PHYLLIS A. DUBOIS AND JANE G. SCHUBERT

Do Your School Policies Provide Equal Access to Computers? Are You Sure?

The criteria schools use to determine which students get how much computer experience can unintentionally perpetuate gender discrimination and slam the door on a valuable learning tool for many students.

Research indicates that inequities exist in computer access and learning. Some of the inequities are well known: (1) students in wealthy schools have more access to computers than students in poor schools; the ratio of students to computers is 54:1 in the wealthiest districts and 73:1 in the poorest schools (Marketing Data Retrieval 1985); (2) disadvantaged students spend most of their computer time on drill-and-practice

Fear of computers is said to limit educational opportunities and career choices for girls, but the SISCOM Project gives girls female role models and an opportunity to conquer the computer demon.

exercises (Becker 1983) rather than on programming or other problem-solving activities; and (3) more males than females attend private computer camps and take summer computer courses (Miura and Hess 1983).

The American Institutes for Research investigated the circumstances within schools that impede computer access and use. We collected 327 "critical incidents": descriptions of situations that educators and students in grades one through nine experienced in relation to computers. We obtained information about the participants in each incident, the circumstances, the immediate effects, and the long-term implications. We sorted the incidents to identify patterns, created a taxonomy, and derived a list of the positive and negative results of computer use and access. Our study uncovered some inequities that are not necessarily determined by economics or gender, but are the unintentional results of administrative actions.

What Administrative Actions Cause Inequities?

We found four areas in which administrators or educational leaders set policies that *unintentionally* cause inequities in computer learning.

1. *Establishing irrelevant prerequisites to computer learning*. An incident from our study illustrates that criteria established for use of computers are sometimes inappropriate.

At mid-year, a second grade boy had not yet been allowed to use the computer in his classroom. The teacher's requirement was that students had to be reading at grade level or higher to use the computer. Because the boy's reading level was not improving very rapidly, it seemed unlikely that he would get to use the computer at all during that school year.

We encountered a number of schools in which math scores determined who was allowed to take computer courses. In one elementary school, we found that students could use the computers only after they had finished their classroom assignments. Most of the boys sped through their work, then raced to the computers; some of the girls, more concerned with neatness and detail, never finished while computers were still available.

In each of these situations, a teacher's rule or a school policy established "gates" to computer learning that unfairly excluded students. For some of the students—the poor reader, the math phobic, the detail-oriented worker—the computer might be a tool that increases their motivation and improves their skills. While it is clear that we have more students than computers and must provide time for instruction that is not computer-centered, our prerequisites must be defensible. We need to ask: Who is being kept away from computers and why? Are our prerequisites valid and fair?

2. *Placing computers in inappropriate areas, limiting or precluding access for some students*. In elementary schools, computers are often placed in each classroom, regardless of the teacher's preparation for or willingness to use computers. In one class-

Co-Learning About Computers

SISCOM is a program that seeks to balance male/female computer use by placing 9- to 14-year-old girls in a co-learning program with a "Big Sister." SISCOM pairs spend about two hours weekly at the computer, discussing activities, taking turns, and helping each other solve problems. In successive sessions, they complete 20 hours of study, including computer basics, problem solving and programming, and communications through graphics and word processing.

The program uses a well-established community program (Big Brothers/Big Sisters) to address an issue that is both social and educational. Girls are less likely than boys to use computers in the home or at school, partly because they have fewer role models. SISCOM puts young girls and their Big Sister role models together in a higly motivating, self-paced learning program that offers extensive hands-on experience.

Big and Little Sisters are enthusiastic about the program, working overtime and continuing their lessons beyond the basic requirements. Little Sisters learn that "Computers are neat!" and Big Sisters see their Little Sisters' confidence bloom.

Currently funded under the Women's Educational Equity Act Program, U.S. Department of Education, in collaboration with the American Institutes for Research and Big Brothers/Big Sisters of America, Inc., the program is also available for use by Big and Little Brothers and other community agencies, and is readily adaptable for other pairs of learners as well.

For information, write or call Jane G. Schubert or Jean M. Wolman, American Institutes for Research, P.O. Box 113, Palo Alto, CA 94302. Phone (415) 493-3550.

