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Creating A Skill Tracker For Junior High School Mathematics Standards Related Directly To Computers

Josephine H. Lair
Nova Southeastern University

CREATING A "SKILL TRACKER" FOR JUNIOR HIGH SCHOOL MATHEMATICS STANDARDS RELATED DIRECTLY TO COMPUTERS

by

JOSEPHINE H. LAIR

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The abstract of this report may be placed in the School Practices Information Files for Reference.

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Running Head: SKILL TRACKER

Authorship Statement

I hereby testify that this paper and the work it reports are entirely my own. Where it has been necessary to draw from the work of others, published or unpublished, I have acknowledged such work in accordance with accepted scholarly and editorial practice. I give this testimony freely, out of the respect for the scholarship of other workers in the field and in hope that my own work, presented here will earn similar respect.

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Chapter 1

Purpose

> "Education does not mean teaching people what they do not know. It means teaching them to behave as they do not behave. It is not teaching them the shapes of letters and the tricks of numbers, and then leaving them to turn their arithmetic to roguery, and their literature to lust. It means, on the contrary, training them into the perfect exercise and kingly countenance of their bodies and souls. It is painful, continual and difficult work to be done by kindness, by watching, by warning, by precept, but above all--by example."

This definition of education by John Ruston serves as the philosophy of this writer's school and the fulfillment of the school's goals. The primary goals of this school are to offer the student an opportunity to explore academic and nonacademic areas, to develop creativity, to communicate ideas, and to practice habits of intellectual inquiry. Specifically, it is to develop language skills and arithmetic operations, appropriate attitudes and citizenship skills, an introduction to necessary vocational skills, maintain

proper mental and physical health, and provide exploratory courses in enrichment areas such as drama, art, music, and the foreign languages. The major responsibility of the teachers, counselors, and administrators is to provide the best possible instructional program for each child attending the school.

The school, a junior high located in the southwest section of the county, was built twenty-five years ago when it was fashionable to have windows and patios. The main part of the school has two floors with the cafeteria, auditorium, and physical education lockers in a one story section connected by patios. The student population is composed mainly of students from average-above average economic level income families. The parents of these students are professionals, with a large number of doctors, lawyers, judges, accountants, and business people. The school has an enrollment of 1270 students served by four administrators, fifty-nine instructional staff, and six non-instructional personnel. The instructional staff is composed of teachers with many years of teaching experience. Fifteen teachers have over twenty years, thirty-five have between ten and twenty years, and nine have under ten years experience. Thirty teachers have their master's degree with five others working on that degree now. Three teachers have their specialist's degrees while three others are working on their doctoral degrees.

The student body is 67% non-hispanic, 19% black, 12% hispanic, and 2% Asian. The teacher-student ratio is one teacher to twenty-two students. There are approximately thirty students in each class. The difference between the ratio and class size is due to special teachers who have small

classes or no classes, such as counselors, librarian, special education, resource, indoor suspension, and work progress teachers.

There is ability leveling in the three instructional areas of language arts, mathematics, and social studies. There are four levels of instruction in each grade level in language arts and mathematics, with two in social studies. Although the program of the school prepares the student more for the academic rather than the vocational, there are industrial arts and business courses offered along with enrichment courses.

The students selected for this study are in the course, Math 2 Advanced, the highest level of seventh grade mathematics for the motivated student. In this course are 89 students: 46 girls and 43 boys. The parents of these students are very interested in and vocal about their child's progress in school. The parents request many teacher conferences and are active in the Parent Teacher Student Association and the Advisory Committee. The PTSA sponsors "Back to school night," Cultural Arts Festival, and a Teacher's Appreciation Luncheon. They have contributed funds toward the purchases of water coolers for the cafeteria, computers, supplies for the school art program, and funds to help finance the equipping of a closed circuit television studio. Parents volunteer to help in the school clinic and in answering the school telephones. The Advisory Committee works in curriculum related areas to provide suggestions for improvements.

As the teacher of these students, the writer can suggest and help implement improvements and additions to the mathematics curriculum and the instruction of these students as long as the objectives of the course are taught.

As head of the mathematics department, it is my responsibility to find ways to improve the instruction of the Florida Standards of Excellence and the objectives in each mathematics course.

