The Community-Based Research Practicum of
The Third College Computer Literacy Project

by

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Background

By all accounts America is in the midst of a computer revolution. Many compare it in magnitude with the industrial revolution. In the current revolution computer technology and microcomputers are rapidly being introduced into the work place, the educational system and our daily lives. The source of this major social change in the development of a new industry built upon the task of information processing. The current shift in employment away from manufacturing toward information-based industries will profoundly affect the nation´s economy and work force. Nordon (1982) of the U.S. Bureau of Labor Statistics recently predicted that by 1990, Americans will have 17 to 26 million new job opportunities. Computers will be a central part of this growing information economy. The Bureau´s predictions show a 60% increase in the number of computer programmer jobs over the next decade, and an 80% increase in employment opportunities for systems analysts. The greatest projected increases, however, are for computer service technicians, whose career opportunities will grown between 93% and 112% over the next decade.

The introduction of microcomputers into society and anticipated changes in work force requirements has sent ripples of influence throughout every level of the nation´s public education system. Already there are three main areas of public school computer uses: administrative and counseling, job training and computer-assisted instruction. Moreover, there is concern within the information-processing industry that public schools should do more. For example, in a recent speech, David T. Kerns (1982), president of Xerox Corporation, called for redirection of the education system to emphasize training for information industry skills. Also, a rapidly warming debate is taking

place among educators as to whether computers in secondary schools should be used for computer-assisted instruction, job skills training, or both.

It has apparently already been decided that computer-assisted instruction in elementary and junior high schools is a good thing. Several states have taken the lead in using their educational systems to address the labor market demand for computer skills. These include Minnesota, Illinois, Florida, New York, Oklahoma, Alaska, Pennsylvania, New Jersey, Nebraska and Oregon. Efforts range from initiating research on computer education to totally computerized, interconnected, state education management systems. Somewhere in this range is the state of Minnesota where 99% of all school districts use computers for instruction. Virtually every student in Minnesota has first-hand experience with computers.

The high technology sector of the job market is growing at about twice the rate of increase in other industrial sectors. As the needs of the industry grow, the need for an education which involves computers will also increase. It is not unreasonable to expect that some time in the near future high school students will have a fourth area of competence, that of computer literacy, added to existing reading, writing and math requirements for graduation. What we may conclude from our knowledge of current and projected changes in the areas of employment and education is that the computer is rapidly becoming a basic tool of activity in important domains of American life. This being the case, it is necessary that steps be taken immediately which will assure that all citizens have the opportunity to learn to use the tool effectively.

At the present time women, minorities and low-income people in particular do not have equal access to computer-based activities. Despite the efforts of public schools and computer manufacturers, children from economically depressed areas still do not participate in computer-based activities to the same extent as their wealthier counterparts. Because of its expense, computer education is widespread only among those who can afford it. Since a larger proportion of minority youth come from lower income areas, these inequities reduce their opportunity to learn about computers. Certainly, if this situation remains unchanged, low-income children will be even more at a disadvantage later on when they enter the employment arena.

The introduction ~~of an~~ and use of microcomputers in public schools is thought by many to be the means by which this problem can be overcome. However, this solution represents a narrow, overly centralized, and possibly ineffective approach. Imagine for a moment that for the first eighteen years of life children were exposed to reading, writing and mathematics only at school. Would that exposure be enough to facilitate the child's learning of the wide range of functions and uses of these skills? No, and the same is true of computer education. Therefore, a more thorough solution would focus on decentralizing microcomputers out of the school and into the community as well as home settings. But considering the cost of computers, how will this outcome be achieved?

The Community Computer Center

The objective of providing equal access to computer-based activities can
be achieved through the creation and operation of a network of Community Com-
puter Centers in areas where families would not otherwise be able to purchase
a microcomputer. This strategy would provide maximum access to computer tech-
nology at a minimum cost. The major objective and organizing principal of the
proposed project is the development of a model community-based system of com-
puter activities coordinated around the practical needs of lay people which
arise out of their everyday activities and their need to be familiar with con-
temporary microcomputers. We believe that the successful development of the
                                          Computer
Third College/Urban League Community ∧ Center would create a prototype which
could be applied in other locations throughout the country. The proposed pro-
ject then provides a means for taking an initial step toward a solution to the
problem of equal distribution of access to computer-based activities.

The uses to which microcomputers would be put in the community center
would focus upon; (1) providing instruction on computer use, (2) providing
instruction in the academic skill areas, (3) providing assistance in daily
matters of practical importance to community members and (4) basic research.
The value of using microcomputers in these ways can be assessed from at least
two perspectives; that of the community and that of the University.

The Community. What could be the value of the Community Computer Center
from the point of view of the community? To answer this question it is useful
to first speculate on the future from the perspective of that community. From
this perspective it is possible to envision two futures which involve computer
technology. In the first case we envision a future where low-income students
continue to perform poorly in the basic academic skills of reading, writing

and mathematics. At this future time we would also see computer literacy added as the fourth area of poor performance for these students. Low achievement in these four areas would have predictable consequences. We would witness a growth in the stratification of society resulting from an even greater inequality in the distribution of employment opportunities, economic resources and political access.

