# THE MICROCOMPUTER AS HOME EQUIPMENT--A ROLE FOR HOME ECONOMISTS



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For decades, home economists have applied their expertise as new technology was introduced into the home. Electric ranges, freezers, sewing machines, vacuum cleaners, food processors, and the microwave oven were notable points in the technological history of the home. We are at another milestone as millions of homes add a computer to the inventory of durable goods. Now we again have the opportunity to lead consumers and families in a major purchase decision and its application to managing the home.

When has so much attention been given to a piece of home equipment? Weekly newsmagazines and evening television news repeatedly feature the "home computer." Numerous accessories for the user appear in stores and mail order catalogs. "How-to" books for computer users are at the top of the list of categories of best selling books. The bright lights of public attention are turned to this new addition to household technology and, indirectly but more importantly, to the tasks and activities that family members pursue in the home. Home economists can seize this as an opportunity to emphasize the scope and significance of the work performed at home and the recreation enjoyed there. They can again provide the expertise that consumers look to in evaluating the potential of a new product.

## The Microcomputer as Home Equipment

Despite the relatively recent origin of the microcomputer for home use, the generic product has taken a certain form and shape. The following definitions are offered for the sake of clarity in the paper, but also because they represent usage that is becoming conventional in the industry.

The term HOME computer is appropriately used to describe a system with a central processing unit (computer) with typewriter-like keyboard and some internal memory, connected to a television for the screen display, with a cassette recorder for a storage device, and probably with a joy stick or paddles since games are a likely use of a home computer. Serious applications for home management (budget records, correspondence) are difficult because of the lack of a printer and the lack of clarity in display of text material on a television screen. Home computers as described here would be too limited to warrant all the attention given the introduction of computers into the home, although consumers purchase such systems at very modest cost and then consider themselves participants in the computer revolution.

A PERSONAL COMPUTER system is comparable to that used in a small business. In addition to the computer and keyboard, a monitor provides a clear screen display, a disk drive stores data and programs, and a printer provides a paper copy of output. With such a system, business-like functions are possible in the home in addition to the entertainment and educational activities enjoyed

on the home computer.

An additional device is a necessity for participation in the world of computer communications--a connecting device (MODEM) to send and receive messages from other computers. The communications function is predicted by many to be the most exciting computer activity on the horizon. Although computer TERMINALS can be purchased at very low cost that allow one to access information networks over telephone lines, using a PERSONAL COMPUTER as a terminal has some advantages: there will be a disk available for storing messages that one wants to keep after the connection with the network is broken and a printer to produce paper copy of text which is needed in the conventional printed form.[1]

Functions Performed by the Computer in the Home

It is interesting to note the changing importance of the several general functions that computers can perform in the home environment. When microcomputers were first promoted as home equipment, before there had been much descriptive information in the mass media, the applications of this technology that were generally expected were record keeping and the control and monitoring of home appliances and environment. These functions may have come first to peoples' minds because they closely imitated the functions of larger main-frame computers in the work environment. The picture that is emerging is quite different, and will be even more different in the future, as computers begin to take their place as household equipment.

Entertainment and education

The enchantment with video games, of course, has been a prime motivating factor in bringing the computer into the home, and a prime reason for turning the machine on once it is there. Game-playing is not entirely evil, by any means. Experiencing this new technology in a fun-and-games fashion overcomes inhibitions, particularly in adults, and provides some intergenerational activity. Of course we should have the usual concerns when any activity is engaged in excessively. For computer users, too much time at the keyboard may mean a lack of physical activity and social interaction.

There is already reason to predict that the simplistic games have lost their initial appeal, except for a minority of insatiable addicts. The educational function of the interactive computer will become as important, or more so, than "blow-'em-up" games. Not only will consumer tastes expand, but the software now appearing in the market generally represents the more stimulating and substantive efforts of the industry, programs that understandably took longer to produce than the first wave of simple-minded action games.

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[1]An excellent product report for microcomputer hardware for home use was presented by Consumers' Union in the September and October, 1983, issues of Consumer Reports.