The Educational Accountability Act of 1976, Florida State Statutes, required that minimum student performance standards be established. All third, fifth, eighth, and eleventh grade students are to be tested on minimal skills in mathematics. As part of the Education Reform Act of 1983, Standards of Excellence in mathematics were developed by the Florida Department of Education. The State Board of Educat on adopted a rule (6A-1.9411) which required each district school board to provide for appropriate instruction based on these student performance standards of excellence. One of the mathematics standards relates directly to computers and calculators. This standard will be included in the testing of eighth grade students in another year. The standard states that the student will demonstrate knowledge of calculators and computers as applied to mathematics through the following related skills:

1. organize, complete, or follow the logic of a flowchart for a daily activity

2. perform the computation involved in a mathematical flowchart with a specific input

3. use a calculator to perform computations

4. determine whether an answer on a calculator or computer is reasonable for a given problem

5. demonstrate knowledge of calculator and computer input and output displays

6. use a calculator to solve basic computation problems involving more digits than can be entered into the display

7. interpret information relating to the execution of the program from a computer printout

8. write a computer program to solve a simple mathematics problem

9. determine the difference between the algebraic use of equality and the computer use of equality.

Deficiencies in eighth grade students starting computer classes have been noted by the computer teacher. These deficiencies include the lack of knowledge of the design and logic of flowcharting, how the computer computes mathematical problems (such as, order of operation), and how to determine the output of simple programs. Also, according to the results of a short survey this writer gave the seventh grade target students, only 34% of the them answered "yes" to the question, "Do you understand and are you able to do flowcharting?" The results of this survey are documented in Table 1. These skills in which the students are deficient are included in the mathematics related skills that eighth grade students are expected to have mastered.

The curriculum in the seventh grade accelerated mathematics class is extremely intensive as both seventh and eighth grade objectives are taught or remediated in order to prepare the students for Algebra. It is imperative for these students to know which mathematics related skills they have not mastered and have a prescription or plan for mastery. This project will seek to identify and remediate these mathematics skills which are related to computers and calculators. The project will seek mastery by students in the

selected group of the three skills found by the computer teacher to be deficient in eighth grade students.

Over a period of eight weeks, eighty percent of the students selected for this study will master the mathematics skills related to computers and calculators as measured by the administration of a pre-test and a post-test on these skills.

It is expected that at the end of eight weeks the students in the selected group will be able to organize, complete, and follow the logic of a flowchart for a daily activity which will aid them in logical thinking and problem solving as evidenced by a pre-test and a post-test and by teacher observation of their approach to the assignments which include word problems.

The students will be able to determine whether an answer on a calculator or computer is reasonable for a given problem and follow order of operation in solving mathematical problems as presented on the computer, the calculator, and paper. This will be measured by a pre-test and a post-test.

The students will be able to write a computer program to solve a simple mathematics problem and be able to determine the output of a simple program. This will be measured by a pre-test and a post-test on the skill.

Chapter 2

Research and Solution Strategy

The National Council of Teachers of Mathematics report (1980, pp.1-2) states "problem solving must be the focus of school mathematics in the 1980's and the mathematics curriculum should be organized around problem solving." It also states "calculators and computers should be used as tools for instruction, the curriculum should emphasize student knowledge of basic facts required for proficient mental arithmetic and estimation, and make concepts and problem solving the focus of curriculum".

According to the above cited report, problem solving must prepare individuals to deal with special problems they will face in their careers. Problem solving involves applying mathematics to the real world and not to teaching a particular function of mathematics at a given time to solve a given problem. True problem solving requires a wide range of knowledge, not only particular skills and concepts, but the relationships and principles that unify them. Each problem can not be treated as an isolated example. The current curriculum emphasizes computational skills apart from their application. These skills are necessary but should not determine the scope of the curriculum.

The mathematics programs must be designed to equip students with methods that support the full range of problem solving. These programs include the traditional concepts and techniques of computation, use of deductive and inductive reasoning to draw conclusions, different methods of

gathering and interpreting information, and the use of the problem solving capacities of computers to extend the traditional problem solving approaches and to implement new strategies. Fundamental to the development of problem-solving ability is an open mind, an attitude of curiosity and exploration, the willingness to probe, to try, and to make intelligent guesses.

The NCTM report suggests that the mathematics programs must take advantage of the power of calculators and computers at all grade levels. Students must obtain a working knowledge of how to use computers and calculators, including the way one communicates with them and commands their services in problem solving. The use of calculators and computers should be integrated into the mathematics curriculum but not replace the classroom interaction of students with peers and teacher.

The mathematics curriculum should include content and skill goals with a clear and logical development sequence for problem solving. In the junior high level, the process should be toward more generalization, abstraction of techniques, and emphasis on similarities and patterns. Techniques learned in one content may be recognized and applicable to other problems. During the seventh and eighth grades, problem solving should be a vehicle to exercise, confirm, and develop basic skills. The ability to create strategies to attack a new problem is simple with increases in abstract reasoning.

