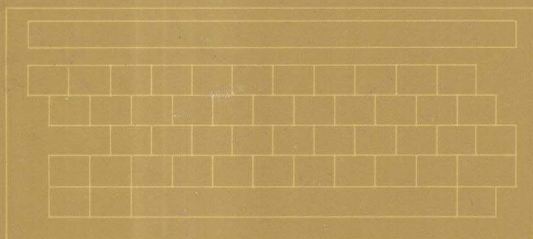


# **MICROCOMPUTERS FOR ADULT LEARNING**

## **Potentials and Perils**

**Edited by David G. Gueulette**



# Microcomputers for Adult Learning *Potentials and Perils*

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David G. Gueulette

## Foreword

When Charles Babbage invented the “Difference Engine” in 1821—considered to be the first computer—I doubt that he realized that some 160 years later computers would play such an important role in the lives of people. Today we chuckle when we compare Babbage’s invention made up of hundreds of rods, wheels, ratchets, and gears to the modern-day computer that sits on our desk top and takes up little more room than a typewriter. Yet, many believe that this “modern-day” computer will be viewed as clumsy and incompetent in a few years.

Computers are not new to education. In the 1950s they were introduced in colleges and universities to help manipulate numbers and assist researchers with statistical computations. These early computers, consisting of hundreds of glowing tubes and yards of multi-colored wires, filled entire rooms. With the introduction of the transistor, computers decreased in size and cost and increased in capacity and ability. In education, we began to see the beginnings of computer-assisted instruction—a kind of programmed learning in which students pushed buttons in response to questions presented by the computer. Early computer-assisted instruction never caught on in education as some educators imagined it would—it was expensive, there were many “down times” during which the machine wasn’t operating, and students became bored with selected, prearranged responses to questions.

Then we began to hear about the microcomputer, a free-

standing, easily portable computer powerful enough to store and manipulate information and inexpensive enough to be affordable. Many businesses, and even families, began purchasing these computers. We began to see microcomputers in elementary and secondary school classrooms, and they became the subject of computer courses at colleges and universities. But business and industry were far ahead of education in the use of microcomputers—executives had them in their offices, secretaries used them instead of typewriters, accounting departments had them, parts departments used them for inventory control; they were scattered throughout firms.

Adult education only recently has begun to explore microcomputers and their application for the education of adults. This book is an early attempt to examine microcomputers from the perspective of adult education.

Within adult education, microcomputers can be viewed in at least three ways: 1) the microcomputer as an appliance may be applied to such tasks as family budgeting, check balancing, controlling home heating systems, assisting the small business owner, and providing entertainment through computer games, 2) the microcomputer as an information finder can be tied to computer banks through telephone hookups to provide a massive amount of information, and 3) the microcomputer as teacher can be used to provide simulations that offer adult learners opportunities to practice tasks more inexpensively than working with the real thing—opportunities for learning a foreign language, mathematics, writing, and a host of other skills. When tied to video machines, the microcomputer can provide an even broader range of interesting learning experiences that offer the opportunity for student feedback and response.

The field of adult education appears to have taken three positions concerning the microcomputer. The first position is represented by those adult educators who have become aware of the microcomputer and haven't decided yet what to make of it. A second group has examined the microcomputer and decided that it has no application in adult education. These adult educators offer a variety of reasons for their position, ranging from cost to the inhumane and impersonal qualities of the computer. A third group has heard about the microcomputer, has gotten excited about it, and wants to incorporate the microcomputer in every aspect of adult education from language education to education in the arts and humanities.

Each of these perspectives presents many problems. On the one hand, those of us in adult education cannot overlook the importance of microcomputers in our society. They are in business and industry, they are increasingly to be found in elementary and secondary schools, and they have just begun to appear in homes. They are not to be ignored. Yet, in my opinion, it is an error to jump on the microcomputer bandwagon without looking carefully before we leap. Some adult educators have done so in the past with other technological innovations. Some, for example, gave adult education via television far more attention than it deserved—not that television doesn't have an important role to play, it does.

