

A PROPOSAL FOR THE DEVELOPMENT OF THE
HOME COMPUTER SYSTEM
AS A FAMILY EDUCATIONAL AND MANAGEMENT TOOL

by

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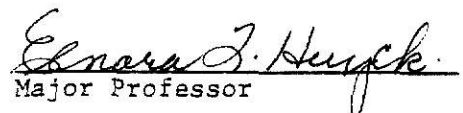
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INTRODUCTION

Home computer sales are booming (1). Small scale versions of machines that revolutionized business management are projected to enter millions of households during this decade (2). Trends are decreasing prices for hardware and software, increasing capacity and flexibility in hardware, and increasing variety and quality of software. American Family predicts that projections showing one-half of American families having home computers by the end of the decade are conservative (3). Most previous estimates of home computer use have fallen short.

Collins (1) predicts that the personal computer is following the pattern of the automobile, television and hand-held calculator, ceasing to be a novel tool and becoming an accustomed part of daily life. Toffler, in The Third Wave, justifies the need for society to become computer literate to prepare for the computer's impact upon the new electronic information society (4). A computer literate populace is viewed as a resource to society, and our society is moving toward that end (5).

Computers confront society with the most rapid changes ever encountered and call for new attitudes, skills, and actions (6). Technology is one tool that can be used to meet family educational needs and enhance family life (7). Computers are becoming a valuable technological tool for the family and are changing the way we work, live and learn (8).

Home economists, educators, cooperative extension specialists and professionals within the computer industry agree the home computer and professionally produced programs can aid the family with its two main functional roles--personal and managerial (9). Developmental tasks related to these functions change as a family progresses through the life cycle (10). Family educational needs vary

according to the problem-solving developmental tasks faced at a given time and societal demands.

Using an educational computer program in the home to prepare for decision making or aid in problem solving related to developmental tasks is compatible with adult education principles. Adults are voluntary learners, goal or problem oriented, who usually benefit by reinforcement and feedback about possible decisions, and prefer to learn in informal, unstructured settings (11). Computer programs used in the home allow for all of these adult preferences. The programs may be directed toward achieving a goal, solving a problem, exploring alternative decisions, or finding resources for family needs. The programs may be used when the family has the need, when readiness is high.

Young families in today's society have the largest educational needs among adult groups because they are faced with many first time decisions and have the least experience in making them (10). Havighurst (12) describes the concept of teachable moments as coming with great urgency as a result of need at a given stage in life. Of all periods of life, early adulthood is the fullest of teachable moments. It is a time of increased sensitivity and unusual readiness to learn. It is usually the time of marriage, choosing a career, having the first child, acquiring the first home, furnishing a home, dealing with childhood illnesses, providing for a family's dietary needs, sending the first child to school, managing family resources, seeking child care, and creating a home environment. This period produces motivation to learn and to learn "now" (12).

Availability of programs directed at family educational needs and the level of computer literacy among the masses will determine the future computer benefits to families. The educational institution recognizes the need to prepare students for the role computers will play in their adult lives (9). In the past, students taking a computer course learned to write programs. Now, courses are designed to aid the students in learning to use the computer as a tool, integrated into the

subject they are studying. Coursework is related to living, learning, problem-solving, decision-making and as a tutorial aide. Gawronski and West (13) specify that computer literacy includes knowledge of (1) how computers are used, (2) what a computer can and cannot do, (3) what a program can or cannot do, (4) how computers work, (5) how to use a computer, (6) the impact of computers on society, (7) how computers can develop the skills of decision making and coping with change, and (8) an introduction to or an awareness of programming. Today's students are maturing with computer technology, and as adults they will own home computers and demand programs to meet their family educational needs.

Microcomputers entry into the home produces a meaningful challenge to the home economics profession. Feinberg and Walton state,

The computer will enter the home with or without direction from the home economists. As we face the charge of enhancing the quality of life, we should address the ramifications of the increasing computerization of society . . . Home economists are in a unique position to lead the examination of computers in society. . . . To recognize, understand, and mold the influence computers will have on us is a challenge we cannot ignore (14).

Research reported in the literature regarding computer use in the home is inadequate. Study is needed in several facets of this subject. First, an on-going study of the family and its educational needs throughout the life cycle is essential. Changing societal demands upon families must be considered. Our society is dynamic. One in three men die of heart disease before the age of 60 (15, 16), and heart disease is being related to long term dietary habits. Families are mobile and do not have the support of nearby extended family. One in five children are living in a single parent home (17). Over 50 percent of women between 18 and 65 years of age are employed in the labor force (18). There is increased health care emphasis on wellness, as opposed to waiting to treat a disease (19). Obesity is a major dietary, health-related problem (20).

Inflation takes its toll on retirement savings and families' spendable dollars, and young families get "over their heads" into debt because of the availability of easy credit (21). The economy often makes dual career families a necessity (18). The occurrence of child abuse is on the increase (22). Less time is available for household production, food preparation, and leisure family time (18). Each change in society affects the educational needs of families. Computer programs must address changing family structures and technological resources to be useful to families.

Second, home economists need to explore the capabilities of computer programs for education. Tutorial, drill and practice, game simulation, quizzing with instant feedback, and interactive decision making are program formats that turn program content into an educational aid (23).

Third, professionals must take the initiative to produce reliable, accurate content for the programs directed at identified educational needs. The team approach, with a home economist writing the content and designing the format, a designer adding art work, and a computer programmer writing the program; is one concept that warrants exploration (1, 4, 23).

Fourth, families must be assisted in identifying educational needs and finding computer programs to meet these needs. Sales of individual programs for private libraries and subscriber service delivery into homes each have potential. As the numbers and variety of computer programs increase and their quality continues to vary enormously, we need new processes and institutions to help families and other consumers find appropriate and reliable programs and computer services (24).

Objectives

The purpose of this report was two-fold: first, to assess the current usage of computers within the home environment, then, to explore the potential

for development of the home computer as an educational and management tool for families.

Specific objectives were:

1. Determine the incidence of home computers.
2. Determine how computers are being used in the home environment.
3. Identify developmental educational needs of families and needs of home computer owners related to the use of the computer.
4. Explore the potential for use of computer programs to meet family needs.
5. Survey resources currently available to home computer owners that would help them utilize the computer and meet family needs.
6. Propose a plan for production of quality software programs directed toward family needs and delivery of those programs into homes.

Definitions

The following definitions are offered for computer related terminology used throughout this paper.

Application software--software for solving specific problems, e.g., a dietary planning package, written to be applied in a particular context (25).

Applications--things that you can actually do with the help of a computer--the problems to which you can apply it (26).

Baud--one bit per second, used to measure speed at which data is transmitted over a serial link, such as a modem. A number of fixed standard speeds are normally used, such as 300, 1,200, 9,600, or 19,200 Baud. 300 Baud is a transmission at about thirty characters per second (26).

Bit--the smallest piece of information in a computer, comes from contracting binary digit, either a 0 or a 1 digit used by the computer. A measure of capacity of the computer (25).

Byte--a group of bits, usually 8, considered as one unit (25).

Compatible--one of the most important words when considering applications of the computer. Indicates that software and hardware will work together (26).

Computer system--an organized collection of hardware, software, and people-ware that works together (4).

Documentation--the written instructions and program description that accompany a software program. Should identify objectives, level of difficulty, hardware capacity required, and specify hardware compatibility (27).

Duplex--description of transmission in which data flows in both directions and at the same time. Also called full-duplex (25). Type of transmission used by modems.

Half-Duplex--description of transmission in which data flows in both directions (e.g., between microprocessor and peripheral) but not at the same time (25). Slower transmission speed than full-duplex.

Hardware--all the components of a computer that can be seen and touched. Deakin (26) describes it as the part of the computer that would hurt you if you kicked it, e.g. microprocessor, keyboard, video display screen, printer, disc drive, modems (1).

Home Computer--a term interchangeable with personal computer and micro-computer, however, home computer implies family applications (4).

Interactive--type of program capable of two-way communication between the user and the computer (4).

Interface--electronic components which allow two different computer devices to communicate with each other, e.g., computer and the disc drive or the computer and the printer (1).

Kilobyte--1,024 bytes, often abbreviated to K. A unit of measurement of memory capacity of the computer (25).

Memory--a collection of integrated circuits in which data is stored. Each binary digit is stored as an electrical signal within the integrated circuit. Memory is classified as read only (ROM) or read/write (RAM), and its size is measured in K (Kilobytes)(25).

Microchip--or Chip--name for integrated circuit, derived from small piece of special material on which the integrated circuit is chemically formed. Carries electrical impulses to transport bits of information (25).

Modem--a peripheral that may be interfaced to a home computer so that it can communicate with another computer in another location, via telephone wires (26). An acoustic coupler (25).

Package--a ready-to-use, prewritten program or collection of programs, complete with all the instructions and other information needed to use it (documentation). Usually concentrate on applications, e.g., budgeting, record keeping, or dietary planning (25).

Peripherals--additional equipment which can be interfaced to the computer to expand its capabilities to send or receive information, e.g., printer, disc drives, modems (1).

Program--a sequence of instructions in the computer's language. Designed to make the computer perform specific activities, such as computation, problem-solving, storing information or organizing data (1, 25).

RAM--random access memory, the share of the memory capacity of a computer that is available to the user. Each software package should specify the amount of RAM required to run the program. RAM is lost when the computer is disconnected from electricity, so a program must be stored on discs or cassettes and transmitted to the computer each time it is to be used (26).

ROM--the share of the memory capacity of a computer that is programmed with instructions to the computer itself. Information is set into a chip and is not lost when the computer is turned off (26).

Software--programs or sets of instructions that direct a computer to accomplish a desired task (1). Described by Deakin (26) as the brain we give to a computer.

Technology--any characteristically human use of instruments for any sort of production (4).

User-friendly--term used to describe hardware or software that is easy to use, by virtue of its design and documentation offered to the user (25).

DISCUSSION

Thirty-five years ago computers were large, expensive, complex machines. The Univac II, built to process the 1950 census, was 30 feet by 50 feet, stored information in thousands of vacuum tubes, and worked very slowly. It had to be rewired to run each new program, and it was incapacitated when a vacuum tube burned out. By the late 1950's, the transistor allowed computers to be more powerful and cost less. But the development of the microchip, a tiny group of integrated circuits no larger than a fingernail, was the breakthrough that revolutionized computers. The microcomputer is a table-top machine that may be interfaced to peripherals to perform a wide range of functions in the office, school, and home. It is the first computer priced and sized for the home market (28). Microcomputers have more memory capacity, more speed, more capability, and are more reliable, for a fraction of the cost of the Univac.

Incidence of Home Computers

The microcomputer has become a part of household equipment (2). Lower prices, improved performance, increased number of programs for home applications, massive advertising campaigns, and expanded distribution networks are fueling the boom in home computer sales (29). Jensen (9) distinguishes between hobbyists and home computer users. The hobbyist is more interested in the process of using the computer than in the application of the computer to necessary tasks. The home computer user is primarily concerned with the tasks a computer can do. This report addresses the home computer user.

