There is also much concern that schools are not encouraging women to pursue careers in the technical and scientific areas. Ms. Thale also feels any computer literacy attempt should include career applications ethics, social impact, and problem solving skills. 50

The thesis project was an attempt to address all the issues brought forth in the *Milwaukee Journal* article. Most important was the concern with bringing computer literacy to disadvantaged portions of our population in order to avoid the movement towards an increasingly stratified society. Beyond that, the project attempted to convey a realistic attitude about computers to its participants. It also addressed all the concerns Ms. Thale alluded to in her article of what a computer literacy program should emphasize in its basic design.

The computer literacy classes focused on developing an awareness of career applications and some training. The

social impact and issues such as ethics were also discussed at length in these classes. For people taking the pro-
gramming portion of the training, skills at learning how to
learn or problem solving are to be the focus of this curricu-
lum. Realizing that broad programming concepts were conveyed
in the initial design, the focus has changed to entail more
problem solving slant to this option of the program. The
program did not have any problems with sexual stereotyping
as the two students who have gone on to college to develop
technical or scientific training are both female. Every
effort was made to avoid limiting choices based upon such
things as race, sex, or age.

All societal institutions are going to have to respond
to the information revolution. Foremost will be the need to
address the concerns for education. The microcomputer
promises to be an extremely versatile tool with which to
address the complexity of this problem. In all the proposals
that were written and intrinsic to the pilot computer literacy
program was the emphasis on the very adaptability of the
microcomputer to answer various educational problems.

Recommendations

Initially, the thesis project was to be an intensive
program developing microprocessing skills for high school
dropouts to become clerical workers utilizing new technology.
Because funding was not obtained, the resources were not
available to develop this type of project. To best utilize
the abundant services of volunteers along with the limitation of one computer, the program was designed as one that would provide more information and background in a classroom type setting and as much hands-on experience as the resources allowed. This was done instead of a program that would focus particularly upon just training on the computer per se. The researcher felt that such a program though was indeed necessary and in late Fall 1983 another attempt was made to submit for funding to the Governor's Employment & Training Office. It is recommended that further attempts for funding be made based on the results of the current project.

It is further recommended that educational institutions recognize the need for training in computer literacy for students with a wide variety of backgrounds. In fact many educational institutions are just beginning to react to the changes brought about by the information revolution. The Business Education Department at Washington High School has acquired the Wang Word Processing System. This is an example of the need of most schools to go out and update their equipment and re-design their courses to reflect the changing workplace and market. Milwaukee Area Technical College (MATC) has, this August, begun a one-year microcomputer specialist program. This course focuses on machine operation and is very similar to the program that the researcher would have developed had he obtained the necessary resources. Chapter Two documents the need for this type of
program as the way in which information is processed, transmitted, and handled is changing rapidly, and there will be a tremendous opportunity for clerical workers who are familiar with the new technology. The researcher submitted proposals for this type of program to Comprehensive Educational Training Act (CETA), Job Training Partnership Act (JTPA), and Community Development Agency (CDA). These efforts were not successful, but will be continued in the future.

The actual thesis pilot project resembled programs such as Play To Win, Inc. and Evergreen Valley College's Computer and Electronics Course. In the Milwaukee area, a new program called the Private Sector Electro-Mechanical Skills Development Center has been developed to provide a background in computers and electronics for students and lead-ins to other programs.

In order to begin to address the problem of an increasingly polarized society, it is tremendously important for community institutions to outreach to the disadvantaged members of society and provide them the necessary knowledge and support to become more involved with informational technology. This is to be done with an emphasis on empowering skills to function in an increasingly complicated world. It is also important that this is planned well, so any people becoming involved will not just obtain semi-skilled jobs, but would use new informational technologies to obtain greater control over their lives.
To ensure that this happens, the researcher recommends that various community institutions develop computer literacy outreach programs. The YWCA has planned just such an attempt to bring the computer phenomenon to young minority women. The researcher not only applauds this attempt, but will act as a consultant in its development.

It is further recommended that other community organizations involve themselves in this type of programming. To this end, the researcher has been in contact with the La Farge Lifelong Learning Institute, University of Wisconsin Extension, Children's Outing Association and Alverno College. The institutions mentioned along with various associations are some of the vehicles to use to reach the public. Realizing this significance, the researcher has been strengthening the work of the non-profit computer network, an association dedicated to the sharing of resources and knowledge among community-based organizations. It is recommended that this viable and relevant organization continue its efforts at bringing computer literacy to all members of society.

Summary

The thesis project was an attempt to address the problem of an increasingly polarized society fueled by the technological revolution. The purpose of this program was to ensure that all members of society share in the benefits of the tremendous progress made by utilization of high tech.
The way this was done was to study the impact the information revolution is having on society. Once this material was obtained, a means was devised to convey a realistic attitude about new technology to any participants in our project. By working with consultants from the many professional components of the industry, the objectives were obtained. Relying on their expertise and vast knowledge, a program was developed to convey information about computer careers and general computer literacy. In addition, the training was provided to encourage students to continue on at higher educational institutions or other programs. The project also attempted to provide for those students, who for various reasons were unable to handle a more sophisticated application of computers, the ability to operate successfully different software utilized in a number of clerical occupations.
### Definition of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Computer</td>
<td>One of the first microcomputers developed and marketed. This is one reason there is more software available for this micro than any of the others.</td>
</tr>
<tr>
<td>Association for Educational Data Systems</td>
<td>An organization formed to promote the use of computers in education.</td>
</tr>
<tr>
<td>Autodidactic</td>
<td>Refers to the art of self instruction.</td>
</tr>
<tr>
<td>Basic Accounting</td>
<td>Fundamental knowledge of microcomputers to do simple bookkeeping.</td>
</tr>
<tr>
<td>Basic Skills</td>
<td>Remedial education in reading, writing, and arithmetic.</td>
</tr>
<tr>
<td>CAI</td>
<td>Computer-Assisted Instruction. The use of computers in teaching, which may involve drill and practice, tutorial or problem solving.</td>
</tr>
<tr>
<td>Community Development Agency</td>
<td>An agency of city government responsible for funding of numerous civic projects.</td>
</tr>
<tr>
<td>Data Entry</td>
<td>The process of transferring information to computer memory.</td>
</tr>
<tr>
<td>Department of Educational Opportunity</td>
<td>A program at the University of Wisconsin-Milwaukee providing support services to disadvantaged students including counselling and tutoring.</td>
</tr>
<tr>
<td>Disadvantaged</td>
<td>Individuals or groups who have low status in a particular society for reasons of race, sex, ethnicity, economics, language, geographic location, environment, education, disabilities, etc.</td>
</tr>
<tr>
<td><strong>Definition of Terms (continued)</strong></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Displaced Homemaker</strong></td>
<td>An individual who has not been in the workplace for a period of time, but has worked as a housewife during this period.</td>
</tr>
<tr>
<td><strong>Displaced Worker</strong></td>
<td>Someone temporarily out of the workforce mainly due to cyclical changes in the economy or automation induced unemployment.</td>
</tr>
<tr>
<td><strong>Employability Development</strong></td>
<td>Program providing participants with prosocial skills, self knowledge, and work knowledge.</td>
</tr>
<tr>
<td><strong>Fundamental Programming</strong></td>
<td>A working knowledge of BASIC, the most common computer language.</td>
</tr>
<tr>
<td><strong>G.E.D. Certification</strong></td>
<td>A testing program that provides accreditation in lieu of a high school diploma.</td>
</tr>
<tr>
<td><strong>Global Village</strong></td>
<td>The ability of modern technologies to foster interpersonal communication.</td>
</tr>
<tr>
<td><strong>Information Technology</strong></td>
<td>The means in which knowledge is stored and transmitted.</td>
</tr>
<tr>
<td><strong>Interactive</strong></td>
<td>Processes that are complimentary to one another.</td>
</tr>
<tr>
<td><strong>International Council for Computers in Education</strong></td>
<td>An organization dedicated to the improved instructional use of computers.</td>
</tr>
<tr>
<td><strong>Job Development</strong></td>
<td>Contacts made with employers in order to have access to job openings for placement of participants.</td>
</tr>
<tr>
<td><strong>JTPA</strong></td>
<td>Job Training Partnership Act. Replaces CETA as the Federal Government's new vehicle for jobs training.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Microprocessor</td>
<td>An electronic circuit chip that can perform arithmetic and logical operations on data. The microprocessor is the brains of a microcomputer.</td>
</tr>
<tr>
<td>Milwaukee Christian Center</td>
<td>A community-based organization sponsored by United Fund which offers an infinite array of social services.</td>
</tr>
<tr>
<td>Multicultural High School</td>
<td>An eleven year old non-profit alternative high school serving Milwaukee's dropouts at six locations.</td>
</tr>
<tr>
<td>Non-profit Computer Group</td>
<td>An association formed to facilitate the sharing of knowledge and expertise among community-based organizations.</td>
</tr>
<tr>
<td>Office of Technology Assessment</td>
<td>An analytical arm of Congress which is responsible for informing legislative policy makers of technological change.</td>
</tr>
<tr>
<td>Private Sector Electro-Mechanical Skills</td>
<td>A program developed with private sector donations fostering the introduction of computers to inner city youths.</td>
</tr>
<tr>
<td>Development Center</td>
<td></td>
</tr>
<tr>
<td>Robotized</td>
<td>The replacement of human labor by computers that are re-programmable and multi-functional.</td>
</tr>
<tr>
<td>Word Processing</td>
<td>A system that performs storage, manipulation and processing of text.</td>
</tr>
</tbody>
</table>
Bibliography


Garrett, Lenor. Personal interview. 4 May, 1983.


