

A TEACHER'S RESOURCE MANUAL
FOR UTILIZATION OF THE COMPUTER
TO INTEGRATE THE CURRICULUM

MASTER'S PROJECT

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by

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CHAPTER I

INTRODUCTION

Background Information

Computer technology has rapidly advanced in our society. What is now known as the latest in innovative technology may be obsolete in a week, month, or a year. This author sees the primary goal of education being to disseminate information to the students so they may acquire the knowledge needed to be successful in life. The rapid advances in the technological field make it difficult to predict what type of skills the young students will need by the time they reach the working world. With that in mind, educators need to incorporate the use of computer technology into their classrooms so that students may realize the potential of the technology available at this time.

There are many teachers who are reluctant to utilize a computer in their classroom. This hesitation is often due to the teacher's lack of computer knowledge as well as the fear that the computer will be used to replace the teacher. If computers are to be used effectively, teachers must receive training on the abilities and uses of the computer. A computer can not replace a teacher, it is merely an instrument of instruction. Learning must remain on a personal, interactive level in order to be effective (Thomas, 1994).

There are many ways in which a computer may be utilized in the general classroom. The computer could be used to

organize and store information which students could easily refer to at any given time. Once students have acquired the basic computational concepts, the computer can be programmed to do these operations. There is a massive amount of information out there that is accessible from a computer, more than we could even begin to teach our students. Access to this type of information will allow the opportunity for the students to complete more problem solving and higher order thought processing tasks. Today's employers continue to stress the fact that the employee needs to be able to problem solve and think on the job.

A computer can also be used for drill and practice activities which can enhance the speed and accuracy of recalling basic facts. This is primarily a way to support the student's prior rote memory skills.

In addition to utilization of the computer in the classroom, one must also look at integrating the subject areas being taught. Integrating the curriculum is a must if we want our students to function at their maximum capacity in the work force. Teaching skills in isolation from each other does not give the student a good understanding of how the different subjects relate to one another. Teachers must take a close look at the methods which are used to educate students. They also need to consider the type of jobs which will be available when the students enter the job market. Almost all jobs will incorporate the use of a

computer in some way. With these things in mind, the author feels that when it is correctly utilized, the computer is one of the most beneficial tools that can be used in the education system.

Purpose of the Study

The purpose of the study was to develop a resource manual for integrating the use of computers into the regular classroom.

Limitations of the Study

This manual was created to be utilized by teachers who have little or no experience with computer use in the classroom. The first three sections of the manual were not intended to be used by the experienced computer operator. They were developed to give teachers a basic background on the ways a computer could be used in the classroom and also the basic instructions for these uses. The fourth section, however, may give insight to anyone who utilizes a computer as a tool for education.

Definition of Terms

1. cell - the intersection of a column and a row.
2. click - to position the pointer on something, then press and quickly release the mouse button.
3. column - one of two or more vertical sections appearing side by side.

4. commercial software - languages, programs or other routines which are purchased for the computer's use to solve any particular problem.

5. computer laboratories - classroom setting with a computer terminal for every student.

6. Curriculum Designs:

discipline based - focuses on a strict interpretation of the disciplines with separate subjects in separate time blocks.

field based - students live in the school environment and create the curriculum from their daily lives.

integrated-day - based on themes and problems which arise in the student's world.

multidisciplinary or complementary discipline - certain related disciplines are brought together in a formal unit to investigate a theme or issue.

parallel disciplines - lessons are sequenced to correspond to lessons in the same area in other disciplines.

7. data - information which is recorded onto data bases or spreadsheets.

8. data base - interrelated data records which are stored in such a structure that will allow for quick access for growth and change.

9. disciplines - the individual areas of instruction, such as science, mathematics, social studies, art, etc.

10. drag - to hold down the button on the mouse while moving the cursor.

12. drill and practice exercises - computer activities which reinforce rote memorization skills such as multiplication.

13. integration - the process of combining two or more topics.

14. interdisciplinary - when two or more disciplines are involved.

15. journal - a written documentation of happenings

16. lap top computer - small computer, about the size of a small brief case.

17. menu bar - area across the top of the screen that contains the names of the menus or computer functions.

18. number crunching - mathematical computation of number problems.

19. on-line - the ability of one computer to interface with another.

20. prime numbers - numbers which have only two factors, itself and one.

21. programming - the act of setting the computer up to complete specific functions.

22. row - one of two or more horizontal sections appearing one above the other.

23. spreadsheet - an application program in which information is arranged in rows and columns.

24. teaching team - a group of teachers who teach various subject areas at the same grade level.

25. word processing - a tool for writing which allows for corrections and revisions to be made easily.

Significance of the Study

This was an important project because the results of it, the manual, will help educate the teachers who are inexperienced or reluctant to use a computer in the classroom.

The experience of teaching mathematics at the sixth grade level in a fifth through eighth grade middle school made this author realize that the use of computers desperately needed to be explored. All of the teachers at this middle school may benefit from the study because one goal of this particular school was to develop interdisciplinary units of study. Incorporating the use of the computer into these units could benefit all involved. The majority of the teachers at this school have little or no experience with the use of the computer in the classroom. The manual will serve as a tool for educating these teachers as well as a reference for them to utilize later.