Christine Copple (1981) states that the use of computers should be integrated into the total school curriculum. The computer was seen by Copple to spark interest and motivate students. Good computer literacy courses should include some basic programming and some research into the hows and whys of a computer design. Copple finds that the student was motivated to

continue the study of computer science which has positive effects on the student's understanding of mathematical concepts and reinforces logical thinking and problem solving techniques. Copple also states that the use of computers for computer assisted instruction was seen to be of value in individualizing instruction, tutoring, and drill work especially in remedial mathematics. A positive attitude on the part of the students was shown and significant increases in achievement was noted. This was attributed to the immediate feedback from the computer.

Bill Frederick (1979) suggests there is a crisis in mathematics literacy, computer literacy, and problem solving. He believes that computers can be the answer to all three problems. Results from programs in computer literacy show that the computer serves as a motivator, a means of awakening student's drive and creativety, and has a positive effect on the student's understanding of mathematical concepts and thought processing techniques. Frederick concludes that computer-assisted instruction can be a good supplementary aid in mathematics.

William Haigh (1986) determines in his research that computers can bring positive results in developing good thinking patterns, in reinforcing mathematical skills, and in the understanding of mathematical concepts. Haigh believes that mathematical concepts can be re-enforced with programming exercises.

David Moursund (1985) finds in his research that computer-assisted instruction can produce significant gains in the student's rate of learning while maintaining current attitudes and long-term knowledge and skills. Computing progress suggests possible changes in mathematical education.

Moursund states that the challenge of the computer-as-a-tool viewpoint far exceeds the challenge of the computer assisted instruction. The computer challenge is here now, but our mathematics education system has yet to rise to the challenge.

Mary Hladky (1983) believes the goal of computers in the classroom is to prepare the students for a computerized society. Most of the jobs will require some knowledge of computers. Many teachers are enthusiastic about how computers work as a teaching aid. Students who have mastered the regular curriculum in a class can move to more advanced subject matter on their own with computers. Slow-learning students find computers will repeat information again and again without getting bored or impatient. The ever-growing number of educational programs being designed for computers can present new information, review what students have already learned, and give tests.

Hladky believes that the computer is a tool for the teacher. It will assist as an alternate teaching tool and it will motivate students. The computers "speaks" to students by giving them a pleasant greeting, praising them for correct answers, and coaching them in the next step of the problem.

Tom Rause (1983) suggests using computer-assisted instruction to teach a lesson or to reinforce a concept that has already been taught in the classroom. Most students find it enjoyable to work with the computer rather than the textbook or workbook.

Rause sees a correlation between problem solving and flowcharting. He believes that people use the principles of flowcharting in their thinking

without realizing it. Since flowcharting is a representation of instructions for performing a task, it is like a roadmap. It can be used to plan how to solve a problem. Properly prepared flowcharts can show the steps that are used in solving the problem. When making a flowchart, two things are very important. First, every step, no matter how trivial, must be listed. Second, the steps must be listed in the correct order. Therefore, a flowchart is not only a representation of instructions but one that shows every step and the proper order for solving the problem. Logical thinking, flowcharting, and problem solving are closely related. Understanding how to organize, complete, and follow the logic of a flowchart will help the students in their logical thinking and problem solving.

The articles reviewed attest to the use of computers in the classroom. They agree that computers should be integrated into the mathematics curriculum. The computer should be used in computer-assisted instruction, as a way of developing problem solving skills, and as a motivator Therefore the computer will be used as part of the solution to this project of identifying and remediating the mathematical skills relating directly to computers and calculators.

A pre-test on each mathematics skill related to computers and calculators will be written and administrated to each student in the selected group. A program, "Skill Tracker", will be written to record whether or not the skills have been mastered. Each student will enter the results from the pre-test in the Skill Tracker program.

This program will trace the student's progress through each mathematics skill. The skills not mastered will generate a prescription

packet listing the skills missed and a plan to remediate each skill. Each prescription will consist of software (commercial, if available), a drill pack of dittos, and specific page numbers in textbooks. Due to having the use of only one computer in the classroom, there will be limited use of software.

The students will use the computer and calculators to help develop a better understanding of how and why the order of operation is used in solving mathematical problems. Since the computer is viewed as a possible tool for problem solving, the students will develop flowcharts from simple everyday activities. The students will also develop flowcharts that can be utilized in writing simple computer programs to be run on the computer. These activities will be included in the prescription drill packs.