Home computer sales are increasing so rapidly that establishing a figure for the number of computers in homes is difficult. During the last five years, most computers entered the home for game playing or business applications and home applications occurred as a secondary function. "Families and Telematics" expects the prediction that one-half of American homes will have computers by the end of the decade is conservative (3). Home computer sales have boomed more than the industry expected. Jensen (9) reports the home computer market has gone through three stages--the hobbyist, work-at-home, the elite consumer; and is now entering the fourth stage--the mass consumer.

Blundell (30) reports a 70% increase in home computer sales from 1981 to 1982, and predicts sales in the U.S. will be one million per year in 1988, and two million per year by 1991. The Eastern Management Group studies project one million home computers in use in 1984, 4.2 million systems by 1988, and 6.8 million systems in U.S. homes by 1990.

Prior to 1982, business and home microcomputers were 8-bit machines. With the development of the 16-bit microprocessor for many business applications, prices for 8-bit systems are expected to continue to fall. The shift from the 8-bit to 16-bit machines should also affect the software industry. Home users may expect to find more software directed specifically toward them (3). This

will mean more performance for the price to the cost-benefit conscious home computer user.

Home computer owners are described as male, 31 to 40 years old, with a college degree, and an annual household income of \$30,000 (31). Jensen (9) found most families invested either less than \$500 or over \$2000 for their home computer systems. One reason for these two price groups is the cost of the VIC 20 and the Apple II Plus on the price scale. The VIC 20 is less than \$500 and is often used for entertainment, and the Apple II Plus with peripherals, is usually over \$2,000. However, the Apple system has the capacity for many home applications. The majority of families in this study spent between \$100 and \$299 on software packages, results compatible with other industry studies (9).

Predictions are that between 1982 and 1987, average system prices will drop 20%, while the average amount of RAM will increase over 500%--from 48K bytes to 456K bytes. In 1990, the average personal computer will cost \$370, down from \$530 in 1982 (30).

How Home Computers Are Used

Hardware technology has progressed so rapidly that research of home use and development of software packages for the home have lagged behind. Jensen (9) found the most common intended purposes for purchasing a home computer were computer education for the family, resource management for the family, management of family business, computer education for children, and business application for the husband; in descending order. Most families used the system for the intended purpose; however, some families could not find the necessary programs to handle the required tasks. The researcher concluded that the intended purposes justify home computer purchase, but are secondary to the actual usage. This study agreed with others that activities performed most often by home

computer users are learning how to use the computer, learning computer languages, and games (9).

Another Eastern Management Group survey showed the top four applications in the home market are, in descending order, games, financial planning and management, education, and banking (30). In a survey printed in the New York Times on May 11, 1983, game-playing was still the number one use for the home computer (32). The lack of high-quality software, the low level of computer awareness and literacy among families, and the amount of time required to learn to use a computer system are contributing factors to how computers are used in the home.

A Link Resources Corporation study in New York City found that 25% of home computer owners are not using them at all (33). This study showed a positive correlation of computer usage with length of ownership and cost of the system. Families owning computers over a year used them more than families buying within the last six months. This may indicate that when people buy a computer, they are still not sure what kind of software they want, or what they expect the machine to do for them. Families buying low-end models used them less than families buying more expensive systems with peripherals and software packages. The low-end models can be used for game playing, but do not have the capacity to run programs to make the computer an educational or management tool.

New computer owners often experience computerphobia. It may be treated individually by reading about computers and possible applications or by actually using tutorial software packages on the computer that take the user through step by step directions. Using the computer to learn about the computer is the fastest way to become computer literate (34).

Magazines and newspaper columns suggest many applications for the home computer. Software packages may be categorized in two groups. First are the record keeping or data-management packages that set up a structure for storing information. Examples of these are budgeting programs, household or food

inventories, grocery lists, address files, spread-sheet financial records, calendars, christmas card lists, indexes for collections. Stolker (28) describes data base type programs as organizers of information, or electronic filing cabinets. Programs of this type are readily available for a variety of hardware, with varying memory capacity and prices. Computer magazine articles frequently remind computer users that these programs will not make them better managers, they will simply make the record keeping chores easier.

The second type of program encompasses the real potential of the home computer. It is the educational program. The subject may be directed at any problem or goal that a family member might have. These programs may focus on learning needs related to developmental tasks for the family. Most existing programs of this type were developed for classroom use.

Computer Software for Home and Home Economics, compiled by Strictly Software lists programs that are examples of both types (27). The directory is divided into five subject area categories, and lists the following programs, examples of the educational type.

Child Development and Personal/Family Relationships

Friends and You, by Aquarius Publishers, for 3rd and 5th grade reading level, for Apple, costs \$29.95. What makes one person popular and another unpopular? Why are some people the center of attention while others are on the outside? This program is packed with attitudes, feelings, and most importantly, ideas to help students assess their relationships with others.

The Life Dynamic Series, by Avant Garde Creations, for Apple, costs \$150.00. A series of programs applicable to those who wish to make changes in their lives and need support in doing so. Multiple choice questions are asked re: your opinion on relationships, sexual and cultural attitudes, life and death, etc. Programs continue with specific life dynamics regarding environment, creativity, sexuality, and the meaning of life. The set is a series of eleven programs.

Consumer Economics and Management

Comparative Buying, by Computer Courseware Services, from grade 2 through grade 7, for Apple, costs \$182. This program

in money management is designed to help students improve their ability to compare products in the marketplace. It helps determine the best buy in terms of price, needs, wants, quality, etc.

Financing a Car, by MCE Inc., for junior high level through adult, for Apple, costs \$50. The program provides necessary information to evaluate various car purchases and the options associated with this kind of purchase. An evaluation printout is also available.

Housing, Home Furnishings, and Equipment

HOME—1, by MPA Enterprises, for Apple, costs \$35.00 This program assists the user in calculating simple mortgage payments, monthly mortgage tabulation, time to pay off mortgage, compare rent vs. buy decision, average home price estimator based on design, perpetual calendar, days between dates, day of week from date, and calculate the value of various woods based on current energy costs.

Solar Energy for the Home, by Instant Software, for Apple, costs \$34.95. The program will compute the NET heating gain, cost of conventional fuels vs. solar heat, and the calculated payback period, showing if the investment in solar equipment will save money.

Nutrition, Foods, and Quantity Foods

Fast Food Micro-Guide, by The Learning Seed, for Apple, for Junior High age groups and above, costs \$36.00. The user selects a typical meal from the menu and the computer will print out (to the screen or to the printer), a nutritional analysis of the meal showing calories, what percentage of calories come from fat, protein analysis, vitamin A, B, and C content and amounts of other nutrients. The teaching guide, also included to aid in interpretation and study of results, helps the user learn nutritional decision making and find out how their typical fast food order stacks up nutritionally.

Food for Thought, by Dietary Data Analysis, for Junior High age group and above, costs \$34.95. The program tests the user's nutrition I.Q. Seven categories of questions and two difficulty levels (novice and expert) include questions about selected topics. The computer indicates if the correct answer was selected and then explains the answer.

Textiles and Clothing

Know Your Pattern, by Orange Juice Software Systems, for grades 7 through 10, costs \$130. The program gives instruction and practice in determining and using the pattern envelope and guide sheet, and in proper pattern layout techniques.

Personal and Home

Magic Memory, by Softage/Artsci, for Apple, costs \$99.95. The data base style program is designed to simplify storage of valuable information. The structure simulates an address book, having two sets of index tabs (A-Z, and 24 tabs that the user may label), and each tab can hold 250, 9-line records. The user may add, delete, edit, sort, and transfer information with a single key stroke.

The Family Budget, by Dynacomp Inc., for Apple, costs \$34.95. It is designed as a two-part electronic home data record-keeping program. Part One-Budget, is used to record expenditures, both cash and credit, and income on a daily basis for one year. Three categories are used to record tax deductible items--interest and taxes, medical expenses, and charitable donations. Part Two-Charge Accounts, provides a continuous record of all credit transactions. The user may get hard copy printouts of any of the information.

This directory does not include evaluations of the program, but categorizes them by topics, with a description of program, cost, hardware requirements, and name and address of the producer. Nancy Dillon, of Strictly Software, estimates that three of every four home computers is either Apple or Apple compatible, and that the majority of programs for home use are Apple compatible.

Although the Strictly Software catalog does not claim to include every program suitable for home use, it does give a representation of the types of programs available for various subject areas. The 1984 edition lists the following numbers of programs by category:

<u>Category</u>	<u>Number of Programs Listed</u>
Child Development and Personal/ Family Relationships	27
Consumer Economics and Management	25
Housing, Home Furnishings, and Equipment	10
Nutrition, Foods, and Quantity Foods	50
Textiles and Clothing	3
Personal and Home	27

These figures indicate the proportion of programs produced within the various subject areas, with the most programs being available for consumer and family economics, and foods and nutrition. Most child development programs listed are for children to use as a learning tool, and very few programs are available for problems dealing with changes in family structure, developmental stages for children, or family relationships. Textiles and clothing is an untapped area. Most programs for this area have been developed for home economics classroom use and deal with the color wheel or clothing construction principles. No listings were found for programs addressing wardrobe planning, fabrics for home furnishings, care of fabrics, or cost comparison for home construction and ready-made purchases.

Another assumption that may be drawn from reviewing software directories is that adequate numbers of the problem-solving, decision-making types of programs are not available to enable families to use the home computer as an educational, management tool. On the contrary, programs for financial record-keeping or data management are readily available, compatible to any computer. Might this explain why game-playing has remained the number one use of home computers?

Irene Hathaway, an extension specialist in the College of Human Ecology, Michigan State University, agrees with these assumptions. Hathaway reports the Michigan State Extension Service is attempting to catalog listings of software packages for home use. County extension personnel may review programs in the state library, in order to make decisions about using the programs in their activities or recommending the programs for home use.

Stolker (28) lists the following applications for computers in the home: data management, word processing, home finance (examples of use are budgeting and record keeping), personal decision making (only one program is listed as a resource), managing nutritional and exercise requirements, learning computer

programming, games for entertainment and education (suggesting educational programs may be designed in game format), computers for artists, monitoring and controlling devices (turning on or off the lights at a given time), telecommunications, information utilities, electronic mail, and public message services. According to Stolker, perhaps the single most exciting application of micro-computers is telecommunications, the ability to reach out beyond the home and tap the resources of other computers. The home computer can access a growing number of data banks through a modem and telephone wires. Compu-Serve, one nation-wide information utility, reported having 40,000 subscribers in July 1983, with subscriptions growing at the rate of 500 to 750 per week (3). Families with this subscription service can link their home computers to the CompuServe data bank in Columbus, Ohio, with a modem peripheral attached to the home computer, via long distance telephone connections. Costs of this service are an annual subscription fee, an on-line charge for the length of the hook-up time, and the long distance telephone service charge. Costs for on line time vary from per hour for weekdays to per hour for evenings. Programs focused on home and family needs listed in the Compu Serve Information Service Subject Index, are listed below (35).

