DOCUMENT RESUME

ED 383 335 IR 017 190

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TITLE	Providing Computer Conferencing Opportunities for Minority Students and Measuring Results.
PUB DATE	95
NOTE	13p.; In: Proceedings of the 1995 Annual National Convention of the Association for Educational Communications and Technology (AECT), (17th, Anaheim, CA, 1995); see IR 017 139.
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*College Students; Community Colleges; *Computer Mediated Communication; Demography; Educational Background; Enrollment; *Equal Education; Ethnic Studies; *Minority Groups; Success; *Teleconferencing; Two Year Colleges
IDENTIFIERS	*Access to Computers; Glendale Community College AZ; Internet

ABSTRACT

This paper reviews the research on the effects of differential computer background on the short- and long-range success of minority students, identifies some strategies Glendale Community College (Arizona) has used to encourage minority students' use of computing, specifically computer conferencing, and explains the measures constructed to track institutional progress in providing equal access. The computer conferencing activity of nearly 12,000 community college students over a two-year period is analyzed. Results show that minority enrollment in classes incorporating electronic conferences seems to match or exceed general enrollment demographics of the community college with respect to ethnicity. Ten tables provide data for college demographics compared with electronic conferencing demographics and minority electronic conferencing demographics compared with general electronic conferencing demographics for each of the five semesters studied, according to the following ethnicities: Native American, Asian, Black, Hispanic, and White, or Non-Hispanic. In an attempt to discover which minority groups find which learning environments more engaging, the number of students participating in one environment, Internet Relay Chat (IRC), was analyzed for 15 weeks, and that distribution was compared with the campus population as a whole. Two tables summarize findings on demographic analysis of IRC participants compared with both general college enrollment and electronic conferencing user demographics. Results show that Asian and white students were over represented among IRC users. Minority faculty are discussed as role models, and a table summarizes demographics of the instructional associates, according both to ethnicity and gender. Both Native Americans and women were found to be under-represented. Fifteen tables illustrate findings. The "works cited" section offers a 16-item annotated bibliography. (MAS)

Title:

Providing Computer Conferencing Opportunities for Minority Students and Measuring the Results

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Problem Statement

Members of minority groups come to college, especially community colleges, with varying levels of computer experience, but generally speaking, their experience is not as extensive as that brought by non-minority students. This initial imbalance has both immediate and long-range effects on minority students' academic success and their eventual career opportunities. However, institutions of higher education, especially community colleges, can develop programs to address these initial inequities. This paper reviews the research on the effects of differential computer background on the short- and long-range success of minority students, identifies some strategies Glendale Community College has used to encourage minority students' use of computing, specifically computer conferencing, and explains the measures constructed to track institutional progress in providing equal access.

Background

Researchers have identified a number of social and economic reasons why minority students leave the secondary schools with less computer experience than non-minority students. Issues of access dominate (Neuman, 1991). Students build their expertise by spending regular and extensive time on computers, so the ratio of students to computers is critical. In addition, they develop a sense of self-efficacy by succeeding in computing tasks and watching others like themselves succeeding also (Olivier & Shapiro, 1993). While many schools have inadequate numbers of classroom computers, minority students are less likely to have alternative access points, either at home or in public libraries where they can supplement the computer time provided at school (Resta, 1992). In schools, more aggressive students are likely to monopolize computer use; they frequently have access to more sophisticated programs and more extensive resources like the Internet. Conversely, minority students, because they are often at-risk, are frequently directed towards the use of "explicit-goal" software, the use of which, according to Stanley Pogrow, causes the learning gap between them and other students to widen (1993).

A number of cultural issues affect minority students' ability to develop extensive computer expertise. Often instruction in computing is linked to math and science instruction; if minority students proceed more slowly in these content areas, they will also proceed more slowly in developing computer skills (Martin & Hearne, 1989; Olivier & Shapiro, 1993). In fact, the kinds of computing activities available in the past for students have fallen into a restricted range, one tied more closely to majority culture than to the interests of members of minority groups (Lucas & Schecter, 1992). In addition, in most computer labs, few mentors and role models exist for minority students. Finally, many teachers view computing hierarchically, reserving it for those students who have mastered other skills perceived as more "basic" (Yellin & Koetting, 1988). Consequently, minority students, over their secondary school careers, may not develop equivalent levels of computer competence as their non-minority peers.