Students also benefit from the manual. When the manual is utilized by the teachers to bring the use of the computer

into the classroom, the students gain. Included in these gains may be the experience of operating a computer system, an understanding of how one subject area relates to another, and the usage of higher order thinking skills. . The computer sheds a whole new light on learning when utilized properly.

CHAPTER II

LITERATURE REVIEW

The purpose of this chapter was to review literature which dealt with the use of computers in an integrated curriculum. Technology in the past few years has expanded greatly and is continuing to do so at a very fast pace. The use of computers has become part of life and all students should have the opportunity to experience the capabilities of computer technology. This review of literature was divided into the following sections.

Use of Computers in Education

First, computers have been used in the education system in various ways. Administratively, computers are used for keeping student records, tracking money expenditures, storage of policies and also as a communication link to parents. The most technologically advanced items in a school system are often found in the main offices instead of in the classrooms. A computer is an instrument of learning which needs to be accessible to teachers and students (Thomas, 1994).

Many schools are equipped with computer laboratories which are set up to teach class-size groups of students (Simonson and Thompson, 1990). This type of arrangement is satisfactory for teaching some of the basic skills necessary to operate a computer, however, the greatest benefit can

come when the computer is placed in the regular classroom. Its use can be specifically linked to the content area being taught.

Teachers must be trained regarding the effective uses of a computer in a classroom. If this is neglected, the student's learning process with computers can be more costly and less effective than with traditional methods of teaching (Thompson, 1991). A computer is nothing more than a tool which assists in the learning process. It is no different than any other educational tool, it must be utilized properly. Students playing games on a computer is not an effective way to utilize a computer, nor does it challenge a student to perform to their maximum.

The most common use for a computer in a classroom is for drill and practice exercises. These are designed to increase speed and/or accuracy of a skill or skills which have already been acquired (Fine, 1991). This is an excellent way for students to improve their rote learning, however, it does not allow for any higher level thinking.

Besides drill and practice exercises, computer technology can have many uses in a classroom. It can be used to assist the learner with data collection and processing. The computer is also a powerful tool of tool of exploration (Apple Computer, 1992). Exploration of

concepts, ideas, and the problem solving process is greatly enhanced with the use of technology.

The computer can give students access to the world beyond the walls of the classroom. On-line networks allow students to access an endless supply of information for projects or reports. Technology allows them to trade data and share information with other schools or facilities (McCarthy, 1992).

Problem solving is an area in most curriculums. It requires the use of higher level thinking skills. The mathematics classroom often offers many opportunities for problem solving. Using a computer in this environment can enhance the problem solving process. The National Council of Teachers of Mathematics has vigorously supported the appropriate use of computers as a means for students to explore mathematics content and to focus on problem solving (NCTM, 1989).

The National Council on Science and Technology Education recommended the development of students' computational skills, including estimation using not only paper-and-pencil but also calculators and computers (AAAS, 1989). Computers can be great tools for reinforcing a students prior learning and at the same time require the student to use higher order thinking to complete a task.

If one were to take a look at the average classroom and the curriculum being taught, they would most likely find a

very traditional setting. Our society is changing very rapidly with all the advances in technology. The method in which children are taught needs to be changed in order to keep up with the demands of our society today. We can no longer continue to teach our children in the fashion of which we were taught.

The Curriculum and Lesson Planning

The second area of the literature review dealt with the curriculum and planning for lessons. The human brain is very complex and this needs to be considered when planning a lesson. There is more information out there than we could even begin to teach our students. Instead, we need to teach our students how to access this information (Caine and Caine, 1991).

An interdisciplinary curriculum is a fairly new concept. There is much confusion regarding the terminology involved with this concept. According to Heidi Hayes Jacobs (1989), there are six main designs which a curriculum may fall. They are the discipline-based design, parallel disciplines design, multidisciplinary design, integrated-day design and the field-based program. Many people refer to any lesson plans in which more than one discipline is teaching on the same topic as interdisciplinary. These methods may fall under another definition according to Jacobs.

The interdisciplinary design is where units or courses of study are deliberately brought together with the full range of disciplines in the school's curriculum. The design attempts to use a full array of discipline-based perspectives.

The discipline-based design focuses on a strict interpretation of the disciplines with separate subjects in separate time blocks during the school day. There is no attempt to integrate the subject areas being taught.

When teachers sequence their lessons to correspond to lessons in the same area in other disciplines it is called the parallel discipline design. The content the teachers are covering does not change, but they may be teaching it at a different time of the year. An example of this would be a history teacher covering World War II in the spring at the same time the literature teacher is covering the Holocaust.

The multidisciplinary design is also referred to as the complementary discipline design. This is when certain related disciplines are brought together in a formal unit or course to investigate a theme or issue. This design may require schedule changes as well as extra planning time to revise the content of what is being taught. The multidisciplinary design differs from the parallel design in that the content of what is taught does not change in the

parallel design, just the time of year in which it is taught.

The integrated-day design is primarily based on themes and problems which arise from the child's world. The emphasis is on focusing the curriculum on the child's interests and questions rather than on the content determined by the school or state. The motivation from the student is often very high because the areas of study are linked to the student's life.