—By Jean Wolman, associate research scientist, Center for Educational Equity, American Institutes for Research, Box 113, Palo Alto, CA 94302.

room we visited, the computer was used almost continuously, including lunch period and before and after school. In another classroom, the teacher made no provision for computer activities, and the computer was almost never used.

In a junior high school, we found that all of the computers were in a math teacher's classroom, so only that teacher and his students could use the computers. Again students were kept away from computers as a result of administrative actions that led to unintended disparities. The questions here are: What is the purpose for locating computers in a specific area or class? Does the location of the computers make them available to as many students as possible?

3. *Overlooking staff members' reluctance or inability to provide computer instruction and supervision.* An elementary school teacher took her class to the computer lab three times a week when the computer teacher was there. When the computer teacher was absent for two weeks, the students had no computer work because the classroom teacher was afraid she would be unable to answer a request for assistance and would look foolish.

We also found that some teachers ignored the computers in their rooms out of fear, resentment, or indifference, and they conveyed a message to their students that computers are to be feared, mistrusted, and ignored. Situations that preclude student use of computers because of teacher ignorance seem intolerable. The questions here are: What attitudes are educators conveying? How are they using this tool? How can school administrators ensure "teacher readiness" for computer use?

4. *Accepting common assumptions about equitable computer learning.* Teachers at a junior high school chose six to eight 8th grade tutors each year. They selected only boys, who were "more knowledgeable and responsible." They never even considered asking girls. Because of the boys' experience and eagerness, the teachers relied on them, giving them even more experience while denying experience to the girls.

We observed programming classes dominated by boys and were told that the girls were "not interested." We learned of computer clubs dominated by males and were told that females did not want to join. We saw computer labs where males hurried in to grab the available computers, leaving females to wait for another day—or give up trying. Administrators, like teachers and parents, often accept computers as part of the male domain and attribute a lack of involvement on the part of females or other groups to disinterest when, in fact, the opportunity is not there or the activity is uninteresting. The computer itself *does* interest students, and it is neutral, requiring no "masculine" or "feminine" skills.

Here we should ask: Why are some students—females, limited-English-speaking students, average students, gifted students—not participating in computer classes or activities? Is the computer used as a multipurpose tool that can serve individual interests?

What Educators Can Do

Administrators and teachers can focus on five specific areas to ensure equitable access to computers:

1. *Find out more.* Our study resulted in the development of *IDEAS for Equitable Computer Learning*, which includes strategies that the educator-members of our advisory work group designed or had already applied. This resource is available from the Center for Educational Equity, American Institutes for Research, Box 1113, Palo Alto, CA 94302, for $8.75 including postage. The Center for Educational Equity is the Title IV Sex Desegregation Center for Arizona, California, and Nevada, and also offers staff development training in computer equity, as do many of the Title IV centers, for other areas.

Other resources include a packet of 50 strategies for schools, parents, and communities called *The Neuter Computer: Why and How to Encourage Computer Equity for Girls* from Computer Equity Training Project, Women's Action Alliance, 370 Lexington Avenue, New York, NY 10017, and a kit, *Programming Equity into Computer Education* ($9.95, prepaid), from PEER, 1413 K Street, N.W., Washington, DC 20005.

2. *Look at your prerequisites, computer locations, and staff qualifications and assumptions.* Some schools limit computer access to certain grades but include every student in that grade. Other schools limit computer use to one subject area and select a discipline, such as social studies, that does not evoke anxiety or disqualify students, as mathematics can. To encourage teachers to learn to use computers, some schools offer staff training and allow teachers to take computers home during weekends and vacations. Computers in teacher lounges with appealing but simple-to-use software like The Print Shop can motivate staff members to learn to use computers. Some use peer learning strategies with teachers, matching experienced and inexperienced teachers so that they can try out strategies while practicing computer skills. All of these

SISCOM's research-based cooperative approach enhances academic performance and self-esteem; exploring the applications of computers in their community, girls and big sisters get experience available neither at home nor at school.

possibilities stress the need to examine assumptions and to deal with their consequences in creative ways.

