COMPUTER LITERACY AND THE ADULT LEARNER

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What is Computer Literacy?

Computer literacy can be perceived as either a goal in itself or as a means to an end. In either case it can be defined in (at least) two ways. (1) Computer literacy is the *knowledge* of what a computing device is and how it goes about performing tasks; and (2) computer literacy is the *ability* to use the computer as a tool to support personal and professional activities. Whereas the first definition of computer literacy should be a goal of all students whose personal or professional life requires a working and current knowledge of the principles by which computers are designed, constructed, and used, the second definition of computer literacy has a much broader audience. Consider the following "literacy" scenarios:

	Scenario #1	Scenario #2
DEVICE:	8-bit Nintendo Controller.	32-bit IBM-compatible personal computer.
SOFTWARE:	Game.	Production scheduling.
LEARNER:	8-year-old third-grader.	45-year-old plant manager.
GOAL:	Learn intricacies of game. Save the princess.	Improve productivity at $100 million production facility. Save your job.
CONSTRAINTS:	Time, as allocated by parents.	Time, as allocated by other job-related demands. Fundamental understanding of the problems to be solved — may exceed individual expertise.
LAST CLASSROOM EXPERIENCE:	2 hours ago.	20 years ago.
RESOURCES:	Large number of peers are willing to provide assistance.	Exist, but willingness to access resources is diminished by perceived admission of incompetency.
RETRIES AFTER FAILING:	Unlimited.	Depends, but usually no more than 3 or 4 times.
CONSEQUENCE FOR FAILING:	None.	Potential for both economic and social demotion. "Public" admission of failure to execute job responsibilties.
CONSEQUENCE FOR ADMITTING A NEED FOR ASSISTANCE:	None — good way to make new friends.	Serious — good way to make new friends at new job.

In each of the preceding scenarios the users seek to become competent within the limits of the applications that fit their environments. The child seeks to become a literate and proficient user of game software, while the plant manager seeks to become a literate and proficient user of scheduling software. In each case computer literacy has a similar meaning — proficient use of a computer system within a given environment. The difference here, and in the minds of many adult learners of computers, is the consequence of failure.

Quitters Never Win... Winners Never Quit

The child learner is expected to experiment, fail, correct his approach, and try again. The manager is expected to perform this computer-based task as proficiently as he does all other tasks within his job description. Failure is not considered a part of the learning process, but rather the evidence of ineptitude. Children seem to rebound effortlessly from their failures. Adults have a tendency to internalize these failures, assume that their level of failure is above normal, and quit. Adults will often rationalize quitting as a way to maximize resources by "cutting their losses." As one adult student said in response to the pending deadline of several computer-based assignments, "Only a fool quits when he's ahead. Quit while you're still behind!"

Talent vs. Skill

As in the case of some mathematics students in our society, many new computer learners perceive computing to be something that those with a "talent" can perform — and those without the talent will never master. This perception provides a built-in excuse for failure. As long as computing (or anything else) is considered to be dependent upon a pre-existing

talent, many new users believe they cannot be held accountable for their failure to possess that talent.

On the other hand, if computing is viewed as a collection of learned skills, this removes the "talent excuse" and places the onus back on the learner to master the skill. Removing the talent excuse is one of the first tasks in teaching computer literacy.

Goals of Computer Literacy

The following goals are broad enough to encompass almost all learning environments within which computer literacy is to be achieved. Special consideration is given to the adult learner. The goals are:

1. **Overcoming the anxiety of using computers.**
2. **Understanding human-machine dialogue.**
3. **Identifying the components of a computer system within the context using the system.**
4. **Identifying strengths and weaknesses of computer-based solutions.**
5. **Using existing solutions to solve well-defined problems.**
6. **Creating a computer-based solution for which there is no precedent.**

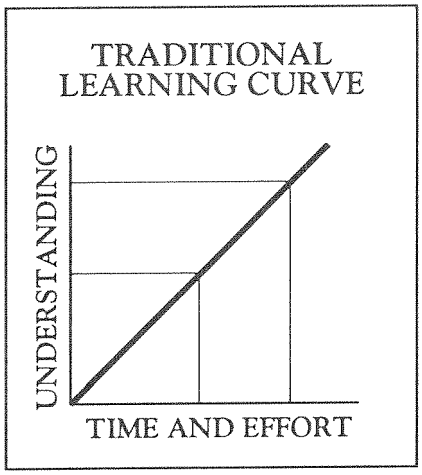
Computer Anxiety

Cyberphobia - An aversion to or fear of computers or computer-controlled devices.