Adult Education	Canning, Home
Advertising--For Sale and Want Ads	Car Care
Travel Guides and Arrangements	Career Planning
Auto Buying Information	Child Care
Aviation Weather	Children, Education
Banking by Computer	Children, Games
Billings, Review	Clothing, Fashion and Sport
Book Reviews	College Cost Program
Budgeting	Consumer News: Software

Cooking	Health and Fitness
Dress	Home Banking
Drugs, Medicine	Home Management:
Education, Family	Amortize a Mortgage
Electronic Shopping	Calculate a Raise
	Checkbook Balancer
	Net Worth
Family Budget	Home Services
Family Life	House Plants
Family Matters Forum	Human Sexuality
Fashions	IRA
Finance	Insurance:
Financial Advice	Dental
Financial Aid, College	Disability
Financial Planning	Employee benefits
Fireplaces, Firewood	Health
Fire Prevention	Life
Fitness	Investment News
Food Buyline	Job, In the Home
Food Storage	Legal Forum
Food for Fitness	Library, Electronic
Food Freezing	Manufacturer's Newsletters
Food, Menus	Mortgage, Budgeting
For Sale: Consumer Goods	Movie Reviews
Funds Management	New York Fashion Report
Games, 37 listed	Nutritional Analysis
Gardening	Parenting and Family Life
Gasoline, Saving	Personal Development
Grolier's Encyclopedia	Personal Finance
	Personality Profile
	Software Reviews
	Recipes

Shop-At-Home

Travel and Vacationing

Smoking and Health

Vegetables

The College Board:
 Choosing a College
 Financial Aid

Families and Telematics reports that of all the major information utilities, CompuServe Information Services, is the only one that has a major service especially for families (3). FAMILIAE, Inc., under contract with CompuServe, provides a series of interactive programs. The format allows two-way communication between users and the data base, as well as with a group of other users who share a family concern and a family counselor. Dr. Robert Lindamood structured the series of parenting and family life programs from material he had prepared for publication as a book. Rather than publishing it in the traditional way, it was done electronically through the information service. The programs are continuously expanded on the basis of user questions and reviews of changing user interests.

The categories in the Parenting and Family Life menu are Functioning Mentally, Functioning Physically, Nurturing Moral Development, Fitting Together as a Family, and Special Family Matters. Groups of experts, knowledgeable on subjects ranging from child care to problems of adolescents and the elderly assist with program structure. The experts are linked to the user by computer, and together they explore the family related subjects. The focus of the sessions may be tailored to the individual user's needs.

Families subscribing to The Source, another nationwide information service, have access to programming for electronic mail, bulletin boards, news, amortization of loans, depreciation schedules, tax calculations, employment services, financial market reports, research on any subject, language translation, shopping and transactions, consumer tips, software available, games (78

are listed), and entertainment (36). Regional information utilities are also available in some areas, with most servicing special interests, such as agricultural or financial.

In summary, families bring programming to home computers through a purchased program from the private library, through subscription to an information utility, or by producing their own programs. Each method has advantages and disadvantages. First, for the type of program that is used repeatedly, such as a spread-sheet financial record program, the family may justify the expense of purchasing the program. However, for the program focused on an educational need related to a life stage, such as choosing the best mortgage plan currently available for a home purchase, accessing the program through a subscription service may be more economically feasible. If the family ever planned to buy a home again in the future, the information in the program purchased today would not be current. The cost of purchasing the program might not be justified in the family budget for a one time use. Accessing programs that will be needed only one time through a subscriber service may be considered more economically feasible. Long distance telephone service for on-line time is the biggest disadvantage of the subscription service. Producing programs requires a major investment of time and talent. Most families see the other two alternative sources of programs as more feasible.

Developmental Educational Needs of Families

Families purchasing home computer systems need to identify how they expect to use the computer, to be able to make a wise selection from the variety of systems available. With an increasing amount of user-friendly software directed at family needs, families will experience full benefit from home computers by recognizing their educational and management needs, exploring

software available to meet these needs, and purchasing a computer system with adequate capacity to operate the software.

Each family member should be considered in the needs identification process. Needs may be recognized according to the two main functions of the family--managerial and personal.

Managerial Function of the Family

Managerial needs are related to all types of record keeping and time, talent, and resource management. A family may feel the need to reduce the time invested in record keeping tasks of maintaining income tax records, balancing the checkbook, addressing envelopes for a mailing list, recording a Christmas card list or address file, keeping a spreadsheet record of budgeted expenses, assembling a record of all savings and credit accounts, or compiling health diaries. Families interested in geneology may want to develop files for a family tree, or all age groups may want to keep records of hobby collections. Collins (1) warns that if by nature one is a haphazard and inefficient record-keeper, the computer may not be a panacea for these tasks. The computer is only as efficient as the user is systematic about entering data. Each family should make an honest assessment of its management habits. Analysis of family resource management patterns can help families recognize skills and weaknesses. If improving management skills is identified as a family goal, it should be included as an educational need.

Experiencing full potential from a home computer for resource management tasks is limited by low computer literacy, lack of resource management skills, and inflexible programs. The family needs to learn about potential applications of the computer for management tasks, develop efficient resource management skills, and select appropriate programming for tasks attempted.

Personal Function of the Family

The second function of the family is personal, including education, entertainment, and family activities. Educational needs are continuously changing as society changes and the family passes through the life cycle. Societal changes affecting family needs are trends toward decreasing family size and increasing family mobility, incidence of mothers employed in the labor market, and need for child care outside the home. The growing number of single-parent and reconstituted families creates special educational needs. Economic changes causing fluctuations in inflation, availability of credit, unemployment, and ability to save may direct some families to educational programs. With the increasing computerization of society, some families recognize a need to aid children in becoming computer literate (9). The growing recognition of the inter-relationship of nutrition, exercise, and wellness may motivate families to seek information about this subject.

The second factor affecting family educational needs is the stage in the life cycle. Continuing education can make an important contribution to the success of family life as the family matures. Rudd and Hall (10), state the two most important tasks of the adult are being a parent and being a citizen, and that young adults in our society are poorly prepared for both. This situation leads to perceived and unperceived educational needs for families. Perceived needs are those that the family recognizes, and views as important. Unperceived needs are those that the family does not recognize. Thus, the family is unaware and the need remains unmet. An example might be a young pregnant woman not recognizing the nutritional requirements during pregnancy, and the need to change dietary patterns to benefit the health of both the mother and the unborn child. These are unperceived needs. If the mother is unaware of the importance of nutrition during pregnancy, change in dietary patterns is unlikely, and the need to change remains unmet. If, however, the

mother becomes aware of the importance of the diet, the need is perceived. She is more likely to be motivated to learn about her nutritional needs and change her eating patterns.

The family in early adulthood faces the largest number of developmental first time tasks, and has the least experience in making the required decisions. It has the greatest educational needs, but the least adult continuing education is available to this age group. It is the life stage of selecting a mate and a career, learning to live with the marriage partner, having the first child, rearing children, acquiring and furnishing a home, managing family resources, taking on civic and social responsibility. These developmental tasks are established by the forces of societal expectations, the maturation of the individual, and personal values or aspirations all influencing the family at the same time (12). It is important that the educator's interpretation of needs, and the learner's interpretation of needs agree if an educational program is to be successful. Since adults are voluntary learners, who are goal or problem oriented, they will be motivated to learn if educational programs are directed toward their current goals or problems.

Middle adulthood brings different developmental tasks. Havighurst (12), lists the following tasks: establishing and maintaining economic standard of living, assisting teen-age children to become responsible adults, developing adult leisure-time activities, relating oneself to one's spouse as a person, accepting and adjusting to physiological changes of middle-age, adjusting to aging parents, and achieving adult civic and social responsibility. Solving problems or reaching goals related to these tasks requires a new body of knowledge. Decisions to be made are different than those made during young adulthood.

Later maturity brings still another set of developmental tasks: adjusting to physical strength and health, adjusting to retirement and reduced income,

adjusting to death of the spouse, establishing an explicit relationship with one's age group, meeting social and civic obligations, establishing satisfactory physical living arrangements. Of all the life stages, the elderly have the most programs directed toward its needs. Government funded programs have focused on needs assessment for the elderly and programs to meet the needs. Since the elderly is a growing segment of society, such programs will continue to be important. However, studies of computer use have identified that families in the elderly age groups do not tend to be computer users (9). Perhaps computer programs directed toward the needs of the elderly would be more appropriately used by the adult children of the elderly.

An educational need results from each first time developmental task for each stage of the life cycle. Other educational needs are related to the processes of need identification, decision-making, and problem-solving. Programs could help the user develop a systematic method of approaching each of these processes.

Computer-Related Educational Needs of Families

Jensen (9) identified three factors that would enable families to achieve greater benefit from home computers: 1) to improve family management skill, 2) to increase the general awareness of computers in society, and 3) to achieve computer literacy of the masses. Low computer literacy rates limit the visions of computer applications in the home. Computer programs could focus on the user's needs to learn about potential applications of the computer for the home, sources for software, and tips for increasing the level of computer literacy.

Problems perceived by home computer users are the amount of time required to learn to use a home computer system, and unavailability of adequate software (9). The quality of the documentation with software packages effects the amount of time required to learn to use a program. Manuals often assume the

user has some computer knowledge. The computer illiterate may become frustrated with the time required, since family time is often limited. The time-consuming tasks of entering data for an inventory, budgets, expense ledgers, address or recipe files may be overwhelming to the computer novice.

The shortage of software for home application limits the use of the home computer for many families. Those skilled in programming may develop self-designed programs, but this requires skills beyond computer literacy. In general, adequate programs are available for financial record keeping and data storage. The inadequacies are in the educational and problem-solving areas. Better communication between the computer manufacturers, software producers, families, and the machine will help alleviate these problems (9).

New computer users can benefit from instruction for use. Classes on computer applications in the home are more helpful than courses in programming. User clubs are one effective way of sharing ideas and learning from other home computer owners.

Better planning and placement in the home is a need of some home computer users. New designs could make the computer more compatible with other home appliances, and allow it to blend into the home decor. Improved appearance and location may reduce the connotation of a "technical device" and promote its acceptance in the home environment as another appliance.

A complete integration of the hardware, software, and people-ware is needed if the home computer is to emerge as a useful system. Families must skillfully assess their needs, identify software that can meet their needs, and select hardware with adequate capacity to operate the software. To accomplish this goal, better communication between professional home economists, hardware manufacturers, software producers, and the family is a must.

Potential of the Home Computer to Meet Family Needs

The full potential and efficiency of the home computer are realized in direct proportion to the operator's skill in need identification, selection of quality programming, and application of the programming to family needs. What a computer is and does closely relates to its application. The level of skill and knowledge of the user may either severely limit or fully exploit those capabilities (1). While using a home computer does not require technological or programming skills, being computer literate helps the user to recognize and utilize what the system can do.