When minority students enter college with less computer experience, they can feel the effects almost immediately. Any perceived inadequacy, whether it is in preparation, experience, or skill level, contributes to the ease with which students are willing to drop out. But differing levels of computer experience have measurable effects on students' ability to complete assigned work in a timely and efficient manner (Resta, 1992). Students with well-developed computer skills know how to use various productivity tools like spreadsheets, databases, and word processors, and recognize their benefits. In addition, they may know how to use the Internet to retrieve up-to-date or obscure information. Students who neither have access to the tools nor have prior experience using them may spend their available time doing mechanical tasks manually, running out of time (and energy) before they get to more intellectually rewarding activities. Lack of computer experience, especially with networked resources, may close off opportunities for developing improved literacy skills, and lack of familiarity with computer environments may hamper minority students when they encounter technologically-rich educational activities like simulations (Yellin & Koetting, 1988). In addition to inhibiting students' academic success, lack of computer experience can close off opportunities for career development, and thus restrict minority students' chances of long-term economic success (Badagliacco, 1990).

Local Strategies

All institutions of higher education, but especially community colleges, have responsibility for fostering increased educational access and for ensuring opportunities for success for minority students. In part, they can do this by encouraging students to increase their level of computer expertise, both before and after they come to college. Glendale Community College has provided extensive computing facilities and a variety of user environments so that members of minority groups can gain easy access and learn in a hospitable climate. However, perceived availability of resources may not translate into actual use. Second, computing activities have been linked with activities across instructional levels and throughout the curriculum, so that lack of progress in one academic area does not preclude the development of computing expertise. In addition, this campus has provided different kinds of computer-mediated environments in order to tap different kinds of learning skills demonstrated by students with a variety of cultural backgrounds. It has provided a variety of computer-mediated communication opportunities, especially ones that take into account backgrounds in oral culture, where students have been able to practice their own literacy skills by reading and writing on topics that relate to their own interests and heritage. Finally, GCC has placed minority teachers, tutors, and assistants in open computer environments where they are visible to minority students and can model computer competence. Investigation into the impact of these strategies is ongoing and involves a number of research methods, both quantitative and qualitative.

Method

This research analyzes various aspects of the computer conferencing activity of nearly 12,000 community college students over a two-and-a-half-year period at Glendale Community College, a campus of the Maricopa Community College District. These students contributed to over 250 computer conferences aligned with conventional classroom instruction across the disciplines, including classes in mathematics, science, social science, and humanities, as well as all levels of writing courses. The conferencing system, called the Electronic Forum (EF), supports extensive record-keeping (time in conference, number of entries read, number of entries written, number of words written) and imports demographic information from the Student Information System (gender, ethnicity, age, and current course load). Although the bulk of this research uses data only from course-related discussions, the conferencing program is used heavily by students for both course-related and personal communication. At this campus, where this conferencing program is most fully developed, class discussions represent about 10% of the total on-line activity. During the academic year 1992-93, approximately 5,000 students exchanged 1.2 million pieces of private mail, and during fall semester of 1993, nearly 2400 students spent an average of 2 hours each week reading and writing online.

Research Questions

The volume of writing activity demonstrated by students, and the potential it implies for literacy skills development, has prompted a number of questions about equity: is participation in this program accessible to students equally? That is, do the students who use the Electronic Forum reflect the demographic make-up of the student population as a whole?

