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A school follow-up questionnaire as a measure of post hospital success in residential treatment of children

Merrill L. Carruthers
University of Northern Iowa

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A school follow-up questionnaire as a measure of post hospital success in residential treatment of children

Abstract

This paper is a review of available studies and literature published over the past ten years. Its purpose is to suggest the need for elementary students, third, fourth, and fifth graders in particular, to become computer literate. It is also the intent of this paper to suggest, as an alternate to in-school computer instruction, a summer computer camp as a viable means of introducing elementary students to microcomputers, their uses, and how to program in BASIC. The literature was reviewed to find 1. a common definition for the term "computer literacy" , 2. the need for an elementary school computer literacy program, 3. overall goals of such a computer literacy program, 4. student objectives of such a program, and 5. to be able to use this knowledge in order to develop a summer computer camp for elementary children, grades 3-5. A study of the literature reveals that computer literacy for elementary students should be an immediate goal for all educators. As technology keeps advancing rapidly, the idea of waiting until high school or junior high level before introducing computers into the elementary school curriculum becomes quickly outdated. Studies show that elementary students are very capable of working with and learning about computers. The review finally indicates that now is the time to begin development and implementation of a computer literacy program for the elementary school student. Because of a demand for a computer literacy program at the elementary level, this writer has developed a computer literacy program in the form of a summer computer camp and offers it as a feasible means to teach computer literacy to elementary school students. In view of the current literature and the need for computer literate elementary students, it appears that such a computer camp would be in order.

COMPUTER LITERACY FOR ELEMENTARY

STUDENTS: A REVIEW OF CURRENT

LITERATURE WITH PLANS FOR A

SUMMER COMPUTER CAMP

A Research Paper

Submitted to

The Department of Curriculum and Instruction

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

by

Merrill L. Carruthers

July 23, 1982

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This Research Paper by: Merrill L. Carruthers

Entitled: Computer Literacy for Elementary Students: A Review

of Current Literature with Plans for a Summer Computer

Camp

has been approved as meeting the research paper requirement for the

Degree of Master of Arts in Education.

Roger A. Kueter

July 26, 1982
Date Approved

Director of Research Paper

Robert R. Hardman

July 28, 1982
Date Approved

Graduate Faculty Adviser

Robert R. Hardman

July 28, 1982
Date Approved

Graduate Faculty Reader

Roger A. Kueter

July 26, 1982
Date Approved

Head, Department of Curriculum
and Instruction

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CHAPTER I: INTRODUCTION

Introduction to the Problem

Since the mid 1940's, and the invention of the first electronic digital computer known as ENIAC, computers have gone through rapid and highly technical change. Indeed, the most significant technological achievement presently affecting the quality of life in our world today is the computer. The computer can be found in all areas of business, industry, education, and even in the privacy of one's own home. With the introduction of the low-cost, but greatly developed microcomputer, almost anyone can own one. Microcomputers have received widespread attention throughout today's population and are beginning to become a household word. Evidence of this can be found by traveling to any K-Mart or department store which sells the low-cost Atari or the VIC-20 Commadore computers, and viewing the constant crowd of children and adults playing with or just watching others use these machines. This, for many, has been their first contact with and view of a microcomputer. In many cases it has sparked a greater interest in gaining further knowledge of the uses of the microcomputer for applications other than recreation. This need to know about computers has been given the label "Computer Literacy". In reviewing the literature, this writer found that the meaning of "computer literacy" was usually different for each author, depending upon what segment of the job market he was from. Even experts from the same field of experience often had differences of opinion on what constituted a computer literate person and how to educate the individual to make him computer literate.

In education, microcomputers are continually showing up in the classroom. They have been in the high school and college curriculum for some time and are just now beginning to make their appearance in the elementary and middle schools. As educators we have an obligation and challenge to teach students about the computer so that they can feel self-assured when using one. Many authors in the field feel that computer literacy, teaching about the computer, should be a separate course from teaching the use of the computer, or computer programming. Having read many journal articles and papers on this subject, this writer has come to the conclusion that the teaching of students about the computer can be taught not only as part of a programming course, but can also be integrated into almost any other academic endeavor.

It is the intent of this paper to develop a case for the integration of "teaching about" the microcomputer into other computer and non-computer related classes or activities. Doing so will help this writer develop a plan, or curriculum, for conducting a one week long computer camp. This computer camp will be held for third, fourth, and fifth grade students living in or around the Burlington Community School District, Burlington, Iowa. To accomplish this, it is the intent of this study to use existing research covering the successful use of computers in the elementary and middle schools and to use first hand information by means of personal interviews of professionals in the field of education who are currently teaching computer literacy.

Statement of the Problem

The idea of teaching students about computers has traditionally been at the high school and college level. With the introduction of the microcomputer, elementary and middle schools are now beginning to purchase these machines. Since many of these schools have not had access to microcomputers and have teachers who have little or no computer experience, this study intends to show that computer literacy can be developed in the elementary age student while the student is learning to program in BASIC, a computer programming language. A summary of the review of literature will be devloped into a week long computer camp for students in third, fourth, and fifth grade, and will be presented as Chapter III of this paper.

This study will review literature, from the past ten years, which takes a look at the different ideas of the many professionals close to or in the field of education and who are concerned about computer literacy. To help get a first hand view of computer literacy being taught, this writer will also visit and interview professionals who teach in an actual microcomputer classroom setting.

Definition of Terms

BASIC - Beginners All-Purpose Symbolic Instruction Code, a computer language.

Microcomputer - Refers to small personal computers about the size of a typewriter.

Atari - A name brand microcomputer.

VIC-20 commodore - A name brand microcomputer.

Elementary school - Refers to Kindergarten through fifth grade levels.

Middle school - Refers to sixth through eighth grade levels.