At the end of the eight weeks a post-test on the skills will be given. The students will enter their results from this test in the Skill Tracker program. A print out showing the student's progress toward the goal of mastery of each skill will be printed for each student. A class list with the student's name and mastery of the skills will be printed for the teacher.

Chapter 3

Method

The Skill Tracker computer program was written as an integral part of this project. The program was designed to allow the students selected for this study to enter their names and answer yes or no as to their mastery of the nine mathematics skills related directly to computers and calculators.

The information entered by the students generated a printout for each individual student stating the skills not mastered and the prescription for mastery. The prescription consisted of drill packs with dittos pertaining to that skill and book references in several textbooks available to the students.

The program was designed for entering the maximum of fourteen names. The pre-test information was entered in the program at one time so that the names already entered would not be erased. After using the program in the class by the students, it became apparent that another individual student report should be printed after the post-test showing whether a skill was mastered or not. This report would list the nine skills and state if that skill had been mastered or not.

The drill packs to remediate the nine skills were developed using materials available. These were dittos taken from practice sheets that came with the textbooks used in the school. Software could not be used as the computer assigned for use in the classroom had to be repaired and therefore was not available for several weeks.

The final part of the program printed a list for the teacher with the name of each student and stated individually whether the skill was mastered or not.

To assure that the skills would be covered during the time allotted for this project, the following schedule was used for the implementation of the project.

WEEK	DATES	ACTIVITIES
1	9/3-5	PRE-TEST WAS GIVEN
2	9/8-12	STUDENT TEST RESULTS INTO PROGRAM
		STUDENT PRESCRIPTIONS PRINTED
3	9/15-19	SKILLS 3 & 4 REVIEWED
4	9/22-26	SKILLS 5 & 6
5	9/29-10/3	SKILLS 1 & 2
6	10/6-10	SKILLS 7 & 8
7	10/14-16	SKILL 9
8	10/20-24	POST-TEST WAS GIVEN
9	10/27-31	STUDENT TEST RESULTS INTO PROGRAM
		STUDENT MASTERY REPORT PRINTED

During the first week a pre-test on the mathematics skills related to computers and calculators was administered to each student in the selected group. Some of the students became frustrated because they could not answer the questions. As these are very motivated students who score

extremely well on tests, the test proved to be a difficult task for a number of them. The survey (Table 1) given the students revealed that less than forty percent of the students had taken computer literacy in elementary school.

After the pre-tests were graded, the students began to enter the test results in the Skill Tracker program. During the first day, as the students were entering the test results in the Skill Tracker program, the computer developed problems and could not be used any longer. Using a computer at home, this writer entered the information in the program so that each student would receive a printout of the skills not mastered with the prescription for mastery. The students had been very excited about using the computer in the classroom and were therefore disappointed when the computer became inoperable. They asked each day as to the status of the repair of the computer.

The skills not mastered generated a prescription packet for each ~~individual~~ student. The prescription listed the skills not mastered and the drill packs and books to use to remediate each skill. The students had five weeks to remediate the skills. The students were responsible for completing as much material as needed to master the skills. This was in addition to the regular work that was done in the class during this time period.

During the next five weeks emphasis was placed on certain mathematical skills as related to the calculator and the computer each week so that the students could ask questions and receive some explanation about the skills. The mathematical skills that related to the calculator were the beginning point for review and explanation. Skills #3 (use a calculator to perform

computations) and #4 (determine whether an answer on a calculator or computer is reasonable for a given input) were stressed . st. The use of the overhead projector was found to be an immense help in the presentation of these skills. Transparencies were made on each skill which shortened the explanation time in each class.

The following week was also used to continue the students understanding of the skills relating to calculators. Skills #5 (demonstrate knowledge of calculator and computer input and output displays) and #6 (use a calculator to solve basic computation problems involving more digits than can be entered into the display) were emphasized.

Special importance was placed on the mathematical skills relating to the computer during the next three weeks. Skills #1 (organize, complete, or follow the logic of a flowchart for a daily activity) and #2 (perform the computation involved in a mathematical flowchart with a specific input) stressed flowcharting. Skills # 7 (interpret information relating to the execution of the program from a computer print out) and #8 (write a computer program to solve a simple mathematical problem) emphasized simple computer programs. Skill #9 (determine the difference between the algebraic use of equality and the computer use of equality) continued the students understanding of the computer.

Due to the fact that the class was without a computer during these five weeks, it was impossible for the students to use software to reinforce the nine skills and to observe first hand how the computer executed commands and ran short programs.