Gunn, Barbara. Telephone interview. 20 April 1983.

Bibliography (continued)


"An Interview with James Martin." The Future, n.d.


Shanovitch, Mike. Personal interview. 26 April 1983.

Smith, Matty. Personal interview. 26 April 1983.


Bibliography (continued)


APPLICANT ORGANIZATION Multicultural Community High School

NAME OF PROJECT WHICH VISTA WILL BE CARRYING OUT Computer Literacy Program

DESCRIBE THE PROBLEM THAT THIS PROJECT WILL ADDRESS. INCLUDE A DESCRIPTION OF THE TARGET POPULATION OR GROUP THAT WILL BE ASSISTED, THE MAJOR CAUSES OF THE PROBLEM AND NECESSARY DATA TO SUPPORT THE PROBLEM STATEMENT.

Lynne Gitt, a Colorado consultant, states, "The future is between the know and the know not; rather than between the haven and the have not." Whether you call our new age the "post industrial," "technetronic," or "information" society, one thing is certain, computers will play the paramount role.

Multicultural Community High School's goal is to help ensure that all members of our society reap the benefits of the sweeping technological computer revolution.

The fundamental objective of the community computer program is to offer computer exposure, education, and training through a neighborhood based organization to people otherwise denied this opportunity. In this manner first the computer will be de-mystified for all participants. After an initial orientation workshop career paths will be explored and some training in practical applications provided. We feel our format allows us the flexibility to serve the greatest amount of people in the most efficient manner.

Multicultural Community High School has traditionally provided for Milwaukee's hard core dropout population. In addition to increasing our services to this group, we feel our program will be of value to other populations in low income neighborhoods. Thus, our project is designed to help accomplish this goal.

This project intends to focus on Milwaukee's inner city, central city and near west areas. Almost 25% of the households in these neighborhoods have an average annual income of less than $10,000. In addition between 35% and 40% of the heads of family have not completed high school. Our intention is to focus on their educational needs in hope that this would eventually aid the economically.

DESCRIBE YOUR ORGANIZATION'S PREVIOUS SUCCESSES WITH THIS OR SIMILAR PROBLEMS. INCLUDE INFORMATION ON YOUR GROUP'S ACCOMPLISHMENTS AND HOW LONG VISTAS HAVE BEEN USED BY YOUR ORGANIZATION.

For the past eleven years, Multicultural has succeeded in reaching between 40% and 50% young people each year - people who were not being reached by any other educational program. We use non-professional teachers and, in large
part, a "homemade" curriculum of math and grammar work sheets. We structure our programs around the skills required for the GED exam. We know how to reach an out-of-school population and we never have to "recruit" students. They find us on their own. We know how to provide a quality education using very few funds. Multi has had VISRA since 1973 (intermittently). From 1973 to 1976, our VISRA were instrumental in creating new multicultural learning centers (finding space, materials, etc.) and in staffing these centers (finding volunteers).

Another VISRA was primarily engaged in advocacy with the Milwaukee Public Schools and was a significant force in MUS' decision to open a middle school "outpost" to attract non-attending students assigned to Kosciuszko and Walker Middle Schools.

Currently we have a VISRA working on an adult literacy program developing study groups in various people's homes in the community.
<table>
<thead>
<tr>
<th>GOALS AND OBJECTIVES</th>
<th>PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS</th>
<th>ACTUAL PROJECT ACCOMPLISHMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOAL 1</td>
<td>Implementation of a computer literacy program offering exposure, education, and training through neighborhood based organizations to people otherwise denied this opportunity - high school dropouts, displaced homemakers, displaced workers, members of low income neighborhoods, neighborhood organization staff.</td>
<td>1 - 2</td>
</tr>
<tr>
<td>Objective 1</td>
<td>Arrange for a computer training program at the Salvation Army, 1645 North 5th Street. Begin initial negotiations stipulating responsibility.</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Objective 2</td>
<td>Develop a curriculum for the program - knowledge of computers, awareness of career potentialities, vocational training in computer related functions, background and motivation to go on to more training. This is to be done in conjunction with a core group of consultants who are experts in all phases of the computer industry and will carry on after the VISTA leaves.</td>
<td>2 - 3</td>
</tr>
<tr>
<td>Objective 3</td>
<td>Recruit volunteer instructors for the project - provide necessary orientation, train on-site personnel. This is to be done in conjunction with a core group of consultants.</td>
<td></td>
</tr>
</tbody>
</table>
### GOALS AND OBJECTIVES

<table>
<thead>
<tr>
<th>ACTION</th>
<th>ACTUAL PROJECT ACCOMPLISHMENT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OBJECTIVE 1</th>
<th>Description</th>
<th>PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS</th>
<th>ACTUAL PROJECT ACCOMPLISHMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>Experts in all aspects of the computer industry and will carry on after the VISTA leaves.</td>
<td>2 - 3</td>
<td></td>
</tr>
<tr>
<td>2 - 3</td>
<td>Obtain the necessary equipment - funding sources, location of computer time by: private company, utilize an existing apple computer by transporting it to training site. Have volunteers use their equipment as needed. Hands-on experience at UH-4 or public schools.</td>
<td>4 - 12</td>
<td></td>
</tr>
<tr>
<td>3 - 4</td>
<td>Provide an educational experience to 60 participants characterized by the aforementioned target population.</td>
<td>4 - 12</td>
<td></td>
</tr>
<tr>
<td>4 - 12</td>
<td>People will attend a series of evening classes. These classes will explore knowledge of the computer itself, computers in education, computer application software, computer applications in data communication, social implications of computer phenomenon.</td>
<td>4 - 12</td>
<td></td>
</tr>
<tr>
<td>5 - 6</td>
<td>After the proper background is given motivation and entice career choices, counseling on where to obtain more training will be tiered.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOALS AND OBJECTIVES</td>
<td>PLANNED PERIOD OF WORK AND ACCOMPLISHMENTS</td>
<td>ACTUAL PROJECT ACCOMPLISHMENT</td>
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<tr>
<td>----------------------</td>
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<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Objective 3</td>
<td>Provide instruction in computer related functions in order for 12 participants to locate jobs in entry level positions.</td>
<td>4-12</td>
<td></td>
</tr>
<tr>
<td>Objective 4</td>
<td>Staff project with an instructor for evening classes to be given every six weeks to 12 participants. In addition four tutors to provide assistance during hands-on training.</td>
<td>4-12</td>
<td></td>
</tr>
</tbody>
</table>
LETTER OF AGREEMENT

Multicultural Community High School agrees to the following obligations as component in good standing of M.A.U.D., Ltd.

1. Compliance with ACTION Guidelines and Regulations.
2. Payment of regular monthly dues for office support.
3. Selection of an appropriate on-site supervisor who will:
   a) regularly attend scheduled committee, general and board meetings.
   b) provide the volunteers with adequate job supervision and support.
   c) provide the volunteers with at least one weekly meeting to discuss volunteers' work, program, etc.
   d) inform the proper MAUD supervisor in a timely fashion of a volunteers' work or health problems.
4. Inform the proper MAUD Supervisor, in writing, of any change in on-site supervisor.
5. Payment of adequate "on the job" transportation costs to volunteers.
6. Preparation of proposals, job description, quarterly reports and volunteer evaluations in a timely fashion as requested by MAUD Supervisors.
7. Recognize that MAUD staff is the liaison between components, volunteers and the ACTION office.
8. Designation of program beneficiaries to serve on MAUD committees and Board.
9. Provide or assist volunteers in procuring necessary resources for assigned tasks.
10. Assistance in the development of Career Development of Plans for low-income locally recruited volunteers.

Signature of Organization Chair

On-Site Supervisor

Date February 11, 1983
VISTA VOLUNTEER WORK PLAN

INSTRUCTIONS: To be completed by Sponsor for each individual Volunteer assignment or assignments performed by a group of Volunteers.

<table>
<thead>
<tr>
<th>SPONSOR NAME</th>
<th>M.A.U.D., Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION</td>
<td>2600 W. Wells St., Milwaukee, WI</td>
</tr>
</tbody>
</table>

2) GEOGRAPHIC AREA(S) OF VOLUNTEER ASSIGNMENT:
Greater Milwaukee Area

3) CATEGORIZATION OF VOLUNTEERS

<table>
<thead>
<tr>
<th>Skill Code</th>
<th>Preferred</th>
<th>Alternate</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>(X)</td>
<td>( )</td>
</tr>
</tbody>
</table>

4) Brief description of sponsoring organization and VISTA project:

Multicultural Community High School is a network of six neighborhood learning centers reaching 400 to 500 young people, ages 14 to 18 each year. The computer literacy program will focus on bringing exposure, education, and training to this population and others in low income neighborhoods.

5) Volunteer Assignment Description:

The VISTA will locate a site in a low income neighborhood where the training can be offered. When the needs of the population in the particular area are assessed the VISTA will design the curriculum of the program. Additional duties will include obtaining the necessary equipment through various funding sources. After recruiting and training of volunteers the VISTA will oversee the educational program.

3) Special placement information (e.g., Climate, Living Conditions, Transportation):

The VISTA should understand that the training of participants is to be done by volunteers and the VISTA's duties involve coordination.
7) Preferred Volunteer Skills/Qualifications (include acceptable alternative skills):

VISTA must have a commitment to working with people in non-hierarchical, egalitarian ways.
VISTA should have community organizing experience.
VISTA should have good verbal communication skills.
VISTA should have experience in managing materials and personnel and/or a willingness to assume a responsible/self-directing role.