The field-based program is the most extreme form of interdisciplinary work. Students live in the school environment and create the curriculum out of their day-to-day lives. They may deal with issues such as architecture because they are interested in the structure of the school buildings. If there is a conflict about how students behave at school, they could study rules or government. This is a totally integrated program because the student's life is synonymous with school (Jacobs, 1989).

Integrating the curriculum allows the student the opportunity to see how the information they are learning can and does apply to every day life. Students are constantly questioning why they have to take classes in a certain discipline. They do not understand how they will ever use the information later in their lives or career choices. By integrating the curriculum, we can show the students how the subjects relate to one another. Integrating the curriculum

is not an easy task. It requires many hours of planning and continued contact among teachers throughout implementation (Glascock, 1993).

Reform in American schools is considered a must in order to meet the changes of the demanding times. The use of technology is one method which should be incorporated into the education of every child (Perelman, 1992). Money is an issue in many school systems. They can not afford to equip every child with a computer. This is not a good excuse for not using computers. Educators need to find ways to effectively use the technology they have access to.

Effects of Computer Use in the Classroom

The third area of literature review covered the effects the use of computers in a classroom can have. Computers have become powerful tools in the workplace, homes as well as in schools. Research showed that when there was integrated use of computer software in the curriculum at least once a week, the technology had a positive impact on the students' learning (Cox, 1993).

The job of an educator is to prepare the student to be successful in life. As an adult, every day life requires problem solving and decision making. These are two areas that we must focus on as educators. The computer can be of great assistance in the problem solving process. With proper training of its uses, the students begin to view the

computer as a powerful and important tool to be used in the problem solving process (Lingefjard, 1993).

Higher level thinking skills is also an area of great focus in the education system. Once a student is competent in the basic skills such as addition, subtraction, multiplication and division, the computer can be used to do the number crunching. This allows the level of mathematics discussion to be taken to a higher level of thinking instead of spending so much time working the number problem (McCarthy, 1995).

Research points to the fact that computers should be utilized in the classroom. They can motivate students to learn as they are powerful tools which can provide creative ways for the student to learn. Their use must be integrated into the curriculum. The most educational experience with a computer comes when the teacher has planned so that the student is interacting with the computer but not relying on it solely. Drill and practice exercises only improve rote memory skills. The computer needs to be used properly in order to facilitate higher level thinking skills. If used properly, the computer allows the user to access information from around the world. This gives a whole new meaning to the word research and makes the topics a student would like to investigate almost limitless. The teacher, however, must

be educated on how to use the computer as a tool to aid instruction.

Subject areas must be integrated in order for the student to see their relevance to every day life. The traditional method of teaching deals with one subject area at a time. There are very few places except for a school where only one subject is dealt with at a time. One does not go through a day thinking first about grammar and then mathematics and then science and so forth. One must be able to pull the relevant information from each area and deal with them all together to solve problems. Using a computer helps to assist in this process.

CHAPTER III

PROCEDURE

Reasons Project was Chosen

This writer was interested in integrating the curriculum as well as the use of the computer in the classroom. After teaching at various grade levels in the same building for five years, it was evident that computers were rarely used in the regular classroom. This author spoke with the members of her teaching team and found out that four of the six members did not know the capabilities of the computers they had access to. There were three main reasons why they chose not to utilize the computer in their classroom. Part of the reasoning for the lack of computer use was due to the comfort level that the teachers had in their ability to operate a computer in their classroom. Another reason was due to the small number of computers available for classroom usage. The third reason given regarded the curriculum. The current curriculums being used did not integrate different subject areas, nor did many of them incorporate the use of a computer.

Interdisciplinary units were being developed due to the school's participation in a Venture Capital Grant. This author attended two conferences regarding integration of the curriculum as well as reviewing the literature on this topic. The conferences, as well as the literature, stressed the importance of the student's ability to see the connection between the individual disciplines verses

learning about each one in isolation. The computer is one tool that can easily link different disciplines.

Effects of Literature Review

Reviewing the literature helped this author determine the effective uses of the computer in the classroom as well as the proper way to plan an integrated unit. The literature supported the use of the computer in the regular classroom instead of in a computer laboratory.

The information collected from the research was used to develop a resource manual for integrating the use of the computer into the classroom.

Manual Topics

The topics for the different sections of the manual were chosen after reviewing the literature and discussing the use of computers with other teachers in the building. This author compiled a list of the different ways in which a computer can be used in the classroom. Through discussions and meetings, it was found that many of the teachers were unfamiliar with word processing, data bases and spreadsheets. They knew that a computer was capable of working similar to a typewriter, however, they were unfamiliar or uncomfortable with actually using the computer. Several of the teachers still use a typewriter even though they have access to a computer. After learning

this, word processing in the format of journal writing, was determined to be the first section of the manual.

The second section deals with the use of data bases. Many teachers did not know what a data base looked like nor did they know the capabilities of their usage. They were unaware of the fact that you can ask the computer to cross reference the data to find any specific details you want. A few of the teachers knew what data bases looked like and had an idea of their capabilities, however, they did not know how to set up their own. With these things in mind, data bases were chosen as the topic for section two of the manual.

Section three covers the usage of spreadsheets in the classroom. The teachers knowledge and experiences with spreadsheets were similar to that of data bases. In general, they had little or no experience using a computer spreadsheet. None of the teachers had any experience with creating their own spreadsheet. Many were unaware of the ease in which you can program the computer to do the mathematical calculations. An interest in the use of spreadsheets in the classroom was evident, so this topic was chosen for section three.