For the computer to become an effective family tool, it must meet family needs and interact with the user. Computers tend to be viewed in a technological sense, rather than a social sense (14). This image is inaccurate when considering potential for home applications.

Technology has advanced so rapidly, that advancement in hardware capacity has gone ahead of program development for home use that is based on human needs (37). The greatest current need appears to be quality software, professionally produced, that is based on currently identified family needs, and produced into a user-friendly package for home use. Family involvement in identifying needs and designing program content could increase the usefulness of the machine to the family (9).

Without user-machine interaction, the computer is nothing more than an entertainer (14). Interactive programs with two-way communication between the user and the computer transforms the computer into an educator, counselor, advisor, tutor, and information resource. Potential programs for human development will be more human-like in ability to relate to us. Programs may be designed to give the user a body of knowledge needed for decision-making, and then give the user experience in making decisions in hypothetical situations. When the user makes a decision, the machine can give immediate feed-back about

the consequences of such a decision, and may offer follow-up resources if more information is desired. Programs can involve family members together, promoting communication about problem areas of family life.

Rapid technological changes require rapid adaptation (6). Computers have created the most rapid societal changes ever encountered. Families differ in adaptive ability, but the process of managing for adaptation is universal (7). It is a process of decision making and action that results in changed behavior.

Families will experience the most benefits from home computer systems when they adapt to them and feel control over them. What people cannot control causes anxiety, uneasiness, and fear. In the case of adapting to computers, it is called computerphobia (34). A family's perception of the home computer is based on its experiences. Past experiences, personality, motivation and needs effect the perception and the adaptation process.

Since adults are motivated to learn by needs, when programming is directed to family and human needs, computers will be purchased in even larger numbers by families to meet these needs (9). Success of the system will then be determined by the ability to adapt to changing family needs.

For families to accept and adjust to technological change, the process should first begin with identifying individual and family needs, and then progress to development of a product or service to meet these needs. Begin with a problem or learning situation, and then apply appropriate technology to it, not the other way around. Perhaps this concept explains why game-playing is still the number one use of computers in the home. Since computers entered the home environment in large numbers, before need related programming has been developed in adequate quantities, computer systems are not being used to their full potential. Maximum benefits can be attained by families who devote time to entering data for management programs and selecting a variety of

problem-solving programs for personal needs. Computer programs should meet needs from either one or both family functions--managerial or personal.

Most available programming was developed for business or classroom use. Development of appropriate programming has lagged behind the entrance of computers into each new environment--first into business, then the schools, and now the home. Professional home economists should give immediate attention to the demands for problem-solving software for family needs in the home.

Collins (1) cites one example of the poor quality of a program when it is produced for commercial purposes, without knowledge and understanding of content.

A diet planner program, taken from a book of programs published for one of the major computer companies, is aimed to allow the user to select a meal type, and then the computer is to produce a menu. After one request for a luncheon, the user received a menu of one waffle, two ounces of cheddar cheese, two teaspoons of french dressing, two tablespoons of raisins, and a sugar-free soft drink. Another menu for a snack was two-thirds cup of blueberries and a lettuce and tomato salad. Since the computer selects foods for menus at random, the menus vary each time they are requested. It soon becomes obvious that the programmer did little to control the combination of items for palatability or for conformity to the basic food groups.

The real problem with this program example is not the techniques of programming, but is the nutritional expertise of the author. Production of program content is a new challenge to professional home economists. The shortage of good software for home applications is a critical limitation for computers achieving full potential in the home.

Appropriate Formats for Home and Family Programs

A variety of program format styles are appropriate for family oriented programming. A computer can become a tutor via a program that gives the user information in sequential steps, with self-paced advances through the content, based on the responses of the user to periodic questions. This format is

flexible and can provide the structure for an endless variety of programs, with creative presentation of information. A possible list of subjects utilizing the tutorial format include learning to make decisions, how to plan a budget, steps to estate planning, menu planning for the heart patient, menu planning for the pre-school child, nutrition education for the teenager, stages of development in the infant, child-care alternatives, preparing the child for the first day of school, choosing floor coverings, selecting software for the home computer, tips for energy conservation. The format allows information to be received at an individual rate with a variety of techniques and visuals.

The simulation format allows for interactive communication between the user and the computer. The user can have experiences in choosing alternatives and solving problems, without the danger or expense that would be suffered in real life experiences. After the user has chosen an alternative, the computer can give feedback about the consequences that might be expected, and explain the reasons different alternatives might be advisable. Perhaps this format encompasses the real potential for programming in human relations and family life. Appropriate program subjects could be identifying concerns in reconstituted families, decision making for the single parent, should I return to the labor force, diet analysis, projections of spending patterns, projections of savings or retirement plans, wardrobe plans for the working woman, furniture arrangements for small rooms, changing behavior patterns, creating a family council, or opening the door to family communication with teen-agers.

The drill and practice format allows for endless repetition for implementation of skills and gaining new knowledge. It is appropriate for children's educational programs and any type of "how-to" instructions.

The data-base program format allows for organization and storage of bits of information. Information can often be filed, retrieved, deleted, rearranged, or added to with single commands. This is appropriate for recipe

files, address files, financial records, tax deductible expenses, inventories, shopping lists, or budget expenses. Financial programs can also offer analysis by graphs or charts, as well as periodic totals.

Providing the flexibility of each format, a computer program can organize informational material or provide a structure for any educational or management need in the home. It can be designed according to adult education principles, compatible with preferred learning styles of adults. Because of the availability of the machine to the user, programs may be accessed at the time of need, when the readiness to learn is high.

Software Evaluation Standards

With the rapid increase in the quantity of programs, the quality varies greatly. Market-wide evaluations are impossible to do and publish, because of the numbers involved. Users purchasing programs are often buying an unknown value. Several points may give the user clues to the programs general quality. The program description should include cost, target group, level of content difficulty, objective, hardware requirements, format style, and the producer's name, address, and phone number. Consumers investing in a program library will be interested in the cost/benefit ratio. Target groups are often identified by age or academic grade, with the content geared to that level of difficulty. It is a must for the objective to be specified, since the program will only be helpful to a family if the objective is directed at a family need. Programs will not work properly if they are not compatible to the hardware being used, because the program is simply a set of instructions in program language. The computer must be able to accept the instructions in the same language, for the program to "run." The format can give clues to the types of experiences the user will have by using the program.

The program manual may be an asset or a hindrance to the user. Its degree of user-friendliness will determine the amount of time required for a computer novice to learn to use the program efficiently. The manual should be written in a clear, concise manner, with step-by-step instructions outlined for the user. A glossary of terms and commands used would be helpful. The documentation can assist the user in selecting programs compatible to a specific hardware, at an appropriate level of difficulty, with a desired objective, and within the user's capability to operate. Since purchased programs cannot be returned if unsatisfactory to the user's expectations, it is important that the documentation for hardware capacity required be accurate. Clear instructions for use can make the program packages flexible, useful tools, and assist the user in experiencing the full potential of the program.

Resources for Home Computer Owners

Computers are everywhere around us. Newspapers carry syndicated columns suggesting computer applications for the home. Abundant magazine articles tell success and failure stories of jubilant or frustrated users. Television commercials show how quickly a computer and the peripherals may be unpacked and assembled into a working technological system. Many new computer magazines have sprung into existence. Each is full of reports of new peripherals and advances in hardware technology, stories told by computer users, book reviews about computers, and examples of applications in the business, school, and home communities. With the environment flooded with technological information, the home computer novice might feel over-whelmed and confused.

Some commercial companies offer seminars to new computer purchasers. Community colleges and cooperative extension services frequently have workshops focusing on guidelines for purchasing a home computer system, use of computer

software, identifying whether a computer would be useful for your needs, or home computer applications.

Selecting Hardware

With the advances in the capabilities of hardware, computers are becoming smarter, have more memory capacity, cost less, and offer many more choices. Most families will attempt to get the most capacity for the money invested. Since computer prices range from \$100 to \$5,000, and capabilities vary accordingly, the choice of the hardware is an important decision. The selection must be based on the family's expected use of the computer system. There is no "best machine" for every family (38). If families attempt to project how they might use the machine within the first year, they will make a wiser choice for the hardware to be used. Choosing a Home Computer suggests beginning with a family needs assessment, then a shopping comparison of available computers for memory capacity, method of information storage, type and quality of screen, keyboard, capacity for use of peripherals, peripheral options, amount of compatible software available, and services offered by the dealer (39). Such an evaluation, prior to purchase, will improve the user's computer literacy, match the hardware capacity to the families needs, lead to a cost effective investment, and help to insure favorable adaptation to the machine.

Most home computers are 8 bit machines, referring to the memory capacity of the microprocessor chip. The amount of K is an important consideration, as it limits the capacity of the machine. An 8K or 16K machine would have very limited capacity, limiting use to game playing or very simple programs. A system with 48K or 64K would make the home computer a more versatile machine.

The method of information storage may be by cassette tape, cartridge, or floppy disk. Tapes are the least expensive method, but are also less reliable. They are slower to use, and a momentary interruption in electrical service may

interfer with the program. They are also more difficult to load into the machine. Cartridges and discs are more expensive but are more reliable and easier to use.

Peripherals include printers, disc drives, and modems. If the system is to be used for financial management and record keeping, or for word processing, then a printer will be helpful. Thermal dot matrix, impact dot matrix, and letter quality produce varying quality of print, but also with varying price tags.

A survey of services available through potential dealers may also be helpful to the family. Are the sales personnel knowledgeable and helpful? Are they able to help with questions and problems? Are training seminars available for new computer owners? Do they refer customers to user groups or clubs? Can they refer you to other customers who are using their products? What are the warranties on the machines? Is service available locally? Are loaners available? Do they have newsletters or information about compatible software?

Following this process for hardware selection will aid the computer novice in making a knowledgeable choice from the variety of machines available. This choice is an important step in the family's adaptation to the machine. It can only be accomplished by accessing available resources.

The Kansas Cooperative Extension Service, like several other states, is offering "Choosing a Home Computer" seminars at the county level. The seminar begins with an assessment of family needs and progresses to a comparison of commercial brand's capabilities to meet the family needs. Participants should develop computer literacy, clarify their family needs and goals, and have a better understanding of how a home computer can become a helpful tool in the home.

Selecting Software

With the increase in software of varying quality, and the advances in the capabilities of hardware, perhaps society needs new processes and institutions to help families and other consumers find appropriate and reliable programs and computer services. Once the family has identified its needs and selected hardware and peripherals with the capacity to operate the programs they intend to use, they are ready to select the specific programs. The task is one of locating programs directed at their specific needs, compatible with the hardware system, using accurate content, presented in an appropriate level of difficulty for family members, with enough user-friendliness that family members can operate it easily, and within a price range the family can accept. Since most software is purchased without being able to test-run the program, the task becomes even more difficult. Commercial programs are not returnable merchandise, or sold on the "satisfaction guarantee."