Sponsor Should Indicate Its Capacity To Accommodate Handicapped Persons:

We see no large barriers to the effectiveness of a handicapped person. Much of the work of coordination will involve use of a phone. If a neighborhood facility could be chosen with easy access this will also ease any major difficulties.

Additional Comments, Information, Background:
Mr. Dale Nook  
613 East Oklahoma Avenue  
Milwaukee, Wisconsin 53207  

Dear Dale:

Our Parish Council has approved your request for the Computer Literacy Program in the amount of $985.00. Thank you for coming to our meeting to discuss your program plans.

God be with you in your work.

Sincerely,

[Signature]

David H. Walker  
Chairperson, Outreach Committee

Enclosure
Circle one of the following choices for each numbered statement below.

SA If you strongly agree with the statement.
A If you agree with the statement.
U If you are uncertain about the statement.
D If you disagree with the statement.
SD If you strongly disagree with the statement.

<table>
<thead>
<tr>
<th>Statements</th>
<th>Choices</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoy working in a group.</td>
<td>SA A U D SD</td>
<td>I enjoy working alone.</td>
</tr>
<tr>
<td>Learning is easy for me.</td>
<td>SA A U D SD</td>
<td>I think computers could be helpful as a means to learn.</td>
</tr>
<tr>
<td>I am somewhat fearful of computers.</td>
<td>SA A U D SD</td>
<td></td>
</tr>
</tbody>
</table>

List several ways that computers are used in everyday life.

1. 
2. 
3. 

List several ways that computers are used in business and industry.

1. 
2. 
3. 

According to some sources how many jobs will be computer or computer-related by 1990.

a. 50%
b. 75%
c. 90%
d. 60%
Word processing is:
   a. Finding definitions
   b. Editing a text
   c. Typing
   d. Writing a manuscript

What is the difference between calculators, computers, and electronic games?

Signify whether these terms are software or hardware with an "S" or "H."

<table>
<thead>
<tr>
<th>Term</th>
<th>S</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>Keyboard</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>Disk</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>Memory</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>Tapes</td>
<td>S</td>
<td>H</td>
</tr>
<tr>
<td>Paddle</td>
<td>S</td>
<td>H</td>
</tr>
</tbody>
</table>

A computer program is:
   a. A television show about computers.
   b. A person who runs computers.
   c. A method of learning about computers
   d. A list of commands.

Computers draw by:
   a. Connecting dots
   b. Drawing lines
   c. With a special pencil
   d. Lapping circles

State what will happen if instructions are not properly stated in the precise language for that computer.
   a. It will stop
   b. It will type "no, dummy"
   c. It will type "syntax error"
   d. It will go tilt
Which of these are an example of computer language. Identify with a capital "L"

Fortran
Machine
English
Robotics

When referring to computers the term BASIC means.

a. A computer language
b. A fundamental task
c. Something very simple or small
d. A video game

Unless a mistake has been made a two-column account form should always

a. Be prepared accurately and neatly
b. List just the assets of a business
c. Balance left side with the right side
d. List a firm's financial ratios

Which of these following terms are assets. Identify with a capital "A."

Cash
Inventory
Stock
Mortgage
Accounts Payable
Land
Accounts Receivable
Equipment

In Accounting, a credit is

a. Something you owe someone
b. Something someone owes you
c. A measure of work completed.
d. The balance of a debt
INTRODUCTION TO COMPUTERS

PART 0: OVERVIEW

In this series of meetings, we'd like you to get comfortable with computers and achieve some understanding of how they work, how they can be useful, and how they will probably affect your life in many ways. This is somewhat loosely known as "computer literacy".

Each week will include some hands-on exercises on Multicultural's APPLE II microcomputer system. Please take part in these. It is important that you actually use the computer. This is the only way you'll get comfortable and productive with it (like riding a bike or playing the piano).

Above all, please ask questions. Someone here either has the answer or can get it for you. Our purpose is to share our knowledge with you as much as possible. If there is some topic you'd like us to talk about, or spend more time on, just let us know.

Tentative Schedule:

Week 1: Some basic terms; Operating the Apple II
Week 2: Some more basic terms; Computers and Education
Week 3: Computer Graphics; Doing Something Useful
Week 4: Data Communications; Word Processing
Week 5: Catchup; Anything by popular demand; Wrapup
INTRODUCTION TO COMPUTERS

PART 1: BASIC COMPUTER TERMS

COMPUTER: a data processing device which has significant computational power. A computer manipulates data in its memory, has the ability to store and carry out instructions, and communicates with its environment in a variety of ways.

MICROCOMPUTER: a small computer built around a microprocessor chip. The difference between microcomputers and large computers is the same as that between a Toyota pickup and a Mack truck.

HARDWARE: the physical components of a computer, such as its electronic chips, cables, cabinet, circuit boards, keyboard, etc.

MICROPROCESSOR: the electronic circuit chip that can perform arithmetic and logical operations on data. The microprocessor is the 'brains' of a small computer. Microprocessors are usually known by a number given them by their manufacturer. Examples are the 6502 (used in Apple, Atari), 9900 (used in TI), Z80 (used in many systems), 8088 (used in IBM personal computer), 6809 (used in Radio Shack's color computer). Of course, every company thinks its microprocessor is best, but don't pay much attention to this. What really counts is the software.

SOFTWARE: the instructions and related data which enable a computer to perform useful work.

FIRMWARE: software which is permanently built into hardware, usually in the form of memory chips.

DATA: the representation of information in a form usable by a computer. For example, a bank account or a business letter are information. They must be changed into data in order to be stored in a computer's memory or to be manipulated by a program.

PROGRAM: a sequence of instructions which the computer follows in order to perform a task. PROGRAM and SOFTWARE are pretty much the same thing. Programs are really just another type of data to the computer. On the other hand, if data representing a checking account is put where the computer expects a program to be, the results are very unpredictable.

MEMORY: storage of various kinds which the computer uses to remember data. Memory can be viewed as collections of boxes of various sizes into which the computer puts data, and out of which the computer can retrieve data. These boxes have the useful feature that when the computer retrieves data from them, the data remains in the boxes and can be used again and again. (Don't take this 'box' idea too seriously.)

Units of memory:

BIT: an electronic switch, also called a flip-flop, which can be in one of two states (on/off, high/low voltage, positive/negative current, north/south magnetism). Bits are given the arithmetic values 0 or 1, which form the basis of all computer logic and
arithmetic. All programs and data in the computer are made up of strings of thousands (millions ...) of ones and zeroes.

BYTE: the smallest unit of memory whose data a computer can move from one box to another. A byte consists (usually) of 8 bits. A byte usually corresponds to a single character of information, such as the letters 'A' to 'Z', the digits '0' to '9', and so on.

K: a unit of 1024 bytes of memory. For example, many small computers are described as having '16K' of memory. This means that it can store 16 x 1024 (16,384) bytes of data. You can usually think of a K as a round 1000.

MEG: a unit of 1024 K. That is, a meg is 1024 x 1024 bytes, or 1,048,576 bytes. You can usually think of a meg as a round million.

WORD: usually the largest unit of memory whose data a computer can move from one box to another. In most small computers a word is 2 bytes. In larger computers a word can be 4, 6, or 8 bytes.

INTEGER: a whole number: that is, one which has no fraction or decimal part. In most small computers integers can only range from -32767 to +32767. This is because an integer is allowed to use only 2 bytes of memory.

REAL: a number which can have a fraction or decimal part. For example, a dollar amount such as $49.63 is stored by the computer as a real number. Real numbers are also known as FLOATING POINT numbers. In a computer's memory a real number usually takes up 4 bytes.

STRING: a sequence of characters. For example, the name 'John Q. Doe' and the address '1575 Main Street' are strings. A string usually takes up as many bytes of memory as it has characters.

Types of memory:

Internal memory: memory which is built into the computer, usually in the form of electronic chips. Small computers can have from 16K to 768K of internal memory.

ROM: read only memory. The computer can retrieve data from this type of memory, but cannot store new data into it. FIRMWARE is usually in the form of ROM chips.

RAM: memory from which the computer can retrieve data and into which it can also store new data.

External memory: memory which must be attached in some way to the computer and which can be detached and moved to another computer.
INTRODUCTION TO COMPUTERS

PART 1: BASIC COMPUTER TERMS

CARTRIDGE: removable ROM memory. Many computer games are distributed as cartridges which plug into microcomputers or video games (which are really microcomputers).

CASSETTE: memory in the form of cassette tapes. The computer records data on the tapes in a magnetic form similar to musical cassettes.

FLOPPY DISK: a flat, circular, flexible form of storage. The computer records data on disks in pretty much the same magnetic form as it does on cassettes. However, disks are faster and more reliable than cassettes, and can store more data. A typical 5-1/4 inch floppy can store from 90K up to 512K of data. An 8 inch floppy can store from 256K up to 1 meg of data. Floppy disks are also known as DISKETTES.

HARD DISK: an inflexible disk which is sealed in an enclosure. Hard disks are otherwise pretty much the same as floppies, but they are faster and more reliable, and can store much more data. A hard disk can store from 5 meg up to 20 meg of data.

FILE: the usual name for a collection of data about one kind of thing (like accounts payable) stored on a disk.