In the second case we envision a future where low-income students are fully and successfully involved with the development of computer literacy practices. At this future time we would also see activities in this new area of success functioning to improve performance in the areas of reading, writing and mathematics. Again, the consequences are predictable. With control of these four basic skills in the hands of all citizens we would witness a fully participatory, pluralistic society.

The value of the Community Computer Center is that it will provide a means for making the second vision a reality. One example of creating the reality out of the vision comes about when we see younger students going to the center anxious to work on tasks involving practice in the basic skills. The computer-based activities of the Center would help students do this by embedding basic skills within contexts that allow students to discover and construct their own goals in activities that they have a hand in designing. For example, it is anticipated that a computer-based activity reported on by Levin and Boruta (1983) can be successfully adapted for use in the community setting. The activity these authors reported was the production of a monthly newspaper by a class of 4th graders using their microcomputers.

The newspaper was divided into different sections: news, sports, weather, book reviews, stories, poems, riddles, and classified ads. The newspaper was stored on one disk with each section of the paper in a separate file on the disk. When students (who frequently worked in pairs) took their turn on the computer, they would retrieve the section/file of the paper they wanted to work on, and add their story to the collection of stories already there. The entire file would be saved at the end of their session.

Near the end of the month, a cut-off date was established for new stories and the editing process began. When students took their turns on the computer at this stage, they were assigned particular sections to edit for spelling, punctuation, capitalization, and overall coherence. When the paper was completely edited, it was printed and distributed to the students. After everyone had the opportunity to read it (including family, friends, and the principal), it was critiqued in a whole-class session. This provided an opportunity to focus on the writer's consideration of the audience during the writing process. The importance of punctuation, dates on weather reports, and author names took on a new significance in light of audience understanding.

Another value of the center is that its activities will not be restricted to the needs of only the children. For parents the Community Computer Center will be a place they can go to get quick and accurate assistance in such daily matters of importance as budget planning, deciding where to go grocery shopping, writing business letters for a variety of purposes and more. For example, the electronic spread sheet of Visicalc will assist parents plan their budget or to decide which local market has the best prices for the items on their shopping list. When parents want to register a complaint with San Diego

Gas and Electric or write a letter of inquiry they will receive assistance
using ~~out~~ "interactive text interpreter" program. Researchers in the Labora-
tory of Comparative Human Cognition have collaborated to design a system that
allows a person to create interactive text by putting the structure in the
text, rather than the text in the structure (Levin, 1982).

Users of the Community Computer Center will have available to them a
range of interactive writing prompters that span a spectrum of the amount of
support that they provide to writers. At one end of this spectrum of support
are form letter prompters, to help people write letters to request informa-
tion. These prompters provide most of the text, stopping to allow the user to
input their names and the details of what they are requesting. Given this
amount of support, even poor writers have been able to generate letters that
they sent off. At this end of the spectrum, we have also used "storymaker"
texts (Rubin, 1980) and "madlib" texts, each of which supply most of the text
for a story, leaving choices or simple input to the novice writer.

Next along the spectrum, providing less support and thus allowing more
experienced writers more freedom, are the poetry and story form prompters. At
a more global level of support are interactive "planner prompters", which help
writers generate ideas or reorganize their thinking to surmount writing blocks
(Collins, Bruce, & Rubin, 1982). These can be as simple as a set of sugges-
tions of things to consider in writing a text.

These are just examples from a much larger set of interactive writing
activities that the Laboratory of Comparative Human Cognition has been able to
develop working together with teachers. Since these activities fill the gap
of shared initiative between the relatively passive task of reading and the

active task of writing, we have been able to construct a sequence of activities that provide dynamic support for writing. These and other software packages will be made available, as they are useful, to participants in the several programs coordinated through the Community Computer Center.

The existing and planned programs of the Community Computer Center are as follows:

Gifted and Talented Program 5th Dimension

The target group of this program are gifted and talented minority students between the ages of 5 and 8 years living in the southeast San Diego community. These children will participate in an after school/summer enrichment program... This program will focus on process learning by providing opportunities for children to learn through discovery and inquiry, find and solve problems, generate new information, analyze and evaluate information and transfer information.

After School Tutoring Program 5th Dimension

The target population of the program is all area students. The objective of the program is to improve the performance of students in academic areas of reading, writing and math.

Junior Urban League

The Junior Urban League is constituted of youngsters from four area high schools. Working with the support of the Urban League, students in the program will work to identify issues and problems facing the Southeast San Diego community. Their task will be then to create and then carry out programs

designed to effectively address certain issues and/or solve existing problems.

Harambee House   5 Cerassion Dempple

Harambee House is a residential treatment facility for juvenile delin-
quents between the ages of 13 and 17. The program is designed to provide
effective educational experiences for these youngsters, prevent their further
penetration into the criminal justice system, and provide them with experi-
ences that will help them become constructive and productive members of the
community. In addition to violating the law, most of the residents of the
program have had difficulty functioning and learning in traditional classroom
situations.