For the skilled programmer, custom designing programs is the answer. Developing programming skills is a tedious, time-consuming task. Most home computer users will not be willing to invest the necessary time to master this skill. Rather, they will select commercially produced programs.

The major commercial companies publish software directories of programs compatible to their specific computer. Some special interest groups, related to home computer use, are also attempting to categorize the tremendous number of programs coming onto the market.

The Michigan Cooperative Extension Service has begun a software library. The state staff reviews programs suitable for home use, and is assembling them in the state office by subject. County staff can then check-out the programs for review and evaluation. The county staff can decide if they will recommend the program for family purchase and home use, or if they want to use the program in a county workshop. Irene Hathaway, extension specialist, cautions

that adequate evaluation standards are not available and that to date, most efforts have been limited to cataloging programs.

Nancy Dillon, a Phoenix, Arizona home economist has formed a private enterprise, Strictly Software. She is publishing Computer Software for Home and Home Economics. These directories are printed in editions for each major brand of hardware, and are updated bi-annually with newly produced software listings. Home users may subscribe for current mailings. Dillon is encouraging more professional home economists to get involved with services to home computer users.

For the home computer user who wants to access a variety of programs for specific needs, possibly needing the program only one time, subscription to a subscriber service may be the solution. As an alternative to purchasing an individual program, the user pays a subscription fee, an additional charge for on-line access time, and long distance telephone charges if the data-base is not in the local area. This service requires a modem peripheral to be interfaced to the hardware. It transforms the electrical pulses of the computer into audible tones that may be transmitted over telephone lines. This process allows the home computer user to access data banks from other computers, load programs from subscriber services, or participate in a variety of telecommunications functions--including banking by computer, electronic mail, and computer conferences.

The CompuServe service rates are determined by the Baud rate of the connection, the time of day, the location, and the type of program accessed. Basic connect rates are \$6.00 per hour of standard time and \$12.50 per hour of prime time for 300 baud service. The rates are \$12.50 per hour of standard time and \$15.00 per hour of prime time of 1200 baud service. Prime time is 8 a.m. to 6 p.m., weekdays. Standard time is all other hours. In addition to these charges the user pays the subscription fee and the telephone charges.

Some organizations are including subscription to subscriber services as a benefit of membership. This concept appears to have real potential among professional groups. The user must consider cost and benefit in determining the value of the programming received through such a subscription service.

Other resources that may be helpful to the home computer user are government and extension publications. Brochures are available for many areas of decision making. "Do I want a home computer?", "Choosing a Home Computer," "How to Shop for a Home Computer", "Selecting Software for a Home Computer", and "Getting the Most from the Home Computer" are frequent titles.

A survey of computer trade magazines, readily available in bookstores, libraries, newstands, or by subscription list many follow-up resources. Contact with user-clubs allows the family to compare experiences, get ideas for home applications, and share sources for quality programs. Information about user clubs, newsletters, mailing lists, software directories, and book reviews is offered in computer trade publications. Since many new home computer owners increase computer literacy by reading, a library or bookstore visit may be helpful (34). For others, tutorial programs for the computer are more helpful (30, 34). The following is a sample of the resources available to home computer users.

Apple Computer Software 1983, a software catalog of programs compatible to the Apple computer, is edited by Jeffrey Stanton, Robert P. Wells, Ph.D., and Sandra Rochowansky. It is available from The Book Company, 112235 Hindry Avenue, Los Angeles, CA 90045.

Choosing a Home Computer, an assessment form adapted from Choosing a Home Computer, written by Irene Hathaway and Judy Lazzaro, and published by Cooperative Extension Service, Michigan State University, December, 1983. This form was developed by Joyce E. Jones and Jean K. Carlson, Kansas State Cooperative Extension Service, Manhattan, KS 66506.

Compuserve, a brochure describing programming available through this subscriber service, is published by Consumer Information Service, 2180 Wilson Rd., Columbus, OH 43228.

Computing Newsletter, is available from the University of Colorado, Colorado Springs, CO 80907.

Creative Computing is a magazine of computer applications and software. Published monthly, the cost of 12 issues is \$20.00. Available from: Creative Computing, P. O. Box 789-M, Morristown, NJ 07960.

How to Shop for a Home Computer, a flyer giving a comprehensive overview of points to consider, is published by the United States Department of Agriculture, Extension Service. It is available through local Cooperative Extension Service offices.

Microcomputer Software General Store, is published by Gamco, Box 310-P, Big Springs, TX 79720. This directory lists over 300 programs by many publishers, and the shipping and handling is free.

Popular Computing, a McGraw-Hill publication, is published monthly. Subscriptions are \$15 per year, and are available from P. O. Box 307, Martinville, NJ 08836.

Scholastic, a collection of software for most popular microcomputers, includes listings of the majority of MECC (Minnesota Education Computer Consortium) programs. Lists include program descriptions for 350 programs. It is available from 904 Sylvan Avenue, Englewood Cliffs, NJ 07632.

Speaking of Computers is a glossary of terms and reference list published by the Kansas Cooperative Extension Service, Kansas State University, Manhattan, KS 66506.

The Home Economist's Computer Newsletter, published quarterly by E. M. Enterprises, 3 Hickory Road, Denville, NJ 07834, is an excellent resource as an overview of what is going on in the computer scene. Each issue focuses on

one approach, such as software, buying computers, computer publications, funding for computer projects.

Quality Courseware, a catalog, lists over 400 programs by 45 publishers. It is available from Follett Library Book Company, 4506 Northwest Highway, Crystal Lake, IL 60014. This 300 page catalog is shipped free.

The Source, an information kit, explains the potential of Source programming being delivered into homes through its subscription service. The kit is available from 1616 Anderson Road, McClean, VA 22102.

In summary, resources are available to families to assist them with needs identification, hardware choices, software selection, developing computer literacy, and exploring potential applications. Some families learn by reading, others learn more efficiently by actually using the computer. A user-friendly manual may be the most valuable resource for identifying appropriate software and gaining the full potential from the home computer system.

Resources may be located through commercial dealers, the cooperative extension service, user clubs, printed media, continuing education classes, and community workshops. Families may select sources for programming from information stored on discs or cassettes that are purchased for a private program library, through subscription to an information service, or by producing their own programs.

Proposal for Future Development

The needs of home computer users are clear. For families to realize the potential of the home computer for managerial and personal needs, there must be increased computer literacy and awareness, increased numbers and quality of problem-solving programs developed for assessed family needs, and development of more economically feasible delivery of the programs into the home. Jensen (9) supports assumptions that the computer industry has neglected the needs of

the users, and that until these needs are met, a useful computer system will not enter the home. Cooperative efforts of the computer industry and home economists working together will help to develop a useful family computer system and prepare the family for the computer era. The combined approach will benefit both families and the computer industry. Home economists are challenged to assume an active role in this process (1, 9, 14, 24).

Collins (1) proposes that "the potential value and the effects of personal computer ownership on the management of the home and on the family should concern home economists. As family-oriented professionals, they must attempt to understand the implications of increased interaction with electronic devices and the effects on lifestyle, health, interpersonal relationships, and the growth and development of individuals." It may be proposed that home economists must go one step further. Standing by to observe the entrance of the computer into the home is not enough. Professionals must foster computer literacy among families, become involved in the production of quality software content, and encourage development of cost-effective program delivery to homes.

Marketing and retailing efforts should identify which situation a product is designed to reach, not the type of consumer to whom it is aimed. Product development then should logically follow the same pattern (40). Observation of the production of home computers indicates the process has occurred in reverse order. Jensen (9) suggests this is because consumers do not know their opportunities and options in computers, computer development has been based on the needs and demands of computer hobbyists since they are the few who are computer literate, and the computer industry is not aware of the needs of families. Home economists are the logical liaison between the family and the computer industry. They are qualified to communicate family needs, goals, and problems concerning the computer in the home to the computer industry. Only when this happens, will home computer systems be designed to meet family needs.

Increasing Computer Literacy

Computer literacy should be adapted as a part of the home economics discipline, since computers are having a growing influence on home management and family life. Increased computer literacy will promote adaptation of families to the home computer as a technological, educational, problem-solving tool. With increased computer literacy will come an awareness of the potential capabilities of the home computer. Only then will families view the computer in a positive manner, interact with it, and have control of it. Computers will no longer be purchased and stored in the closet. They will become an integral part of family life.

Home economists can aid families in this process by providing resources. Families need assistance in becoming aware of the potential role computers can play in the home, identifying management and personal needs, recognizing computer applications that can help the family to meet these needs, and acquiring a computer system appropriate for their needs. Resources may be produced through the media, in the form of magazine articles, newspaper columns, radio spots, or books. A home economist employed by the computer industry could produce newsletters, work with user-clubs, and direct customer workshops. Extension home economists could organize community workshops and produce printed brochures that assist families in each step toward home computer literacy and adaptation. Home economics educators could incorporate applications of computers to family needs in curriculum. All home economists could produce software content that would assist the family with needs identification, management skill development, or potential application awareness.

Research should be an important part of this process, giving the home economist a guide for resource development. Appropriate subjects are on-going needs identification, observance of the computer's influence on the family, effectiveness of programs in meeting family needs, product design and

development, and evaluating the level of computer literacy. Rowan A. Wakefield, author of "Families and Telematics," monthly column in American Family, is attempting to establish a clearinghouse of research efforts developing across the country. Graduate students and home economists may contact him for information on current and planned research activities. Wakefield (41) has categorized research interests as follows:

(1) research on the impact of the home computer use on families, with initial emphasis on self-help programs, in particular in education and health; (2) research on the impact of increasing home computer use of self-help programs on the professions serving families (in education, medicine, health promotion, therapy, counseling, law, religion, etc. . . .; and (3) impact of increasing home computer use on the future development and availability of the technology: hardware and software.

As research results become available, home economists should use them to mold the direction of their efforts in aiding families to develop computer literacy.

Increasing Program Content Quality

Home economists need to view the computer software package as a new media for communicating to the family. Traditional medias are magazines, newspapers, radio, television, books, public meetings, or flyers and brochures. The same subject matter, directed toward family needs and enhancing the quality of family life, may now be presented to the family through computer programming.

The computer program is an appropriate vehicle for family management and educational material because it is compatible with adult educational and life-span learning principles. Content may be focused on current problem-solving needs, may be presented in an informal program structure, may give reinforcement and on-going informal evaluation of the learner's progress, and is available for immediate use.

To develop a high quality program in a specific subject area, an individual must be an expert in the academic area, have sophisticated programming

expertise, and talent for artistic design. Since few individuals are competent in all of these areas, and most early programs have been produced by an individual effort, one explanation for the varying quality of programs is clear. The combined efforts of a subject area specialist, a programming specialist, and a design specialist should enable the production of sophisticated, quality programs. Home economists must initiate participation in this area of career potential. The approach to promoting software production needs to be focused in two directions; first, to educate subject area specialists of the need for content material, and second, to provide a structure where the team effort will occur.