The eighth week was used to review the skills by using problems taken

from the drill packs. At the end of this week a post-test was given to all members of the target group. The computer was repaired and returned to the classroom that week, so the students were able to enter the results of the test in the Skill Tracker program. The following week each student received a printout stating each skill and whether the skill was mastered or not.

A class list with the names of the students and the skills mastered and not mastered was printed for the teacher. From the results of the pre-test and post-test comparisons could now be made on the mastery of the skills.

Chapter 4

Results

The results of the pre-test and the post-test were compared during the ninth week in order to determine if eighty percent of the students selected for this study had mastered the mathematics skills related to computers and calculators.

The following table shows the comparison between the test results of the pre-test and the post-test.

MASTERY OF SKILLS (IN PERCENT)

SKILLS		PRE-TEST	POST-TEST
1. Organize, complete, or follow the logic of a flow chart for a daily activity			
	Mastered	58	89
	Not mastered	42	11
2. Perform the computation involved in a mathematical flowchart with a specific input			
	Mastered	72	61
	Not mastered	28	39
3. Use a calculator to perform computations			
	Mastered	73	92
	Not mastered	27	8
4. Determine whether an answer on a calculator is reasonable for a given problem			
	Mastered	15	62
	Not mastered	85	38
5. Demonstrate knowledge of calculator and computer input and output displays			
	Mastered	38	80
	Not mastered	62	20

6. Use a calculator to solve basic computation problems involving more digits than can be entered into the display		
Mastered	2	21
Not mastered	98	79
7. Interpret information relating to the execution of the program from a computer printout		
Mastered	16	64
Not mastered	84	36
8. Write a computer program to solve a simple mathematics problem		
Mastered	19	30
No mastered	81	70
9. Determine the difference between the algebraic use of equality and the computer use of equality		
Mastered	3	65
Not mastered	97	35

The table indicates that the students have shown improvement in eight of the nine skills. They have reached mastery of eighty percent in only three skills, therefore not reaching the goal of eighty percent that was set for the selected group. On the positive side the students showed an improvement from nineteen to sixty-two percent in eight of the nine skills.

The results of the post-test show that sixty-three percent of the students have mastered the nine skills as compared with thirty-three percent in the pre-test. Table 2 which compares the number of skills mastered by students in the two tests displays the increase in the number of skills learned by the students. The top fifteen percent increased from six and seven skills to eight and nine. The middle sixty plus percent went from two, three, or four skills to five, six, or seven. The bottom twenty plus percent increased from zero and one skill to one, two, three, or four skills. This shows a significant increase in the mastery of the skills though not the goal

or expectation of eighty percent.

Several factors could have had an effect on the results of the tests. The beginning of the school year for seventh grade students is an adjustment period. It can take several weeks or even months for some students to adjust to junior high school. They find junior high school is very different from elementary school. They are in a larger school with many more students, larger classes, changing classes each period, and at least six different teachers. Many of the students in the selected group were not used to the swiftness and the amount of work that is covered in an accelerated class. They found they needed to learn how to listen, take notes, and follow directions. By the middle and end of the year, they will be able to work independently without having work assigned and checked. Many of these students have not had experience with computers and the classroom computer was being repaired during most of this time period.

Lack of knowledge of the design and logic of flowcharting was one of the deficiencies noted by the computer teacher. Eighty-nine percent of the students mastered the flowcharting skill. This shows an increase of almost thirty percent from the pre-test. Carefully checking the assignments involving problem solving has been done by the teacher to see if there is any evidence that flowcharting has helped in problem solving. Observation has noted that many of the students are not having as much difficulty with problem solving as they did at the beginning of the year. They are now able to set up their problems and explain them in a more logical and sequential manner.

The skill that shows how the computer computes mathematical problems,

including order of operation, has been successfully mastered by ninety-two percent of the students. This is partly due to the fact that order of operation was part of the regular curriculum during this period of time. There was time to work with the entire class on this skill and give assignments to practice this skill.

The writing of simple programs and determining the output of simple programs showed a mastery of thirty to sixty-four percent. Not having a computer in the classroom kept many students without prior knowledge of a computer from mastering these skills. The students who did not have a computer at home found that they were at a disadvantage because they had no way of seeing and understanding what a computer can do.

The final print out of the program which lists the individual student name and the mastery of the skills has revealed that sixty-three percent rather than eighty percent of the target group have mastered the nine skills.

Chapter 5

Recommendations

In many ways this project has been very successful. Three skills were mastered by eighty percent or more of the students. Four other skills were mastered by over sixty percent of the students. Only two skills were mastered by fewer than sixty percent of the students selected for this study. The students will continue to work on the skills they have not mastered during the remainder of the year. They will be tested again at the end of the school year.