Findings

Analysis of data collected from class-based conferences over five semesters reveals that minority enrollment in classes incorporating electronic conferences seems to match or exceed general enrollment demographics of the community college with respect to ethnicity. That is, a pattern of restricted access by minority students to this computer conferencing system does not seem to be emerging. In fact, in four of the five semesters, minority students (Native Americans, Asians, Blacks, and Hispanics) are over-represented among those students who have access to EF as part of their required classwork, although in any given semester, EF users represent only between 12-17% of the student population on campus. Tables 1-5 illustrate the patterns for various groups for each semester; with the exception of Spring, 1992 when there was no significant difference in the access of various groups ($p=.1012$), during the following four semesters, minority students were significantly over-represented among EF users ($p<.0000$).

	Observed	Expected	Residual
Native American	21	14.03	6.97
Asian	35	32.23	2.77
Black	40	31.30	8.70
Hispanic	124	114.73	9.27
White, non Hispanic	841	868.71	-27.71

Chi-square=7.7499 D.F.=4 p=.1012

Table 1. College Demographics compared with EF Demographics
(Spring Semester, 1992)

	Observed	Expected	Residual
Native American	29	19.51	9.49
Asian	51	48.36	2.64
Black	74	44.02	29.98
Hispanic	200	162.00	38.00
White, non Hispanic	1028	1108.10	-80.10

Chi-square=39.8719 D.F.=4 p=.0000

Table 2. College Demographics compared with EF Demographics
(Fall Semester, 1992)

	Observed	Expected	Residual
Native American	28	24.20	3.80
Asian	80	54.09	25.91
Black	73	51.11	21.89
Hispanic	247	176.96	70.04
White, non Hispanic	1194	1315.64	-121.64

Chi-square=761.3558 D.F.=4 p=.0000

Table 3. College Demographics compared with EF Demographics
(Spring Semester, 1993)

	Observed	Expected	Residual
Native American	30	21.62	8.38
Asian	57	50.55	6.45
Black	52	40.47	11.53
Hispanic	230	159.05	70.95
White, non Hispanic	1026	1123.31	-97.31

Chi-square=47.4417 D.F.=4 p=.0000

Table 4. College Demographics compared with EF Demographics

(Fall Semester, 1993)

	Observed	Expected	Residual
Native American	31	27.17	3.83
Asian	69	59.91	9.09
Black	114	54.94	59.06
Hispanic	276	189.57	86.43
White, non Hispanic	1150	1308.41	-158.41

Chi-square=123.9853 D.F.=4 p=.0000

Table 5. College Demographics compared with EF Demographics
(Spring Semester, 1994)

Approximately 77% of those students with EF access for their classes actually participate; however, no significant difference in the ethnicity of participants as compared with those merely having access has appeared (p<.0000). Tables 6-10 show the demographic makeup of EF users compared with the demographic makeup of the EF population as a whole for each of the semesters studied. Non-participants are students who neither read nor wrote in the class conference for the entire semester; some of them may have dropped the course.

	Observed	Expected	Residual
Native American	15	16.55	-1.55
Asian	26	27.58	-1.58
Black	29	31.52	-2.52
Hispanic	93	97.70	-4.70
White, non Hispanic	673	662.65	10.35

Chi-square=.8239 D.F.=4 p=.9352

Table 6. EF User Demographics compared with General EF Demographics
(Spring Semester, 1992)

	Observed	Expected	Residual
Native American	21	23.57	-2.57
Asian	38	41.44	-3.44
Black	60	60.13	-.13
Hispanic	153	162.52	-9.52
White, non Hispanic	851	835.34	15.66

Chi-square=1.4163 D.F.=4 p=.8414

Table 7. EF User Demographics compared with General EF Demographics
(Fall Semester, 1992)

	Observed	Expected	Residual
Native American	19	21.13	-2.13
Asian	54	60.37	-6.37
Black	54	55.09	-1.09
Hispanic	181	186.39	-5.39
White, non Hispanic	916	901.02	14.98

Chi-square=1.3132 D.F.=4 p=.8591

Table 8. EF User Demographics compared with General EF Demographics

(Spring Semester, 1993)

	Observed	Expected	Residual
Native American	15	23.72	-8.72
Asian	43	45.07	-2.07
Black	34	41.12	-7.12
Hispanic	181	181.86	-.86
White, non Hispanic	830	811.24	18.76