COMPUTER LANGUAGE: a language with which a human being can communicate with a computer. Because computers have always been, and remain, more stupid than humans by several magnitudes, it has been necessary for humans to talk down to them. This situation is similar to the way we must talk to infants and small children (GOO-GOO, DA-DA, MA-MA, ICY-POO!), differently than we talk to other adults. So remember when dealing with computers that it is usually the computer’s fault, not yours, if things go badly, and keep your patience. Also remember that most computers simply cannot tolerate spelling mistakes or simple grammar errors that humans handle as a matter of course.

Note: This situation is improving rapidly. However, our APPLE II system is still pretty primitive. Please bear with it.

The names of some common computer languages are BASIC, FORTRAN, COBOL, LISP, Pascal, Forth, C, and ADA. There are literally hundreds of uncommon computer languages.

BASIC: the most common computer language provided with small computers. It has a limited vocabulary and is most appropriate for numerical problems. Unfortunately, each type of computer comes with its own dialect of BASIC. All of these versions are similar, but they are all different in various respects.

MACHINE LANGUAGE: a low-level language which a computer can understand directly. Machine language is unintelligible to most humans.

BASIC INTERPRETER: a program, often provided as Firmware in ROM,
INTRODUCTION TO COMPUTERS

PART I: BASIC COMPUTER TERMS

which interprets the BASIC language into machine language instructions which the computer can understand directly.

PROGRAMMING: the process of making a computer solve a real-world problem. It consists of several steps:

1. Understand the real-world problem.
2. Understand how to solve the problem in a normal human way.
3. Figure out how the computer can be used to solve the problem. Can the computer do it faster or better? Maybe the computer is unnecessary. Maybe the problem can’t be solved without a computer.
4. Design instructions to solve the problem.
5. Translate the instructions into a computer language so the computer will know how to solve the problem.
6. Let the computer have a go at it. If it doesn’t work, go back to step 1 (or wherever else the programmer made a mistake) and repeat until it does work.

I/O: input/output. These are the various ways by which a computer communicates with its environment.

Keyboard: a device similar to a typewriter’s keys on which you can type commands and data for the computer. Unfortunately, every computer comes with its own special keyboard, and no two manufacturers can agree on the same way to lay out the keys. Some small computers have a keyboard built into them, like the Apple. Others have detachable keyboards. Still others have no keyboard at all, and require a terminal for communication.

Terminal: a typewriter-like device on which the user types his input. A terminal has a display screen, or a printer, or both, which the computer uses to show its output.

Printer: used for hardcopy (paper) output.

CRT: cathode ray tube. A television-like terminal on which the computer can show information to the user. Most CRTs are black-and-white only and do not have the ability to do graphics. Most CRTs also have a built-in keyboard. Some small computers have a CRT built right into them.

Video monitor: another television-like display device. Monitors come in both black-and-white and color versions. Some small computers have a monitor built right into them.

TV: an actual television set which the computer can use to display information.
INTRODUCTION TO COMPUTERS

PART II: BASIC COMPUTER TERMS

RF modulator: a device that converts the video output signal from a computer to the antenna level input of a home television set. RF modulators are not required if the computer is attached directly to a video monitor, but necessary if a home TV is being used.

Telephone Network: common carrier communications systems accessible by telephone. With special hardware costing from $150 to $400 and special software, small computers can communicate with other computers anywhere the phone system extends.

Voicer: synthesized human voice output and human voice input. Good quality, but not perfect, voice output is now affordable ($200 - 500) on home and office microcomputers. Voice input, however, is still in the development stages. Many problems still remain to be overcome in the areas of vocabulary capability and wide spectrum voice recognition before voice input will be cost-effective.

Database: a comprehensive collection of data about some field of interest (for example, books in a library), organized in such a way as to make intelligent retrieval of the information easy. Computer databases are usually very large files stored on disks.

Graphics: the ability of a computer to divide the display screen of a monitor or CRT or TV into a matrix of dots. The computer can turn each of these dots on or off individually, often in several colors besides black and white. This allows the computer to draw pictures and graphs on the screen. Most small computers can show dots in from 4 to 16 colors, and in several different intensities.

Resolution: the number of dots into which the computer can divide the screen. The higher the number of dots, the finer the pictures the computer can draw. Most small computers range from a resolution of about 40 horizontal by 40 vertical to about 600 horizontal by 300 vertical.

Robot: a programmable, multifunctional manipulator designed to move materials, parts, tools, and/or specialized devices through variable motions for the performance of a variety of tasks.

Pick-and-Place Robot: a simple robot with limited ranges of motion and control, usually capable of point-to-point moves.

Intelligent Robot: a servo-controlled robot which is capable of making sophisticated decisions and choices through its sensing (voice, light, touch) and control systems.

All contemporary robots are controlled by computers and/or have small computers built right into them. Heathkit now sells a robot kit for $1900 that has a built-in computer, voice output, a gripping arm, and sensors for light, sound, and touch.

Artificial Intelligence (AI): a field which blends computer science,
INTRODUCTION TO COMPUTERS.

PART 1: BASIC COMPUTER TERMS

In general, it has two aspects:

1. Making computers more useful by giving them the ability to do jobs which we’ve always considered to require human intelligence (whatever that is).

2. Using the computer as a research model to discover more about human intelligence, learning, and the nature of knowledge.

AI researchers have had a strong working interest in computers and robotics since AI got started.
INTRODUCTION TO COMPUTERS

PART 2: OPERATING THE APPLE II

I. Handling Diskettes

The computer records data magnetically on the surface of the diskette. While diskettes are reliable and durable in normal usage, the data on them can be destroyed easily by various forms of abuse. So, here are a few rules:

1. Don’t fold or bend a diskette.
2. Don’t write on a diskette label with ball point pen or pencil. Instead, use a felt tip pen and press lightly.
3. Don’t place or store diskettes near any source of radio frequency radiation (radio, television set, tape recorder, speaker).
4. Don’t force a diskette into or out of the disk drive.
5. Don’t touch the shiny exposed surface of the diskette.
6. Keep diskettes in their envelopes when not in use.

II. Putting Diskettes into the Disk Drives.

1. There is a small red light on the front of each disk drive. When this light is ON, the drive is either reading from or writing to the diskette.
   
   **Never open or close the disk drive door, or insert or remove diskettes, when the red light is ON!**

2. Always insert diskettes with the labeled side UP, and the oval cutout pointing INTO the drive.

III. Starting Up the Apple.

1. Make sure the Apple and the video monitor are plugged in.
2. Find the diskette labeled "DOS 3.3 SYSTEM MASTER". Insert this diskette into the drive labeled "1". Be sure the disk drive door is closed.
3. Turn on the video monitor. It has a small red light which indicates it is turned on.
4. Turn on the Apple with the switch on the fan box.
5. The Apple should "beep" and display "APPLE II" at the top of the video monitor screen.
6. Firmware in the Apple’s ROM will load more software into its RAM. These are the programs which actually control the computer.
INTRODUCTION TO COMPUTERS

PART 2: OPERATING THE APPLE II

7. After the control programs (known as the Disk Operating System (DOS) and the APPLESOFT Basic Interpreter) have been loaded from the diskette into RAM, you will be given the choice of using the Step-by-Step instruction programs, or running other programs. Just follow the instructions displayed on the video monitor.

IV. Running Programs.

1. Files.

The computer stores data on diskettes in files, which are simply collections of related data. Some files contain programs; others contain data used by the programs, such as the text of a letter or some business accounting records.

Each file on a diskette has a unique name. In order to run a program, you must know its name.

2. To find out what programs are on a diskette, type:

```
CATALOG
```

The computer will list the names of the files on the diskette. If the screen fills up, it will wait until you press some key on the keyboard before continuing.

3. To use the other disk drive, insert a diskette and type:

```
CATALOG D2
```

You will get a listing of the contents of the diskette in drive 2. All commands will now use drive 2. To return to drive 1, type:

```
CATALOG D1
```

The computer will always use the drive which was last specified. You can flip back and forth all you want.

4. To run a Basic program (Basic programs have an A or an I in front of their names when you do a CATALOG), type:

```
RUN XXXXXXX
```

where XXXXXXX is the name of a program. If the program has a B in front of its name, type:

```
RUN XXXXXXX
```

If a name in the catalog has a T in front of it, it is a data file and not a program; you can't run it.

5. To run programs on the other disk drive, just type:
V. How to Tell What in Heaven's Going On.

1. The Prompt Character.

When the computer is waiting for you to input something, it will display the prompt character. For Integer Basic, this is \textbackslash{}j. For AppleSoft Basic, it's \textbackslash{}j. Note: Different programs will use different prompt keys, such as \textbackslash{}1, \textbackslash{}2, or \textbackslash{}1. The instructions for the program should explain this.

2. The Cursor.

The cursor is the blinking white box which originally follows the prompt character. When you press a key on the keyboard, the computer will display it on the screen where the cursor is, and move the cursor to the right, or to the next line.


The APPLE II comes with two flavors of the Basic language. Integer Basic is the simpler of the two, and only allows integer numbers (no fractions or decimals). AppleSoft is much more powerful, and allows fractional and decimal numbers. You can tell which one is currently in control by the cursor, as described just above.

4. The RETURN Key.

As you type a command on the keyboard, the computer will display it on the screen, but will do nothing with it. In order to tell the computer to actually process your command, you must press the RETURN key. The RETURN key is a way of telling the computer that you are done typing.

5. The RESET Key.

The RESET key is like an electric cattle prod, and you should use it only when the computer is behaving very badly. If you use it carelessly, you might lose the work you were doing, or damage a diskette file.
INTRODUCTION TO COMPUTERS

PART 3: COMPUTERS AND EDUCATION

In this part we'll explore some of the ways computers can be used in education at all levels. There will be several programs for demonstration and hands-on practice.