The use of the Skill Tracker program was a plus with the students. They were enthusiastic about having a computer was in the classroom. If the computer had been available to the students during the project probably a greater number of students would have scored highter on the tests. As Copple stated in her article the computer sparked interest and helped motivate students. The students were eager to have their turn at the computer to enter their test results. As this writer has permission to use the computer in the classroom for the remainder of the school year, the computer will be integrated into the curriculum of the class. The students are working with the teacher in setting up a schedule for use of the computer during the class period.

The time period for the introduction and remediation of these basic computer skills should be extended. Many of the students found the skills

were new to them and they needed more explanation and written assignments on these skills. It was found that nine weeks was not enough time for the students to master skills with which they are not familiar. The teaching of these skills should be spread over the entire school year and incorporated into the curriculum so that they are a part of the course and not a separate item to be covered.

This writer will suggest to the administration that each seventh grade student be tested on the mathematics standards of excellence related to computers and calculators at the beginning of the school year. Using the program developed in this practicum with a few changes, a prescription packet would be printed for each student to remediate the skills not mastered. This mastery would be incorporated into the curriculum so that the skills would be introduced and remediated during the entire school year. It will be recommended to the administration that all mathematics classes have access to a computer, either in the classroom or in a lab situation. This means that each mathematics teacher will need experience in using a computer. Therefore an inservice course in use of computers in mathematics should be offered for the teachers. In order for the skills related to calculators to be taught, it will be recommended that calculators be available in the classroom so that the students can practice these calculator skills.

Another test will be administrated to the seventh grade students at the end of the school year with the results available to the teachers of the eighth grade mathematics classes. At the beginning of the next school year the eighth grade teachers can help the students remediate those skills not

mastered.

With the addition of more class time, computers, and calculators in the classroom, this writer feels that most seventh grade students will not have any difficulty in mastering these nine skills.

Reference List

Cople, Christine. (1981,June). Computers in the Secondary Mathematics Curriculum. Publication of the Registrar. Indiana University.

Frederick, Bill. (1979,Summer). Computer literacy, school mathematics, and problem solving, three for the price of one. HRDS Journal,12, 163-170.

Haigh, William E. (1986,February). Microcomputer unit: generating random numbers. Mathematics Teacher,79, 132-136.

Hladly, Mary. (1983). Computers in classes now as basic as 3 R's. Computer Education: Book of Readings, (5-7). Ft. Lauderdale, Florida: Nova University.

Moursand, David. (1985, December). Will mathematics education rise to the challenge of computers? Mathematics Teacher, 78, 660-661.

National Council of Teachers of Mathematics. (1980). Agenda for Action: Recommendations of School Mathematics of the 1980s. (ISBN 0-87353-166-3).

Rause, Tom. (1983). Computer Literacy: a Co-ser Project of Cortland-Madison Boces. Cortland-Madison Board of Cooperative Educational Services. Cortland, N.Y.

Appendix A

Table 1

COMPUTER LITERACY SURVEY

	RESPONSE IN PERCENT		
QUESTION	YES	NO	DON'T KNOW
1. Have you ever taken computer literacy?	26%	74%	
2. Have you ever taken classes in computer programming?	67%	33%	
3. Do you consider yourself to be computer literate?	20%	20%	60%
4. Do you know how to load and run a program on a computer?	92%	8%	
5. Do you or a member of your family own a computer?	75%	25%	
6. Do you understand and are able to do flowcharting?	34%	66%	
7. Do you know how to use a word processor?	43%	57%	
8. Do you know how to use a data base program?	20%	80%	