Chi-square=4.9702 D.F.=4 p=.2904

Table 9. EF User Demographics compared with General EF Demographics
(Fall Semester, 1993)

	Observed	Expected	Residual
Native American	22	22.95	-.95
Asian	42	51.08	-9.08
Black	79	84.39	-5.39
Hispanic	195	204.31	-9.31
White, non Hispanic	876	851.28	24.72

Chi-square=3.1380 D.F.=4 p=.5350

Table 10. EF User Demographics compared with General EF Demographics
(Spring Semester, 1994)

Specific findings with respect to particular ethnic groups may be of interest:

1. Native American students represent about 1.5% of GCC's student population and are consistently over-represented among students with EF access. Their access has increased slightly over the past five semesters. On the average, 33% of the Native American students chose neither to read nor write in their class conferences.

2. Asian students generally represent about 3% of GCC's student population and are slightly over-represented among students with access to EF. Their access has fluctuated over the past five semesters. On the average, 30% of the Asian students chose neither to read nor write in their class conferences.

3. Black students represent slightly less than 3% of GCC's student population and are over-represented among students who have access to EF. Their access has generally increased over the past five semesters. On the average, 27% of Black students chose neither to read nor write in their class conferences.

4. Hispanic students represent nearly 11% of GCC's population and are over-represented among students using EF for classes. Their access has generally increased over the past five semesters. On the average, 25% of Hispanic students chose neither to read nor write in their class conferences.

5. White students generally account for 75-80% of GCC's student population and are generally underrepresented among EF users. Their access has generally increased over the past five semesters. On the average, 21% of White students chose neither to read nor write in their class conferences.

While these figures about access and overall use are encouraging, some statistically significant differences have appeared with respect to the volume of participation of members of different ethnic groups in class conferences. It is becoming clear that members of some groups willingly participate and others

write less frequently and at less length. This may represent actual inequities in literacy instruction (Lucas & Schecter, 1992), subtle differences in communication environments (Willis, 1991), or the institution's failure to be proactive in addressing diversity (Trueba, 1993). These differences have not been consistent across semesters nor across groups, and their analysis is made even more difficult because of the occasional presence of some very active writers. In addition, gender may be a contributing factor. For example, preliminary analysis suggests that black women are more comfortable in class conferences (as measured by the amount of writing they do) than black men. However, we can now develop baseline data for extensive longitudinal studies which can identify differences in participation and look for strategies to address them.

Alternative Learning Environments

Several researchers have suggested that in order to address the needs of minority students effectively, educational institutions will have to develop alternatives to the conventional pattern of lecture and large-group discussion (Light, 1990). Emerging data with respect to the participation of minority students in voluntary on-line discussions such as IRC suggests that different kinds of environments, especially ones that seem more "oral," may appear more hospitable to some students, encourage greater participation, and spark an important kind of meta-cognition that students can avoid in other kinds of learning environments (Shedletsky, 1993; Pogrow, 1993). In an attempt to find or create these spaces, DeVaney (1993) suggests that members of minority groups should be able to construct technological environments that reflect their culture and practices.

Many features of computer-mediated computer environments can affect student interest, comfort, and learning, so identifying specific qualities will be quite difficult. In an attempt to discover which groups find which environments more engaging (and following up on some personal observations of computer activity), we analyzed the number of students participating in one such environment, Internet Relay Chat (IRC), for the first fifteen weeks of the Spring, 1994 semester and compared that distribution with the campus population as a whole. Asian students were significantly over represented in this group.

	Observed	Expected	Residual
Native American	12	11.88	.12
Asian	67	26.19	40.81
Black	18	24.02	-6.02
Hispanic	71	82.88	-11.88
White, non Hispanic	549	572.03	-23.03

Chi-square=67.7158 D.F.=4 p=.0000

Table 13. Demographic Analysis of Internet Relay Chat Participants compared with GCC Enrollment
(Spring Semester, 1994)

Compared with the general demographic makeup of EF users, both Asian and White students were over-represented among IRC participants.