In this part we'll also get started with the Step-by-Step computer aided instruction course in the BASIC programming language.
INTRODUCTION TO COMPUTERS

PART 4: GETTING THE COMPUTER TO DO SOMETHING USEFUL

This is an exercise in which we'll use the computer as an "electronic filing cabinet". In fact, we'll use a program called FILE CABINET. This program was written in the BASIC language by computer hobbyists (not professionals!). We'll see how easy it is to use the Apple II to store and manipulate information.

Here's our project:

We've decided to set up a little dog breeding business on the side. We want to keep track of the following information about each of our dogs:

- It's name;
- Its breed;
- How many ounces of dog cereal it needs each day.

We want to get an alphabetical (by name) listing of our dogs which shows the total amount of dog food they need daily.

This project will illustrate how to describe information to the computer, how computer data entry works, and how to get a computer report.
In this part we'll explain computer graphics and some of its uses in engineering, manufacturing, business, games, and music.
I. Terms

MODEM: A modem is a device which converts the digital signals from a computer or terminal into analog signals which can be moved through the telephone network, and from analog back to digital. A modem allows a terminal or computer to hook into the telephone networks.

NETWORK: an organization of computers, terminals, and other data processing devices (called NODES) which are connected by communication links. Intelligent nodes, usually computers or computer-based terminals, have knowledge of the network structure and can participate in controlling the network.

BPS (Bits Per Second): the rate of speed at which data can be sent over a communications link. The usual speed for home computers is 300 bps, which is the same as 30 characters per second. Other common rates are 1200, 2400, 9600, and 19200 bps. (BPS is sometimes incorrectly referred to as the BAUD rate.)

HALF DUPLEX: data can flow in only one direction at a time.

FULL DUPLEX: data can flow in both directions at a time.

II. Uses of Data Communications

A. Online applications for government, business, industry, and education.
   Examples: Banking and Airline Reservations

B. Conferencing Systems and Electronic Mail.
   Examples: ARPAnet

C. Databases, commercial and educational.
   Examples: Legal, Agricultural (Agristar), Medical, Business (Dow Jones)

D. Home Banking.

   - General Purpose
   - Special Purpose
     Computer Languages
     Particular brands of computers
     Computer Music
INTRODUCTION TO COMPUTERS

PART 6: DATA COMMUNICATIONS

Space Travel

Sat.

Amateur Radio

Games

- Community or social orientation
- QSpace-net
- CommuniTree
- Program exchanges
PART 7: WORD PROCESSING

Development of word processing:

1. Text Editors
2. Text Formatters
3. Word Processing Programs
   - combine functions of editors and formatters.
4. Office Automation
   - combine word processing, electronic mail, conferencing, calendar management, other typical office functions.
5. Hands-on demonstration of word processing
General Information on Word Processing

The purpose of a word processor is to eliminate retyping of documents, letters, proposals, or any other printed material from office or an individual. Even when typing your own letters, you may find a need to change a few words, clean up a sentence, delete something you decided not to say. This is where a word processor comes in handy. In addition to making changes, a word processor is good for getting work done faster because editing work is easier than before. Copying paragraphs from one page to another, deleting sentences from the middle of a page, automatic centering of text and other features can all be done with a few simple keystrokes.

You personally could use a word processor for job resumes, sending a letter or many to a company you are unhappy with, send recipes to friends and a copy for yourself, or just simple reminders to yourself to get those household chores done.

For students, word processing can be used for term papers, research notes, and book reports. You can put your thoughts to a rough draft and then come back and finish it up without having to retypew the entire report. Using a hunt and peck system typing or just two fingers would be still faster than writing out the entire report and rewriting it by hand. Teachers say they prefer typed reports versus handwritten reports and a word processor can help.

There will be a difference in computers and the way they operate, but knowing the basic features of one computer will give you a head start on using other equipment. The main purpose of giving you training on the Apple is to get you acquainted with what you can do with a word processor. It is necessary that you arm some of the terms used when talking about word processing that you understand the instructions from your boss or the salesman trying to sell you a word processor. Each different word processor uses some basic features, what you will have to arm are the keys that operate the machine. When you learn to use a different machine, all you will have to learn will be the new keys to do the job, you will already know how to do word processing. You can then ask intelligent questions on how to use a machine once you have learned some terms and had some experience with the word processing program.

No matter what system you operate there is no program that will correct bad grammar or make sense out of an incomplete thought. You must already know the basic language skills to rely use a word processor. Any employer will expect the "operator" to point out any sentences that don't make sense and correct bad grammar. Until you have learned the basic language skills of grammar, spelling, and punctuation, getting a job as a word processor operator will very hard to do.
One other important idea when using a word processor is to keep a good dictionary handy! If you are beginning a new job, there will be many terms that will be unfamiliar to you. If you are typing a job resume, make sure all the spelling is correct. Resume with obvious spelling mistakes will lessen your chances of getting the job.

Having a resume ready when you go for a job will eliminate a lot of writing and guesswork when you are asked to fill out an application. Many employers will now attach your resume to the back of the application. On your resume you can be sure to have all the information ready ahead of time. This will save time at the interview and show the employer you are prepared. A word processor can produce a neat and effective resume for your interview.
Main Features of Word Processing

Deleting Text - removing a word, sentence, or paragraph from the text.

Move/Copy Text - taking words from one place and moving or copying it to another place in the document.

Search/Replace Text - exchanging one word for another automatically.

Proportional Spacing - making the right side and the left side of a letter look even when printed out.

Automatic Centering - type in a title or heading and have it centered on the page with one keystroke.

Form Letters - using a document with blank spaces in it to be filled in later. May be sent to many people by filling in the blank spaces with names, addresses, or other information.

Insert Text - adding new words or sentences to a document that is already been typed.
Common Word Processing Terms

Backup Copy - second copy of a document in case the original document is lost.

Finder - space used to hold words or lines that you wish to move copy to another place in the document.

CTRL key - stands for 'control' key. Used with other keys to form special functions.

Cursor - mark to show where you are in the text.

Diskette - magnetic record used to store letters and reports.

Document - a form of work on the word processor.

Edit - making changes to a document because of spelling mistakes, rough drafts, or other corrections.

Delete File - Wipe out stored text to start over, or delete a letter from the diskette.

ESC key - 'escape' key. Used for special functions, such as taking the place of a shift key.

Format - the settings of the margins, the number of lines on the page, the width of the lines, etc.

Index (catalog) - listing of the stored documents on the diskette.

Information lines - lines on the screen, usually at the bottom, that show the number of lines typed, space remaining, or general information.

Justification - to have the text line up with the left or right edge of the page.

Keystroke - one keystroke would be to hit one letter on the keyboard.

Merge Text - to combine two lines, paragraphs, or letters into one.

Mode - another word for the function or operation you are doing, such as the editing mode, insert mode, etc.

Option - special feature you can use.

Page Break - the end of text on a page even though it is not the physical end of the page.

Rigged Edge - to have the right side of the page look uneven
because you did not use proportional spacing.

Replacement string - words to replace other selected words, such as correcting a name that you have typed in various places.

RETURN key - the key most often used to enter your text into the machine.

Rolling - moving the cursor around the document.

Source text - original document or letter.

Tabbing - to skip left and right on the line.

Replacement string - the words you wish to replace or change with her words.

Text - words, lines, paragraphs, or letters that you type into the machine.

Breakable space - used when you do not wish two or more words separated on different lines when printed, such as Lincoln. Names are never typed on two different lines.

Word wrap - moving a word to the next line when there is not enough room to type it on the first line.
These are the BASIC topics we should be familiar with after completing STEP BY STEP #1:

PRINT
PRINT with commas and semicolons
Order of arithmetic
NEW
REN
LIST
DEL
END
STOP

Variables: Real, Integer (X%), String (X$)
LET (assignment)
INPUT
GOTO
IF...THEN
REM
Functions: INT(x), ABS(x), RND(x), SQR(x)
GOME
TAB(1)
TAB n
TAB n
READ...DATA
RESTORE
FOR...NEXT and STEP
Nested loops
APRove
DIM

Cover any questions or misunderstandings about these topics.
SESSION 1, PART 2: COMPUTERS AND NUMBERS

1. Integers
   - Integers are whole numbers from -32767 to +32767.
   - In Applesoft, a variable is specified to be an integer by ending its name with a per cent sign.
     Examples: A%, I%, COUNT%
   - In Applesoft, integer arithmetic uses up less memory than real arithmetic. So, use integer variables whenever it's appropriate, especially when you use large arrays of numbers.

2. Real Numbers
   A. Scientific Notation
   B. Precision: the number of decimal places you want.
      - Applesoft's precision is 38
   C. Accuracy: the number of significant digits you want.
      - Applesoft's accuracy is 9
   D. Problems with real arithmetic
      1. When is zero zero?
         Moral: when checking real numbers for zero, check that the numbers are within a range which is too small to be useful. For example:
         Instead of IF A = 0 THEN ... do this IF (A < .0001) AND (A > -.0001) THEN ...
      2. Accumulated rounding errors
         Moral: postpone rounding until all calculations have been completed; then round the final result.
   E. Solution: use true binary coded decimal arithmetic
      - A hardware feature on some computers; a software feature on others.
      - Not provided with Applesoft
      - A feature of most "business" BASICS
SESSION 1. PART 3: INTRODUCTION TO PROGRAMMING

I. Software Engineering

A. Computer programs should be built in the same way that machines and buildings are built.

B. Programs should be designed before they are built.

C. You should be confident that a program will work properly before you start coding it.

D. Complex programs should be designed in small units, called modules.
   - Each module should do only one thing, or at most a sequence of very closely related things.
   - Each module should know only as much about the whole program as it absolutely needs to do its job. Ideally, a module knows nothing about the whole program.
   - When modules communicate with each other, they should exchange as little information as absolutely necessary to get their jobs done.
   - If a module seems too complex, difficult to understand, or error-prone, then break it down into simpler modules.