CHAPTER II: REVIEW OF LITERATURE

Introduction to the Literature Review

The impact of computers on society has been and will continue to be revolutionary. The one glaring exception to this generalization is found in education where this tool that we call a computer, which is considered a vital necessity in business, science, and government, has no similar role. Several reasons may be given as to why computers in education do not yet have the status of necessity found in other segments of society. Some say that computer awareness programs in schools, for example, are an unnecessary frill and such awareness is the individuals' responsibility outside the school. (Molnar, 23, p. 11) However, since computer uses are expanding at an accelerating rate, the day is fast approaching when adults who are not computer literate will be at a distinct disadvantage, for without awareness and literacy first, people can not know how to use computers or to evaluate their impact. Since children learn to use computers easily and quickly because they do not have the adults' fear of them, it seems appropriate for schools to be involved in the teaching of computer literacy. (Gottschalk, 13, p. 1)

Because of their relatively low price, broad educational application and ease of operation, there is no doubt that microcomputers will have a profound effect on society in general and on education and children in particular during the 1980's. The machines will be finding their way into elementary classrooms in an increasing number. (Souviney, 32, p. 53)

It is the intent of this study to review current literature to develop a case for teaching computer literacy at the elementary school level. Integrating the teachings of computer literacy into a basic microcomputer programming course, at the elementary school level, will also be investigated and a plan of curriculum will be developed and proposed as Chapter III of this paper.

Literature Review

ENIAC, the first general purpose electronic digital computer was built on a university campus. Indeed, many of the early (1946-1951) computers were built on campuses and were used by students and faculty as research and learning aids. Thus the history of instructional use of computers begins with the beginning of computers. As computers became commercially available in the early 1950's, their use spread quickly to educational administration throughout higher education, and eventually into precollege education. Second-generation computers, third-generation computers, time-shared computer systems, and mini-computers created booms to computers in education. By the early 1970's computer usage in higher education was commonplace in administration, instruction, and research. Finally came microcomputers...the answer to many computer educators' dreams. Now that every school could afford the hardware, surely we could expect all schools to begin making extensive instructional use of computers. So far computers have had a very modest impact upon instruction at the precollege level. The typical high school graduate, having had little or no interaction with computers is not computer literate. (Moursund, 25, p. 32)

Discoveries of fundamental importance are occuring in all fields of science at an incredible rate. These developments have created a new body of knowledge that has affected all mankind. The computer, with its enormous power and speed, has acted as a great catalyst to scientific discovery. It has become an amplifier of human thinking, the tool for complex problem-solving, and the repository for huge quantities of the world's data, information and knowledge. The transition to an information society has created new national needs. While computers improve national productivity, they also make many jobs and occupations obsolete. Computers have tended to decrease the value of "physical work" and increased the value of "thinking", thereby requiring totally new occupational skills and training. (Molnar, 22, p. 26)

In education, computers have changed the very nature of many of our educational needs and have brought into question many of the basic assumptions upon which our educational process is built. If we are to take advantage of the ever-increasing quantity of information, we must master the use of new computer-based tools and "work smarter." If individuals are not computer-literate and do not understand how these systems work, they will be unable to take advantage of information and will be unable to meaningfully participate in actions that affect their lives. If we are to have equity in our society, all citizens, not only specialists, must have access to information, and all citizens must have an understanding of computers, since they (computers) are the tools that make information useful and productive. (Molnar, 24, p. 69)

The growing recognition of the importance of widespread public understanding of computers in an information/computer society has prompted concerned educators to urge that educational efforts be launched to teach people about computers. The International Federation of Information Processing Societies Working Group in Secondary School Education in 1955 argued that since it is important for all students to understand the nature and use of computers in modern society, teachers of all subjects should have a working knowledge of computing. The Association of Computing Machinerys' Elementary and Secondary Schools Subcommittee's Working Group on Computing Competencies for Teachers has recently issued a similar plea. The Conference Board of Mathematical Sciences (1972) has also recommended, on several occasions, the development of a computer literacy curriculum for pre-college students. In 1978, the National Council of Supervisors of Mathematics issued a position paper which included computer literacy for all citizens in a list of ten basic skills. The National Council of Teachers of Mathematics (1980) released recommendations that during the 1980's every student should be exposed to a computer literacy course and all mathematic teachers should be trained in computing. (Anderson and Klassen, 1, p. 130)

Evidence of widespread teacher agreement with the need to foster computer literacy among students is also emerging. The MECC survey of 3,576 mathematics, science, and business education teachers in Minnesota found that 85% of the teachers believed that "every secondary student

should have some minimal understanding of computers." Fully 93%
supported the statement that "every student should learn about the
role that computers play in our society." (Anderson and Klassen,
1, p. 130) More limited surveys in other states suggest similar
teacher support. This writer conducted an informal survey of
elementary and middle school teachers in the Burlington Community
School District, Burlington, Iowa, and found that a majority of
those questioned felt that computer literacy should be taught to all
students at all levels.

In February 1967, the President of the United States specifically
directed the National Science Foundation (NFS) to work with the U. S.
Office of Education in establishing an experimental program for devel-
oping effective methods for utilizing computers at all levels of educa-
tion. In 1972, the Conference Board on Mathematical Sciences' Com-
mittee on Computer Education recommended to NSF that, in addition to
introducing computers into high school mathematics, a junior high
school course in "computer literacy" be designed to provide all students
with enough information about the nature of a computer so that they can
understand the roles which computers may play in our society. As part
of another long-range planning activity for NSF, Arthur Luehrmann
of the Lawrence Hall of Science has recommended that the entire
basic curriculum in computer use be developed. The course, he says,
should aim not merely at teaching the syntax of a common computer
language, but should mainly show students how to perform meaningful

tasks, thereby improving their analytic and problem-solving skills.
Students should learn to structure problems in a logical form, to
express ideas as algorithms, to simulate real systems as computer
models, to process text, to construct graphs, and to search data
bases among other skills. (Molnar, 22, p. 27)

The use of computers in instruction has been an option available
to schools for approximately two decades and has been a cost-effective
option for almost five years. It should no longer be the case, there-
fore, that computers are a novelty to educators or students. We, as
educators, can no longer depend upon a Hawthorne effect or the novelty
of the machine to motivate students. The teacher, as always, has the
responsibility to plan instruction based on the intended outcomes of
the curriculum, that is, on the basis of what to teach and then to
consider to whom. Within this design, the tools and media are of
secondary importance rather than primary. (Beck, 4, pp. 7-8)