	Observed	Expected	Residual
Native American	12	13.55	-1.55
Asian	67	30.17	36.83
Black	18	49.84	-31.84
Hispanic	71	120.67	-49.67
White, non Hispanic	549	502.77	46.23

Chi-square=90.1855 D.F.=4 p=.0000

Table 14. Demographic Analysis of Internet Relay Chat Participants compared with EF User Demographics
(Spring Semester, 1994)

There are a number of reasons why Asian students might find IRC more interesting than other forms of online communication, not the least of which may be their ability to communicate on various channels in their native languages with other Asian students in the United States or around the world. Then again, the interest may be in the synchronicity of communication, the speed and immediacy of response. In addition to surveying students who are active IRC users and analyzing their responses, a strategy possible with computer-mediated communication (Beals, 1992), our next step will be to bring in a number of Internet discussion lists that might be of interest to Asian students, some in languages other than English. By analyzing student participation in asynchronous discussions, we may be able to determine whether the attraction is cultural or structural.

Providing Role Models

Students' sense of their own computing competence is affected not only by their own ability to perform adequately, but also by their observations of others similar to themselves who are also successful (Olivier & Shapiro, 1993). Role models for minority students are critical (Resta, 1992); that means that not only must there be adequate numbers of minority group members who can model computer competence, but they must also be visible, interacting with students on a regular basis. The over-representation of minority students among EF users is encouraging in this respect.

Architecture and staffing policies can make a difference in the "visibility" of role models. Glendale has two large, open computing facilities which make use of student workers who have demonstrated computing expertise. More so even than faculty members, these individuals work closely with students, providing motivation and assistance, modeling computer competence. The demographic makeup of this group during Spring, 1994, reflects the diversity of the campus with respect to ethnicity except for participation of Native Americans. The difference with respect to gender between Instructional Associates and college enrollment is non-significant, although women are under-represented.

	Observed	Expected	Residual
Native American	0		
Asian	4	3.12	.88
Black	3	2.86	.14
Hispanic	13	9.87	3.13
White, non Hispanic	64	68.15	-4.15

Chi-square=1.4972 D.F.=3 p=.6829

[Chi-square statistic questionable because 2 cells have expected frequencies of less than 5; minimum cell expected frequency is 2.9]

	Observed	Expected	Residual
Male IAs	45	38.39	6.61
Female IAs	40	46.61	-6.61

Chi-square=2.0735 D.F.=1 p=.1499

Table 15. Demographic Analysis of Instructional Associates as compared with College Enrollment
(Spring Semester, 1994)

Recommendations

In many cases, providing technological environments that foster increased access to learning for members of minority groups can be accomplished at little or no cost (Martin & Hearne, 1989). Obviously, it is a useful barometer of access to continue to collect data each semester with respect to the participation of minority group members in discussions aligned with their classes and in the diversity of the group of Instructional Associates hired to help those students. Cross-district analysis (and cross-institutional analysis as well) may help us identify policies, climates, and strategies that are effective (or not, as the case may be). In addition, the following initiatives can be launched at little or no cost:

- Increase the variety of courses (and the range of instructional levels) that employ computer-mediated communication as an instructional tool;
- Identify (by textual analysis of class discussions and surveys) issues of interest and importance to minority students;
- Sensitize teachers to different kinds of communication practices common among different ethnic groups and show how they are revealed in online communication;
- Work with campus clubs and groups as "sites" of peer-based learning;
- Develop connections with the feeder high schools to introduce college-bound minority students to a variety of open computing environments;
- Enlist members of minority groups to "scour" the Internet for additional resources of particular interest;
- Encourage teachers and students to collaborate on creating unconventional learning environments.

Enhancing minority students' facility with technology, especially in ways that recognize and respect ethnic differences, may have immediate and long-range effects on students' persistence, academic success and career satisfaction.

Works Cited

Badagliacco, J. M. (1990). Gender and race differences in computing attitudes and experience. Social Science Computer Review, 8(1), 42-63.

