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Use of computers in the early elementary classroom

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Abstract

Microcomputers are becoming increasingly more common in today's society. The cost of the unit Is decreasing, more software is available, and the quality has improved. As computer usage becomes more common in society, schools must respond through educational preparation and utilization. The number of pub l le school computers more than tripled between 1980 and 1982, increasing to nearly 100,000 by the spring of 1982 (Magarrel I, 1982). Between 1980 and 1982 the number of home computers l n use grew more than seven-fold and the number of educational programs available for these micros increased more than ten-fold (Zlajku, 1983). Due to this growing availability, the curriculum in many schools currently includes work on the microcomputer. Given the potential impact of the computer on the educational development of children, it ls essential that computer training be offered in the schools. There ls much controversy, however, over the question of the age, or grade at which computer instruction should begin.

THE USE OF COMPUTERS

IN THE

EARLY ELEMENTARY CLASSROOM

A Research Paper

Submitted to

The Department of Curriculum and Instruction

In Partial Fulfillment for the Degree

Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

by

Susan B. Freet

1985

This Research Paper by: Susan Barbara Freet

Entitled: The Use of Computers in the Early Elementary Classroom

has been approved as meeting the research paper requirement for the

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July 25, 1985
Date Approved   Director of Research Paper

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I - Introduction

Microcomputers are becoming increasingly more common in today's society. The cost of the unit is decreasing, more software is available, and the quality has improved. As computer usage becomes more common in society, schools must respond through educational preparation and utilization. The number of public school computers more than tripled between 1980 and 1982, increasing to nearly 100,000 by the spring of 1982 (Magarrell, 1982). Between 1980 and 1982 the number of home computers in use grew more than seven-fold and the number of educational programs available for these micros increased more than ten-fold (Ziajku, 1983). Due to this growing availability, the curriculum in many schools currently includes work on the microcomputer. Given the potential impact of the computer on the educational development of children, it is essential that computer training be offered in the schools. There is much controversy, however, over the question of the age, or grade at which computer instruction should begin.

Educational software is currently being used by elementary and secondary teachers for drill and practice in basic skill areas such as reading and math, for tutoring in specific areas of knowledge, for demonstrating phenomena in the natural world, and for playing instructional games involving mathematical concepts

and logic. In the past few years, several programs have been developed for use by children younger than five years of age. Such programs include the use of music and color graphics to promote such concepts as: above and below, left and right, and moving an animated "shape room" where children can create pieces in various configurations.

Many experts suggest that exposure to computers should begin in the early childhood and early elementary years, and that a basic understanding of computers at this level can promote better understanding at a later age. Others disagree, saying that the child will tire of the microcomputer if exposed too early and on such a continual basis.

Statement of the Problem

The major research question to be addressed in this paper is at what developmental level is the microcomputer most effectively integrated into the curriculum? Specifically, is the micro a viable educational tool for the early childhood and primary years? Secondly, how does the micro fit into the existing currricula for young children?

The purpose of this paper was to provide a synthesis of current research and literature on the utilization of computer assisted instruction with young children. Also included are a brief section on computer utililzation with special populations and curricular implications.

II - Review of the Literature

Very young children, as young as 18 months, can use a computer to execute simple programs. A toddler may touch a key and have a display of colors appear on the screen. Preschoolers can use a program in which they are asked to judge shapes or letters as being the same or different, try a maze, or draw a picture with a light pen. The TORTIS (Toddler's Own Recursive Turtle Interpreter System), a predecessor of LOGO, is a unique computer language that enables young children to program the actions of a turtle. It is designed to teach such concepts as numbers, breaking the problems down into smaller steps, writing, and debugging procedures (Perlman, 1974 as cited in Zeiser and Hoffman, 1983).

Preschoolers can execute a surprising number of operations with the microcomputer. Even four-year-olds can push keys on a microcomputer keyboard to move objects right and left, and up and down on a screen. At the same time the concepts of left and right can be developed. They can also generate various patterns, colors, letters and numbers; compare and match objects i.e. one-to-one correspondence; create shapes; and solve the

intricacies of some fairly complex puzzles. The developers of educational software are just beginning to explore its potential for use by young children. The range of possibilities, for professional educators, should continue to increase over the next few years.