E. Don't re-invent the wheel!
   - If there is a program or module that already does something that you can use, use that code; don't write new code.
   - Build a "software toolkit" that you and other people can use to build programs.

F. Design a program or module to work correctly. Code it and get it to work first. Then, and only then, worry about efficiency. A well-written program can always be made more efficient. A poorly written one, no matter how efficient, may never work properly.

G. Don't try to write the whole program at once, and then try testing it all at once. Write as much as you need to get one useful unit of work done. Test out that much until it works. Then write the next unit of work and test that out. And so on, until the whole program is done.
A. Computer programming is not merely knowing how to "speak" a particular computer language.

B. Computer programming is:

1. Understanding a problem that needs to be solved.
2. Understanding how to solve the problem, whether by computer or some other means.
3. Figuring out how to solve the problem with a computer.
4. Designing a "machine" or "structure" or "system" to solve the problem.
5. Implementing the solution to the problem in an appropriate computer language.
6. Verifying that the solution works properly and consistently.

C. Very important: Don't think in computer language in steps 1 thru 4. Think in simple, straightforward English. Use computer language only in step 5.

D. BASIC is only one of many computer languages. Once you learn BASIC, it will become easier to learn a second one. After that, it will be easier to learn even more.

E. Learning how to understand, analyze, and solve a problem is far more difficult than learning a computer language. It is also more important!
**MAIN PROGRAM**

GOSUB 1000

**INITIALIZATION**

HOME

**GET A NUMBER FROM THE USER**

PRINT "ENTER ANY NUMBER, OR JUST ZERO TO QUIT: "; N

IF N = 0 THEN QT = 1

**ROUND N TO 2 DECIMAL PLACES**

R = ABS (N) * 100

R = INT (R) * SGN (N)

**PRINT OUT THE ROUNDED NUMBER**

PRINT "NUMBER TO 2 PLACES IS "; R

**END THE PROGRAM**

END

ANY NUMBER, JUST ZERO TO QUIT: 503.70809
N TO 2 PLACES IS 503.71

ANY NUMBER, JUST ZERO TO QUIT: -55.0735
N TO 2 PLACES IS -55.07

ANY NUMBER, JUST ZERO TO QUIT: -55.0753
N TO 2 PLACES IS -55.08

ANY NUMBER, JUST ZERO TO QUIT: .804082
N TO 2 PLACES IS .8

ANY NUMBER, JUST ZERO TO QUIT: 4032.66666
N TO 2 PLACES IS 4032.67

ANY NUMBER.
ANY NUMBER, JUST ZERO TO QUIT: .12345678
R TO 2 PLACES IS .12

ANY NUMBER, JUST ZERO TO QUIT: .87654321
R TO 2 PLACES IS .88

ANY NUMBER, JUST ZERO TO QUIT: 0
AT'S ALL **

T "SCIENTIFIC NOTATION, PRECISION, AND ACCURACY"
T "SCIENTIFIC NOTATION, PRECISION, AND ACCURACY"
# Demonstrate rounding using half adjustment

```c
#include "stdio.h"

() /* Demonstrate rounding using half adjustment */

JITTIME = 0;
N;
BUFFER[0];

double atof();

if (QUITTIME == 0) {  
  printf("Enter any number, 
  ");
  printf(" or just return to quit: ");
  fgets(BUFFER, sizeof BUFFER, stdin);
  (BUFFER[0] == "\n") break;
  atof(BUFFER);
  printf("Number to 2 places is ");
  printf(stdout, %.2f\n\\n", N);
  ("*** That\'s All ***\n");
}
```