Solicitation for home economists to function as software authors should be conducted among educators, cooperative extension specialists, and university researchers. Seminars at professional conferences, special interest association meetings, and faculty staff meetings could educate professionals about the growing demand for software programs for the home, the varying quality of current programs, and the need for their participation in software production. A demand for free-lance software authors could be communicated to home economists through professional journals, career programs, and university professional courses.

Creating an arena for team-produced software is a challenge to the profession. The production of quality software that will meet the demand from families for need-based packages, will benefit families, and in the end benefit the computer industry. When the industry benefits, support from it may be expected.

The workshop format warrants examination for the team project. The workshop is a group of 10 to 25 persons sharing a common interest or problem, meeting together to improve their individual proficiency, to solve a problem, or to extend their knowledge of a subject through intensive study, research, and discussion (42). The workshop format would allow the team of the subject

specialist, the programmer, and the designer to identify problems, explore the need, and seek solutions by working together to produce need-oriented software. Resulting software would use accurate content, that is effectively programmed, user friendly, and attractively presented. Each team member would be able to contribute his own expertise.

This process is time consuming for participants and each must be able to work individually, as well as collectively. Advance preparation will facilitate efficient progress. Physical needs would be a room large enough for group and team meetings, and laboratory work space for the review of example programs and the evaluation of the end products. Resources might be computers with appropriate peripherals, examples of programs of varying quality and formats, program manuals of varying quality, and directories of currently available software. Results of studies addressing family needs would also be helpful.

Workshop leaders will guide the process, but participants must be allowed to determine the goals and the methods to be used to reach the end product. Resource persons may facilitate this process. (Refer to the Team Software Production workshop outline, Appendix.)

Authoring services are another resource for home economists, turned potential software producers. These packages may be purchased by individuals who wish to produce software content, but are not skilled programmers. The easy to use language trains the subject specialist to organize content by screen. The Home Economist's Computer Newsletter advises that these will allow authors, with a minimum amount of skill in programming, to write programs to meet individual needs or to be produced commercially (23). The advantage of easier programming techniques may be off-set by the reduced flexibility potential for the programs produced by this method.

One authoring service is EnBasic from COMpress. The software package may be purchased from 286 Congress St., Boston, MA 02210. Ellen Young, a marketing

assistant, advises that the program has been available for about one year and 400 copies of the program have been sold. The company does not know the subjects of the programs that have been produced using this system.

Evaluation standards must be addressed when considering software production. No standard criteria have been developed for home computer packages. Efforts thus far, have been limited primarily to cataloging packages, with a brief description of each. Development of specific evaluation criteria would be helpful to program authors. Efforts in the field must address this topic if quality software is desired.

MicroSIFT, a federally funded organization "to obtain and implement a model for the dissemination of information about microcomputer software and materials for educational use at the K-12 levels" (43), has developed an Evaluator's Guide For Microcomputer-Based Instructional Packages. The guide specifies critical points in the program description, and a list of criteria for evaluation. Evaluations measure content, instructional, and technical characteristics. Evaluations give a description of the program with producer, ability level, date produced, cost, subject, date evaluation was completed and by whom, hardware requirements, software requirements, instructional purpose, and format. Evaluations address documentation, instructional objectives, instructional prerequisites, content and structure, time of operation required, potential uses, major strengths, major weaknesses, and other comments. Not only must the content be accurate and pertinent, but the educational principles must be valid for the subject and the learner addressed, and the technical format must be appropriate and responsive. These standards suggest that the team approach is indeed a valid concept for the production of software for family use in the home. This guide may be ordered from International Council for Computers in Education, University of Oregon, 1787 Agate Street, Eugene, Oregon 97403, for \$3.00.

In summary, quality of software packages produced for home use varies widely. Home economists must participate in the process of identifying family needs, communicating these needs to the computer industry, contributing software content, and cooperating in a team effort for software production. When this occurs, the computer will be a meaningful technological tool for family use in the home.

Developing a Delivery System for Home Use Programs

As discussed earlier in this report, Potential of the Home Computer to Meet Family Needs, the type and purpose of the program determines the most efficient delivery method to home computers. For the program that offers a structure, like a filing system or a ledger form, the family would decide to purchase the program for repeated use. The nature of the program would justify the cost of these relatively inexpensive programs. Programs for financial record-keeping, address or recipe files, or general data bases can be purchased for under \$100 (44). However, for the program with a problem-solving orientation, or directed at a one-time educational need, the family probably would not be able to justify the expense of the program. Since these programs are more expensive to produce, the situation is further complicated. A nationwide subscription service from a data bank of this type of programming may be the solution. Since two private enterprises have subscription services, the concept has been tested. However, programming from these services is primarily financial, news, and weather. Until recently, very limited family and home programming has been offered. CompuServe, through contract with Familiae, is offering a series of programs related to family relationships. The original content was developed from a manuscript prepared by Dr. Robert Lindamood, for publication as a book (3). Because of Dr. Lindamood's interest in families, he approached CompuServe and secured a contract to publish the material electronically through the

subscription service. The material is being expanded through the use of resource specialists in the fields of nutrition, family life, and human development; and requests from users. Thus, the content is responsive to the user's needs and is problem-solving in format.

The biggest disadvantage of the nationwide subscription service is the use of the long distance phone lines during time required to use the program. For many families, frequent use of services would be too expensive for the family budget. To eliminate this handicap, a system needs to be devised for downloading programs from a national data-base, to state or regional data-bases, to terminals at the local level. With such a system, the only charges would be the subscription fee, and an on-line charge to the subscriber for the time the family was receiving programming from the data-base. This could bring the subscription service within reach of virtually every family with a home computer system. Since predictions are that over one-half of American homes will have computers by the end of the decade, effort to investigate the possibility of such a system seems warranted (3).

The logical structure for disseminating the subscriber service is the Cooperative Extension Service. It is not only staffed with an array of specialists in subject matter related to the home and families, but it has a network of offices on the national, state, regional, and county levels. Extension services across the country are exploring selection of computer equipment and developing programs dealing with home computer use. Pilot projects in states to explore the potential for such a system could address family needs assessment and computer potential to meet the needs, program development, downloading of programming from the state to county levels, and evaluation of the effectiveness of computer programs meeting family needs. Exploration of the hardware requirements for such a system and the feasibility of the use of staff to operate the system needs to be studied.

Dr. Russell G. Mawby, Chairman and Chief Executive Officer of the W. K. Kellogg Foundation, gave a challenge to the extension service in his 1983 Seamon A. Knapp Memorial Lecture, at the annual meeting of the National Association of State Universities and Land-Grant Colleges (45). His challenge is to address issues of current vital public concern and to have a vision of the future in program planning. As the American society moves to the end of the 20th Century, the issues at the top of its agenda have changed. Dr. Mawby encouraged land grant colleges to launch new initiative in continuing education, augmenting their traditional commitment to life-span learning.

With the trends within the computer industry of increased hardware capacity and decreased hardware cost, such a system may soon be a feasible proposition. With the growth in the numbers of home computers, and the projections for continued growth, families will demand programming to meet their educational and problem solving needs. Home economists must address the delivery of family oriented programming.

SUMMARY

Microcomputers are entering the home environment by the millions. Rapid advances in hardware technology, increased capacity and capabilities for a decreased price, have gone ahead of software development, study of home computer users' needs, and understanding of the relationship between family and computer. Home economists are challenged to assume an active role in the adaptation of the family to the computer revolution.

The purpose of this report was two-fold: first, to assess the current usage of computers within the home environment, and second, to explore the potential for development of the home computer as an educational and management tool for families. The investigations focused around six objectives: 1) to determine the incidence of home computers, 2) to determine how computers are

being used in the home environment, 3) to identify developmental educational needs of families and needs of the home computer owners related to the use of the computer, 4) to explore the potential for use of computer programs, 5) to survey resources currently available to home computer owners that would help them utilize the computer to meet family needs, and 6) to propose a plan for production of quality software programs directed toward family needs and delivery of those programs into homes. This report is a broad overview of the entire scene. It is hoped that other home economists will select particular areas of the identified needs for more detailed study.

Objective 1

The trends of increased capacity for a decreased price have fueled the home computer boom. In 1983 fewer than 1 million families had computers in their homes. Studies show that over ninety percent of home computers are purchased by families with an annual income of \$25,000 or more (30). Projections are that by the end of the decade over one-half of American families will own a home computer (3). Other estimates are that by 1990 there will be 7 million computers in American homes (30).

Objective 2

Current uses of home computers are games, financial planning, education, and banking (30). The computer is often used to learn how to use the computer or to learn computer languages. Jensen (9) concludes that the lack of useful software, the time required to learn how to use the computer, the newness of it, and the lack of skills to perform desired tasks are contributing factors to how the computer is used in the home. Assumptions may follow that for the potential of the computer as an educational and management tool to be realized that:

- 1) families must identify their learning and management needs, 2) families must recognize the need to learn to use the computer to meet these needs,

3) professionals must produce quality software content related to family needs, and 4) a cost effective delivery of software to the home computer must be developed.

Blundell (30) predicts that the home computer will move from being a base-ment toy to being an integral part of the home during the 1980's. This will happen only when the computer industry begins to recognize and address family needs, there is an increase in computer literacy among all families, there is an increased number of quality software programs related to specific family needs, and a feasible delivery system is developed for the home market. Jensen (9) suggests that a valuable family computer system will evolve when it consists of three wares: the rapidly developing hardware, software, and the forgotten but most important people-ware. When all three wares are available, the computer can then be integrated with the family, which is necessary for the system to be useful in the home (1, 9, 30).

Objective 3

The family has two general types of learning needs: first, the needs related to family functioning, and second, the needs related to using the computer. The learning needs related to the family are a result of the two basic functions of the family--managerial and personal. The managerial function creates needs for developing management skills and using programs for organization of information. Programs to meet these needs may give a structure for management or record-keeping. Financial spreadsheets, budgets, and data-base files are examples. These programs are readily available for all types of home computers, at a reasonable price.

The personal function of the family includes education. Educational needs change as the family passes through the life cycle and as societal demands

change. On-going studies of the family are essential to identify current family needs.

The second type of learning need is related to learning to use the computer and developing computer literacy. Increased computer literacy will promote positive adaptation for families to the home computer as a technological, educational, problem-solving tool. With increased computer literacy will come an awareness of the potential capabilities of the home computer. Families will view the computer in a positive manner, interact with it, and have control of it. Computers will not be purchased and stored in the closet. They will become an integral part of family life.

To accomplish this literacy goal families need guidance toward becoming familiar with the home computer. Tutorial software programs are helpful to some families, while reading resources are more helpful to others (9, 25, 26, 34). User-friendly software program manuals may be the most important resource for families with this need. Clear documentation will assist families to select programs compatible with their levels of computer literacy.