Child Development

Knowledge of child development patterns, physical and emotional, as well as cognitive, is essential when considering educational programs for young children. Instruction at a level below the child's stage of cognitive development results in boredom while teaching beyond understanding creates frustration and confusion. Instruction compatible with the intellectual level of the child is stimulating, challenging, and maintains interest. Therefore, developers of computer software must be careful to provide concrete interactive modes for children who are functioning at the preoperational and concrete operational levels of development.

Research on Computer Usage with Young Children

In 1983, data were gathered to determine how a child's age affects choices of instructional aids. Thirty-two children were observed for fifteen days, for a period of thirty minutes daily. When the data were analyzed, no significant differences were noted in their choices. Both children under five years of age and those over five chose the computer with equal frequency (Winkle,

1982).

Bloomstrand (1984) studied the interaction of young children with the computer. They played games for as long as time allowed. The drill and the logic development games were received very enthusiastically. Spatial relation activities were also popular. Many children asked to use the computer during free time, thus providing evidence that preschoolers enjoy computer interaction.

The most commonly reported observation was that children were very enthusiastic about working with computers--whether trying to do simple drill and practice exercises, doing very complex simulations, writing or learning to program. Informal reports suggest that when software is well-designed for teaching a particular subject and the teacher is knowledgeable about using a computer, the children's use of the computer complements the teacher's work and contributes to learning. The microcomputer provides a tool by which children can practice skills, pace themselves as they learn the material, repeat necessary lessons, and progress to the next level of difficulty if appropriate software is available for their use (Zeiser and Hoffman, 1983).

Brebner (1980) reported that certain children, especially those who learn slowly or need to repeat lessons, appear to learn more readily when they can proceed at their own pace through the computerized lessons and can repeat each lesson as often as they choose. Similarly, exceptionally capable children were able to

proceed through lessons as rapidly as they choose. Such children progressed quickly through materials and appeared to feel that they were controlling the pace of their efforts.

Silvern (1983) reported evidence that children learn material better and more quickly when using the microcomputer than they might otherwise. One teacher reported that "time on the computer" had been used as a motivator and reinforcer for completing other tasks.

Nida, Daniel, Shade, Pipinski and Watson (1984) studied preschoolers and their interaction with the computer. They concluded that preschoolers can work with microcomputers and can use the keyboard with minimal instruction and minimal software adaptations. They also noted that there was little change in the amount of interaction between the children and their peers, and that little supervision was needed after initial instruction in computer usage.

Sheingold (1983) suggested that microcomputers might be used to help children get in touch with the symbolic aspects of what they already know, or are learning about from other experiences. For example, real chicken eggs could be incubating in a preschool classroom at the same time that a computer simulation of the development of a chick inside an egg was available in class. In such an instance, children might be more apt to make connections between the real world and the images provided on the microcomputer.

Skill Development Through Computer Utilization

Burg (1984) reported that computers can be used to promote divergent thinking or conformity, freedom or restriction, self-confidence or fear. She also stated that choosing the system by which the educational tool is to be used is the responsibility of the teacher. Also, teachers often lack computer knowledge and, therefore, feel that the computer is not doing its job. Teachers should strive to increase their own knowledge of the computer in order to make it an effective learning tool for children.

Some of the computer's capabilities for promoting learning in young children were also noted by Burg (1984). She stated that the computer can encourage problem solving skills and the direct manipulation of concrete objects. Children can guess the missing color of a blank square in a grid of symmetrically arranged colored objects, or build a block structure on the right side of the screen to match what the computer has arranged on the left side. Then children can use this same program with real blocks to work out the problem in three dimensions. There is a game in which the child guesses the number the computer is thinking using clues provided in the program. Games are designed to encourage the child to guess which item does not belong in a set of graphics. The advantage is that the computer can provide immediate feedback to inform students of their accuracy.

Computers can be used to stimulate divergent thinking.
Children can play "How many different ways can you arrange these
blocks?". They work with "real blocks" selected by the computer
and enter as many combinations as they can. The computer shows
them all of the possible combinations when asked. Chidren, as
young as preschool age, are also using their creativity to
suggest the content for new games.