Before we become seduced by the tremendous potential microcomputers seem to have for adult education, we must examine a series of questions and explore a number of potential problems that the microcomputer presents. First, we need to recognize what the microcomputer can and cannot do. It can make available almost unlimited information, particularly when tied via telephone to computer banks. It allows the learner to talk back. It can be tied to other people who have microcomputers. It can be set up in one's home. And it allows a person to work with various types of information at a selected speed.

Given all of that, what can't it do? It cannot provide real life experiences—it can come close with simulations, but a simulation is often a quantum jump from the real thing. It can't provide the warmth that is possible when a group of adults explore some topic together, work on some problem, or attempt to learn some skill. It can't provide the opportunity for learning interpersonal skills. As some have said, if all of the world were one day to consist of isolated learners hunched over microcomputers, how would we ever solve the problems of groups, states, and nations that must learn to live in the world together?

The microcomputer is a tremendous resource for information processing. It is much more difficult to think of it as a resource for ethical decision making, for developing appreciations for the arts and the humanities, for developing attitudes and feelings about what it means to be a human being.

How can we, then, take advantage of the strengths of the microcomputer in adult education and, at the same time, be cognizant of its weaknesses? Let me suggest some "what ifs."

What if we began to view the microcomputer as a source of information for adults, and thus release education from its his-

torical primary role of transmitting information from source to learner? Is it possible thus to change the very definition of what teaching and learning is about? Is it possible to view teaching and learning as something more than transmitting information?

If the microcomputer is a ready source of unlimited information, from computer banks and from people who are willing to share their information via microcomputer exchanges, why bother to have people "learning" information as a part of educational programs? Why, for instance, have an adult education course that explains the workings of the stock market when people can obtain that information for themselves on their microcomputers? Why offer a course that summarizes recent research in food processing when those concerned can easily obtain that information for themselves, and more inexpensively too?

Taking this idea a step further, if adult education could be freed from its role of transmitting information, it could begin to spend more time on the meaning of information, on problems and issues, on ethical concerns, on matters that require human interaction such as a nation's policies toward the environment, nuclear energy, peace, and human rights.

Before becoming enthused about this application of the microcomputer, several serious problems must be explored. What will happen to those vast numbers of adults who do not have enough money to buy a microcomputer and thus do not have ready access to the information sources? Will we develop a society even more widely split between the haves and have nots?

And what about the information controllers, those who provide the information for the computer banks? How can we be assured that the information is accurate, that the information isn't slanted in a particular way, that certain information isn't being excluded, that we aren't somehow being manipulated by the information? (Of course we already face this problem with our present information sources.)

There is every indication that the microcomputer will continue to decrease in price and thus become widely available to many more people. We in adult education are already behind in examining its potentials for assisting adult learning. It is time we began a serious exploration of these potentials, albeit an informed and thoughtful exploration.

Jerold W. Apps  
University of Wisconsin



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## Introduction

*The way to solve the conflict between human values and technological needs is not to run away from technology. That's impossible. The way to resolve the conflict is to break down the barriers of dualistic thought that prevent a real understanding of what technology is—not an exploitation of nature, but a fusion of nature and the human spirit into a new kind of creation that transcends both. When this transcendence occurs in such events as the first airplane flight across the ocean or the first footstep on the moon, a kind of public recognition of the transcendent nature of technology occurs. But this transcendence should also occur at the individual level, on a personal basis, in one's own life, in a less dramatic way. (Pirsig 1974: 261–262)*

*A recently completed study involving research with the Myers-Briggs Type Indicator has strong indications for CAI uses. This study, involving 3500 learners, indicates that CAI programs may favor those learners who have the ability to quietly concentrate, pay attention to details, memorize facts, and stay with a single task until its completion. Extroverts (or perceptive learners), on the other hand, may not fare so well.*

*If the learner craves the presence of other people, interacts well with other people, is deeply concerned with other people, the inanimate computer does not satisfy his/her preference.*

*In summary, the individualized concept which might result in a computer for every learner will produce inadequate educational learning performance for a large percentage of learners. (Hopmeier 1981: 16–17)*

Before adult educators rush headlong into the rapidly developing area of microcomputers for instruction, it is imperative that they examine a balanced view of the potentials, perils, and practicalities of this new medium. Beset by glowing claims, inundated by sales and promotional materials on the educational applications of microcomputers, and constantly exposed to the dramatic and colorful examples of exciting teaching possibilities as found in professional and popular literature, those in decision-making positions regarding the selection of instructional delivery systems are in great need of a reference or issues text that reveals the complex and often contradictory aspects of this technology in a critical and evenhanded manner.