3. *Provide a range of computer experiences for students*. Realizing that different students respond to different types of activities, some schools provide a kaleidoscope of computer activities: drill and practice, data management, spread sheets, word processing, simulations, problem solving, programming—a wide range in which no assumptions are made about which students will "like" or "do well" with which activities. By providing multidimensional activities and equal time for students, these schools maximize the opportunities for computer learning.

4. *Plan for equal access and use of computers*. Some schools that have found that females are reluctant to use computers before and after school when males are present have designated an equal number of Boys' and Girls' Days in the computer lab. Though fewer girls than boys come to the lab initially, these schools tell us that once the practice is established, more girls begin to use the lab. Other schools have made efforts to encourage females to be leaders, appointing them in numbers equal to the males as computer tutors. Schools have also made special efforts to provide role models for all of their students by (1) inviting computer experts who are female or members of an ethnic group in addition to experts who are male; (2) recruiting female and male computer teachers who represent a range of ethnic backgrounds; and (3) obtaining bulletin board materials, computer software, and curriculum materials that are free of bias.

5. *Become aware of equity issues in general*. Few administrators and teachers intentionally deny learning opportunities to students; they simply have not considered the effects of their actions. We have found that once educators realize which behaviors result in disparate learning opportunities, they change their behavior and seldom revert to inequitable practices. Many schools provide a variety of workshops or seminars that raise consciousness of equity issues. Such activities include studying teacher-student interactions to ensure equal attention to both genders; looking at enrollment patterns to see if courses are gender-balanced; examining instructional materials to eliminate gender bias and misrepresentation; providing positive role models, female and male, to expand students' perceived possibilities; and encouraging all students to prepare for careers that interest and challenge them.

An Overall Relevance

Computers offer a unique opportunity and challenge to educators. Because they are still "new machines," computers do not yet have a clearly established role in the curriculum. They are ubiquitous and interest in them is high, so people are willing to listen to ideas about access, prerequisites, types of activity, and assumptions. By addressing equity in the area of computer education, we can help staff members see the relevance of equity in other areas. For example, one of the barriers our study identified was "Dominance by one student over another during computer time." If teachers can implement strategies to ensure that students are not dominated during computer time, they can use the same strategies for activities away from the computer. By working toward equity in computer learning, they can become aware of ways to work toward it in other areas as well.□

Computer Fear Revisited

A September 1983 *Educational Leadership* article, "Computer Fear" (Bacon, Nielsen, and McKenzie, p. 27), reported on the male dominance of computers in ten New Jersey high schools and female students' reluctance to join the computer revolution. A subsequent survey taken last spring of 233 New Jersey 3rd and 4th graders revealed more information about students' feelings about computers and how societal influences affect those feelings.

We found, for instance, that boys are significantly more comfortable with computers than are girls and are more likely to own home computers and to select programming as a computer activity. While more boys than girls rate highly on LOGO programming, boys and girls are equally adept at word processing with Bank Street Writer. Owning a home computer helps students feel comfortable with computers, but the help students receive at home is more likely to come from fathers and brothers than from mothers and sisters.

How Schools Can Narrow the Gender Gap

- **Teachers should be made aware that there is a gender gap in computer use and be encouraged to examine the role models and computer use opportunities they provide for girls.**
- **Elementary students should be made aware of the career implications of computer illiteracy in a technological society.**
- **Schools should consider using programs that are less gender divisive; LOGO, for instance, is less male-specific than BASIC, and word processing is more appealing to both sexes than is programming.**
- **Parents should be encouraged to support home computer use by their daughters as well as their sons.**
- **Parents should be wary of computer games and poorly designed drill-and-practice packages, which tend to reward aggression and appeal primarily to boys.**
- **Schools should encourage mothers as well as fathers to help educate their children in computer use and provide training for parents in ways to reverse the trend of male dominance in home assistance.**

—By Jamieson A. McKenzie, assistant superintendent, and Mary Demarest, classroom teacher, Princeton Regional Schools, P.O. Box 711, Princeton, NJ 08540.

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Phyllis A. DuBois is associate research scientist, and **Jane G. Schubert** is principal research scientist and director, Center for Educational Equity, American Institutes for Research, Box 1113, Palo Alto, CA 94302.