There is evidence that computers can be used to develop
counting patterns (Wilburg, 1984). Elementary students need to
learn to count by 2's, 5's, 10's, 3's and so on. A simple
computer program allows children to gain experience with creating
different counting patterns as part of the regular mathematics
curriculum. To do this, students entered and ran the following
program:

```
1 N  = 0
2 N  = N + 1
3 PRINT N
4 GO TO 2
```

In this loop pattern, line 2 can be changed to read N = N + 5, then
N = N + 2 and so forth. The children in Wilberg's study enjoyed
the activity and were found to learn counting patterns more
quickly than students who did not participate in the computer
program.

Zeiser and Hoffman (1983) designed a program in which

students were asked to make the decision of whether two shapes on the video display of the microcomputer were the same or different. The correct answer resulted in a flashy display across the screen, and incorrect answers brought no change in the image on the screen.

Raths, as noted in Zeiser and Hoffman (1983), contends that many mathematical and visual discrimination programs are skill and drill programs. In such programs the computer delivers certain questions, or situations, and children respond with either correct or incorrect answers. Behaviors that indicate that thinking is occuring in these programs are: 1)observing--the child accumulates fact that are related to the overall problem, 2)comparing--the child uses observations to compare two or more objects, and 3)classifying--purposeful grouping on the basis of relationships. Most programs written for young children are drill and practice programs such as this.

Another type of computer activity involving mathematical skills is the simulation (Zeiser and Hoffman, 1983). In simulations real life problems are presented and the child must seek a solution. Certain data are given to the users and they must use logic and decison-making skills to manipulate the data and solve the problem. In one program, for example, the child sets up a lemonade stand. The decisions that must be made include: how much lemonade to make, how much money to spend on advertising, cost of supplies, and so forth. Other variables such as inclement weather are added; this complicates the

situation and requires additional problem solving skills.

Sense of Control and Self-Esteem

Silvern, (1983), feels also that computer work gives children a
sense of control over their own learning and may contribute to
higher self-esteem. Children can work at a lesson until they can
complete the program successfully. This helps to build a good
self concept and to lessen the discouragement that is created
when children feel as if they are behind the rest of the class
because their lessons are not completed.

Computer feedback to children on their progress during
lessons also appears to motivate them, thus, improves time on
task and fosters positive attitudes towards learning. Through
programs that automatically moved the learner to a higher level
of difficulty when the previous level had been mastered, children
were able to cover more material than they might have otherwise
mastered in the same period of time (Hallworth and Brebner,
1980). Preliminary reports on microcomputer usage, as well as
reports by teachers already working with children and micros,
indicate that there is improved learning and enthusiasm when
children use microcomputers.

Piestrup (1981) worked with 55 three and four-year old
children, helping them learn reading readiness concepts on the
Apple II microcomputer. Concepts included: "above", "below",
"left", and "right". She reported that both teachers and

children were enthusiastic and that criterion tests on the four concepts showed that children improved during the 3-week period with the computer.

At a San Francisco Bay area school, disadvantaged kindergartners worked weekly for seven months with Commodore PET computers; programs included mathematics, visual discrimination, name, and telephone number practice. Each of the twelve children involved in the study had a computer to use and was allowed to explore the keyboard extensively. They grasped the connection between pressing a key and observing that something new appeared on the screen. Gradually the children learned to progress through the programs, increasing the amount of time they could work with the computer from 15 to over 35 minutes. In later tests of the children's ability to learn from the computerized instruction, four children performed better on certain math, counting, and telephone number tasks than six children who had not used the computer (Hungate, 1982).

Sheingold (1983) stated that, contrary to earlier concerns, using a computer might contribute to sociability rather than the opposite. Self esteem appears to be fostered by the confidence and satisfaction generated through exercising control over the computer, making choices during a program, and learning to program. Positive self concept development has been cited, as a side benefit, by several teachers working with young children. At one preschool, Sheingold noted that a "shy" child gained the respect of class members and improved his social skills as a

result of his demonstrated computer "expertise".

In Morgantown, West Virginia, Warash (1984) viewed the computer as a motivational tool for teaching three- and four-year olds and as a complement to the Language Experience Approach. Children verbalized more about their computer-drawn pictures than their hand-drawn ones. Warash also believes that, in addition to motivational considerations, the computer can be beneficial because it provides the opportunity for the child to produce perfect letters and shapes.