Attitudes toward computing differ according to race, ethnicity, and gender. Men have more positive attitudes, and women less positive. Whites have more experience with computers, and Hispanics have less experience. These differences have serious implications for higher education because, if women and racial and ethnic minorities self-select themselves out of courses employing technology, they may be committing themselves to membership in an "underclass" which limits their opportunities for economic success.

Beals, D. E. (1992). Computer networks as a new data base. Journal of Educational Computing Research, 8(3), 327-345.

Computer-mediated communication, because messages can be collected and stored for later analysis, can help researchers identify patterns of communication and reveal how people think, how they respond to different kinds of situations, what roles they bring to networked communication and how those roles can change.

DeVaney, A. (1993). Reading educational computer programs. R. Muffoletto, & N. N. Knupfer (eds.), Computers in education: social, political & historical perspectives, (pp. 181-206). Cresskill, NJ: Hampton Press.

Analyzing common computer software reveals their sexist and racist underpinnings, primarily because they make use of popular culture, itself racist and sexist. It is critical that educational software treat its users with respect, provide various people as its subjects, and promote authenticity rather than stereotypes. This is possible to achieve by putting technology under the control of groups usually disempowered by it and encouraging them to pursue equity and personal freedom. It is important to encourage ethnic groups to construct technological spaces that reflect their culture, and to allow women to create programs that foster cooperation.

Light, R. J. (1990). Harvard assessment seminars: Explorations with students and faculty about teaching, learning, and student life. (First report),Cambridge, MA: Harvard University.

Support groups that study together are critical for learning, especially for women. More involvement with out-of-class activities is correlated with higher satisfaction with college. Language facility is critical for academic success; lack of language skills is a barrier to academic progress.

Lucas, T., & Schecter, S. R. (1992). Literacy education and diversity: Toward equity in the teaching of reading and writing. Urban Review, 24(2), 85-104.

Literacy instruction for minority students is affected by the characteristics of the individual students, by sociocultural elements, by language differences and by instructional culture. It is the responsibility of schools to redress language instruction inequities.

Martin, B., & Hearne, J. D. (1989). Computer equity in education. Educational Technology, 29(11), 47-51.

Minority group members, women, and disabled persons frequently lack computer experience; this hurts their career development and helps to reinforce the stereotypical notion that they have less computer aptitude. Cultural and economic forces help perpetuate this differential development of computer experience, but most of the variation in computer access for different groups can be redressed by administrative leadership and personnel commitment. Enhanced consciousness can change these patterns.

Neuman, D. (1992). Technology and equity. D. P. Ely, & B. B. Minor (editor), Educational Media and Technology Yearbook Vol. 18, (pp. 100-103). Englewood, CO: Libraries Unlimited.

Using technology does not automatically promote equity. The ratio of students to computers is highest in wealthiest districts and lowest in the poorer districts. In addition, it is common for students at the lowest levels to be relegated to using the least imaginative software. In some schools, computers are located in areas to which only the most advanced students have access. Finally, much educational software makes use of sounds, graphics, and plots that reinforce "masculine" traits and thus encourage girls in their negative attitudes.

Olivier, T. A., & Shapiro, F. (1993). Self-efficacy and computers. Journal of Computer-based Instruction, 20(3), 81-85.

Self-efficacy, the perception of one's ability to perform specific tasks, is a judgment derived from success in one's efforts, observations of others' succeeding, encouragement from others, and anxiety. Behavior modeling, because it enhances one's sense of self-efficacy, is a more effective teaching strategy than use of computer tutorials. Self-efficacy with respect to computers is directly correlated with mathematics confidence and perceived mathematics ability. Various assessment instruments exist to measure self-efficacy, and their use could point to opportunities for strategic interventions and instructional improvement.

Padilla, R. V. (1992). Using dialogic research methods to study Chicano college students. Urban Review, 24(3), 175-183.

Dialogic research methods, Freire's "psycho-social method," can help researchers discover "generative themes" embedded in a particular group of students. This research identified three themes: a sense of soci isolation from family, a recognition of the personal cost of academic achievement, and a feeling of ambiguity about ethnic identity. These themes were worked out in both inter-ethnic and intra-ethnic struggles. Identification of these conflicts can point to intervention strategies that will help Hispanic students persist in their education.