NAME_____ PERIOD_____

PRETEST ON MATHEMATICAL SKILLS RELATING TO COMPUTERS AND CALCULATORS

SKILL 1 PASSED YES OR NO

1. The following are mixed-up steps in choosing a television program. Number each step in the correct order.

___Turn dial to correct channel

___Turn on television

___Find list?

No-Go back to Step 1 Yes-Go to Step 3

___Look for list of television programs

___Find a good program in T.V. listing

2. The following are mixed-up steps for averaging student's grades. Number each step in the correct order.

___Add all grades

___Input grades and the number of grades

___Print the average

___Divide by the number of grades

3. The following are mixed-up steps in Buying a Record. Number the steps in the correct order.

___Walk into a record store

___Take the record to a clerk

___Read the album covers to find the records that interest you

___Leave the record store

___Pay for the record

___Do you have enough money?

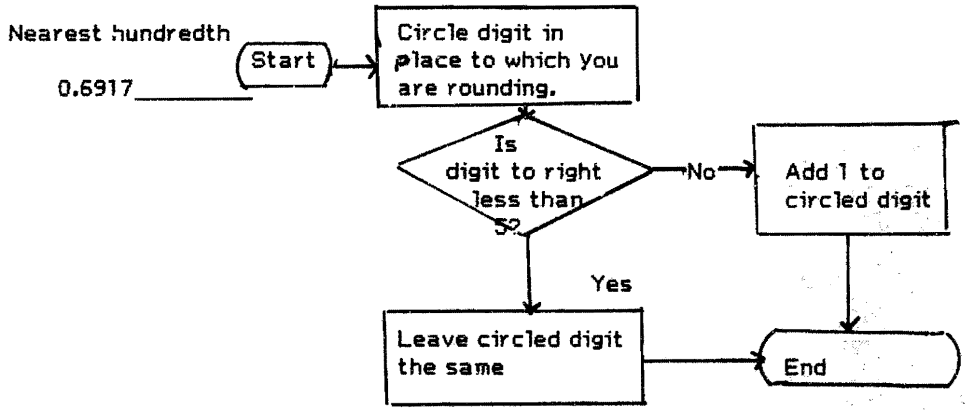
___Do you see a record you would like to buy?

SKILL 2 PASSED YES OR NO

4. Follow the flowchart to round the number given to the indicated place.

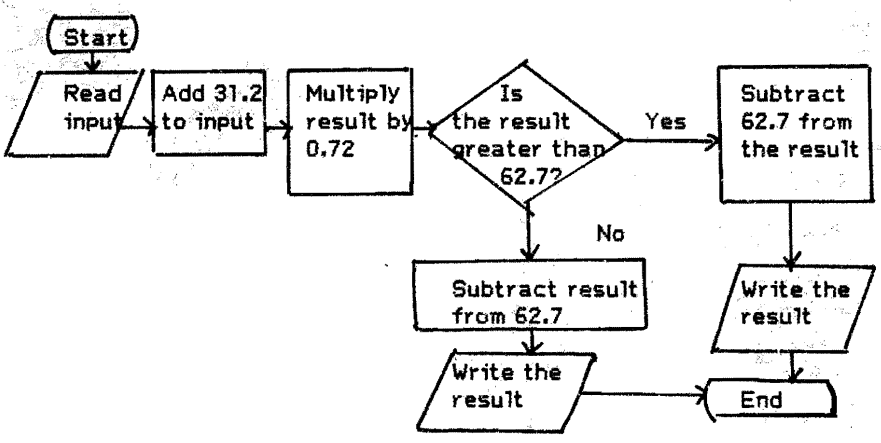
Nearest hundredth

0.6917_____



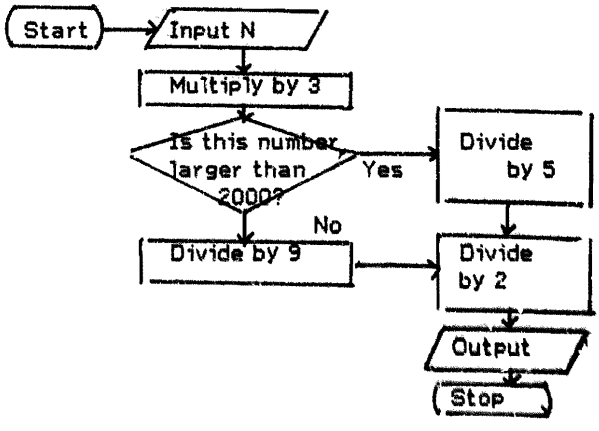
5. Follow the flowchart to state the output for the given input.

60.3 _____



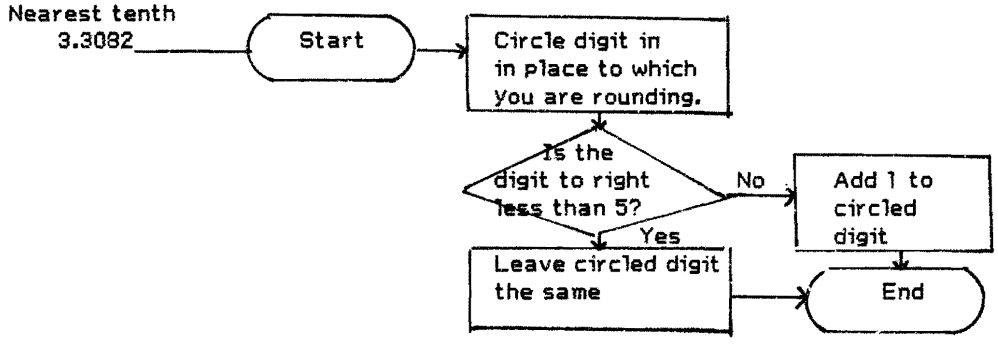
6. Follow the flowchart. Start with N, complete the operations and then write the output.