In order for the teacher to answer the question, "What should be
taught?" one must first come to an agreement as to what constitutes
"computer literacy." Bork and Franklin (1974) state that computer
literacy is combined with the elements of computer programming and
problem solving, along with the social impacts of computing. An ex-
cellent case can be made for the use of computer programming as a vehicle
for the systematic algorithmic expression of the solution of certain
types of problems. The development and refinement of such solutions
is a form of training for analytic thinking which is applicable to
broad classes of problems. The computer is the dominant tool of our

time and, as such, is having a profound influence on our society. Knowledge of the technical aspects of computer science does not guarantee understanding of the consequences of this technology. But such understanding should be based, in part, on acquaintance with the capabilities and limitations of computers. Computer literacy, then, is concerned with people who will not necessarily become computer professionals. In a society where computers are playing an increasingly important role, it is essential that people be acquainted with computers and their capabilities. Computer literacy goes beyond programming, but most computer literacy courses involve some programming efforts on the part of the participants. Computer literacy courses are presently offered primarily at the college level; opinions on how to run such courses vary greatly. It seems likely, even inevitable, that they will migrate into the high school and even junior high school curricula. (Bork and Franklin, 6, pp. 18-19)

Niell, 1977, tends to agree with the description of computer literacy detailed by Bork and Franklin. He also points out that computer literacy is aimed at all students and all disciplines. The student taking auto mechanics courses should develop a working knowledge of applications of computers in this field. The student taking advanced mathematics courses should have a working knowledge of the capabilities and limitations of computers as an aid to solving mathematics problems encountered in these courses. Notice the emphasis upon the "working" level of knowledge. It is difficult to give a definition of computer

literacy that is universally acceptable or which lends itself to easy
measurement. But a computer is a tool, an aid to problem solving.
Students need to understand this idea, and to learn to use the tool in
whatever disciplines interest them. (Moursund, 25, p. 33)

Anderson and Klassen, 1981, propose that computer literacy is
"whatever understanding, skills and attitudes one needs to function
effectively within a given social role that directly or indirectly
involves computers." They go on to state that the school is the main
institution for socialization in citizenship; thus, it is appropriate
that computer literacy education be provided to future citizens as
early as junior high school. It is imperative that they learn not
only what every citizen needs to know about computers but what every
student needs to know for doing effective school work. The need to
combine the computer education requirements of citizens and students
implies that a broad spectrum of computer literacy is necessary.
Students need to know how to use the computers as a tool in their school
work, and they need to know about the limitations, general capabilities,
and social implications of computers for coping with computerization
in their everyday lives.

One major implication of this approach is that it allows the term
computer literacy to apply to many dimensions of the total concept. For
instance, courses covering different aspects of computer literacy may
be called computer literacy courses. But the label "computer literacy"
should not be used if the material, ideas, skills, etc..., do not sat-
isfy the needs of the particular students involved. The responsibility

is upon the teacher or instructional designer to identify and satisfy the needs of the targeted students.

The definitional approach taken here is quite compatible with most of the literature on the computer literacy concept. For instance, Moursund (1976) defined literacy as the "non-technical and low-technical aspects of the capabilities and limitations of computers, and of the social, vocational, and educational implications of computers." This philosophy is effectively embodied in computer literacy texts for elementary students by Ball and Charp (1977), and for secondary students by Billings and Moursund (1979), Moursund (1978), and others. Those writing on the definition of computer literacy, e. g., Rawitsch (1978), Thomas (1979), have expanded on this approach to elaborate specific requirements in various arenas. Of course, as technology advances, the objectifying of computer literacy must follow closely.

This approach to computer literacy is not compatible with the approach of those who choose to define the term narrowly. Some writers argue in favor of equating computer programming instruction with computer literacy. Others view computer literacy as just general knowledge about the role of computers in society. Anderson and Klassen believe that to function effectively as a citizen in the 1980's one needs to know about the role of computers in society, and to function effectively as a student (at high school or above) one needs to know about the elementary concepts and techniques of computer programming. Thus, a true computer literacy program for the junior high school should include these social elements as well as whatever else is needed to understand and be able to use computers in some minimal way. (Anderson and Klassen, 1, pp. 129-130)

While this writer agrees with Anderson and Klassen's definitional approach to identifying the meaning of computer literacy, this writer disagrees with Anderson and Klassen and others who advocate junior high school as a beginning point for teaching computer literacy. Throughout the country, elementary schools are introducing microcomputers into the classroom. The use of these machines varies from computer-assisted drill and practice to computer programming and problem solving. Although this influx of computers into the elementary schools is to be lauded, it raises many serious questions for educators. What are elementary students presently involved in computer programming learning? What should elementary students learn about computers? (Battista, 3, p. 37)

Dr. Michael T. Battista, Visiting Assistant Professor of Mathematics at Purdue University is currently assessing the computer literacy of prospective elementary teachers and determining how much that literacy increases after various computer-related activities. The results of a computer literacy and awareness assessment given three groups of students were of interest and tended to promote the idea of computer literacy in elementary students. The first group consisted of 23 preservice elementary teachers who were enrolled in a methods course for teaching elementary school mathematics. Most of these students were college juniors or seniors.

The second group consisted of 24 fifth grade students selected by their school to receive instruction all year on TRS-80 microcomputers. The students were selected by the five fith grade teachers and the administration of the school, based on their high academic performance.

The students received, on the average, one 45 minute session per week
of classroom instruction on computers. The computer sessions emphasized
student exploration and problem solving, with heavy emphasis on creating
graphics displays and altering pre-written programs to do specified
tasks. Students had access to the computers in their regular classrooms
about 10 minutes per day. The students were also asked to teach what
they had learned in computer class to their classmates.