Objective 4

The computer program is a flexible tool that may be altered to meet specific family educational needs. Tutorial, interactive simulation, drill and practice, and data-base formats give the framework for development of program subjects that is only limited by family needs. Interactive programs can facilitate two-way communication between user and machine. Immediate feedback, realizing consequences from decisions, and follow-up resources are effective reinforcements to user learning. The potential value of programs is limited only by the creativity of the content author and the programming skills of the programmer.

Program quality control must be addressed. The hardware technology has developed so rapidly, that software production has not kept pace. Software has not been produced by subject area professionals in response to family needs. Rather, programs have been mass produced by programmers who are inexperienced in the subject area. Few program evaluations are available, and standards have not been developed for evaluating home and family programs. Standards developed for educational programs intended for classroom use are helpful. Most efforts to date have been limited to cataloging home and family programs by subject area.

Objective 5

With the increasing numbers of software programs, and the varying extremes in quality, families need to utilize resources for selecting software to meet their family needs. Many family computer systems are sitting idle (33). Such families either do not have adequate software to turn the computer hardware into a useful tool, or they do not have adequate computer literacy to understand the potential of the system. In either case, resources can be valuable assets. The lay press, computer trade journals, radio and television, cooperative extension service, educational institutions, continuing education programs, commercial dealers, and user-clubs are all resources available to new computer owners. Resources will assist families in understanding the potential applications of the computer for their family needs, as well as overcoming computerphobia and gaining control of the machine.

Directories of programs, published by commercial companies, professional home economists, or the extension service, are helpful when families attempt to select programs to meet their specific needs. Although evaluations of programs are needed, the descriptions listed are helpful. They list hardware requirements, subject of content, producer, level of difficulty, cost, and a brief description of content.

Objective 6

This report identifies three areas that home economists must address. Efforts to increase computer literacy across society, contribute to software content, and develop a subscriber service for delivery of educational and problem-solving programs to the home will all promote family adaptation to the home computer system. Newspaper columns, magazine articles, and public meetings all help to increase computer awareness. The emphasis on using the computer as an educational tool in the classroom is producing future families that will demand programs to meet their educational needs in the home.

The team approach to software production warrants thorough investigation and experimentation. With a home economist contributing content, a programmer writing the program, and a designer adding artistic touches, the quality of software will increase. Authoring services are another alternative for the professional who wants to attempt to author a software package.

Delivery of educational programs through a subscriber service is realistic because families would not want to invest the purchase price of such a program into one use. Being able to select from a data bank of programs, according to specific current family needs, would increase the family's benefit from the computer. Programs would be available to access at any time, in the convenience of the user's home, when motivation to learn is high.

The Cooperative Extension Service appears to be a logical choice for the structure of a subscriber service because of the network of offices nationwide, and the staff of subject area specialists. If specialists could contribute software to a national data bank, and the programs could be downloaded to equipment at the local level, subscribers could access the service at the local level. This would provide programming with local phone service, as opposed to the long distance service required of current subscriber services.

With this glimpse of the computer's entry into the home environment, it is apparent that the home computer revolution is in its infancy. The list of potential applications for family use is just beginning. Stolker (28) describes the home computer as an incomplete tool. Users must define what they want the machines to do, for home computer systems to become an asset to families in managerial and personal functioning.

Blundell (30) views the home computer scene of the 1980's as an unfolding technological revolution. The availability of a more affordable, accessible, and versatile personal computer and its potential market acceptance have always promised to have enormous impact on American homes.

Home economists are challenged to address the computer entry into homes, study it, and guide it. Current understanding of the computer's influence on families, and their adaptation to it is limited. The revolution has only just begun (28).

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APPENDIX

A WORKSHOP GUIDE

Authoring Software for Family Education in the Home

WORKSHOP OUTLINE

Authoring Software for Family Education in the Home

PURPOSE: This workshop outline was planned to stimulate the production of microcomputer software to be used for family educational and problem solving needs within the home environment.

RATIONALE: Home economists and subject area specialists need to become more involved in the authoring of content for microcomputer programs. Quality and accuracy of content is important and needs to be produced by individuals knowledgeable in the field.

There are identifiable developmental stages during the family life cycle. During the early years of family life, educational needs are higher than at any other point in the life cycle because the family faces many "first time tasks." This is also a time when adult education efforts are at a low, and young adults have very little experience or preparation for the tasks they face.

Microcomputer programs have the capability of being an effective educational tool for problem solving subjects. Program format lends itself to interaction with the user, practice in choosing alternative solutions, receiving feedback immediately concerning the consequences that may be expected as a result of this choice, gaining a body of factual knowledge, and requesting follow-up resources for more information on the subject.

The number of computers in homes is increasing rapidly. Predictions are that by the end of the decade over one half of American homes will be equipped with microcomputers.

There is need for two types of software programming. First, the package that will have repeated use--usually gives structure. Examples, spreadsheet for record keeping, data files, address books and mailing lists, budget records. Family would probably want to purchase the program for repeated use. Second, the package that may have a one time use--usually problem solving orientation. Examples, What type of life insurance do I need?, Types of mortgages for a home purchase, Developing a savings plan for a child's college expenses, What to look for when planning to buy a home, Should I rent or should I buy? Programs of the first type are available, but very little is available of the second type. This workshop will focus on programs of the second type--educational and problem solving content related to developmental stages in the family life cycle. These programs could be delivered through a subscriber service.

Use of computer programs is compatible with preferred learning styles of adult voluntary learners--problem solving orientation, self-evaluations, informal structure, self selection of subject according to their needs, available when motivation is high, to use in their own home, and at a convenient time.

SESSION I: Developmental Stages in the Family Life Cycle

Objectives: By the completion of this session, the participant will be able to:
identify developmental stages in the family life cycle and the educational needs related to each.

recognize the capabilities of the microcomputer program to meet these educational needs.

assess the scope of types of programs available, and list areas where no programming is available for home use.

Session Outline:

- I. List Developmental Stages of the Life Cycle on blackboard and Discuss
 - Formation of New Family
 - Birth of First Child
 - First Child to Enter School
 - Last Child to Leave Home
 - Retirement
 - Death of Spouse

This workshop will focus on the early stages in the life cycle because the least amount of programming is available for these needs and stages.

- II. The Computer Program as an Educational Tool for the Family in the Home--
 - Group Discussion
 - Capabilities - to address problem solving needs
 - to give a body of information on the subject
 - to ask for the user's choice of solutions to a problem situation
 - to give immediate feedback related to possible choices
 - to give follow-up resources for continuing needs

Thus, the microcomputer program is capable of addressing all levels of learning--acquiring new knowledge, aiding in comprehension, applying what is learned to specific situations, analyzing the part this information plays in the family's total functioning, synthesizing a plan for over-all functions from the values important to the family, and evaluating the family's situation in relationship to their goals, values, and plan.

III. Brainstorming Session

The group is asked to list educational needs arising from the early stages of the family life cycle. These needs are listed, by category, on the blackboard as they are suggested by group members.

Examples of possible suggestions as related to Family Economics: (similar lists can be made for Nutrition, Clothing and Textiles, Family and Child Development).

Establishing the First Home

Deciding to rent or to buy
What insurance do I need?
How much can I afford for housing?
How to check the condition for
roof, plumbing, heating-cooling,
termites, etc.

Planning Long-Term Financial Goals

Analysis of Net Worth
Figuring Growth Rate of Net Worth
(+ or -)
Identifying Personal Values
Specifying financial goals
Giving priority to goals

Planning Ahead for Education Costs

Tax advantages of various plans
How much do I need to save?
Alternative plans
Grants, scholarships--when the time
gets closer.

Credit

Wise use of credit
Understanding interest charges--the
cost of borrowing money
Installment credit
Mortgages--various types
Revolving credit--what is the cost?
When the borrowing limit is reached

Buying a Car

How much can I afford?
Financing plans--which is the best
credit buy?
How to determine the value of a
used car
Tips for dealing with car dealers
How to assess the value of a car
in relation to its condition
Costs of operating a car--a part
of the total cost

Figuring a Budget

What is included in a budget?
Tips for making a budget workable
Ways to recover from poor spending
habits
Identifying values related to spend-
ing patterns

Re-location for Employment

Are you really getting a raise after
the expenses of a move?
Choosing a new home--neighborhood,
schools, re-sale value, financing
Selling our home--establishing a
price, choosing a realtor, making
a home more sale-able,
Moving expenses--how to save, what is
tax deductible
Figuring my total income--which job
pays more--cash earnings, fringe
benefits, transportation costs

Insurances

How much life insurance do I need?
Why do I need disability insurance?
How and when to insure my automobile
Shopping around?--coverage vs. cost
Homeowners--which plan do I want or
need?
Medical coverage--what is the best
buy within my ability to pay?
What type of life insurance is the
best buy for my needs?
Use of life insurance in a financial
plan

Deciding if the Wife-Mother should Participate in the Paid Labor Force

What are the costs of returning to
work?--clothing, transportation,
child care, less time for household
care, etc.
How can I allocate my time?
Promoting shared time for household
responsibilities

Aids for Parents to Teach Money

Management to Children

Managing the Allowance
Uniform Gifts to Minors--management
of funds
Learning to Earn

The list could go on. Many decisions need to be made about finances, financial plans, and the family's economic condition. These decisions are often made without adequate knowledge. Lack of experience also contributes to the educational needs of young families. Computer programs developed to aid in such decision making could be delivered by subscriber service to homes with microcomputers--without a compatibility problem--by way of modem connections. Thus, families would not need to purchase programs that may only be used one time, and would have access to the entire library of available programs for the cost of the subscription fee.

IV. Define categories of needs--Perceived Needs and Unperceived Needs--and relate to the list compiled on the blackboard

Perceived Needs--needs that an individual recognizes. If a person is aware of a need, the motivational level for taking action to meet the need is usually higher.

Example--a young couple wants to purchase a home. They do not have any experience with mortgages or determining a home's value. It is likely they will take the initiative to explore current home values in the area, and sources and costs of financing. They may also seek information about determining how much home value they can afford.

Unperceived Needs--needs that an individual does not recognize. Without recognizing that a need exists, chances are that it will remain unmet. If something informs the individual about the need, and they become aware of it, then the motivational level to meet the need often changes.

Example--a young couple may not be taking advantage of deductible expenses on their income taxes, because they are unaware of the potential. After learning that moving expenses, transportation for out of town medical care, and child care while both parents are employed are deductible; they are motivated to save records of these expenses and save money on the amount of income tax they pay.

Microcomputer programs may then not only meet educational needs that families recognize and are motivated to learn about, but they may also help young families identify needs and problem areas that they were unaware existed.

V. Review of Currently Available Software

Directories are supplied as a resource for the participants to use to identify programs that are available for educational and problem solving needs. Areas that are not addressed by programs are also noted. (Note: so few programs are available commercially that this step will be accomplished quickly).