Nieboer (1983) included a computer in a preschool setting and found it to be wholly justifiable. Every child in the study chose to work in the computer center at least once during the course of the study. It never was considered to have interrupted the flow of classroom activity and no management problems were noted. It was felt that the computer center allowed opportunities for fine motor development, creative involvement, verbal expression, problem solving, widened experience, and resulted in a sense of success and pride in achievement.

Nida, Lipinski, Shade and Watson (1984) categorized twelve behaviors as prosocial, anti-social or neutral. They observed the behaviors of preschoolers by using Friedrich and Stein's Observational Scale during several one hour free play periods. Little change was noted in the social interaction patterns of these children whether in the microcomputer area or other areas in the classroom. They also note that the critical factors to

consider in the introduction of computers into the preschool include the ratio of children to microcomputers and the amount of structure provided by the teacher.

Too Much, Too Soon?

One common criticism of the introduction of computers into the early childhood classroom is that free time was interrupted and chaos results. One current study showed that while free time is disrupted initially, after one to two weeks free play returned to normal (Lipinski, Nida, Shade and Watson, 1984). That same study addressed additional criticisms; the researchers found that there was no significant relationship between competence and computer time, and that girls spend as much or more time on the computer than boys. Previously it was thought that boys dominated computer time and were more competent in their usage.

Chin (1984) investigated whether preschoolers were being bombarded with too much, too soon. Child development researchers at the University of Wisconsin-Madison contend that children write more if allowed to "fool around with the keyboard." These specialists also consider that when computers are properly introduced into the home or classroom, preschoolers can use them to sharpen such skills as eye/hand coordination, fine motor skills, spatial concepts, problem solving. Chin also interviewed teachers at the Bing School of Stanford University who had been using microcomputers in the early elementary classrooms since 1981. She found that children enjoy computers and, if properly

utilized, children's self-esteem and social interaction as well as their cognitive and motor skills can be increased.

II - Computer Adaptations for Special Populations

With the current focus on mainstreaming of disabled students, modifications are needed in the basic computer. Many adaptations have been made for the physically impaired to ensure benefits from this relatively new technology.

Nonvocal children with severe physical handicaps can now use the microcomputer as a speech output communication aid. One program, available for the Apple II micro, is TALK II. By using an Echo II speech synthesizer, the Apple is converted into a speech output communication System. TALK II allows for a totally customized vocabulary from 1 to 800 letters, words and phrases all of which can be accessed from one or two key presses. All of the vocabulary can be deleted, added to, or moved around at any time. TALK II can accommodate up to 200 sentences. The child can "speak" any message up to 100 words long in a single key press, thus increasing the speed of spoken conversation. The message can be displayed on a monitor, spoken, printed, or stored. Once it is stored it can be spoken with one or two key presses. (Rushakoff, 1983).

Another problem that the physically impaired have with computers concerns the typical input device---the keyboard. However, a variety of input devices are available. The Computer King Keyboard for the Apple II Plus computer has 1 3/4" diameter keys which are slightly recessed. Single switches are also

available for children whose physical limitations preclude them from using the standard keyboard. Special light pens allow the child to indicate his or her choice directly on the display screen to make a correction or execute a drawing. There are also pressure sensitive screens that enable the user to interact directly with the display. Controls can be activated by touch, drawing, sound, light, gesture or even a glance. A scan mode is also available in which the letter, or number, characters are arranged horizontally on the screen and a pointer, or marker, performs a step-scan process from left to right across the characters until the switch is activated indicating a desired entry. An auxilliary keyboard, operable with one finger, fngernail sensitive and headstick sensitive are two other available variations. Many of these special systems can also be mounted directly on a wheelchair for the individual.

For an impaired student who cannot use the keyboard, still another solution is available. On standard Apple game paddles, there is a tiny switch on the side. This can easily and inexpensively be replaced with a switch that is either larger or more accessible. Movement of this larger switch would be much easier for some handicapped students. All of these devices must be secured by the teacher, leaving original devices such as the keyboard intact. Finally, there are expanded keyboards available which would be useful for children when it is found that a larger keyboard would prove to be more functional.