any number,  
just return to quit: 503.70809  
  to 2 places is 503.71

any number,  
just return to quit: -55.0735  
  to 2 places is -55.07

any number,  
just return to quit: -55.0753  
  to 2 places is -55.08

any number,  
just return to quit: 4032.66666  
  to 2 places is 4032.67

any number,  
just return to quit: -385.555555  
  to 2 places is -385.56

any number,  
just return to quit: -87654321  
  to 2 places is 0.88

any number,  
just return to quit:  
  it's All ***

```
A subroutine is an independent part of a program which performs one simple unit of work. It corresponds to the idea of program module which we talked about under software engineering.

Subroutines may be entered with a GOTO statement, but this does not work out well if the subroutine is used from many places in a program.

Subroutines should be entered with a GOSUB statement.

1. BASIC remembers where a GOSUB statement was used in a return stack.
2. The RETURN statement goes back to the statement after the last GOSUB that was used.
3. The POP statement removes a return pointer from the return stack, but does not cause BASIC to transfer control.

Errors with GOSUB:
1. More RETURNS than GOSUBs
2. More POPs than GOSUBs
3. More GOSUBs than Applesoft can handle (25)
4. GOSUB (or GOTO) to a non-existing line number.

Example: the rounding program from session 1.

The main routine of this program is lines 200 - 700.

This program has five subroutines:
1. Initialization
2. Getting a number from the user
3. Rounding the number
4. Printing out the number
5. Ending the program

GOTO and GOSUB are transfer of control statements.
SESSION 2, PART 2: FLOWCHARTING

A flowchart is a sort of blueprint for a module, a program, or a system of programs.

A flowchart is also a model of a program. It can be used to find out if the design of a program is correct. By playing computer and following through the flowchart, we can validate the design.

It is much easier to correct a design by changing a flowchart, then to correct a design by changing a real program.

Flowcharts are also an aid in understanding a program long after it was written. Flowcharts are a form of documentation.

Flowcharts can be very simple or very fancy, as appropriate.

Flowchart Symbols:

Entry and Exit:

General Processing:

Test or Decision:

Subroutine:

Input/Output:

On-page Connection:

Off-page Connection:
M A I N P R O G R A M

ENTRY

1000
INITIALIZE

2000
GET A NUMBER

QUIT TIME?

YES

NO

3000
ROUND THE NUMBER

4000
PRINT THE NUMBER

END THE PROGRAM
EXIT
Subroutine: Get a Number

ENTRY

PRINT PROMPT

INPUT N

N=0 ?

Yes

No

Time to Quit

RETURN
An operating system is a program (or set of programs) which stands between the user of a computer system and the nitty-gritty details of the computer system.

Functions of an operating system:

1. Manages the hardware at the lowest levels of detail.
2. Manages system resources (memory and I/O devices).
3. Presents a "user-friendly" interface to the user.

Historical notes:
The first computer operating systems were designed to support punched card, paper tape, and teletypewriter devices for user I/O, rather than the video display devices which are now standard. This accounts for the predominance of 80-column video terminals. It also accounts for the use even today of certain special keyboard characters:

- Carriage return (CR)
- Line feed (LF)
- Combined carriage return and line feed (CR/LF)

The Apple II Operating System:

1. The monitor program resident in ROM - contains programs to control graphics generation, text screen, keyboard, speaker, and cassette.
2. DOS (Disk Operating System) - consists of programs to control the disk drives and manage the storage of data on diskettes.
3. BASIC - allows the programmer access to the monitor and DOS through BASIC language commands.
SESSION 3. PART 2: FILES

A FILE is an organized collection of data, usually related to a single application. Examples: a file of inventory data; a file of student test scores.

A RECORD is a set of data items related to a single entity. Examples: a bank account record; an employee record.

A FIELD is a single data item. For example, an employee record might have these fields:

1. name
2. address
3. social security number
4. monthly salary or hourly wage
5. birth date
6. marital status
7. department

Records in a file usually contain one or more fields called key fields, which uniquely identify each record in the file. For example, in an employee file, the employee’s name or social security number might be key fields.

Key fields are also used for sorting the records in a file in some particular order. For example, the records in an employee file might be sorted in ascending order by social security number. Such fields are called sort keys.

Files have traditionally been stored on magnetic tapes, disks, and punched cards.

Some operating systems view all system resources as files, including:

- printers
- terminals
- communications lines
- memory
- programs
SESSION 3. PART 3: DISK FILES ON THE APPLE II

A DISKETTE is a plastic disk covered with a layer of magnetic material on which data may be recorded, in much the same manner as sound is recorded on audio cassette tapes.

A diskette is divided into a number of concentric rings in which the disk drive's read/write heads record data. Each ring is called a TRACK.

Each track is divided into a number of SECTORS. A secto is the amount of data which is read or written at one time by the disk drive.

The Apple II divides a diskette into 35 tracks, each having 16 sectors of 256 bytes of data. This permits 143k bytes of data to be stored on one diskette. However, since Apple's DOS uses 1 sector for a catalog and 3 sectors to store the DOS program itself, only about 123k bytes are actually available.

Each diskette contains a CATALOG. This is simply a directory of the files contained on the diskette. Each file on a diskette has a unique name by which it is known in the catalog. An entry in the catalog tells DOS what kind of file the name refers to, where on the diskette the file is stored, and some facts about the file. A catalog is very much like the card catalog in a library.

A catalog has space enough to keep track of 105 files.

The DOS takes care of all the bookkeeping involved in storing files on diskettes. A programmer doesn't need to worry about any of these details.

Types of disk files:

SEQUENTIAL: this type of file consists of fields of text characters. Each field is ended by a CR character to separate it from the following field.

Sequential files can be processed only in sequence from start to end.

Note: in some operating systems a group of text items terminated by a CR or LF or CR/LF is known as a LINE. This is a carryover from when lines of data were typed on a teletypewriter. The text items within a line are usually separated by spaces or commas.
RANDOM: this type of file consists of fixed-length records. Each record consists of fields of text characters, each field ending in a CR.

The records in a random file can be processed without respect to order. Each record is identified simply by its record number in the file, starting with zero.

KEYED: this type of file consists of records which can be located by a KEY field. The contents of the key field are used to look up an entry in an index. The index entry points to the actual data record.

A telephone book is similar to a keyed file, since all you need to find a person's phone number and address is the person's name, which serves as a key.

For example, in an employee file, a person's social security number could serve as a key.

Although Apple's DOS does not support keyed files, several programs to do so are available from software vendors.
SESSION 4, PART I: MISCELLANEOUS

Refer to the household INVENTORY demonstration program for examples.

1. Accessing machine addresses from a BASIC program
   a. `PEEK(x)`
   b. `POKE x,y`
   c. `CALL x`

2. Error trapping
   a. `ON ERR GOTO linenumber` (line 30 in demo)
   b. Error trap subroutine (lines 32200-32360 in demo)

   Note: If you want to trap any kind of error, you must trap all kinds of errors!

3. Branching by variable
   a. `ON x GOTO` (line 5200 in demo)
   b. `ON x GOSUB`

4. Records in BASIC

   In some computer languages, the programmer can define records explicitly, for example:

   ```basic
   Type INVENTORY_RECORD is record
     OWNER_ID : integer;
     DATE_PURCHASED : integer;
     PURCHASE_PRICE : integer;
     REPLACE_COST : integer;
     CATEGORY : integer;
     DESCRIPTION : string;
   End record;
   ```

   In almost all versions of BASIC, this is not possible. Rather, the programmer must keep track of each field of a record in a separate variable.

   Refer to lines 1000-1280 in the demo program.
Notes on the household INVENTORY demonstration program.

1. This program uses random disk files. Each inventory item is identified by its record number (from 1 to the size of the file).

   Each record has 6 fields:
   - Owner's id
   - Date purchased (month and year combined in one integer)
   - Purchase price (in whole dollars)
   - Replacement cost (in whole dollars)
   - Category of item
   - Description

   Record 0 is reserved to contain only the size of the file.

2. The main part of the program is lines 5000-5300. All the rest of the program is subroutines.

3. This program communicates with the user through menus and prompts. The user doesn't need to remember any commands or codes.

4. Disk I/O subroutines are:
   - Open disk file: lines 31400-31480
   - Read disk record: lines 1000-1080
   - Write disk record: lines 1200-1280

5. Various constant information is set up in the initialization routine (lines 31900-31300).
INTERPRETERS

Interpreters are programs which are able to follow instructions written in some computer language, such as BASIC. An interpreter works like this:

1. The programmer types his program from the keyboard.
2. As each line is typed in, the interpreter stores it in order of ascending line numbers, and translates reserved words into 1-byte tokens which can be recognized quickly when the program is later run.