The use of commercial software was chosen as the topic of section four. All of the teachers who were spoken to were aware of the fact that there are hundreds of different types of software available for use in the classroom. Some

even expressed the feeling of being overwhelmed by the amount of software available for the classroom. The software was viewed as something to be used by one student at a time. They saw it primarily as a way to reinforce learning instead of as a method of teaching higher order skills such as problem solving or thought processing. This author believes that the computer has much to offer to the general classroom in these areas, so this topic was chosen for section four of the manual.

Format and Design of Manual

Sections one, two and three of the manual were designed to begin with an introduction to the topic and the ways in which the specific topic can be used in the classroom. If the topic was one in which the item could be created on the computer, directions for this were included. Following the step by step directions, examples were given.

Section four of the manual was created differently due to the content. The computer applications regarding commercial software are predetermined by the manufacturer of the software so there were no step by step instructions needed for programming. This section was written to introduce the reader to methods of integrating the use of commercial software into the curriculum. An example of this using one specific piece of software was included.

Computer terminology was found to be unfamiliar to many

of the teachers. With this in mind, a section was added to the end which defines the terms used throughout the manual.

CHAPTER IV

Results

**THE COMPUTER:
A TOOL FOR
INTEGRATED TEACHING**



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Introduction

Computers are a great part of today's world. Almost every occupation relies on the use of a computer in one way or another. It is important that we teach students the uses of a computer so they will be better prepared for future careers. The students are usually experts on how to play games on a computer. The skills they have acquired from this will assist them in the classroom use of computers.

Living in our world requires us to make decisions daily. We rely on various experiences and past learning to help us make these decisions. It usually takes a look at all aspects involved to make a good decision. With that in mind, we need to take a look at how we are educating our children. Traditionally we have taught them how we were taught, one subject at a time. When teaching this way, they rarely see the connection of one subject to another. This manual will provide ideas and information regarding the use of computers in a classroom as well as the integration of different subject areas.

The step by step computer instructions in this manual were designed to be used with the DOS version of Microsoft Works 3.0. Other versions of Microsoft Works as well as other programs have similar functions, however, one may need to refer to the owner's manual for assistance.

Journal Keeping in the Classroom

WHAT IS A JOURNAL & WHY SHOULD THEY BE USED?

An excellent way to reinforce learning is by writing. With a journal, the student is able to reflect back on what he/she has learned. They may also keep an index with a list of definitions/terms in which they may refer back to at a later time.

The ideal situation would give every student access to a computer to keep a daily journal on, such as a lap top computer they could carry with them. Since this is not a reality in many places, the student may keep a notebook journal and the class as a whole keeps a computer entered journal.

After a given topic or area is explored, the students are given an opportunity to write in their journals. Entries are then discussed. As a class, an entry is made into the computer. When the students understand the process, a student can do the class entry into the computer instead of the teacher.

A word processing program is used for the journal. This makes it very easy to pull parts out as a review sheet or to use as demonstrations. Using the journal will familiarize the student with the word processing program and

the ability to import information. This experience will than help them utilize the computer more effectively in the future.

The journal can be used in ANY subject area. It can be very beneficial to keep one journal for related topics in various classes.

The following are some guidelines which are helpful:

EVERY JOURNAL ENTRY MUST INCLUDE THE DATE IN THE UPPER LEFT CORNER

EACH ENTRY MUST INCLUDE AN EXAMPLE IF POSSIBLE

EACH ENTRY MUST INCLUDE A QUESTION ABOUT THE TOPIC

The following pages give examples and blackline copies of what a journal should look like.

(SAMPLE JOURNAL PAGE)

DATE:

TOPIC:

EXAMPLES:

QUESTIONS:

DEFINITIONS/TERMS

(sample)

PRIME NUMBERS - A prime number will only make one rectangular shape when using color tiles. It only has 2 factors, itself and 1.

Data Bases

WHAT IS A DATA BASE AND WHY USE ONE?

Data bases provide a place to store information in an organized fashion, kind of like a file cabinet. A data base is a very helpful tool in the collection of information. They can be set up to focus on the areas of interest. Once the information is in the data base, it is easy to cross reference the information to find similarities or differences. Information can be stored in the data bases forever and can be accessed at any given time.

A data base is a good place to compile information from different subject areas. It is an excellent tool to help the student see the relationship between disciplines.

There are commercial data bases available, however, creating your own data base lets you control the type of information which will be entered onto it. You can also gain access to data bases with on-line systems. Once the student is familiar with data bases and what they can offer, utilization of commercial data bases can be very beneficial.

CREATING A DATA BASE:

When creating your own data base, the first thing you need to ask yourself is: What information do you want to

collect? If you are planning a unit on "Early America", you may want to create a data base to collect information on the different Indian tribes.