In the area of creative arts, physically disabled children can often use some percussion-like instruments. Microcomputers, and

appropriate software, allow these children to bypass their motor
disabilities and generate their own musical creations. They can
write music, save it, edit and play it all through the microcomputer
system. In the area of art, many physically impaired children are
often limited to such simple tasks as fingerpainting. Software
available for creating art projects allows for the production of
color artwork and animation even with little physical motor
facility. Artwork can also be saved and changed at a later time.

Perhaps the most important function of the microcomputer with
the physically impaired is to improve self concept. Students who
have not developed a strong sense of autonomy because of their
constant dependence on others for basic needs, can perform on their
own. They have a powerful chance to develop their own feelings of
self-worth and to regard themselves as successful learners and
performers.

Teachers of special needs children who are often overwhelmed
with bookkeeping aspects of education will find it helpful to
develop Individualized Educational Plans with the computer. Record
keeping is easier; information on each student's goals and
short-term learning objectives, along with learning methodologies,
costs and resources can be stored on floppy disks.

Therefore, computers in the classroom, even for special
populations, provide many advantages. In addition, the quality of
speech synthesis as well as the quality of programs for the computer
is improving. The computer is interactive and enables a child to be

in control of his or her own learning. The child can adjust

programs to a comfortable rate. Special cildren can be accomodated

so they are a part of the regular classroom, yet the unit is

self-contained. Only a basic knowledge of computer language is

necessary to operate a microcomputer. However, literature on

computers for special populations does not address the question of

cost of specialized software. For this reason, caution should be

taken when considering the direct application of these data and

ideas.

Sources of instructional software for special education are

listed in appendix A.

IV - Curricular Implications and Summary

Despite the positive considerations in the curriculum, there
are, of course, disadvantages. One obvious deterrant to introducing
microcomputers in kindergarten and elementary classrooms is the
ratio of computer cost to the number of children who can use it at
one time. Another problem lies in the development of individualized
programs. Even if teachers acquire the necessary skills to create
programs, time is still an important consideration. One possible
solution, in public school settings, would be to have older students
write programs for the younger children. Courses on computer
programming could require student projects which include the
creation of usable programs meeting the specifications of
kindergarten teachers. This teacher-student interaction could add
purpose to older students' learning and thus make it more enduring
and meaningful.

The danger exists that some people will expect the youngest
children to be able to program. Parents and others must be reminded
that a five-year-old's intellectual development is insufficient to
write complicated programs. The preschooler's thinking depends more
on trial and error than on logic.

Recent brain growth research, which supports Piaget's theory of
intellectual development, also has implications for the limitations
of computer applications for this group. According to Epstein and

Piaget (1981 as cited in Burg, 1984), many and varied concrete experiences are crucial for children during ages four through six for optimum brain growth. Computers can be programmed to foster the manipulation of concrete objects. However, the computer is often used for two dimensional rather than three dimensional simulated experiences. It is essential to remember that the computer is only ONE tool---ONE experience. It must be used supplementally rather than as a primary element in the early childhood curricula.

Computer hardware is decreasing in cost. However, these costs are not addressed to any great extent in the literature. Educators must be aware of the cost of programs needed to appropriately supplement their instructional program when considering the purchase of a micro.

One of the major advantages is that the computer can help students pace themselves. Children can progress at their own rate, repeat parts that they don't understand, and skip parts that they have already mastered. In the future, as software improves, individualized instruction may become more of a reality and children will be able to proceed at their own rates through computer-assisted lessons appropriate for their levels of ability.

Computers can also foster fine-motor skills and eye-hand coordination. Additionally, they may have some value for the child's emotional and social development. The computer has been proven to motivate children, increase their attention span, give them a sense of independence, and a sense of control. Computers

provide an immediate response, aid in motivation, and make individualization more possible. Often children regard the computer as recreational. At the same time, they are learning many valuable skills and concepts that will be important in their later years. The introduction of computers at this early age can help teachers in subsequent grades since students will have had prior exposure; they can learn the basic functions such as "on/off" and terminology such as "cursor" and "menu". Society's technological advances require adults to have some computer knowledge; maybe it should be a regular part of a child's whole life. If computers are introduced in the early grades in a pleasurable and yet challenging way, students will develop positive attitudes toward the technology. Whether increasing numbers of students will be exposed to computers at an early age is no longer a question. They will be.