The entertainment and education potential of microcomputers initially was realized through programming the computer, a truly absorbing hobby. The "hackers" are a tiny minority of computer users now, since commercial software offers such diverse applications few new owners are willing to learn the discipline of a programming language.[2]

Processing numbers and words

The business-like tasks of home management--budget records, recipe files, Christmas card mailing lists--seem to have failed in capturing the computer user to the extent predicted. The low-priced home computer system, adequate for game playing, is seriously handicapped in performing such tasks, and the price tag on the personal computer system, as well as the more demanding users' manuals, were intimidating to the middle-class consumer. The market penetration for home computers has not reached predictions. The industry seemed to be taken somewhat by surprise by the sophistication desired in hardware and software by those who purchased a personal computer for home use. It would seem that the computer engineers generally underestimated the serious business-like tasks that must be done in SOME homes, at the same time that they over-estimated the market for simple software for budget records in the average home. Word processing has been a far-more popular application than expected and the electronic spreadsheet software (e.g. VISICALC) a good seller even for home use. The incidence of home-operated small businesses and the volunteer efforts to keep non-profit organizations alive (treasurer records, mailing lists, etc.) likely contributed to the demand for business software for home use. (We, as home economists, could say that we've always recognized the importance of such work performed at home by family members--the engineers should have consulted us!)

Electronic control and monitoring

Although the more fanciful predictions of some years ago (particularly by those who did not know much about microcomputers) emphasized the electronic home with equipment monitored and controlled by a central computer, very few microcomputer owners have asked their new machines to do any such thing. Indeed, few hardware or software products are offered by the retail computer stores to assist the new owner in using the computer for this purpose. The problems are generally these: most microcomputers can do only one task at a time so if the machine is monitoring the smoke detectors, it can't be used at the same time to update the budget records; special wiring may be needed to bring the operation of appliances under the control of a single computer; customized software will have to be written; malfunctions of the system can have disastrous effects (the lawn sprinkling system runs all the time you're on vacation). A far more reasonable application of computer technology to home control, and the widely prevalent one, is the use of special purpose microprocessors. These tiny pre-programmed "computers" are in our timed thermostats, microwave ovens, automobiles, etc. at far more reasonable cost and maintenance requirements than if we tried to do all of this from a single

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[2]This lack of mastery over the computer by the user concerns some experts, particularly where children are concerned. In his excellent book Mindstorms, Seymour Papert pleads for introducing children to the computer in a manner that leaves them master over the machine rather than the reverse, as tends to be the case with most programmed computer-assisted-instruction exercises.

microcomputer in the home. When considered in this manner, most of us are computer users and we never had to learn a single keyboard command.

Communications and information

There is much greater interest, and more products, directed toward the communications mode than the electronic control mode. Therefore, one means for being recognized as computer literate is to talk of personal computers interfacing with other computers rather than controlling the coffee pot and monitoring the smoke detectors. The communications and information functions offer the most exciting opportunities for computer use in the home, and are likely to have the greatest impact on home functioning of any application.[3]

One hesitates to even begin constructing a list of what is possible when a home computer terminal is connected to a computer network; the possibilities are infinite so any list is constrained. Information retrieval is one category of use. This could mean something as simple as accessing airline schedules, weather forecasts anywhere in the nation, stock and commodity market prices, et cetera. Essentially, these are the kinds of information that we now seek in either one-way media such as daily newspapers and the morning television news or interactive media such as telephone calls to agents and brokers. And, just as with a telephone call to a stock broker, access to a computer network also allows for interactive use or transactions, the second category of use. So we must think of the many household-to-market transactions that could be done at home: banking, shopping, ticket reservations, scheduling home maintenance services. Information retrieval could also be more ambitious such as on-line searching of encyclopedia or library reference materials.

Then there are the person-to-person communications such as electronic mail, a version of which is now provided to computer users in some metropolitan areas by the U.S. Post Office. Computer users who subscribe to one of the information networks (CompuServe, Source, and several others) have electronic mail services available for communicating with other subscribers as well as the bulletin board where messages can be electronically "posted" for any interested reader.