Pogrow, S. (1993). A learning drama approach to using computers with at-risk students. R. Muffoletto, & N. N. Knupfer (eds.), Computers in education: social, political & historical perspectives, (pp. 207-217). Cresskill, NJ: Hampton Press.

At-risk students (beyond the third grade) do not benefit from, and may actually be harmed by the use of explicit-goal software (conventional CAI as well as word-processing programs and simulations). Such software assumes that at-risk students fail to learn because they do not practice working with concepts, but current research shows that the problem is more a failure to recognize and apply mental strategies to problems. That is, at-risk students do not know what it means to understand; they do not know how and in what situations to generalize, hypothesize, or predict. Better software provides intriguing problem-solving settings that spawn conversations about what is happening, encouraging students to develop critical thinking skills.

Resta, P. (1992). Organizing education for minorities: enhancing minority access and use of the new information technologies in higher education. Education & Computing, 8, 119-127.

Minority students, who generally enter college with less background and experience with computing, do not have equal access to tools which help majority students achieve academically, and thus can remain "information-disadvantaged." Providing special computing programs directed toward minority students, encouraging minority students to develop their computer skills, recruiting minority students as workers in computing labs, and building cohesive minority groups through electronic networks are strategies that institutions of higher education can use to redress these imbalances.

Ross, S. M., Smith, L., Morrison, G., & Erickson, A. (1989). An apple a day and at night: A distance tutoring program for at-risk students. Educational Technology, 29(8), 23-28.

Distance tutoring, in which at-risk students have increased opportunities to interact individually with teachers, can make use of the increased educational benefits of personalized instruction and mitigate the logistical problems of time and expense. This project had beneficial effects on student writing.

Shedletsky, L. (1993). Minding computer-mediated communication: CMC as experiential learning. Educational Technology, 33(12), 5-10.

Computer-mediated communication can promote four different kinds of learning: response learning (negotiating commands and keystrokes), situation learning (developing ideas about the meaning and usefulness of CMC), transsituation learning (reflecting on changes in one's interpretation of the CMC experience), and transcendent learning (inventing new ways of thinking about CMC).

Trueba, H. T. (1993). Race and ethnicity: The role of universities in healing multicultural America. Educational Theory, 43(1), 41-54.

Educational institutions can heal bitter social, political, and economic divisions between different ethnic groups by promoting a "multicultural literacy" in which cultural differences are acknowledged and where new means of communication across them are practiced. Schools are not neutral institutions; they are political environments in which a social order (usually the current one) is perpetuated. Given the current crisis, schools must become more active in addressing issues of educational inequity presented by the increasing proportion of immigrants, refugees and minorities in society.

Willis, J. (1991). Computer mediated communication systems and intellectual teamwork: Social psychological issues in design and implementation. Educational Technology, 31(4), 10-20.

Researchers usually identify either engineering and technical reasons or business and marketing reasons for the success or failure of technological innovations; however, the social and behavioral sciences can also provide analytic frameworks. Electronic communication can provide access to information (either "standard" or "specialized"), can enable participants to exchange information, or can enable collaboration (either to solve problems or to develop and exchange information). These different uses may require tailored communication systems.

Yellin, D., & Koetting, J. R. (1988). Literacy instruction and children raised in poverty: A theoretical discussion. Journal of Curriculum Theorizing, 8, 101-114.

In order to improve the educational success of disadvantaged students, schools must employ a new form of literacy instruction that focuses on literacy as a means for the communication of ideas. The history of both reading and writing instruction has followed a circular route: beginning with instruction in isolated skills, moving to embedded instruction, and then back to emphasis on teaching discrete or so-called "basic" skills. Current educational practice with its emphasis on pretest-posttest cycle, standardized curriculum, specified outcomes, and measurable objectives has served to reinforce this reductive, "techno-rational" picture of literacy. An alternative model promotes "real reading and writing" of texts that have personal importance to students' lives.