Computers can also be used effectively as a reinforcer. This can be observed in schools where children use the computer as a reward when they finish their other work. Teachers are, of course, in charge of what program they work with on a particular day, thus the computer can be used to reinforce previous learning or to strengthen concepts with a computer game. Therefore, practice is enjoyable rather than tedious.

One very important factor in the effective use of the computer in the preschool and early elementary settings is the appropriate use of software. A large amount of software is available, however the teacher is responsible for it's selection and evaluation. Things to consider include the educational objectives of the lesson,

the tie needed for implementation, the biases contained in the program, accessibility of instructions, record-keeping, prerequisite knowledge, and quality of materials. For further information, an Educational Software Evaluation Form is included as Appendix B of this paper.

All indications point to the fact that computers are going to become an intergral part of children's lives. One of the most crucial things that all teachers can do is to become more aware of computers and their potential for education. Teachers should take classes, attend inservice, and experiment with the computer. Exploration into the world of technology is needed in order to become comfortable with the systems before effective instruction can result. Teachers of young children need to know how computers are being used, what they can and can not do, and what effects computers in the classrooms are likely to have on both teachers and students. In whatever way and in whatever capacity microcomputers are used in the classroom, the goal is the same: to help children learn more effectively.

As a result of this investigation, it was concluded that there is conclusive evidence that the computer can be effectively introduced into the early elementary curriculum. Furthermore, if used as a supplement in the classroom, the microcomputer can be a viable tool for elementary intervention.

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Selected Sources of Instructional Courseware for Special Education

Aquarius Publishers, Inc.
P.O. Box 128
Indian Rocks Beach, Florida 33535
(813) 595-7890
Apple, TRS-80
IC, Elem, HS

Behavioral Engineering
30 Mt. Hermon Road, Suite 207
Scotts Valley, California 95066
(408) 438-5649
Apple II+ (48K), Commodore 64, Vic 20, IBM PC
Elem, HS

Comput-Tations, Inc.
P.O. Box 502
Troy, Michigan 48099
(313) 689-5059
Apple II+ (48K), Atari 800
IC, Elem, HS, Post

Computer Courseware Services, a division of EMC
Publishing/Changing Times Education Service
300 York Avenue
St. Paul, Minnesota 55101
(612) 771-1555
Apple II+, TRS-80 models I & III, Commodore PET
IC, Elem, HS

The Conover Company
P.O. Box 155
Omro, Wisconsin 54963
(414) 685-5707
Apple, TRS-80, Atari
Elem, HS, Post

Data Command
329 East Court Street
Kankakee, Illinois 60901
(815) 937-1816
Apple II & II+, TRS-80 models I & III
Elem

Developmental Learning Materials
One DLM Park
Allen, Texas 75002
(214) 248-6300
Apple (48K)
Elem

Educational Activities, Inc.
1937 Grand Avenue
Baldwin, New York 11510
(516) 223-4666; (800) 645-3739
Apple, TRS-80, Atari, Commodore
IC, Elem, HS

Adaptive Firmware Card
  Adaptive Peripherals
  4529 Bagley Ave. N.
  Seattle WA 90103
Express III
Apple Keyguard
  Prentke-Romich Company
  R.D. 2, Box 191
  Shreve OH 44676
King Keyboard (expanded keyboard)
Apple Keyguard
  Technical Aids and Systems for the Handicap
  2075 Bayview Ave.
  Toronto, Ontario
  M4N 3M5, Canada
Omni
  Communications Research Corp.
  1720–130th Ave. N.E.
  Bellevue WA 98005
Expanded Keyboard
  Cacti Computer Services
  130 9th St. S.W.,
  Portage la Prairie, Manitoba
  R1N 2N4, Canada
Tetra-Scan II
Zygo 100
  Zygo Industries
  P.O. Box 1008
  Portland OR 97207

Journal of Apple Courseware Review
Apple Computer, Inc.
Box 28426
San Jose, California 95159