VI. Laboratory Assignment

Distribute handout - Rate your Software

Participants are asked to review the guide, as well as other resources in the laboratory concerning subjects of software programming currently available. Then, programs with a problem solving focus will be reviewed on the laboratory computers. Special attention should be given to the checklist on the evaluation guide, and the standards listed for evaluation. Notes may be made

concerning preferences on format, use of graphics, tips to make a program user-friendly, screen arrangement of text, ways to organize content. Tips for ways to involve the user in decision making should be noted. The important step of identifying the target audience, and presenting the content on that level of difficulty should be addressed.

RESOURCES available in the laboratory:

Computer Software for Home and Home Economics. Published by Strictly Software, Phoenix, AZ, 1984.

Evaluator's Guide--For Microcomputer-Based Instructional Packages. Developed by MicroSIFT--a project of The Computer Technology Program, Northwest Regional Educational Laboratory, University of Oregon, 1982.

Microcomputers in Home Economics. Published by Kansas State Department of Education, Topeka, KS, Fall 1983.

Softswap. Published by San Mateo County Office of Education and Computer-Using Educators, Redwood City, CA, 1984.

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Additional Resources that may be ordered for the laboratory:

Microcomputer Newsletters:

Computing Newsletter, available from the University of Colorado, Colorado Springs, CO 80907.

Popular Computing, a McGraw-Hill Inc. publication which is published monthly. Subscription cost is \$15 per year. Available from Popular Computing, P.O. Box 307, Martinville, New Jersey 08836.

The Home Economist's Computer Newsletter, published quarterly by Elaine Muller, E. M. Enterprises, 3 Hickory Road, Denville, New Jersey 07834.

Software Catalogs:

Apple Computer Software 1983. Edited by Jeffrey Stanton, Robert P. Wells, Ph.D., and Sandra Rochowansky. Available from The Book Company, 112235 Hindry Avenue, Los Angeles, CA 90045.

Quality Courseware, Follett Library Book Company, 4506 Northwest Highway, Crystal Lake, IL 60014. (400 programs listed, 45 publishers, shipping/handling free).

Scholastic, 904 Sylvan Avenue, Englewood Cliffs, NJ 07632. Collection of software for most popular microcomputers. They have evaluated the program and allow the customers a 30-day evaluation period. Majority of MECC programs are listed and described. 350 programs listed.

Microcomputer Software General Store, Gamco, Box 310-P, Big Springs, TX 79720. (300 programs listed, many publishers, shipping/handling free).

NOTE TO WORKSHOP LEADER: It is suggested to have a variety of programs available for the workshop participants to run on computers and evaluate in the laboratory. Selecting examples of excellent and undesirable quality programs would be helpful in giving a comprehensive over-view of desirable program structure.

SESSION II: Authoring Software in Home Economics

Objectives: By the completion of this session, the participant will be able to: identify evaluation standards for software packages and apply the standards to reviews of software and make valid evaluations.

select a developmental need of families and author content for a software package that will address that need.

construct the program content according to a selected format, compatible with computer capabilities.

Session Outline:

- I. Discussion of software that was reviewed in the laboratory
 - Points addressed:
 - Standards for evaluation
 - Terminology used
 - Documentation of programs
 - Tips for organization of content and selection of format

II. Team Approach Concept for Software Production

The participant should view themselves as the author of family education material. The delivery of this material may be by way of writing a book, distributing a newsletter, writing a magazine article, doing a radio show,

presenting a public meeting, or in this case--authoring content for a computer program. Functioning as a member of a team, uses each individual's expertise, and improves production efficiency. The author need not learn to program, just as a computer programming specialist, need not learn the subject material in detail. The designer is a specialist in art and system design, but need not be a specialist in the content area.

III. Selection of a Target Audience and Identification of a Need.

Each participant selects one topic from the list compiled during session. (Consider Documentation items on evaluation guide). Emphasize that content must be related to current family needs. Objective must be realistic to target audience. Format is selected according to program objective.

IV. Authoring Program Content

Each participant uses resources to gather facts, terms, ideas, principles, theories, and concepts related to the problem solving need selected. Participants are given a week to submit program content, then the programming process will begin at the next session.

Content is organized by screen, and submitted in written form.

V. References

Feinberg, Richard A., and Walton, Kathy M., The Computers are Coming, The Computers are Coming: A Study of Human-Computer Social Interaction, Home Economics Research Journal, 1983, 11, 319-326.

Jensen, Jacie Whitmore, Family Perceptions of and Adaptation to the Home Computer, Thesis, Washington State University, 1983.

The Home Economist's Computer Newsletter, edited by Elaine Muller, Vol. 1, No. 1-4, June 1983-April 1984.

Tydeman, J. Videotex: Ushering in the electronic household. Futurist, 1982, 16, 54-61.

SESSION III: Team Produced Software

Objectives: By the completion of this session, the participants will be able to: communicate with other team members, the programmer and the designer, concerning expected performance of the content to be programmed.

deliver program content to a programmer and designer.

I. Joint planning between the author, programmer, and designer.

This joint meeting of the participants and a staff of computer programmers and a designer will allow team members to review the content. The author should be able to explain expected performance and intended responsiveness of the

program. Programmers must understand the action course of the program. Designers are able to accent the content with graphics and or sound, as they deem appropriate. The action part of the process is then passed to the programmer.

II. Evaluation standards should be itemized for the programmer.

SESSION IV: Review of Programs

Objectives: By the completion of this session, the participant will be able to: evaluate completed programs according to the evaluation standards established, recognizing content, education, and technical characteristics of the program.

function as a member of a team to produce a microcomputer software package--the author of content, the programmer, and the designer.

Participants come together in a laboratory setting where they have access to computers. Each member reviews the programs produced. Programs are evaluated according to the evaluation handout used in the production process. Evaluations are related to the stated program objectives, the target group, and the identified family need.

Participants who wish to share programs produced in this workshop may provide discs for the exchange.

Possible applications of the programs may be discussed. Commercial production, sale to a subscriber service, or sharing among professional organizations may be potential outlets.

SUGGESTION FOR WORKSHOP FUNDING

Apple Education Foundation provides equipment packages for both educators and individuals. Contact: Dr. Barbara Bowen, Director, 1201 N. DeAnza Blvd., Cupertino, CA 95014 (408) 973-2105.

Atari Institute for Educational Action Research is especially interested in fostering computer related education in non-formal learning situations. Write: Sandra Williams, Manager of Program Development, Atari Institute, 1196 Borregas Ave., Box 427, Sunnyvale, CA 94086.

Bertamax, an educational-software company will help schools with small budgets and many kinds of microcomputers. Fifty schools form a consortium. The host school is given 250 programs and accompanying teacher's manuals--with permission to copy one for all its members. First year fee is \$500 per participating school. That works out to \$2 per software package. Schools can be from within the same district or spread across several districts. Further information is available from Bertamax, Inc., 3647 Stone Way North, Seattle, WA 98103.

Commodore Business Machines, Inc., 1200 Wilson Dr., West Chester, PA 19380 has initiated a nationwide grant program for educational institutions. Initial grant recipients, which ranged from elementary schools to universities, wrote proposals for creative uses for computers.

Education Secretary, Terrel Bell in Sept. '83 called for a massive influx of federal funds for research and development in computer education. Among the goals of these monies would be high quality educational programs. Keep in touch with your state Dept. of Ed. or write Susan Kline, NIE, 1200 19th St., N.S. Washington, D.C. 20208.

Electronic Learning's March 1984 edition features "Money for Micros." It includes Bills before Congress and stories of four grant recipients.

Classroom Computer Learning's March 1984 edition features "Finding Funding for your Computer Project." It has lots of tips how to go about finding funding.

Consider local resources--parents' groups, local computer retailer, chamber of commerce, special interest groups to supply software in their interest area, or team up with several departments resources.

RATE YOUR SOFTWARE

	1	2	3	4	5
SOFTWARE DESCRIPTION					
Name of Program _____					
Subject clearly defined	—	—	—	—	—
Objective Identified	—	—	—	—	—
Age/ability specified and appropriate to target audience	—	—	—	—	—
CONTENT					
Accuracy	—	—	—	—	—
Applicable to Needs of Families	—	—	—	—	—
Clear and Concise	—	—	—	—	—
Organization	—	—	—	—	—
DESIGN					
Screen arrangement of Text readable	—	—	—	—	—
Appropriate use of Graphics	—	—	—	—	—
Appropriate use of Color	—	—	—	—	—
Appropriate use of Sound	—	—	—	—	—
Quantity of Material	—	—	—	—	—
User manuals are comprehensive	—	—	—	—	—
PERFORMANCE AND EXPECTED RESULTS					
Format is _____					
(Interactive, Problem Solving, Tutorial, Game, Other)					
Format effective for subject	—	—	—	—	—
Use is motivational	—	—	—	—	—
User's ease in reaching program objective	—	—	—	—	—
Built-in evaluation to give feedback to user	—	—	—	—	—
*Utilizes computer capabilities	—	—	—	—	—
Total Score					_____
Average Score					_____

COMMENTS: (Note major strengths and weaknesses)

Scoring Guide: 1) Poor, 2) Fair, 3) Adequate, 4) Very Good, 5) Excellent.
Check the appropriate space.

A PROPOSAL FOR THE DEVELOPMENT OF THE
HOME COMPUTER SYSTEM
AS A FAMILY EDUCATIONAL AND MANAGEMENT TOOL

by

RUTH RAYMOND HASTERT

B.S., Kansas State University, 1967

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

College of Home Economics

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1984

Computers are entering homes at a phenomenal rate. Predictions are that over one-half of American families will have a home computer by the end of the decade. The decrease in cost has moved a flexible microcomputer within limits of family budgets.

The purpose of this report was two-fold: first, to assess current home uses; and second, to explore potential for use as an educational and management tool for families.

While current home uses are primarily game playing, financial record-keeping, and children's education; the computer has potential value as an educational and problem-solving tool. Families' educational needs are a result of societal changes and progression through the life cycle. They face decisions and problems without experience to choose from alternatives. The computer program, with interactive, tutorial, simulation, or drill formats; can be a valuable family resource.

Home economists must direct attention to three areas of development for home computer systems. First, the level of computer literacy of the masses must increase. Families need a better understanding of the potential applications of computers for educational, problem-solving, decision-making, management needs. Second, subject area specialists must contribute accurate content for computer programs. One approach to program production utilizes the home economist as a member of a team, with a programmer and a designer. Each member would offer his own expertise, which would result in improved quality programs. Third, an economically feasible delivery of programming into the home must be developed.

A subscriber service delivered through the cooperative extension service is compatible with the goals of the organization and with the structure of computer systems. The extension philosophy is based on a commitment to life-span learning. A national data bank of programs could be downloaded from the

national to the local level. Participating families could subscribe to the service and receive programming through a modem peripheral and local phone service. A thorough study of this potential system and pilot projects are needed.

Home economists are challenged to assume an active role in the microcomputer's entry into homes, development of programs, and implementation of a subscription service for delivery of programs. The challenge is clear. Research projects are needed to monitor and guide the action.