The themes of the articles in this anthology express the following concerns: potentials of this new teaching medium as reflected in actual and proposed learning activities; perils or problems associated with selecting, using, and misusing the technology; and recommendations or models for the appropriate implementation and use of microcomputers for the instruction of adults.

The contributors to this anthology have been drawn from the fields of adult education and instructional technology. Several of the writers are noted experts in both fields. While it is impossible to bring together a complete or even comprehensive accumulation of all the issues, practices, or prospects for this new teaching medium, the selection of topics in this text attempts to provide sufficient balanced information on instructional microcomputers so that an adult educator or administrator might make a more informed decision on how, when, and where to employ the technology.

Some of the authors have approached the task as an exercise in overcoming traditional resistance to the adoption of innovative teaching methods or media that has characterized the field of education in general and adult education in particular. Other writers consider the adult educator to be a wise and cautious leader who thoughtfully examines potential teaching tools and accepts and implements only those that can support meaningful learning approaches and beneficial social values.

The authors have tried to avoid making references to specific equipment types, software packages, or costs, except when citing an example, as these aspects of the technology change so rapidly. Suffice it to say, that equipment is becoming more readily available, more adaptable to individual needs, and easier to program and use. Software or courseware is also easier to

locate and more specific to identified learner aptitudes. Costs of equipment and software are going up, but modestly, compared to other instructional technologies.

The terms used by the authors vary somewhat in that they sometimes assign different meanings to concepts, programs, or applications. This appears to be one of several problems with this emerging field. The distinctions between the structure, uses, and impact of the microcomputer are sometimes difficult to discern from the structure, uses, and impact of the large mainframe computer. Computer-Assisted Instruction (CAI) is a basic function of both computer systems and this encourages a writer to explain the instructional process as applicable to either or both systems. The problem of separating the microcomputer, with its functions and their ramifications, from the earlier and still dominant large computer is one that has yet to be resolved. Some experts have suggested that there is really little or no distinction between the two, at least in the educational end result; perhaps they are right.

The Foreword to this collection is provided by Jerold W. Apps, who develops an informative and provocative review of the development of the computer in the educational context. He discusses the three positions that seem to reflect traditional adult educators' views of computers. His main theme, however, is a call for a more creative and responsible role for adult educators in their use of technology. He has determined that the most valuable function computers can provide for educators lies in the area of information management, which can free teachers from the time-consuming drudgery of recording and retrieving data for more important activities such as personalized instruction.

W.C. Meierhenry begins "Microcomputers and Adult Education" with an investigation of serious issues related to adult learning and technology. He argues that the dilemmas facing adult educators concerning their use of methods of instruction should not prevent them from facing the problems head-on and from making reasoned choices for the best and most humane applications of microcomputers and other teaching tools.

Meierhenry's primary contribution lies in his lucid and helpful explanation of adult learning theories and how they relate to the uses of the microcomputer. His careful review of current ideas on how adults learn considers the repercussions of interfacing mechanical and isolating systems with accepted adult learning styles.

Drawing upon a considerable base of research in adult learning, Meierhenry relates these findings to the emerging knowledge on the effects of computers and allied devices. His research findings reflecting potential uses of technology for adult education support his claim that microcomputers must be used and used humanely to provide the best possible educational support services for the many adult learners who will need educational assistance in the coming years. His conclusion suggests a future in which adults will be educated with new technologies that will be directed by appropriate learning theories.

"The Development of a Unique Teaching Technology" by Hugh Garraway is a compact yet informative review of the development of the computer and computer-assisted instruction. His explanation of the emergence of the "information society" focuses on the transition of training needs from basic instruction for vocational education purposes to the management of information in a world characterized by increasing use of electronic devices and associated materials (software).

Garraway outlines the historical development of the computer and the creation of initial applications. He defines the terminology of the medium as it has evolved with the equipment and software. He also comments on the initial success of the technology and suggests that it has proven its value for adult education in business, industry, and the military.