Next, you must ask yourself: What do we want to know about the Indians? It is beneficial to have the students give input for these areas. This will make the investigation more interesting for them. You may decide on the following areas:

NAME OF TRIBE
LEADERS
LOCATION
WAY OF SURVIVAL
DRESS
DIET
TIME FRAME

Once you have decided on the categories, the data can be researched and entered. One may use any data base program they have available. There are instructions on the computer regarding the use of the data base. You may refer to them or you may use the following steps to create a data base using Microsoft Works 3.0:

1. Highlight "File" on the menu bar - drag down to "Create a New File" and release
2. Highlight "View" on the menu bar - drag down to "List" and release

3. Highlight the first column by clicking on the top cell of it
4. With the column highlighted, go to "Edit" on the menu bar - drag down to "Insert Field Names" and release
5. Type your first field name
6. Click on "OK"
7. With column still highlighted, go to "Format" on the menu bar - drag down to "field width" and release
8. Enter a width that will accommodate your field name and the information which will be entered
9. Continue to enter all field names in this fashion
10. Your data base is now ready for information to be entered (It is wise to protect the data which you do not want students to change. It is also recommended that you hide the menu bar so it is not as easily accessible to students.)

BELOW IS A SAMPLE OF TWO DIFFERENT VIEWS OF A DATA BASE

	NAME OF TRIBE	LEADERS	LOCATION	WAY OF SURVIVAL	DIET	TIME FRAME
1	Apache		mid west			1700-1846

NAME OF TRIBE: Apache

LEADERS:

LOCATION: mid west

WAY OF SURVIVAL:

DIET:

Spreadsheets

WHAT IS A SPREADSHEET AND WHY SHOULD THEY BE USED?

Spreadsheets, like data bases, are used to collect and store information. The spreadsheet, however, has the capability to compute numerical values. They are very useful in keeping track of things such as inventories or checking accounts. They can be set up to allow the student to practice estimation skills while he/she is using the program. Once the basic computational skills are learned by the student, a spreadsheet can elicit higher order thinking. The computer does the computation of numbers allowing the student the opportunity to engage in some higher level thinking.

WHAT IS NEEDED TO SET UP A SPREADSHEET:

One must decide what topic area will be covered. For this example, the topic of "careers" will be used.

One must decide what information will be entered on the spreadsheet and what mathematical calculations will be used in the formulas. For this example, the following areas will be entered and the spreadsheet will be set up to calculate them using addition and division:

CAREER TITLE	MONTHLY SALARY
YEARLY SALARY	WEEKLY SALARY

WAYS TO USE A SPREADSHEET:

Once information is entered into a spreadsheet, the student can engage in activities which require him/her to refer to the spreadsheet to answer higher level questions. Such as, the student may be required to write a short paper on what career he/she would like to pursue after high school or college. Along with this, they could also be required to write about the type of lifestyle they will lead. The student could then create a budget for themselves and see if they will be capable of supporting their lifestyle with their career choice. This type of activity will require the student to do some investigating outside the classroom in order to find the dollar amount required for such things as rent, car payments, taxes etc.

Spreadsheets can be used in many ways. After the students have an understanding of how a spreadsheet works, they can create their own. This requires them to organize the information to be placed on the spreadsheet. They also will have to use their mathematics skills to enter the correct formulas. Spreadsheets can be used to create games or story problems. Students can have a great deal of fun creating spreadsheets while at the same time practicing their computer and mathematics skills.

STEPS FOR CREATING A SPREADSHEET:

1. Go to "File" on the menu bar - drag down to "Creat New File" and release. Choose the spreadsheet option.
2. A blank spreadsheet will appear on the screen. To set the column width you highlight the column by clicking on the top cell of it. With column highlighted, choose "Format" from the menu bar - drag down to "column width" and release. Enter the number of spaces you would like the width of the column to be. Set the column width so that the title of the column as well as the information to be entered into it will fit. Repeat this process for all categories.
3. Type in the column names by moving the cursor to the cell in which the name will be entered. With the cursor on the cell, simply type in the name. When you move the cursor from the cell, the information you typed in will appear in the cell. (Example: Career Title)
4. To align the column titles in the center, you use the mouse to highlight all the cells in which the titles are located. Go to the menu bar and highlight "Format" - drag down to "Alignment" release. Choose "center" and then click on "OK".
5. To enter data into the cells, move the cursor to the cell you want to enter data into and type the information in. (For this example you would only need to enter the career title and the amount of the yearly salary)

6. Enter formulas into cells. To enter a formula into a cell, the cell must be highlighted. The equal sign(=) is always the first thing entered for a formula. In this example the monthly salary is the yearly salary divided by 12. With the correct cell highlighted, enter =B3/12. B3 represents the cell the computer takes the numerical value from. The formula for weekly salary will be entered this way: =B3/52. The basic mathematical functions are: the equal sign (=), addition (+), subtraction (-), multiplication (*), and division (/). If you want to find the sum of part of or an entire column, you would type in the (=) sign and then the left side of the parentheses and the word sum like this: =(sum At this point you highlight the top cell of the column or row to be added and drag down to the last cell to be added and release. The cells you highlighted will automatically be listed after the word sum. Now you add the right parentheses so it should look something like this: =(sum A2:A8) The mathematical functions described will complete most of the formulas you will be using. You will want to refer to your spreadsheet manual for the proper way to enter the more complicated mathematical functions.

7. Once a formula is entered, it is easy to continue that formula down the column. Move the cursor to the cell which the formula is entered. Drag down to highlight as many cells in that column as you want the formula the same for. Choose "Edit" on the menu bar - drag down to "Fill Down" and release.