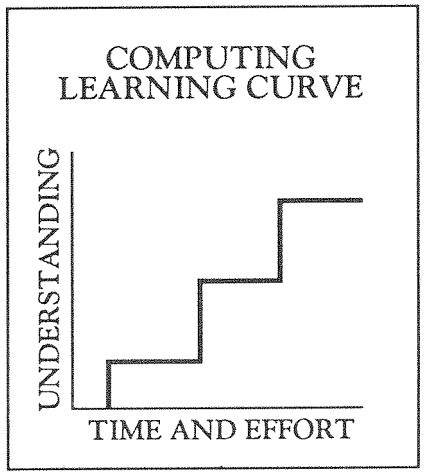
Many new users of computer systems complain of cyberphobia, and behind the stated fear looms another, more significant one, the fear of failure. New users of computer systems must learn to recognize this and direct their energies toward the root of the problem — not its symptoms.

Many of the adult learners who are found in computer literacy classes have been competent professionals for decades. It has been so long since they have felt inadequate in the execution of job-related duties, they have forgotten how it feels not to be the expert within their operating environment. Given the complexity of learning the intricacies of the computer system and the anxiety of going about it as a novice, many new users give in to the feelings of inadequacy and quit. They may even cite an updated version of the old saw, "It is better to be thought computer illiterate than to sit at a keyboard and prove it beyond doubt."

Another source of anxiety comes from unrealistic expectations of how quickly the material will be mastered.



The learning curve for most subjects reflects a uniform increase in understanding as a function of the amount of time and effort spent on the subject. Most learners of history, geography, biology, etc. expect to improve in direct relation to the amount of time and effort they are applying.



Learners of computing do not experience that same even progress, where one hour of diligent effort is rewarded by a measurable increase in understanding of the material. Instead, a "stair-step" learning curve is more typical. Some adults abandon their studies while traversing the flat part of the curve, unaware that enlightenment may be only one or two examples away. Making adult learners aware of this curve can reduce their anxiety when things do not progress at a rate they perceive to be acceptable.

Dialogue

A constant source of disagreement among those who teach computer literacy is the trade-off between education and training. Advocates of training restrict the scope of the material and reinforcing exercises to complement only those problems that the user will encounter in a specified, controlled environment. Advocates of education seek to identify a common set of literacy principles that can be taught and then applied by the learner within a variety of environments. In an area as "applied" as computer skills, the distinction can be blurred, but there is one principle that does emerge as universal, which can be the cornerstone of either a training or educational curriculum. That principle is the *dialogue*.

Whenever a user interacts with a system, a dialogue takes place. An organized exchange of information between the user and the computer system must occur. New users must be made aware of three things: 1) A dialogue is, in fact, taking place; 2)There are rules for the dialogue that must be learned and followed; and 3) The dialogue's rules are not flexible; they are enforced with a rigor that often exceeds the new user's patience and fortitude. This is one of the primary reasons that the manuals for a computer system should never be more than an arm's reach from the workstation.

Components Within Context

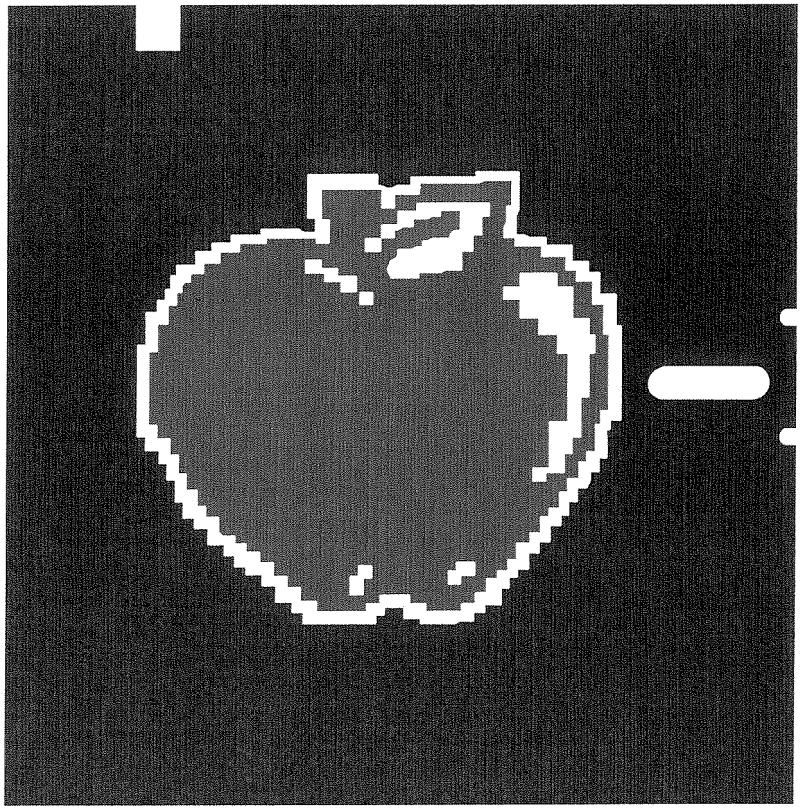
Describing to a new user that a computer system is a collection of unified components is like telling a new driver that an automobile is a collection of unified components. Both facts are true, yet neither observation gives the learner much insight into the proper utilization of the device at hand. New computer users need a description of the logical and physical components of a computer system, but these descriptions are best understood in the context of using a specific system — not as an abstract collection of terms.

