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ABSTRACT

In exploring the impact of microcomputers and the future of the university in 1985 and beyond, a distinction should be made between computing literacy--the ability to use a computer--and computer literacy, which goes beyond successful computer use to include knowing how to program in various computer languages and understanding what goes on mathematically, logically, and/or electronically inside the computer. Though computer uses in higher education in the future are difficult to predict given the propensity of the educational system to resist change, some of the possible current and future uses include word processing, submission of manuscripts to textbook editors, teacher student communication, faculty work at home, online access to library holdings, interactive computer network conferences, student advising and schedule planning, use of videodiscs as interactive "textbooks," and artificial intelligence applications. The university must promote and encourage computing literacy in order to survive. While the initial cost for providing computers may seem unrealistic, the potential savings could significantly reduce administrative overhead. Computing will become more central to the function of professionals, and, because information is power, will increase the power of the individual. (LMM)

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COMPUTING LITERACY

IN THE UNIVERSITY OF THE FUTURE*

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COMPUTING LITERACY IN THE UNIVERSITY OF THE FUTURE

At times we see through a glass darkly. Today, at the inception of the personal computer generation, we often become confused and refuse to try to see through the glass at all. However, if we hide our heads in the sand we are likely to find ourselves buried alive.

Given the unbelievable pace of microcomputer technological development, a person must be very wise or very foolish to predict the future. In every sense of the word, the future in microcomputing is incomprehensible. The only limit to the use of computers in the university of the future is the limit of our own imaginations. However, our system of higher education aggressively resists change and it is this inflexibility which becomes the real obstacle to advancement in the use of computer technology rather than any real limit inherent in the nature of the technology.

This paper explores the future from the vantage point of a computing literate person as opposed to a computer literate person. Computing literacy refers to the ability of a person to use a computer (micro, mini, or mainframe). The requisite skills include knowing how to turn on or sign on the computer, load a piece of software or execute a program, and successfully use programs for data handling, record keeping, word processing, and others. Computer literacy goes beyond successful use of the computer to include knowing how to program in various computer

languages such as BASIC, Pascal, LOGO, or COBOL, as well as understanding what happens mathematically, logically, and/or electronically inside the computer.[1] Compaine says our definition of literacy must change from the ability to read, write, and calculate to the ability to use the computer as a TOOL.[2] This "new" literacy should cause us all to tremble because, if faculty and administrators do not become computing literate soon, they will be more illiterate than their students. However, the issue of faculty computing literacy is the subject of another paper.[3]

What will be the uses of the computer in the university of the future? Again, given the propensity of our educational system to hide its proverbial head in the sand, no one can know! The best we can hope for today is to examine some of the things we will be capable of doing.

For the purposes of this paper, the university of the future is the university of 1985 and beyond. Some writers project that by 1985 nine of ten adult jobs will involve the use of a computer.[4] This projection includes our universities! Let's explore what can be done with computers and what we should be able to do in the near future.

Reports, journal articles, convention papers, and more can be written using a word processing program; spelling, style, and grammar can be checked using programs designed for such purposes. We will be able to eliminate the laborious chore of writing and correcting. The endless reports required by local administrators and state agencies or other governing bodies can be transmitted

directly to the people requesting the material--computer to computer. The day will come when a person may sit down in front of a computer and, using English sentences, not computer language, describe what he/she wants in a report, how to put the information together, and to whom it should be sent. The task is complete! In fact, the October issue of BYTE contains an advertizement describing software which allows the computer user to have complete voice control of all commands and data entry when using an electronic spreadsheet called SCRATCHPAD.[5]

Students will even be doing their writing on the computer--in the classroom or at home--and the teacher will read the work from a computer screen, have it printed, or listen as the paper is "read" by the computer equipped with a voice synthesizer. A by-product of student and faculty use of word processing will be more accurate spelling, better grammar, and improved writing.

Manuscripts will be submitted to textbook editors on "floppy disks" or the editor and author will interact via the phone lines--computer to computer. The editor will propose changes and the author will be able to respond--immediately if necessary. In fact, workbooks and similar materials could be sold in disk format with tests and exercises contained on the disk. Today a person can generate tests on a computer, use the computer to grade the test, and record the grades.[6]

In the university of the future, many faculty will do more work at home using their own computer, or use their "modem" to connect to the university's large mainframe for analysis of large data sets, and have their work printed at the office, at home, or,

in some cases, have material delivered to a microcomputer laboratory used by students for drill and practice. Readers of The Chronicle of Higher Education learned of philosophy professor Patrick Suppes' use of several modern technologies, including the computer, to teach 13-14 courses each year at Stanford.[7] Feats such as those attributed to Professor Suppes are facilitated in part by the fact that in some, if not many, university and college communities today there are more computers of various kinds in the homes of faculty than there are on their campuses.

There are now computer magazines on disks. In the future, some or all professional journals will be available on disk and will regularly receive submissions in the form of disks or direct transmission over phone lines or satellite.