8. To get dollar signs and decimal points, highlight all columns in which numbers will appear. Go to "Format" on the menu bar -drag down to "Number" and release. Choose "Currency" and "2" decimal places.

The following is the spreadsheet created by carrying out the above steps.

CAREER TITLE	YEARLY SALARY	MONTHLY SALARY	WEEKLY SALARY
Teacher	\$22,632.00	\$1,886.00	\$435.23
Sales Clerk	\$12,000.00	\$1,000.00	\$230.77
Accountant	\$29,000.00	\$2,416.67	\$557.69

Examples of other types of spreadsheets:

PENCILS	BOXES	# PER BOX	TOTAL
small box	3	36	108
large box	3	144	432
Total to be sold			540
Purchase Price		\$0.05	\$27.00
Selling Price		\$0.25	\$135.00
		PROFIT	\$108.00
FUND-RAISER			
Your objective is to raise a minimum of \$100.00			
Use the above spreadsheet to plan your order for the amount of pencils you intend to sell.			

CHORES	JIMMY	SAM			
WASH DISHES	2				
WALK DOG					
MAKE BED					
SET TABLE					
EMPTY GARBAGE					
FOLD LAUNDRY					
DUST FURNITURE					
TOTALS	2	0			
Washing dishes = 2	Jimmy and Sam want to go to the movies. Their				
Walk dog = 1	mother will pay for the tickets and popcorn if				
Make bed = 4	they each earn ten points doing chores. Each				
Set table = 3	chore has a point value as indicated.				
Empty garbage = 2					
Fold laundry = 2	As you enter the points, the spreadsheet will				
Dust furniture = 6	total the number of points for each boy.				
	Goal: assign the chores, using each only one				
	time, so the total points shown is 10 for				
	both boys.				

Other Computer Uses

USING COMMERCIAL SOFTWARE:

There are hundreds of simulations available for the computer. The Carmen series is a popular one. Others include Oregon Trail, Sim Tower, Operation Frog and Swamp Gas. Many schools have some of these programs. Most of the time the students simply use the programs as they are set up. This is fine, however, it does not always provoke higher level thinking. It is most educational if the simulations are looked at from an interdisciplinary view. One then creates activities and/or questions which require the use of the software along with utilization of higher level thinking skills.

The following is an example of how one piece of commercial software can be adapted for group work. Each member of the group is responsible for specific duties.

INTEGRATED SIMULATION EXAMPLE:

For this example, Jenny's Journey software will be used. One must consider what the software has to offer when determining what skills the student will be working on. It is beneficial to have the students work in groups of 3 to 5. They learn a great deal from one another. Each group member should have specific jobs to be responsible for. After reviewing the software, the following was developed:

JOBS

- 1) Keyboard operator - Calculates rates at the end
 - 2) Navigator - Gives verbal directions and records directions
 - 3) Mileage keeper - Keeps count of number of blocks and total blocks traveled, North, South, East, and West
 - 4) Time keeper - Keeps the amount of time it takes to travel to each place
- (The students will be divided into groups of 4)

STEPS

- 1) Choose "shopping trip"
- 2) A list of 6 places you must visit will appear
- 3) Decide, between the group members, the shortest route to travel
- 4) Keyboard operator listens to verbal directions of navigator
- 5) Mileage keeper records the number of blocks traveled and is responsible for converting mileage into the appropriate unit (with a given scale)
- 6) Time keeper records the amount of time it takes to go from place to place and is responsible for the total amount of time as well (given in different units)

SKILLS REQUIRED TO COMPLETE TASK

- 1) Map reading
- 2) Conversion scales
- 3) Critical thinking
- 4) Problem solving
- 5) Figuring time/mileage
- 6) Creative writing
- 7) Keyboarding
- 8) Directionality
- 9) Cooperative learning
- 10) Giving and receiving directions
- 11) Calculations/using formulas

OBJECTIVES

- 1) Calculate total number of blocks travelled - converted to units of measure
- 2) Calculate total number of blocks travelled North, South, East and West
- 3) Calculate total time it takes - converted to different units (seconds, minutes, hours)
- 4) Calculate rate - $\text{rate} = \text{distance} / \text{time}$ using different scales (kilometers-hours, miles-seconds)
- 5) Each student writes their own short story describing their trip including places stopped, the order things happened, items bought, etc.

- 6) The group evaluates the efficiency of the trip by comparing their number of blocks to the computer's record of blocks travelled. They then analyze what they could have done differently.
- 7) The group designs a brochure "trip ticket" advertising their trip. They must show map, list directions, describe highlights, sight seeing and the time of arrival at each destination.