The third group of students consisted of a class of 21 sixth graders
who were studying social studies at a middle school where no formal in-
struction on computers was given. The class was not ability grouped.
This group was used as a comparison or control group for the fifth
graders. Although no claim is made for the equivalence of the two groups,
the data for the sixth graders does provide some useful benchmarks for
analyzing the performance of the fifth graders. (Battista, 3, p. 37)

There were 68 items on the computer literacy and awareness assess-
ment which were selected from the Minnesota Computer Literacy and Aware-
ness Assessment which was developed by the Minnesota Educational Computing
Consortium. (Klassen, 17, pp. 1-208) The data collected indicated
that the fifth graders had more positive attitudes towards computers
than did the sixth graders and preservice elementary teachers. This,
therefore, suggests that elementary school students' attitudes
towards computers can be improved by involving them in computer pro-
gramming instruction on microcomputers. The fact that the fifth graders
did not exhibit more knowledge of computers can be attributed to the
lack of attention given to computer literacy topics during instruction.

The results indicate that teaching elementary school students how to program a computer will not necessarily give the students a sound knowledge of computer capabilities. Explicit discussion of these capabilities is required. The fifth grade students' computer literacy could also have been improved if discussion of how computers are used in society had been given. (Battista, 3, pp. 38-39)

Computers are scary, fascinating, impersonal, useful, amusing, and frustrating, depending upon the circumstances under which you meet them. But no matter how you feel about them, in today's world, sooner or later, you will have to deal with them. (Loop, 21, p. 22)

What, then, should our goal be for preparing today's students for the computerized revolution? "Start early!" says Ronald Palamara. The preschool level provides an excellent psychological conditioning period to introduce computers. When he was a university professor, he found three, four, and five year old children to be very inquisitive and open to new concepts. During the early years, they can quickly develop a perception and appreciation of computers. Children seem to be comfortable with and accept processes that may seem foreign to an adult. One goal would be to introduce children to computers before biases or fears of using them develop. Another goal would be to treat the computer as a tool similar to the chalkboard, a pad of paper, a pencil, or a ruler. It should be a basic component of the curriculum that will become as familiar as the use of calculators and adding machines. Computers should also provide a laboratory for teaching other experiences. (Long, 20, pp. 312-313)

Computer literacy for children is a survival skill necessary for coping with the world of electronics for both today and tomorrow. Consider the person who is unable to focus on a simple flowchart, or to understand the binary system, both of which can be taught to children by the time they are fifth graders. (Hirschbuhl, 15, p. 185) Some of these benefits to the students are:

(1)   one to one instruction--the computer serves as an individual tutor.

(2)   immediate reinforcement--the student gets instant feedback.

(3)   continuous progress instruction--the student progresses at his or her own pace.

(4)   privacy--student can make mistakes without ridicule.

(Educational Services Center Region 4, Houston, Texas, 10, p. 4)

For a society which will become computerized beyond our imagination by the time these kids are adults, it is sad to see the majority of elementary schools using their affordable, portable microcomputers only for computer-assisted drillwork, or playing guessing games. Children can easily learn to write their own programs. However, the elementary teacher who wants to teach programming to kids faces the problem of finding materials which take into account their conceptual development and reading levels. Finding relevant examples is also not an easy task. (Larsen, 19, p. 58)

What is an elementary student to do if he/she has been bitten by the computer bug or wants to learn more than he/she now knows? One of the great American institutions, the summer camp for children, has joined the computer age. With many schools, television sets, and the

cover of Time magazine adapting to the influence of the machines, what is believed to be the country's first computer day camp was held in July 1978 in Orange, Connecticut. The camp was like traditional summer camp for children, with campers attending daily from 9:00 a.m. to 4:30 p.m. However, instead of engaging in such activities as baseball, drama, or music, the teenagers spent all their time working with computers. Why such a day camp? Computers are fast becoming an important educational consideration as students need to be prepared to live in a computerized society. Both parents and students are aware of the computer revolution and are certainly interested in computer literacy. The purpose of the camp was to provide youngsters with ample opportunities to use the computer for instructional as well as recreational applications. In the process, they came to understand the potential as well as the pitfalls involved in using computers. (Zabinski and Zabinski, 36, p. 35)

Another computer camp, California's Computer Camp, Inc., located near Los Padres National Forest outside of Santa Barbara, is the bright idea of Dennis Bollay. Bollay sees his camp as a response to what he terms the "agonizingly slow pace" of school instruction in the subject. "In the future, he says, those who are not computer literate will be at a terrible disadvantage. Training kids to work with computers is like training them to read--it's that critical." (Pierce, 28, p. 70) Other computer camps for elementary through high school age students include: Atari Computer Camps, Hill School Computer Camp, National Computer Camp, and Computer Camp, Inc. (Elliott, 11, pp. 4-5)

According to National Computer Camp director Professor Michael Zabinski, the impact of computers on our society requires that a computer camp provide general knowledge about computers, computing, social implications of computers, and opportunities for careers. The goal of the National Computer Camp was to offer a general introduction to computers and provide a suitable basis for subsequent study in a school setting. The following objectives served as guidelines in conducting the camp:

1. To introduce computer concepts and techniques and thus provide a general appreciation of the power and limitations of computers, i. e., to remove the mystique about computers.

2. To provide a technical, social, and moral perspective of present and future roles of computers in our society.

3. To acquire some competence in computer operations and programming in BASIC, but without attempting to develop exceptionally proficient programmers.

4. To use the computer as a motivational instrument to stimulate interest in science and mathematics. Techniques gained through the use of the computer may be applied to life situations due to the step-by-step approach.

5. To discover that working with a computer can be recreational and entertaining.

6. To provide a new learning experience that includes such topics as flowcharting, programming, algorithms, modeling, hardware, software, and library programs.

The primary ingredient for making a computer camp a success, according to Zabinski, is the enthusiasm of the staff and their campers. The next most important component for such a camp is organization and adequate facilities as well as excellent instruction and supervision. (Zabinski and Zabinski, 36, pp. 35-36)

It is important to point out that some of these computer camps are "day camps" and others "resident camps", with day camps being conducted from 9:00 a.m. to 4:00 p.m. daily and resident camps meaning ones at which campers live over a period of a week or a few months. The setting for these "camps" may also range from a modern classroom set up in the middle of the city, to a classroom which is found in a cabin in the middle of the woods.