Micro Media Review
Box 425
Ridgefield, Connecticut 06877

MicroSift News
Northwest Regional Educational Laboratory
300 S.W. Sixth Avenue
Portland, Oregon 97204

School Microware Reviews
Dresden Associates
P.O. Box 246
Dresden, Maine 04342

EDUCATIONAL SOFTWARE EVALUATION FORM
PART A: BACKGROUND INFORMATION

Program Title: _____ Cost: _____

Hardware or System Requirements: _____
_____
_____

Type of Media: ☐ 5″ Floppy Disk
                ☐ Cassette Tape

Skill/Ability/Grade Level: _____
_____

Producer/Date: _____
_____

Type of Program: ☐ Tutorial (Developing Concepts)
                  ☐ Drill and Practice
                  ☐ Entertainment
                  ☐ Other, Specify _____

Content Area: _____
_____
_____
_____
_____

PART B: INSTRUCTIONAL PURPOSE	YES	NO
1. Are instructional objectives specified?	☐	☐
2. Are the objectives stated clearly?	☐	☐
3. Do the objectives fit in with the existing educational objectives established by the teacher, school district or program?	☐	☐
4. Can the objectives be easily adapted for specific individualized instructional purposes?	☐	☐
5. Are the objectives significant or extensive enough to warrant the expenditure of funds?	☐	☐
6. Have the objectives been developed to meet the needs of specific student populations? If "yes," specify population: _____	☐	☐

PART C: CONTENTS	YES	NO
1. Are the contents accurate in meeting the specified objectives?	☐	☐
2. Are the contents appropriate to the students' maturational level(s)?	☐	☐
3. Is the length of the program appropriate to the students' maturational level(s)?	☐	☐
4. Are the contents motivating, interesting, attention-getting and enjoyable?	☐	☐
5. Are the contents attractive, colorful, and otherwise aesthetically pleasing?	☐	☐
6. Do the contents foster positive attitudes, values and behaviors towards others?	☐	☐
7. Are the contents free of any racial, cultural or sexual biases?	☐	☐
8. Is this program a more effective way of presenting material than has been traditionally offered to the students?	☐	☐
9. Are all of the instructions accessible within the program as needed?	☐	☐
10. Are the program instructions easy-to-follow without extensive referral to the manual?	☐	☐
11. Is information provided on how to "escape" from the program at any time?	☐	☐

PART D: FEATURES	YES	NO
1. Is there a record keeping system which records students' responses?	☐	☐
2. Does the program provide for the assessment of and programming for instructional needs of students?	☐	☐
3. Does the program provide practice for remediation purposes?	☐	☐
4. Is the program adaptable for small groups as well as individual use?	☐	☐
5. Can the program be run with or without sound, depending on the requirements of the instructional setting?	☐	☐
6. Will the program load, boot and/or run without extensive user knowledge of the use of microcomputers?	☐	☐

PART E: DOCUMENTATION	YES	NO
1. Are the program authors/developers identified?	☐	☐
2. Are the authors respected educators?	☐	☐
3. Do the authors have the knowledge and expertise in the area for which the program has been developed?	☐	☐
4. Is there an instructional manual accompanying the program?	☐	☐
5. Does the manual provide information relating to:		
A. Field testing?	☐	☐
B. Program objectives?	☐	☐
C. How the program works?	☐	☐
D. Suggestions for helping students with the program?	☐	☐
E. Possible follow-up activities?	☐	☐

PART F: OTHER CONSIDERATIONS	YES	NO
1. Are purchasing procedures clearly stated?	☐	☐
2. Are all guarantees and warranties specified in writing?	☐	☐
3. Is the making of a backup disk permitted?	☐	☐
4. Are the materials of a high quality and well-labeled?	☐	☐
5. Is the program adequately packaged for storage and durability?	☐	☐

SUMMARY

OVERALL QUALITY:

☐ Excellent
☐ Very Good
☐ Average
☐ Fair
☐ Poor

RECOMMENDATION:

☐ Purchase Immediately
☐ High Priority as funds become available
☐ Do not purchase
☐ Other, Specify _____
_____

SIGNATURE OF EVALUATOR: _____ DATE OF REVIEW: _____