THE FOLLOWING ARE ITEMS ON A HAND OUT TO BE GIVEN TO EACH GROUP:

JENNY'S JOURNEY TALLY SHEET

I. PLAN OF ACTION

Destination A =	Location:
Destination B =	Location:
Destination C =	Location:
Destination E =	Location:
Destination F =	Location:

II. DISTANCE

Blocks travelled:
 Unit of Measurement:
 Total distance travelled:

III. TIME

Starting point - Destination A =

Destination A - Destination B =

Destination B - Destination C =

Destination C - Destination D =

Destination D - Destination E =

Destination E - Destination F =

Destination F - Starting point =

Total Time Traveled:

Unit of Measurement:

Converted Time:

IV. DIRECTIONS TRAVELED (TALLY)

North

South

East

West

Total traveled in each direction:

North =

South =

East =

West =

V. RATE CALCULATION

(Rate Calculation: $R=D/T$)

Unit of Measurement:

Distance Traveled:

Time Needed:

VI. RESULTS/EVALUATION

Number of Blocks Traveled:

Least number of moves according to computer:

Results: Evaluation of your moves:

THIS IS JUST ONE EXAMPLE OF WHAT CAN BE DONE WITH COMMERCIAL SOFTWARE. THE POSSIBILITIES ARE LIMITLESS. HAVING STUDENTS WORK IN GROUPS IS BENEFICIAL IN SEVERAL WAYS. MOST SCHOOLS DO NOT HAVE ENOUGH COMPUTERS FOR EVERY STUDENT TO HAVE ONE TO USE, SO GROUP WORK IS VERY APPLICABLE. WHEN WORKING IN GROUPS, THE STUDENTS TEND TO RAISE MORE QUESTIONS AND GUIDE EACH OTHER IN THE LEARNING PROCESS.

Developing an Integrated Unit

There are many steps involved in the development of an integrated unit of study. One must be prepared to spend many hours for planning, evaluating and restructuring.

There are 4 major steps in developing a unit. One needs to put much thought into this process for the unit of study to be successful. The steps are:

STEP 1: SELECT A TOPIC

When selecting the topic of a unit, many things need to be considered. You want a topic that is neither too narrow, nor too broad. You also want a topic that will be interesting for the students. If possible, allow the students to help in the selection of a topic.

STEP 2: BRAINSTORMING

Once a topic is selected, the various disciplines involved in the unit need to meet to brainstorm ideas of how their discipline relates to the topic. Individually, the teachers should write down their thoughts on this relationship. The ideas and thoughts are then shared with the group. The following is an example of what the results of a brainstorming session may be:

BRIDGES

(topic)

Math - cost of construction, measurements, angles, scale models of bridges

Science - weight capacities, pulley systems for construction, type and composition of building materials, types of bridges and their relationship to the environment

Social Studies - the historical development of bridges, location of famous bridges, the relationship of the bridge construction to its uses, occupations related to bridges

Language Arts - literature related to bridges, research of bridge development

Industrial Arts - the construction of a bridge following building codes, blue prints, etc.

STEP 3: DEVELOPING THE SCOPE AND SEQUENCE OF THE UNIT

A good way to develop the sequence of a unit is to formulate questions. The questions are derived from the brainstorming of step 2. They should be cross-disciplinary and an easy way to think of them would be as chapter headings for a book on your topic. The questions should begin with fundamental issues and move to more complex ones. Examples of questions for a bridge unit would be:

1. What is a bridge? (this includes not only the obvious man made bridges, but also natural

bridges in nature along with the idea of bridging such as bridging the gap)

2. What is involved in the construction of a bridge?
3. What has been the impact of bridges on human beings? (consider the materials used for construction and where we would be without certain types of bridges)
4. What is the future of the bridge?

The questions developed will shape the curriculum. Once these are decided upon, you can move to step 4 and create the activities.

STEP 4: DEVELOPING ACTIVITIES FOR IMPLEMENTATION

Once your questions have been developed in step 3, the means for exploring these questions must be developed. The activity design is the basis for the unit. It lets you know what the students will be doing to explore the topic that has been chosen. When developing the lesson plans, one must encourage critical and creative thinking.

When developing activities, a variety of modalities as well as many different grouping patterns should be utilized. Individual and cooperative learning should both be evident. The activities should encompass a full gamut of instructional possibilities. When creating each activity, one must first consider the objective they wish to set. The following should be considered when writing the objective:

1. The subject- who is the learner
2. An action verb- denoting the behavior requested
3. A product- the observable outcome of the activity
4. The conditions- or stipulations for specific activities
5. The evaluation standard- the criteria for an acceptable level of performance in terms of quality, quantity, or time

When developing a unit, one must also consider the schedule and time frame in which it will be presented. The activities developed should involve multi-disciplinary tasks. Time may need to be blocked off and the students schedules revised in order to carry out the activities. It is most beneficial if the teachers can team teach. When this happens the students are better able to see the relationship and interdependency of the disciplines.

If the activity involves group work, it is essential that each member of the group knows exactly what his/her responsibilities are. Each activity needs to be thoroughly planned.

THINGS TO CONSIDER WHEN PLANNING AN ACTIVITY:

- will the work be completed by individual students or groups
- if group work, how many members are needed in each group

- what are the responsibilities of each group member
- how can a computer be utilized in the activity*
- will the activity require a schedule change
- will teachers be teaching as a team
- what supplies/resources are needed for the activity
- will the activity be interesting to the student

*The use of a computer can be linked to almost any activity through the use of spreadsheets, data bases or word processing. It also can be incorporated through the use of commercial software as discussed in Chapter IV.

IT IS NOW TIME TO IMPLEMENT YOUR ACTIVITY

Throughout implementation, the team members need to meet to discuss problems and make adjustments to the activity. You will find things that work well, and others that don't. An activity that was thought to be of high interest to students may not interest them at all. Be flexible and ready to delete and/or add things to your original plan.