The outdoors has long been a source of inspiration and stimulation for learning and creativity. In 400 B.C. Socrates is said to have utilized the outdoors as the primary teaching resource to employ his inquiry, Socratic, method of teaching. Through the ages parents and elders have taken their children outdoors to teach them how to hunt for food, how and where to grow crops, and how to survive by living one with nature. The outdoors has always been a living classroom.

As technology began to change the world, however, occupations became more specialized, people moved away from the rural life into

cities, and there were fewer opportunities for parents to teach their children the lessons of the land. Instead, schools were organized to provide formal education which emphasized the basics of survival in the ever increasing industrial and technological society. (Staley, 33, p. 3)

In 1968, the American Camping Association conducted a major survey on the scope of the camping movement. It was ascertained that the total number of organized camps in the United States, counting boys', girls', resident, and day camps, was approximately 10,682. The number of children at these camps totaled up to about 7,796,333. (Rodney and Ford, 31, p. 26) This writer found current figures, for the same type of information, were unavailable. But, even when using the outdated statistics above, one can see that organized camping and out-door education have a place in our society today and in the future. By studying the following objectives of an outdoor center, one can see that outdoor education can be a positive learning experience for child-ren of all ages.

Objectives of an Outdoor Center

1. To give children sufficient background in our state and national conservation problems.

2. To equip our children so that they can carry out their own personal conservation responsibilities in connection with the ownership or stewardship of private property, use of public property, and production of raw materials.

3. To give our children an emotional drive to do something

about conservation problems. This could be called patriotism,
civic responsibility, conservation morality; the late Aldo
Leopold, a native and long time resident of Burlington, Iowa,
called it the "Ecological Conscience."

4. To create in all our children a greater awareness of our
dependence upon our natural resources for the basic needs of
man--food, water, clothing, and shelter.

5. To improve learning by bringing deeper insights, greater
understanding, and more meaning through firsthand observation
and experience.

6. To enrich the lives of our children through learning
experiences that involve the outdoors. (Williams, 35, pp. 7-8)

Summer (camp) programs offer an ever new and broadening horizon to
youth. They have come to exist to meet almost all special needs offering
a wide range of valuable opportunities. Summer study, at summer camps,
provides opportunities for the student to accelerate, to work for ad-
vanced placement, to overcome weak background or poor study habits
often resultant from repetitive exposure of subject matter. Summer
programs reveal academic opportunities that offer clarity for students
who will benefit from make-up, review or preview, as well as stimulating
enrichment and recreational programs leading to greater self-confidence
and personal development. (Guide to Summer Camps and Summer Schools,
14, p. 10)

On June 19, 1982, this writer had the opportunity to visit an
organized camp setting in Iowa which promotes both outdoor education

and computer literacy. Yellow River Station Computer Camp, in Northeast
Iowa, is located on 280 acres of deciduous forest. The camp is about
one mile from the Yellow River and very near to Effigy Mounds
National Monument. Wild turkey, deer, and ruffled grouse abound on
the camp property. The Yellow River Station is at the edge of the
Mississippi flyway and is visited by more than 110 species of migrant
birds, including the bald eagle. One can see that the camp is steeped
in history, folklore, and wildlife. The computer camp itself is to
last five days and nights and is held for students 10 to 16 years old.

Dr. John K. Smola, computer systems analyst and Adjunct Professor
at Upper Iowa University, is the camp director at Yellow River Station
Computer Camp. This is the first year for the camp and the first group
of students had just completed their week's stay. When asked why he has
a computer camp out in the middle of the woods he replied,

"Many experts believe our society is quickly en-
tering an information age. An information age means
that the processing of information is more important
than, say, production of items. These same experts see
a time when men use information to control robotic ma-
chines which will, in turn, do the production. This means
the need for skill and knowledge of men will be oriented
toward processing information rather than toward doing
and building things for himself.

The computer is the primary method of processing
large amounts of information in a small amount of time.

Computers have become increasingly smaller and less expensive. Today small businesses, farm operations, and even family groups can afford relatively sophisticated computers which, when used properly, can process more information than deemed possible only three or four years ago. Already many of our schools have obtained microcomputers and are integrating their use into regular curriculum work.

While computers are being made and sold and some people are using them in small business, on farms, and in homes, other people see them as a threat to society. Most everyone has had an experience with a computer. This experience leads us to believe the computer either threatens our identity or bugs us for payments. In general, many of us are still illiterate about computers and are not fully aware of their potential. Also, many of us feel there has to be a conflict between the natural things in life and the man made things, such as computers, because of the technology involved in engineered items.

We at Yellow River Station Computer Camp believe that man should use and enjoy both-nature's finest and man's advanced technology and engineering skills. As educators, we have developed courses and taught microcomputer skills to agribusiness and health occupations students. The primary purpose of these courses, as well as the ones

taught here at Yellow River Station, was to increase
awareness, literacy, and numeracy of computers on an in-
dividual basis while reducing anxiety about the computer's
position in society.

We feel a five full-day experience, with an equal
amount of time spent in nature's surroundings and with
hands-on computer experience, can help the camper under-
stand both of these interest areas. The camper will also
benefit from these experiences as he or she uses and
applies them in a formal or informal school setting."
(Carruthers, 7, pp. 1-5)

When your students come back to school in the fall and write the
ever-popular composition, "How I Spent My Summer Vacation," you're
likely to find one or two compositions sprinkled with words like
BASIC, FORTRAN, and LOGO. Those lazy afternoons in the summer sun
at Camp Hiawatha have been invaded by computers--and the campers are
not complaining. Young people (some with computer experience, some
without) are willingly giving up some of their time in the pool to
sit at computer terminals for two to six hours a day. (Elliot, 11, p. 4)

One of the most important teaching functions of computers in the
schools will be the actual teaching about computers. As computers
become more prevalent in society, it is important that members of
society learn to work with computers. Exposure to computers of
various sorts from an early age in the school system will not only
cause people to use them routinely but will mold their thinking to the

logic of computer functions. In a very real sense, the illiterates of the next generation will not be those who cannot read but those who cannot program computers and use their capabilities. (Gambrell, 12, p. 328)

Summary

In this literature review we have looked at current research concerning the computer literacy of our society and the outlook for integrating computer literacy into the elementary classroom. We have researched the methods of teaching computer literacy from pre-school through the high school level. After showing a need to define the term "computer literacy" we found that the literature suggested that computer literacy should be used and thought of in its broadest sense. This would allow us to incorporate all aspects of learning about computers, its uses and applications, into our educational system. From looking at the research it was found that elementary age children are capable and willing students, ready for instruction on and about computers.