3. When you type RUN, the interpreter looks at each line of the program in line number order. It examines each token and each other string of characters, and figures out what it is supposed to do with them. Then it carries out the instruction.
4. No matter how often a line may be executed, each time the interpreter examines that line it must go through the whole process of figuring out what it is supposed to do.

Interpreters are easy to use because errors can be corrected quickly, simply by typing in a new program line. However, the process of interpreting each line over and over takes a lot of time, so that interpreted languages are rather slow.

COMPILERS

A compiler is a program which translates a file containing statements in some computer language, such as BASIC, into a machine language file which can then be executed directly by the computer. The compilation process works like this:

1. The programmer types his program from the keyboard into another program called a text editor. The text editor saves this program into a disk file, known as the source program.
2. The programmer runs the compiler, which reads in the source program, examines the statements, and translates them into machine code. The compiler outputs a new file containing the machine code, which is known as the object file.
3. The programmer runs the linker, a program which reads in the object file, combines it with other object files which have been compiled separately, and outputs a new file containing the machine language program, which is known as an executable file.
4. You can now run the executable file.

Compiled programs run much faster (10 - 100 times) than interpreted programs. However, it is more difficult to make corrections, since the programmer must change the source program and repeat the compiler and linker steps.
REM ** HOUSEHOLD INVENTORY **
REM ** DEMO PROGRAM **
REM ***********************
GOTO 32200
ONE
OSUB 31000; REM INITIALIZE
GOTO 5000
REM READ DATA RECORD
PRINT D$:"READ ";F$;"R";K%
INPUT ID%,DP%,PP%,RC%,CG%,DD$
PRINT D$
RETURN
REM WRITE DATA RECORD
PRINT D$:"WRITE ";F$;"R";K%
PRINT ID%
PRINT DP%
PRINT PP%
PRINT RC%
PRINT CG%
PRINT DD$
PRINT D$
RETURN
REM SCREEN LIST ROUTINE
VTAB 2; CALL - 958
LC = 0
IF LC = 7 THEN RETURN
GOSUB 1000
IF IDK < > 0 THEN GOTO 1680
K% = K% + 1
IF K% > FS% OR K% > ER% THEN RETURN
GOTO 1580
GOSUB 4000
PRINT ; PRINT L1$; PRINT L2$
LC = LC + 1
K% = K% + 1
IF K% > FS% OR K% > ER% THEN RETURN
GOTO 1560
REM FORMAT PRINT LINES
LA$ = "R#II + STR$(K%)
LB$ = "II 0=11 + STR$(IDK)
W1% = INT (DP% / 100)
W2% = DP% - (W1% * 100)
LC$ = " + STR$(W1%); + "/" + STR$(W2%)
LD$ = " $" + STR$(PP%); " $" + STR$(RC%)
LE$ = " C=" + STR$(CG%)
L1$ = LAB$ + LBC$ + LC$ + LD$ + LE$
L2$ = DD$
RETURN
REM ***********************
REM ** MAIN ROUTINE **
HOME
Z% = 0
PRINT EM$: EM$ = ""
PRINT "AVAILABLE FUNCTIONS ARE"
FOR I = 1 TO 9
PRINT I; SPC(2);FF$(I)
NEXT I
PRINT "WHAT FUNCTION ?"
INPUT Z%
ON Z% GOTO 11000,12000,13000,14000,15000,16000,17000,18000,6000
REM ** END MAIN ROUTINE **
REM ****************
REM ** TERMINATION **
REM******************
REM IF FOX > 1 THEN GOTO 6100
PRINT D$;"CLOSE";FI$
HOME
END
REM FORMAT NEW FILE
HOME : PRINT EMS:EMS = ""
PRINT "HOW MANY RECORDS DO YOU WANT ?";
INPUT FS%:
IF (FS% > 0) AND (FS% < 1000) THEN GOTO 11200
EMS = "FILE SIZE INVALID"
GOTO 11000
GOSUB 31400: REM OPEN FILE
GOSUB 31800
ID% = 0:FP% = 0:RCX = 0:CSX = 0:DD$ = "X"
FOR K = 1 TO FS%
GOSUB 1200
NEXT K
GOTO 5000
REM COPY FILE
HOME
INPUT " HAS THE NEW FILE BEEN INITIALIZED - Y/N " ;Z$
IF LEFT$ (Z$!) = "Y" THEN GOTO 12040
EMS = "CANNOT COPY"; GOTO 5000
INPUT " ENTER NEW FILE NAME " ;NF$
OFS = FIS: REM SAVE OLD FILE NAME
GOSUB 31400: REM OPEN OLD FILE
GOSUB 31600: REM GET FILE SIZE
FIS = NF$
GOSUB 35000
NDSLOT% = XDSLOT%:XDRIVE% = XDRIVE%
GOSUB 31200: REM OPEN NEW FILE
FOR K = 1 TO FS%
K% = K:
FIS = OFS
GOSUB 1000: REM READ OLD FILE
FIS = NF$
GOSUB 1200: REM WRITE NEW FILE
NEXT K
PRINT D$;"CLOSE";FI$
XDSLOT% = NSLOT%:XDRIVE% = XDRIVE%
FIS = OFS: REM SET OLD FILE
GOTO 5000
REM ADD A RECORD
HOME
GOSUB 31400
GOSUB 31600
GOSUB 20000
IF KX = 0 THEN GOTO 5000
GOSUB 1000
IF IDX = 0 THEN GOTO 13160
EMS = "RECORD " + STR$ (KX) + " ALREADY EXISTS"
GOTO 13060
GOSUB 20400
GOSUB 20600
INPUT "ENTER PURCHASE PRICE " ;PP%
INPUT " ENTER REPLACEMENT COST " ;RCX
GOSUB 22000
INPUT " ENTER DESCRIPTION " ;DD$
GOSUB 1200
GOTO 13160
GOSUB 31600
GOSUB 31000
GOSUB 20000
IF K% = 0 THEN GOTO 5000
GOSUB 1000
IF ID% < > 0 THEN GOTO 14200
EM$ = "RECORD "+ STR$(K%)+" IS NULL - USE ADD"
GOTO 14080
GOSUB 26000
Z$ = ""
INPUT "CHANGE OWNER ID - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14240
GOSUB 20400; GOSUB 26000
Z$ = ""
INPUT "CHANGE DATE OF PURCHASE - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14300
GOSUB 20800; GOSUB 26000
Z$ = ""
INPUT "CHANGE PURCHASE PRICE - Y/N";Z$
INPUT "ENTER PURCHASE PRICE";PP$
GOSUB 26000
Z$ = ""
INPUT "CHANGE REPLACEMENT COST - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14400
INPUT "ENTER REPLACEMENT COST";RC$
GOSUB 26000
Z$ = ""
INPUT "CHANGE CATEGORY - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14470
GOSUB 22000; GOSUB 26000
Z$ = ""
INPUT "CHANGE DESCRIPTION - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14540
INPUT "ENTER DESCRIPTION";DD$
GOSUB 26000
Z$ = ""
INPUT "CONFIRM CHANGES - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 14200
GOSUB 1200
GOTO 14080
REM DELETE A RECORD
HOME
GOSUB 31400
GOSUB 31600
GOSUB 20000
IF K% = 0 THEN GOTO 5000
GOSUB 1000
IF ID% < > 0 THEN GOTO 15200
EM$ = "RECORD "+ STR$(K%)+" IS NULL"
GOTO 15080
GOSUB 26000
Z$ = ""
INPUT "CONFIRM DELETION - Y/N";Z$
IF LEFT$(Z$) < > "Y" THEN GOTO 15080
ID% = 0;DP% = 0;PP% = 0;RC% = 0;CG% = 0;DD% = "X"
GOSUB 1200
GOTO 15080
REM DISPLAY A RECORD
HOME
GOSUB 31400
GOSUB 31600
GOSUB 20000
IF K% = 0 THEN GOTO 5000
GOSUB 28000
INPUT "PRESS RETURN FOR NEXT RECORD ";Z
GOTO 16060
EM$ = "RECORD "+ STR$(K%) + " IS NULL"
GOTO 16060
REM LIST FILE ON THE SCREEN
HOME: GOSUB 31400: GOSUB 31600
BR% = 0: ER% = 0
INPUT "ENTER BEGINNING RECORD "; BR%
IF BR% < 1 OR BR% > FS% THEN GOTO 17060
INPUT "ENTER ENDING RECORD "; ER%
IF ER% < BR% THEN GOTO 17100
HOME
PRINT "FILE CONTAINS "; FS%; " RECORDS"
K%= BR%
GOSUB 1500
VTAB 24
INPUT "PRESS RETURN FOR NEXT PAGE "; Z
IF K% > FS% OR K% > ER% THEN GOTO 5000
GOTO 17200
REM LIST FILE ON PRINTER
HOME: GOSUB 31400: GOSUB 31600
BR% = 0: ER% = 0: LP% = 0
INPUT "ENTER BEGINNING RECORD "; BR%
IF BR% < 1 OR BR% > FS% THEN GOTO 18060
INPUT "ENTER ENDING RECORD "; ER%
IF ER% < BR% THEN GOTO 18100
INPUT "ENTER LINES PER PAGE "; LP%
K%= BR%
GOTO 172(10
REM LIST FILE ON PRINTER
HOME: GOSUB 31400: GOSUB 31600
BR% = 0: ER% = 0: LP% = 0
INPUT "ENTER BEGINNING RECORD "; BR%
IF BR% < 1 OR BR% > FS% THEN GOTO 17060
INPUT "ENTER ENDING RECORD "; ER%
IF ER% < BR% THEN GOTO 17100
INPUT "ENTER LINES PER PAGE "; LP%
K%= BR%
GOTO 17200
REM LIST FILE ON PRINTER
HOME: GOSUB 31400: GOSUB 31600
BR% = 0: ER% = 0: LP% = 0
INPUT "ENTER BEGINNING RECORD "; BR%
IF BR% < 1 OR BR% > FS% THEN GOTO 17060
INPUT "ENTER ENDING RECORD "; ER%
IF ER% < BR% THEN GOTO 17100
INPUT "ENTER LINES PER PAGE "; LP%
K%= BR%
GOTO 17200
REM LIST FILE ON PRINTER
HOME: GOSUB 31400: GOSUB 31600
BR% = 0: ER% = 0: LP% = 0
INPUT "ENTER BEGINNING RECORD "; BR%
IF BR% < 1 OR BR% > FS% THEN GOTO 17060
INPUT "ENTER ENDING RECORD "; ER%
IF ER% < BR% THEN GOTO 17100
INPUT "ENTER LINES PER PAGE "; LP%
K%= BR%
GOTO 17200
REM ACCEPT OWNER ID
HOME
PRINT EMS;EMS = ""
PRINT "VALID OWNER NAMES ARE"
FOR I = 1 TO 3
PRINT I; SPC(2);OW$(I)
NEXT I
INPUT "ENTER OWNER CODE ";IDX
IF (IDX > 0) AND (IDX <= 3) THEN GOTO 20600
EMS = "INVALID OWNER CODE"
GOTO 20400
RETURN
REM ACCEPT DATE OF PURCHASE
HOME : PRINT EMS;EMS = ""
PRINT "ENTER YEAR PURCHASED"
PRINT "IN FORM YY"
INPUT YY
IF (YY < 0) THEN GOTO 21400
IF (YY > 40) AND (YY <= 82) THEN GOTO 21000
EMS = "INVALID YEAR": GOTO 20800
HOME: PRINT EMS;EMS = ""
PRINT "ENTER MONTH PURCHASED"
INPUT MM%
IF (MM% > 0) AND (MM% <= 12) THEN GOTO 21100
EMS = "INVALID MONTH": GOTO 21000
DP% = (MM% * 100) + YY%
RETURN
DP% = 0: REM NOT PURCHASED
RETURN
REM ACCEPT CATEGORY CODE
HOME : PRINT EMS;EMS = ""
PRINT "CATEGORIES ARE"
FOR I = 1 TO 5
PRINT I; SPC(2);CN$(I)
NEXT I
INPUT "ENTER CATEGORY CODE ";CG%
IF (CG% < 0) AND (CG% <= 5) THEN GOTO 22200
EMS = "INVALID CATEGORY CODE": GOTO 22000
RETURN
REM DISPLAY A RECORD
HOME.
PRINT "RECORD NUMBER ";II
PRINT "OWNER IS ";OW$(IDX)
MM% = INT (DP% / 100)
YY% = DP% - (MM% * 100)
PRINT "PURCHASED ";MM%;";YY%
PRINT "PURCHASE PRICE WAS ";PP%
PRINT "REPLACEMENT COST IS ";RC%
PRINT "CATEGORY IS ";CN$(CG%)
PRINT ";"$="*
PRINT
RETURN
REM INITIALIZATION
DIM OW$(3),CN$(5),FF$(9)
FOR I = 1 TO 3
READ OW$(I): REM OWNER'S NAMES
NEXT I
FOR I = 1 TO 5
READ CN$(I): REM CATEGORIES
NEXT I
FOR I = 1 TO 9
READ FF$(I): REM FUNCTIONS
NEXT I
REM PAGE COUNTER
FOX = 0: REM FLAG FILE CLOSED
EM = 1111: REM SCREWUP MESSAGE
D$ = "": REM CRTAL D FOR DOS
RL% = 60: REM RECORD LENGTH
FS% = 0: REM CLEAR FILE SIZE
PRINT D$; "NOMON C\lII\lOIi"
RETURN.
REM FILE OPEN ROUTINE
IF FO% = 1 THEN GOTO 31440
PRINT D$; "OPEN I;FI$;u\lL"; RL%; "!lS"; XSLOT%; "!'Du; XDRIVE%
FO% = 1: REM FLAG FILE OPEN
K% = 0: REM SET 1ST RECORD KEY
RETURN
REM READ FILE SIZE ROUTINE
IF FS% < 0 THEN RETURN
PRINT D$; "READ I;IFI$;u\lR"; 1<%
PRINT FS%
PRINT D$
RETURN
REM WRITE FILE SIZE ROUTINE
PRINT D$; "WRITE I;IFI$;" R"; K%
PRINT FS%
PRINT D$
RETURN
REM INITIAL VALUES
DATA "PAUL","FRED","JOHN"
DATA "FURNITURE","APPLIANCES","CLOTHING","TOOLS","OTHER"
DATA "FORMAT NEW FILE","COPY FILE","ADD A RECORD","CHANGE A RECORD"
DATA "DELETE A RECORD","DISPLAY A RECORD","LIST FILE ON SCREEN"
DATA "LIST FILE ON PRINTER","END OF JOB"
REM ERROR TRAP ROUTINE
IF PEEK (222) = 255 THEN GOTO 32320
IF PEEK (222) = 254 THEN GOTO 32360
Z = PEEK (218) + PEEK (219) * 256
PRINT "ERROR CODE "; PEEK (222); " IN LINE "; Z
STOP
EM$ = "INPUT INTERRUPTED": GOTO 5000
PRINT "RE-ENTER "...": RESUME
REM SETUP DISK ADDRESSES
XSLOT% = 6: XDRIVE% = 1: REM DEFAULTS
PRINT "DO YOU WANT TO CHANGE DISK ADDRESSES?"
INPUT "Y/N"; Z$
IF LEFT$ (Z$, 1) = "N" THEN RETURN
INPUT "ENTER SLOT "; Z$
IF Z% < 2 OR Z% > 7 THEN GOTO 35050
XSLOT% = Z$
INPUT "ENTER DRIVE "; Z$
IF Z% < 1 OR Z% > 2 THEN GOTO 35080
XDRIVE% = Z$
RETURN
CERTIFICATE

This is to certify that

has completed the course 'Computer Literacy'

May 24, 1983

Matt J. Burgushi