These services provide a new media for "networking", a form of interaction considered to be of considerable social significance. (See particularly Marilyn Ferguson's comments in "Microcomputer Revolution: Family Friendly?") The opportunity to dialogue with persons in whatever location who share similar interests has great appeal. Although the interaction among members of these special interest groups (SIGs) is through text messages on a computer screen rather than voice communication, this need not be inhibiting. Indeed, there are certain advantages. Physical appearances and mannerisms are of no significance. It is not necessary to go through the niceties of social convention to establish a conversation. The other participants need not be available at the moment you want to talk; they can read your messages and respond when convenient.. But, as with so many activities, if the appeal is great so is the potential for abuse. Communication skills essential for social

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[3]B.O. Evans describes in detail the potential and problems in Computers and Communications in The Computer Age. See also the excellent Trend Analysis Report Compunications from the American Council on Life Insurance, Summer, 1982.

interaction will not be developed or maintained by those who choose this form of interaction. It is so easy to converse only with those persons who share identical interests, preventing exposure to a diversity of topics. This "narrowcasting" is at odds with the need for broad awareness and understanding among people in our pluralistic society.

Another consideration is the cost of accessing computer networks, a not insignificant matter today when long-distance telephone charges must often be paid. Cable television and satellite communications will provide the transmission media in the years ahead, greatly reducing the cost of information access and communication via home computer terminals. The cost factor is of great significance because of the importance of access to information in this society. It is often suggested that differentiation into social classes may become more a matter of the "know" versus the "know-nots".[4]

Expert systems for decision assistance and behavior modification

The newest direction for home applications for microcomputers is in the area of software designed to provide expert services. These include a variety of programs, for example, one that will prepare a will for you based on information you provide as to assets and beneficiaries. (The promotional message is "Your computer has the power of attorney.") Programs to analyze nutritional content of your diet and to recommend menus are available. Expert programs in the medical area are expanding so rapidly that the FDA has established standards to monitor them because of the danger of misleading diagnoses. (Infoworld, 5:41, p. 33) Therapy for problems with interpersonal relationships or with substance addiction is available in computer software for home use. These are intended to improve mate selection and behavioral problem identification.[5] CompuServe users can now access the Familiae service for help with family problems, either in an individual counseling mode, or through information retrieval. (Infoworld, 5:41, p. 30)

Surely there must be a lot of "tongues-in-cheeks" over the potential for artificial intelligence applications for home and personal use, especially when the promises are so sweeping as those put forth by Smith and Debenham which range from reduction in divorce resulting from mate-selection computer systems to happier and better organized families with increased involvement of family members with one another--all of this because of the use of computer-

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[4]Commentary and debate over the social framework of an information society is found in articles by Daniel Bell and Joseph Weizenbaum in The Computer Age, and in the recent and widely-read Megatrends by John Naisbitt. See also recent popular article by Gerber in Today, and Masuda's The Information Society.

[5]The "Families and Telematics" column in the American Family newsletter edited by Rowan Wakefield provides a continuing up-date on this particular type of application which Wakefield predicts will become the most important application for home users.

assisted decision models.[6] The design of expert systems[7] is a branch of artificial intelligence which is viewed by many as still at the parlor-game stage of development. No one should be too dubious about the potential of electronic technology, and yet a healthy skepticism will assure that we maximize the benefits and reduce the risks. It seems strange that an area as subjective and personal as family relationships should be analyzed through such a constrained and impersonal medium. The potential for expert systems in the financial decision-making realm seem far more promising. Although even here, aspirations should not be too grandiose. A recent Sears promotional for Commodore 64 home computer promises "financial counseling in your home," an ambitious declaration given the commercial software available.

A research project at the University of Missouri intends to develop expert systems for financial counseling. But the intended use of the system will be in the office of a financial counselor, rather than in the home without professional guidance. Even in the financial domain where solutions to the problem are fairly objective, even mathematical, few professional financial counselors would feel comfortable with the extent of expertise captured in a computer program simple enough for a person to use at home. In computer software, sophistication in function is rarely accompanied by simplicity in use. For example, think of an expert system that would assist a family financial manager in making income tax-related decisions and complete IRS forms. How much knowledge would be necessary for the user to understand the information the program requires? What provision is there for the program to be kept up-to-date as IRS rules change? How quickly are updates available following a change in IRS regulations?