Garraway suggests that microcomputers have many distinct advantages over the large mainframe computers. For example, the equipment can stand alone in many diverse locations and is not tied to central equipment or software. Microcomputers are easy to operate and are not limited to time-sharing or terminal restrictions. They are less expensive to buy, maintain, and operate. His comparison of the microcomputer and the mainframe computer is most important if one is trying to determine if one system is better suited to an identified need than the other. Another useful section of this article deals with the possibility of networking to share facilities and software.

The discussion on obtaining courseware by buying or producing programs will be especially helpful to the new consumer. Garraway cautions prospective users that quality instructional programs can only be developed with the aid of adequate planning. He also points out that the medium is still in the nascent stages of its development.

George Mozes describes current applications of microcomputers in the health field in "Professional Education and the

Microcomputer." He outlines the use of this technology for solving patient-management problems (PMP) by using the microcomputer for simulations. Medical educators can avoid dangerous and expensive procedures and they can compress time by using microcomputer simulations. The problem solving emphasis of PMP is a perfect task for the microcomputer, which can simulate the various data that must be considered in teaching patient-management problems.

Mozes explains how the microcomputer has been used for actual patient-management problem simulations at Michael Reese Hospital in Chicago and provides a detailed commentary on the equipment, languages, and programs used. He also puts forth the case for using this simulation strategy for continuing professional medical education for doctors and others in the field. A network of shared simulations would be advantageous to participants as they would be relieved of the necessity of producing specific programs.

Continuing medical education for practicing physicians via the microcomputer also takes the form of pre-packaged seminars on tapes and disks.

Mozes lists and evaluates several of the typical applications of the medium for continuing education for various segments of the health services. He concludes his article with a strong argument for extensive use of the technology for continuing educational experiences in other professional areas as well; the argument is based on adult learning needs. His forecast provides a useful perspective on the potential uses of the medium from one who is currently very active in the development and use of microcomputers for continuing professional education.

Dorothy H. Judd provides a comprehensive outline of professional applications of microcomputers for teaching reading and writing skills to adults in her article, "A Microcomputer Role in Adult Reading and Writing Skill Development." She constructs a sound rationale for teaching adults reading and writing that is consistent with the technical characteristics of microcomputers. For example, she notes that the medium is very patient, very consistent, and very persistent, all of which support an effective approach for teaching adults to read and write.

Judd also points out the technical requirements of the microcomputer that must be available for the best teaching environment for an adult learner. Her analysis of computers and the Language Experience Approach suggests that the technology



and its language are important to this language-teaching technique. The medium and the technique match exceedingly well.

The unique ability of the microcomputer to supply highly individualized teaching also supports other reading and writing programs. Judd discusses these programs and recommends microcomputer applications. Of particular interest is the use of microcomputers by learners with learning disabilities. One of the primary strengths of the technology may well be its ability to provide specialized instructional programs and conditions for the adult learner who has some kind of learning, visual, or auditory limitations.

"Perceptions of Decision Makers Concerning Microcomputers for Adult Learning" by Carol E. Kasworm and Cheryl A. Anderson is an engaging and useful summary of the results of a survey of adult education administrators regarding the following topics:

1. Current awareness and use of microcomputers
2. Instructional staff development for using microcomputers
3. Accessibility of software and its development
4. Perceptions about adult learners and the medium
5. Financial concerns related to the technology

The survey was designed to uncover perceptions held by adult educators and administrators about the use of microcomputers for their instructional programs with the objective of trying to list common concerns. By doing so, the authors were able to make some generalizations on how, when, and where these decision makers will begin to buy microcomputer hardware and software for their respective institutions.

The important questions listed in the survey received responses from the administrators; the authors have presented the consensus or lack thereof in a manner that can serve as a helpful guide to those in similar situations who might be considering the introduction of microcomputers into adult education programs. The results are interesting and perhaps not necessarily those that might be expected.

Computer literacy and in-service training for instructional microcomputers are the main concerns of Roger Sanders in "Computer Literacy: Innovation Adoption and In-service Training." Sanders begins his plan for microcomputer in-service training and literacy development with a review of current bar-