In looking at the use of outdoor camps as a setting for teaching computer literacy, we found that summer camps provide a suitable surrounding for learning about both the environment around us, and almost any other independent or specialized topic. Summer camps provide children with an alternative to schools as a place for them to grow and develop both mentally and physically.

Finally, it was shown that in today's ever-changing and highly technical society, where people are becoming processors of large

amounts of information, the computer with all of its power should be used as a tool for the benefit of all man-kind. In order for this to take place, it was found that computer literacy must be taught to all people and instruction on and about the computer should begin at an early age. A computer camp for elementary age children could be the beginning of a computer literate society.

CHAPTER III: COMPUTER CAMP PLAN

In 1981, Area Education Agency #16, Fort Madison, Iowa pro-
vided Radio Shack Color Computers to local school districts for use
in the elementary and middle/junior high schools. AEA #16 recommended
that these computers be used for teaching computer literacy, and a
model program, Part I: Introduction to BASIC was provided.

The major goals of the computer literacy project are for students
to learn:

1.   how a computer works and how to use it.

2.   how to write a computer program and be able to under-

stand simple computer logic.

A major benefit to students is the discipline and logical thinking
required in learning to use the computer. As students become more
capable users of the computer, it becomes an "intelligent tool" which
can be invaluable in solving problems in high school, college, or
careers.

Should the Color Computers be used primarily for computer assisted
instruction or for computer literacy? A survey by the National Council
of Teachers of Mathematics found that for the lay public:

1.   78% indicated that the emphasis on computer literacy
should be increased.

2.   79% favored integration of computer literacy within the
existing K-12 mathematics program.

Proponents of computer assisted instruction believe it is an
effective means for providing additional drill and practice for students

struggling with basic skills. The major problem with an effective
computer assisted instruction program is that large numbers of computers
are required. The cost is prohibitive at this time in comparison to
alternate methods such as textbooks and worksheets. In addition, there
is a shortage of quality lessons for use with students, especially with
the color computer. Computer assisted instruction is a future goal for
which we should strive, but at the present time, would be a _less_ ef-
fective way to use the computers and software that AEA #16 has provided.

RECOMMENDATION

AEA #16 recommends that the color computers be used primarily to
accomplish computer literacy goals. When these goals have been ac-
complished, the computers could then be used for computer assisted
instruction with the limited software available. This course of action
will result in a responsible, cost effective use of a limited educational
resource. (Doyle, 9, p. 2)

The preceding comments were from an AEA #16 Position Paper which
was concerned with "Using the Color Computer in Grades 3-8." As can
be seen by the position paper, computer literacy is a concern of AEA
#16 and the Burlington Community School District. AEA #16 has taken
the stand that to become computer literate a person must learn to program
a computer. Also faintly implied in that paper was the need to learn
about computers, its uses, and possible careers. While AEA #16 should
be commended for taking this stand on the need for computer
literacy, earlier references in the Literature Review in this paper
show that computer literacy is "whatever understanding, skills, and

attitudes one needs to function effectively within a given social role that directly or indirectly involves computers. (Anderson and Klassen, 1, p. 131) If the students in Burlington, Iowa and those in the AEA #16 district are truly to become computer literate, then instructors and administrators of these institutions must take a broader view of the term "computer literacy." Not only must computer instruction include computer programming to increase their problem solving skills, (Molnar, 22, p. 27) but also all kinds of information concerning computers such as the uses of computers, the limitations of computers, and careers that computers are used in. (Zabinski, 36, p. 35) With this in mind, Burlington Community School District and AEA #16 will need to reevaluate their concepts of computer literacy.

While the Burlington Community School District does have computers at the elementary through high school levels, computer instruction is the responsibility of the individual teacher. With many teachers being computer illiterate themselves, this writer has witnessed many inequities in our school district in the teaching of and student use of computers at the elementary school level. With the need for equity of computer literacy, (Molnar, 22, p. 26) all teachers must give instruction on and about computers. But until all teachers become computer literate, this will not happen. There must be some supplemental computer instruction for teachers and also for the students who are now missing this instruction.

AEA #16 and the Burlington Community School District have recognized this fact and have worked together to provide teachers with a computer workshop. But what about the students who have missed this

instruction? The idea for a summer computer camp for elementary students appears to be a viable alternative for those students who need this experience to improve or increase his or her computer literacy. (Zabinski, 36, p. 35) The intent of Chapter III, of this paper, is to propose a summer computer camp as a method for carrying out the goal of Burlington Community School District and AEA #16; computer literacy of their students.

This summer computer camp is intended to be integrated into an existing organized outdoor summer camp located in the immediate area of Burlington, Iowa. Examples of these outdoor camps would include: YMCA/YWCA, Boy Scouts of America, Girl Scouts of America, and a variety of church camps. At the present time, the idea of a computer camp has not been discussed with any of these organizations; however, it should be noted that these organizations are usually very cooperative with the school district. Since it is not now known what type of organized outdoor camp this computer camp will be a part of, the computer camp will be developed so that it stands alone as a course in itself. The computer camp curriculum can then be integrated into any organized outdoor camp and modified as need be.

Students will attend the computer camp four hours per day for six days. The only equipment that students will need to furnish will be one (1), twenty-minute certified computer cassette tape, which they can easily purchase at any Radio Shack store. Cost of the camp, if any, will be determined after an organized outdoor camp sponsor is found

and procedures and time-tables are discussed. The hours of the computer camp were chosen by this writer and are subject to manipulation.