Perhaps we should look at something less complex than federal income tax (hardly anything is MORE complex). For example, the financing of a home. The mathematics required to guide decisions in home purchase and financing are easy to build into a computer program. But under current market conditions, the family decision-maker needs to understand at least the basics of balloon payments and adjustable rate financing to use such a program. The problem here is that such decisions are infrequent for a given consumer and the knowledge base is weak for most home purchasers. My university upperclassmen should be more adept at such reasoning than the average consumer, but I have little reason for confidence in their understanding of the nuances of mortgage financing. The point is that there is a need for such computer-assistance but the software should be designed and used by professionals. I see no other way to maintain valid decision-assistance computer software available to consumers in areas that are somewhat complex and/or subject to changes in rules. There may be

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[6]The not-too-convincing justification for these results is in the article in Futures, February, 1963, pp. 33-46, and, more recently, in The American Journal of Family Therapy, 11:1, pp. 16-31.

[7]Expert systems are computer programs that capture the knowledge (data) and reasoning (decision rules) of experts. Such programs may be made available for clients to use, or may serve as computer assisted problem-solving for the expert. In the latter case, the decision rules as well as the data should be subject to modification by the user. Commentary and critique of artificial intelligence applications can be found in Crichton's Electronic Life and in Minsky's "Representation of Knowledge" in The Computer Age.

potential for computer-assisted decision-making following the decision models from the consumer behavior and home management literature. These models would be acontextual; that is they would be designed to guide problem solving in any domain. This eliminates the problem of updating.

A Role for Home Economists

It is understandable if professionals committed to helping families feel overwhelmed and confounded when such a complex product appears so quickly and is predicted to be as pervasive in its impact as the microcomputer. In the midst of many mandates to become computer literate, it is refreshing to find balancing perspectives such as the book, Computer Choices: Beware of Conspicuous Computing by Covvey and McAllister and this statement by Les Cowan

> We hear about the necessity of becoming computer literate with the implication that those who don't will be doomed to permanent career inferiority and intellectual sterility. This is heard mostly from people who are in the business of selling products designed to confer this modern equivalent of divine grace. The hullabaloo about computer literacy is 80 percent marketing and 20 percent the kind of one-upmanship that turns national interest into fear of being left behind when anything new comes along.

But it would be a serious mistake for us to use such statements as excuses for an ostrich posture. We do have commitments to the welfare of the families we serve and to the credibility of our profession. How often we hear it said (and particularly well-said by Alan Mirabelli in"Microcomputer Revolution: Family Friendly?") that we must be in control over the technology we use or it will control us. The answer to the question," Is the microcomputer revolution family friendly?" seems to be that it depends on us, on professionals that want the best for consumer and families and have the expertise to make the best happen.

Rather than emphasizing what we do not know and should learn about computer technology, we could readily build on the relevant expertise and experiences we already possess. Viewing the computer as another piece of home equipment helps us see that we can be of help with the standard concerns of insurance protection, warranties, financing, leasing, and repair service. Home equipment specialists could easily learn the details of protecting the computer from such phenomena as power surges and brown-outs, without knowing the design of the microprocessor circuitry. We have been of help to consumers with the selection, use, and care of automobiles without knowing a great deal about the gas combustion engine. Similarly, we have not felt the need to teach drivers education; perhaps our efforts are not best expended in the direction of teaching clients to use computers since such instruction is so widely available.

Expertise in using computer software and hardware (not necessarily in programming) will give us a base for evaluating products which, when combined with our present expertise in influencing the design and marketing of products, will enable us to impact on producers so that families are better served by this industry.

We have considerable expertise in disseminating useful information to households. The information networks claim to provide home management information, but we would not likely be favorably impressed with what is available relative to the storehouse of wealth in Extension publications and programs. It would seem to be a clear and present challenge for Extension to make their information base available to households through such a media. Finally, we could guide families in maximizing the benefits of this new technology and minimizing the costs to family relationships. The possibility of the electronic cottage with education and income-earning at home via computers poses as many problems as it does potentials and it is home economists who can provide the leadership in this transition.

Home economists could, and should, be doing all of this. But meeting such a challenge could claim the entire corps of Home Economics Extension Specialists, leaving sparse attention for the multitude of other concerns facing the family. It is essential that we establish a thoughtful perspective and carefully set priorities so that our expertise is focused in the most effective direction. A criticial mass of Home Economists must have a high profile in the microcomputer revolution, primarily for the welfare of the families we serve and also for the credibility of our profession.

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