Urban League/IBM Training Program

The program is designed to provide San Diego residents with training in
business applications of computer technology. After students complete their
training, the program will assist graduates to secure employment in the busi-
ness sector. It is anticipated that some of the participants in the Center's
Evening Program will decide to enter this training program.

Evening Program   Consulta Constatas ; ; ; ;

The program is designed for adult community members. Its primary objec-
tive will be to de-mystify computer technology by providing hands on experi-
ence and instruction in computer use.

Computer Library Program

The target population for the program is the Southeast San Diego community. The objective of the program is to provide for the widest possible distribution of microcomputer technology for home use in the community. This program will develop a software library, develop and coordinate a hardware and software loan program and provide technical consultation.

Home Computer Program

The program will investigate the existing and potential uses of microcomputers in the home in a study that integrates ethnographic and quasi-experimental approaches. The proposed study is organized into three phases: (1) ethnographic study of paper and pencil literacy, (2) a quasi-experiment in planned change and (3) dynamic support for planned change. ¶ The essential requirement for achieving the second outcome discussed above is providing people access to interactive contexts of learning and practice. The Community Computer Center is intended to provide students of all ages and their parents with the opportunity to work with computers in contexts that will allow them to use the maximum level of self-determination, creativity and imagination in the development and practice of the four basic skills.

The University. From the perspective of the University the Community Computer Center will serve as the community-based laboratory of the Third College Computer Literacy Project. The Center will operate as a basic research program organized to bring Third College students and faculty into productive contact with the youngsters and parents of the Southeast San Diego community. Through the Center we seek to create a context in which practical users,

University students and faculty can collaborate to design strategic contexts
of computer use and develop useful systems of information processing for lay
people. For Third College students, the major advantage will be their oppor-
tunity to study in a context that is organized to allow them to use the max-
imum level of self-determination, creativity and imagination in carrying out
action research projects. Students will have the opportunity to investigate
the introduction of a revolutionary medium of communication into American
society. Moreover, through their research and participation they will be in a
position to influence both the process of introduction and the designing of
systems of activity involving the new medium. Most important is that this
will occur in a setting that has cultural meaning and importance to them. In
some cases the community served will be the students' own community since we
expect that the activities of the Center will encourage a number of local
college-bound students to study at Third College.

The Community Computer Center will be a dynamic research setting that
will allow students to investigate practical problems. The variety of pro-
grams coordinated through the Center will provide Third College students a
wide range of research problem areas to become involved in. For example, stu-
dents working in the Gifted and Talented program, the After School Tutoring program and the Harambee House pro-
gram could ask, "how can the computer be most effectively used to help a
youngster understand the number line or write an essay on a topic of the
youngster's choosing." Forming a small group, these students would have the
opportunity to study the same problem within three very different groups of
users. One way into the problem might be to experiment with different ways to
create a sequence of tasks that would take the user from not knowing what the
task is to being an expert. In this case students would have to collect data

on the spontaneous division of labor, for example, to develop ways that the computer could divide the task between two people. Or, students might wish to study how human tutors guide users toward appropriate task understanding. In either case a thorough analysis of the problem could lead students to collect and analyze key stroke data, audio-taped data and ethnographic data in order to help people use the computer more effectively to understand the number line or write an essay.

Students working the Computer Library program might ask, "how does the library establish and develop usership, what problems arise out óf loaning out computer hardware ad software and what are their solutions?" One way into this problem might be to conduct community surveys to assess people's opinions about computer technology and the circumstances that might lead them to interact with this new technology. Still other students might ask even broader questions such as; how does the computer influence community life, how will community members appropriate the new technology to replace actions and operations typically handled by print and pencil literacy, or to what extent will community members invent new uses of the technology to organize and/or support their other daily activities. These questions could be approached through ethnographic methods.

Surely the number and variety of "relevant" questions abound, with the only limitation on the kind of questions raised and the quality of solutions produced being the student's creativity, imagination and degree of technical preparation. With the activities of the Community Computer Center providing dynamic support we expect students to be motivated to explore the range of microcomputer capabilities and applications; develop machine operation skills;

learn how to evaluate and alter existing software; practice methods for systematically observing and documenting patterns of activity involving microcomputers; and develop some programming skills.

We estimate that this project would take three years to complete and would cost $215,000 per year. In addition the project would need 15 Apple IIe microcomputers, ~~two~~ ten of which would be linked to the University. A partnership between Third College, the San Diego Urban League and Harambee House, Inc. will facilitate the conduct of the project.

Our project will provide a clear understanding of how to decentralize microcomputers out of the school and into the communities of low-income people. This will be done by developing a prototype Community Computer Center which could be applied in other locations throughout the country. Our project will also provide a clear understanding of how to enhance the person-computer interaction in community settings and the minimal resources necessary for accomplishing this interface. With our focus on the larger scale social, cultural and organizational issues as well as the micro-interactions of the Community Computer Center, we will provide a clearer understanding of the ways that inequalities in access to computer-based systems of activity can be avoided.