The day may come when no professional organization will publish hard copy journals. Your subscription will be a free dial up service to access the articles you desire and, if you wish, store the articles on your own disk. The recent growth of online databases indicates the demand already exists. In the Fall of 1979 there were 400 online databases. In the Fall of 1982, 1133 existed with 1600 estimated for the Spring of 1983.[8]

Even the library as we know it will change. Major portions of the holdings will be available for online access. In fact, the development of the laser video disk makes possible the storage of the holdings of entire libraries for interactive computer retrieval.

We will also have interactive computer network conferences using campus WATS lines and connecting computers on numerous

campuses around the country or several offices on the same campus. Writing projects by multiple authors can and do work on the same concept.

Everyone will be doing student advising and schedule planning on a micro or terminal.[9] Much of this type of work may be done by faculty on their own computer or terminal rather than one provided by their institution, but, such is life in the academic community.

It won't be long until many textbooks will not be printed but will be sold as laser video disks which will allow the student to "interact" with the text and even use the text at different levels of competence. Materials for the course would be recorded on the disk according to prescribed levels of mastery. When the student first uses the disk, a diagnostic test would be administered and the level of mastery determined. The student would then work at that level until demonstrating sufficient competence to move up a level or more.

Another major area of study related to future computer technology finds expression in the phrase "artificial intelligence." I recently received promotional material from The University of Miami's Intelligent Computer Systems Research Institute encouraging me to subscribe to a new publication--the Applied Artificial Intelligence Reporter. The following paragraph is part of their sales pitch.

> All over the world, in universities and the research laboratories of private industry, extraordinary breakthroughs are occurring every day in which machines are acting more like human beings--able to understand and respond to human language..."see" and "feel" the world around them and react to it...design and build

> copies of themselves...handle a dizzying variety of input--speech, handwritten notes, video images, printed text...and not only give highly technical information, but sound advise based on knowledge and old fashioned "gut instinct" that only experts are believed to have, for a fraction of the cost of an expert.

Projections such as the ones outlined in the above paragraph may frighten some but they challenge me to learn as much as I can so I do not become the mindless victim of a machine built by man. However, the thought controlled arms system of the Russian fighter plane depicted in the movie "Firefox" may not be so futuristic.

Some say there is no cause for alarm; the cost of computer technology will keep many of these projections from coming true. While that is indeed possible, the very rapid growth of the personal computer industry indicates a popular chord has been struck.. The microcomputer is not a fad; it is here to stay! The cost will be borne by the individual, if necessary. The time will come when every student and every faculty member will own a personal computer or terminal and, in many cases, will own more than one. The trail blazing efforts of the Carnegie Mellons and Drexels are most noteworthy but also expected. What may not be expected is the recent decision of Union College in Lincoln, Nebraska to install a computer terminal in each of the school's 400 dorm rooms.[10] The university that does not promote and encourage computing literacy for students and faculty alike will not exist in ten years.

While the initial cost for equipping a campus with micros or terminals may seem unrealistic, the potential savings could reduce administrative overhead by significant amounts. As faculty and administrators learn to use the computer, they will do more of

their own work which, in the long run, will reduce the number of clerical and support personnel now required to run our institutions of higher education. However, the nature of the remaining jobs will change significantly and only those who are willing to change and grow personally and professionally will survive. People must be prepared for the consequences of the information age.

When all is said and done, computing in the university of the future will be more central to our function as professionals than we can imagine today. The computers will be more powerful, more person-like, more easily used by the novice, and more indispensable than any tool we use today. The "future" is the information age. Information is power, and the microcomputer brings a significant amount of information within the grasp of the individual, thereby giving power to the individual.

ENDNOTES

[1]Vernon Gantt, "Computing Literacy: An Outlet for the Communication Specialist," Kentucky Journal of Communication Arts, XI (Fall, 1983), 30.

[2]Benjamin Compaine, "The Evolution of the 'New' Literacy," National Forum, LXIII (Summer, 1983), 10-12.

[3]Gantt, 29-31.

[4]John Hayman, "President's Corner," Alabama Council for Computer Education Newsletter, I (January, 1983), 2.

[5] BYTE VIII (October, 1983), 322-323.

[6]Examples include: TEST CRAFTOR.SYSTEM, TEST PRESS, and GRADEBOOK by Thorobred Software of Murray, Kentucky.

[7]Judith A. Turner, "How a Stanford Philosopher Uses Technology--and Teachers 13 Courses a Year," The Chronicle of Higher Education, XXVII (October 12, 1983), 21, 25.

[8]Carlos A. Cuadra, "The Microcompter Link: Online Database Services and Local Electronic Libraries," National Forum, LXIII (Summer, 1983), 32.

[9]Examples include: ADVISOR, for the microcomputer, by Thorobred Software and the ACE system, for mainframe, at the University of Connecticut.

[10]John Wallace, (ed.), "Behind the Screens: People, News, and Trends," Family Computing, II (October, 1983), 13.