The three major components of a computer system are: 1) application software, 2) operating system, and 3) hardware. Of these three components the application software will contain the solution (if one exists!) to the user's problems. The operating

system exists to control the hardware, and the hardware exists to carry out the combined instructions of the application software and the operating system.

For adult learners this connection between the problem and the application software is critical. They are responsible for problem solving as a part of their job duties. The quality of the solutions they hope to achieve through computer systems is in large part dictated by the application software used to address the problem.

The need to build a working vocabulary of computer-related terms is an important goal, but the acquisition of this vocabulary should not produce an abstract collection of words and definitions. Persuading adult learners to learn for the sake of learning is a tough job. Demonstrating the concrete benefits of what they are learning, as they learn it, makes everyone's job easier.



Solutions Are Not Universal

A computer user who knows only one software environment is much like the mechanic who can only use a hammer. There is a tendency to view every problem as one that is best solved by hammering on it. Without a sufficiently broad exposure to software capabilities, the adult learners can fall prey to the same trap: assuming that all problems they encounter can be best solved (or solved at all!) by the software in which they are competent.

Most new computer users are biased toward the application of existing skills. Because of this bias, most new spreadsheet users will approach all problems as problems best solved by a spreadsheet. As it becomes more and more obvious that the selected software is inappropriate for the problem, the dedicated spreadsheet user will simply try harder.

Getting students to recognize the general properties of problems and to define in advance what constitutes a successful solution to the problem will help eliminate a tendency to force problems through pre-existing solutions.

Matching Existing Solutions to Well-Defined Problems

At first, new learners will be eager to begin applying their newfound computing skills to problems in their environment. An important next step is providing the adult learner with instructions on how to match text-processing problems to text-processing software, word-processing problems to word-processing software, desktop-publishing problems to desktop-publishing software, etc.

At an early stage it is important that the adult learner experience success. Success here will encourage experimentation in the future. Structured (or well-defined) problems are those with ample prior solutions, and which possess well-understood, uniform attributes. All users will experience greater success with structured problems than with unstructured problems. Unstructured problem solving requires extensive skill as both an expert of the problem and as an expert of the system upon which the solution will be implemented.

Creating Solutions

Creating solutions to problems is why adults choose to acquire computing skills. They are typically already experts in the problems they wish to solve. (This is a great advantage over the juvenile learner who may be proficient at manipulating the hardware and software but has no real understanding of the problem to be solved with these tools.) Encouraging these adult learners to move from the security of implementing solutions to "canned problems" to the risk and reward of solving their own problems is the final task of teaching computer literacy.

Conclusion

Computer literacy is a process not a course. Just as we do not narrowly define a person who completes a single course in English grammar as a "literate" person, we should not consider a student who takes a single course in computing, "computer literate." Computer literacy is the ability to apply computing skills to the solution of contemporary problems. This makes computer literacy a moving target — again emphasizing the "process" of literacy.

Adult learners present both challenge and opportunity to teachers of computer literacy. Their detailed understanding of the problems they wish to solve proves invaluable in the later stages of learning the application of the computer system. In the early stages, their anxiety and lack of patience with themselves prove to be liabilities that can overwhelm both the student and teacher. As a final observation, perhaps the most important thing adult learners bring to a computer literacy class is the appreciation for a difficult task done well.