N=720 _____



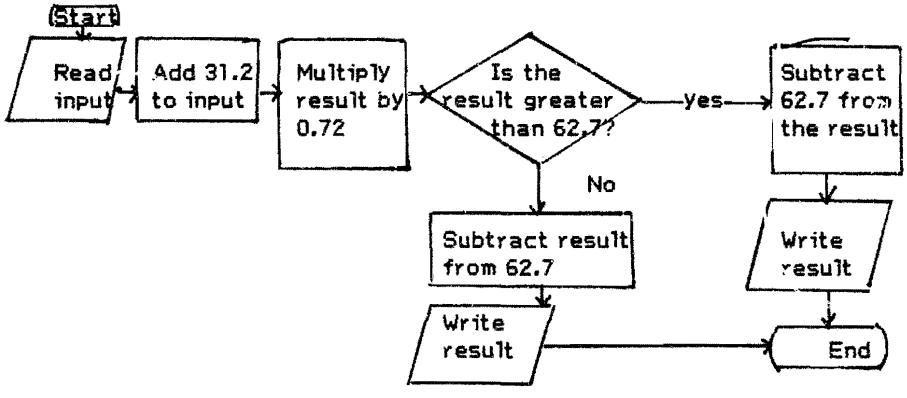
SKILL 2 PASSED YES OR NO

4. Follow the flowchart to round the numbers given to the indicated place.



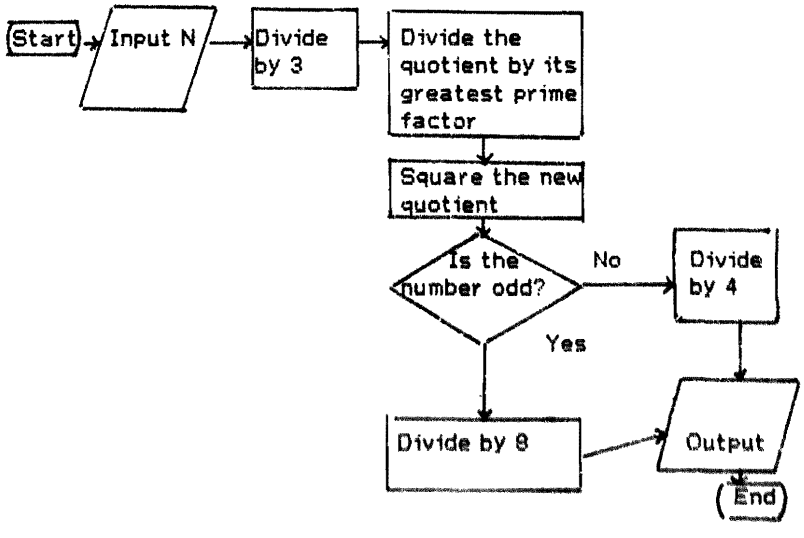
5. Follow the flowchart to state the output for the given input.

N = 10.6 _____



6. Follow the flowschart. Start with N, complete the operations and then write the output.

N=96 _____



USER'S GUIDE:

After the program starts, the menu for the program will appear on the screen.

MENU

<1> ENTER STUDENT INFORMATION

<2> PRINT STUDENT PRESCRIPTION

<3> PRINT STUDENT MASTERY RECORD

<4> PRINT CLASS REPORT

<5> EXIT PROGRAM

You have five choices. Type your choice (1 through 5).

Choice 1 asks you to type in your last name, then your first name. Then you type yes or no for mastery of the nine skills that have been previously tested. All student information must be entered at the same time. If the program is rerun and additional names are added, the former names will be erased.

ENTER STUDENT TEST INFORMATION

ENTER LAST NAME; ?

ENTER FIRST NAME;?

TYPE 'YES' AFTER SKILLS YOU HAVE MASTERED

TYPE 'NO' AFTER THE SKILLS YOU HAVE NOT MASTERED

<1> ORGANIZE, COMPLETE, OR FOLLOW THE LOGIC OF A FLOWCHART FOR A DAILY ACTIVITY; ?

continue with skills

Choice 2 will print reports for each student stating the skills not mastered and the prescription for mastery. An example is shown.