The computer camp itself is intended for 3rd, 4th, and 5th grade students who have little or no knowledge of computers and their uses. This is to be a beginners course, one that will give the student a positive attitude toward the use of computers and also an introduction into the computer language of BASIC. This computer camp is not intended for those students who have a good grasp of what a computer is and what it is capable of doing. Neither is the camp for the student who has a good command of BASIC.

Students will be introduced to and work with a Radio Shack computer, the TRS-80 Color Computer with a 16 K memory. All of the Burlington Community School Districts' elementary school students in grades 3-5 have access to both a 4K and 16K TRS-80 in their own school building. Because of this fact, the experiences gained from this computer camp should help the student to feel more comfortable learning about and using computers in a school setting.

While the concern for this paper is computer literacy of Burlington's elementary students, it is hoped that the student campers can also benefit from the outdoor experience and can obtain the objectives of the outdoor center that (Williams, 35, p. 10) has identified earlier in this paper.

It will now be up to those instructors and administrators who will be making this summer computer camp a reality, to sit down together with the outdoor center and tailor it to fit into their own computer literacy plan. For, as Anderson and Klasson have stated earlier, "The responsibility is upon the teacher or instructional designer to identify and

satisfy the needs of the targeted students." (Anderson and Klassen, 1, p. 132)

Program Goals

Since computer literacy should be thought of in broad terms, the overall objectives should be stated in a broad fashion too. A summary of purposes for a K-8 computer literacy program, outlined by Hunter, is one that would be satisfactory for the summer computer camp. These purposes are listed below:

1. Help students and teachers to value computers as general purpose machines designed, built, and operated by humans to assist in many tasks.

2. Encourage teachers and students to find and create computer applications that are useful to them in teaching, learning, managing information and solving problems in math, science, and social studies.

3. Help students and teachers to develop a sense of control over computers and to learn a variety of tools and techniques for exercising that control.

4. Help students and teachers learn to use computers as an aid in solving problems. This should have the side-effect of increasing the emphasis on problem solving in the classroom and increasing the variety of problems addressed.

5. Encourage teachers and students to behave in an ethical manner in relation to the computers and information systems they use.

6. Help students and teachers to become aware of a

variety of computer applications and their uses by individuals and organizations.

7. Help students and teachers learn to evaluate advantages, disadvantages, and limitations of particular computer applications.

8. Help teachers and students to become aware of ways computers affect groups and individuals, thereby helping to prepare students for responsible citizenship.

9. Help students and teachers become aware of computer-related skills and experience that are important in a variety of careers. (Hunter, 16, p. 2)

Specifying educational objectives in terms of student behavioral outcomes is a useful approach to the design of the instruction. Objectives are generally specified at one of three levels; broad goals for learning, informational objectives or desired learning outcomes for a specified course or instructional sequence, and behavioral objectives for a specific lesson or module. (Anderson and Klassen, 1, p. 133) have stated their revised objectives as informational objectives for an instructional sequence. This list of objectives can be found in an appendix to "A Conceptual Framework for Developing Computer Literacy Instruction" written by Anderson and Klassen for the AEDS Journal, Spring of 1981. It is very up-to-date and would be a good reference for those who are wanting to initiate a computer literacy program. Behavioral objectives for students of the summer computer camp and the structuring of these goals into individual lessons, including a schedule of the week's computer activities in the camp, can be found

in the Appendix of this paper.

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APPENDIX

Student Objectives

Lesson 1: What is a computer and how is it used?

By the end of this lesson the students will be able to:

1. properly identify the microprocessor (CPU), keyboard, video display, and cassette player.

2. label a block diagram of a general purpose computer.

3. explain the meaning of the five components of the general purpose computer; input, output, processing, memory, and control.

4. understand computer terms used when discussing these components; i. e., BIT, BYTE, K, R.O.M., R.A.M., and BASIC.

5. list at least 3 different ways a computer can be used in today's society.

6. list at least 3 different careers in which a computer is used and tell in what way they are used.

7. trace a general history and development of computers.

8. recognize the limitations, advantages, and disadvantages of computers.

Lesson 2: Getting ready for hands-on.

By the end of this lesson the students will be able to:

1. know how to get the machine running by learning the proper placement of all wires to computer and cassette.

Lesson 2: Getting ready for hands-on (continued)

    2.   know the necessary behaviors to exhibit when using, and observing others use, the computer.

    3.   identify any potential physical danger that may be involved when using the computer.

Lesson 3: Learning to use the keyboard.

    By the end of this lesson the students will be able to:

    1.   begin using the keyboard with both hands instead of a hunt-and-peck method of typing.

    2.   identify the meaning of all letters, numbers, and symbols that are located on the keyboard.

Lesson 4: Flowcharting and record keeping.

    By the end of this lesson the student will be able to:

    1.   understand the reason for using flowcharts.

    2.   follow the progress of a flowchart and explain it.

    3.   keep a daily log of their activities and use it for personal reference.

    4.   recognize that record keeping is a necessary and useful skill which will be used the rest of their lives.

Lesson 5: BASIC commands/Use of the cassette player.

    By the end of this lesson the students will be able to:

    1.   understand the meaning for and use of the ENTER and BREAK keys.

Lesson 5:   BASIC commands/Use of the cassette player (continued)

2.   learn and begin to use these BASIC commands; CLS, NEW, LIST, RUN, CONT, CSAVE, and CLOAD.

3.   know how to use a tape recorder to play, record, rewind, and fast-forward.

4.   learn the proper volume setting for the cassette player and learn to leave it there.

5.   save a program onto cassette from the computer.

6.   load a program into the computer from cassette.

Leson 6:   Print statements

By the end of this lesson students will be able to:

1.   learn the use of line numbers and demonstrate their use in future programs.

2.   learn to use the print statement and the use of quotation marks in order to print things on the screen.

3.   use print statements to skip a line and leave a space in a program.

4.   use the print statement without the use of quotation marks.

5.   identify that the print statement can be used to print letters, words, numbers, symbols, or a combination of all of the above.