Putting it all Together

Integration of subject areas is not a simple process. It takes much time and effort from all involved. When done correctly, however, the student gains much. Utilization of a computer in the classroom also takes planning time if it is to be used to its maximum capacity. The content area of the science and mathematics classrooms can easily be related to the use of a computer.

Hopefully, this manual is of some assistance to you as you plan and develop integrated units of study or as you apply the use of a computer in the classroom. Remember, the more interesting and fun learning is for the student, the more he/she will benefit from the experience.

Terminology

1. cell - the intersection of a column and a row.
2. click - to position the pointer on something, then press and quickly release the mouse button.
3. column - one of two or more vertical sections appearing side by side.
4. commercial software - languages, programs or other routines which are purchased for the computer's use to solve any particular problem.
5. computer laboratories - classroom setting with a computer terminal for every student.
6. data - information which is recorded onto data bases or spreadsheets.
7. data base - interrelated data records which are stored in such a structure that will allow for quick access for growth and change.
8. disciplines - the individual areas of instruction, such as science, mathematics, social studies, art, etc.
9. drag - to hold down the button on the mouse while moving the cursor.
10. drill and practice exercises - computer activities which reinforce rote memorization skills such as multiplication.

11. integration - the process of combining two or more topics.
12. interdisciplinary - when two or more disciplines are involved.
13. journal - a written documentation of happenings
14. lap top computer - small computer, about the size of a small brief case.
15. menu bar - area across the top of the screen that contains the names of the menus or computer functions.
16. number crunching - mathematical computation of number problems.
17. on-line - the ability of one computer to interface with another.
18. prime numbers - numbers which have only two factors, itself and one.
19. programming - the act of setting the computer up to complete specific functions.
20. row - one of two or more horizontal sections appearing one above the other.
21. spreadsheet - an application program in which information is arranged in rows and columns.
22. teaching team - a group of teachers who teach various subject areas at the same grade level.
23. word processing - a tool for writing which allows for corrections and revisions to be made easily.

CHAPTER V
SUMMARY AND IMPLICATIONS FOR PRACTICE

Summary

In Chapter I, the writer provided the introduction to the project which included the following: background information, purpose of the study, limitations of the study, definitions of terms, and the significance of the study.

In Chapter II, a review of the literature related to the project was provided. This literature included journal articles, books, and video cassettes.

Chapter III dealt with the procedures used to create the manual. In this chapter were sections that included: the reasons that this particular project was chosen, the effects of the literature review, the manual topics and the format and design of the manual.

Chapter IV contained the actual manual which was created. The topics covered in the manual were journal writing, data bases, spreadsheets and the usage of commercial software. The manual included reasons for the usage of these in the classroom as well as instructions on the creation and examples of each. Also included in this manual were the definitions of terminology in which the teacher may be unfamiliar with.

Implications for Practice

This manual could be used by various people for different reasons. It was designed to be used at a specific middle school by teachers who were not familiar with the capabilities or uses of word processing, data bases, spreadsheets, and/or commercial software. This group of teachers was made up of individuals who had only taught for one or two years as well as those who were veteran teachers approaching retirement. The thing all these teachers had in common was the lack of training, experience and knowledge regarding the use of computers. The beginning teacher may have been required to take a computer course in college, however, they were not always taught how to utilize a limited number of computers or how to plan a class lesson with the computer being a major tool used in the lesson. At the other end of the spectrum, the veteran teacher was often set in his/her ways of teaching and was reluctant to take the time and effort that is required to learn how to use a computer and integrate it into the classroom teaching. It is much easier for them to just continue with their current methods. The manual would be helpful to individuals who fall into either of these categories. The manual could also be used by teachers who do have some knowledge and experience with the usage of computers but have not designed their own data bases or spreadsheets.

The manuals which come with a computer or software are often difficult to understand. This makes usage of the programs more complicated. The manual designed for this project was created so that the beginning computer user would be able to understand and follow it.

There are different ways in which the manual could be used. It could be used to educate the teacher of the specific functions required to utilize the programs. Included in these functions are the commands to operate the computer. It may also be used as a reference for the teacher to refer to as needed.

Through this manual, the user may also acquire knowledge regarding the basic capabilities of the word processor, data base, spreadsheet and commercial software. Once the user has an understanding of the capabilities of the individual programs, the manual can help them gain an understanding of how they can be effectively used in the classroom.

The manual does not have to be used by a teacher. Students, parents or anyone else who is interested in learning more about these computer functions may find the manual helpful. A teacher may decide to have a student or group of students set up a spreadsheet or data base. The manual was written in a manner in which middle school

students who have some experience with computers should be able to understand.

The manual, as a whole, was designed to assist the teacher in using the computer as a tool for integrating different disciplines. This could be accomplished by incorporating the use of one section of the manual with one particular activity which had been planned for the classroom. An example of this would be to use a spreadsheet to track money expenditures when involved in a bridge building activity. As ones comfort level increases, he/she may add information from another section into the lesson plans also. For the bridge building activity, commercial software which has been adapted for small group usage, may be added. The sections of the manual are therefore capable of being used in isolation or in any combination with each other.

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