6.   demonstrate the ability to use the CLS, NEW, LIST, and RUN commands.

Lesson 6: Print statements (continued)

    7. use more than one print statement on a line using commas and semicolons.

    8. use a question mark (?) as a replacement for the word PRINT.

    9. learn to correct mistakes in a program.

Lesson 7: Computer arithmetic and its symbols.

By the end of this lesson the students will be able to:

    1. identify the special symbols used for arithmetic; +, -, *, /.

    2. explain how to use BASIC to add, subtract, multiply, and divide.

    3. explain the order of operations in BASIC, according to the M.D.A.S. rule.

    4. learn to use the print statement with and without quotation marks in respect to arithmetic.

Lesson 8: Branching--Goto and If-Then statements.

By the end of this lesson the students will be able to:

    1. explain what is meant by conditional and unconditional branching.

    2. explain the function of and give examples of the BASIC statement Goto and If-Then.

    3. write programs using conditional and unconditional branching statements.

Lesson 9:   For-Next and Input statements, and RND functions.

By the end of this lesson the students will be able to:

1.   explain what looping is.

2.   explain the purpose of and demonstrate the use of the For-Next statement.

3.   explain the use of the Input statement.

4.   use the Input statement using two types of variables.

5.   explain the meaning and function of the RND statement.

6.   use the RND statement in a program.

Lesson 10:   Graphics.

By the end of this lesson the students will be able to:

1.   use and plot (X,Y) coordinates.

2.   explain the use of and write programs using the SET, RESET, POINT, CLS statements.

3.   explain the use of the PRINT TAB statement and PRINT AT statement and demonstrate their use in a program.

Lesson 11:   Read-Data statements.

By the end of this lesson the students will be able to:

1.   explain the use of Read-Data statement pairs.

2.   explain four rules concerning the use of the Read-Data statement pair.

3.   explain and show how the Read-Data statement pair can be used with the For-Next statement.

Lesson 12: Sub-routines.

By the end of this lesson the students will be able to:

1. explain the general purpose of the Gosub-Return and On-Gosub-Return statements.

2. write programs using these statements to make a program more efficient.

The twelve lessons shown above will be taught on a daily basis which will follow the schedule below:

Daily Schedule

Monday A.M.

9:00--Introduction of staff, computers, and special rules.

9:15--Lesson 1, Objectives # 1,2,3,4

9:45--Lesson 2, Objectives # 1,2,3

10:00-Break for 10 minutes

10:10-Lesson 3, Objectives # 1,2

10:30-Lesson 4, Objectives # 1,2,3,4

10:50-Review and shut down equipment

11:00-End

Monday P.M.

3:00--Lesson 5, Objectives # 1,2,3,4,5,6

3:25--Lesson 6, Objectives # 1,2,3,4,5,6

4:00--Break for 10 minutes

4:10--Lesson 7, Objectives # 1,2,3,4

4:30--PRACTICE lessons # 5,6,7

5:00--End

Tuesday A.M.

9:00--Review any questions from Monday

9:15--Lesson 1, Objectives # 1,2,3,4,5,6,7,8

9:45--Lesson 2, Objectives # 1,2,3

10:00-Break for 10 minutes

10:10-Lesson 3, Objectives # 1,2

10:30-Lesson 4, Objectives # 1,2,3,4

10:50-Review and shut down equipment

11:00-End

Tuesday P.M.

3:00--Lesson 5, Objectives # 1,2,3,4,5,6

3:20--Lesson 6, Objectives # 1,2,3,4,5,6,7,8,9

4:00--Break for 10 minutes

4:10--Lesson 7, Objectives # 1,2,3,4

4:25--Lesson 8, Objectives # 1,2,3

5:00--End

Wednesday A.M.

9:00--Review daily schedule and answer any questions

9:15--Visiting speaker demonstrating Apple computers

10:00-Break for 10 minutes

10:10-Lesson 3, Objectives # 1, 2

10:30-Lesson 4, Objectives # 1,2,3,4

10:50-Review and discussion

11:00-End

Wednesday P.M.

3:00--Lesson 5, Objectives # 1,2,3,4,5,6

3:15--Lesson 6, Objectives # 1,2,3,4,5,6,7,8,9

3:40--Lesson 8, Objectives # 1,2,3

4:00--Break for 10 minutes

4:10--Lesson 9, Objectives # 1,2,3,4

4:30--PRACTICE lessons # 6,8,9

4:50--Review and discussion

5:00--End

Thursday A.M.

9:00--Review daily schedule and answer any questions

9:15--Visiting speaker demonstrating Atari computers

10:00-Break for 10 minutes

10:10-Lesson 3, Objectives # 1,2

10:30-Lesson 4, Objectives # 1,2,3,4

10:50-Review and discussion of speaker and demonstration

11:00-End

Thursday P.M.

3:00--Lesson 8, Objectives # 1,2,3

3:30--Lesson 9, Objectives # 1,2,3,4,5,6

4:00--Break for 10 minutes

4:10--Lesson 10, Objectives # 1,2,3

4:40--Lesson 11, Objectives # 1,2,3

5:00--End

Friday A.M.

9:00--Review daily schedule and get on the bus

9:15--Field trip to a business, a government agency, and a

school building to see their uses of computers

10:50-Back at camp for discussion of field trip

11:00-End

Friday P.M.

3:00--Lesson 9, Objectives # 5,6

3:20--Lesson 10, Objectives # 1,2,3

4:00--Break for 10 minutes

4:10--Lesson 11, Objectives # 1,2,3

4:30--Lesson 12, Objectives # 1,2

4:50--Review and discussion of the day

5:00--End

Saturday A.M.

9:00--Work on individual projects

10:00-Students will break when it is conventient for themselves

10:30-Students will show their programs to their peers

11:00-End

Saturday P.M.

3:00--There will be an Open House for parents and any public

that may be interested. Students will show off their programs

and what they have learned during the course. It will also be

a time for parents and the public to try their hands at working

on a computer.

5:00--Box-up the equipment to make sure all materials are present.

5:30--End