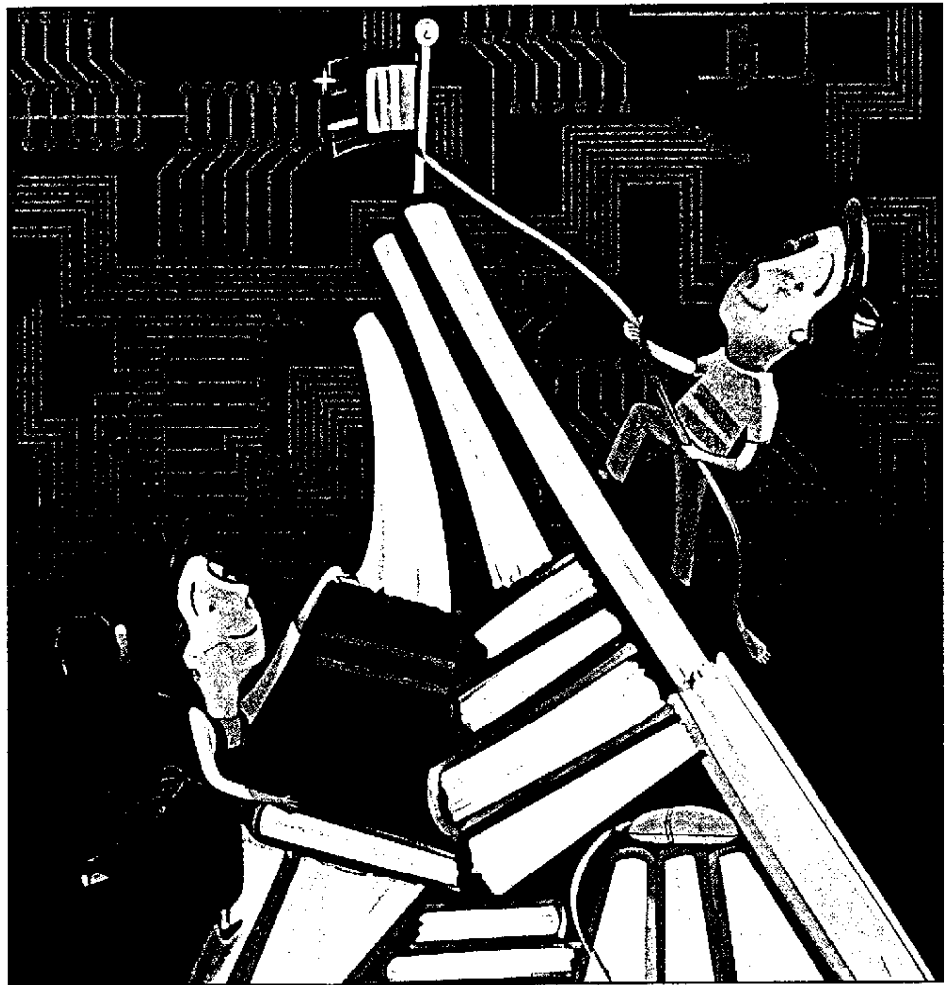


Technology—the New Gender Gap

By Janice Weinman and Lisa Cain

GOOD NEWS, IT SEEMS, HAS A SHORT LIFE IN SCHOOL THESE DAYS. CLOSE ONE LEARNING GAP AND ANOTHER ONE COMES ALONG. JUST WHEN MATH AND SCIENCE GENDER GAPS—STUBBORN DIFFERENCES BETWEEN GIRLS' AND BOYS' EDUCATIONAL PERFORMANCE—ARE NARROWING THANKS TO INCREASED EFFORTS BY PARENTS AND EDUCATORS, A NEW AND GROWING RIFT IS CAUSING ALARM. AND IT SHOULD. THE NEW GAP IS IN COMPUTER TECHNOLOGY, AND GIRLS ONCE AGAIN ARE ON THE SHORT END.



Brenda Graman

A report released in October 1998 by the American Association of University Women (AAUW) Educational Foundation shows that girls come to school with less computer experience than boys and, years later, leave the same way, effectively shutting the first in a series of doors on high-end technology careers. It's easy to see the problem if one looks at the small number of women entering technology fields in college and graduate school or tries to find the few women actually working in computer-related jobs beyond the data-entry work of a secretary.

To put the problem succinctly, the virtual ceiling has replaced the glass ceiling as a barrier to girls' advancement, according to the new report, *Gender Gaps: Where Schools Still Fail Our Children*. If nothing is done, girls and women will be bystanders in the 21st-century economy. That sums up the urgency of the situation.

HOW DID WE GET HERE?

Over the past decade, educators have begun considering the issue of gender equity and its impact on their classrooms.

In 1992 the AAUW Educational Foundation published *How Schools Shortchange Girls*, calling national attention to the barriers girls faced in U.S. schools. That report documented disturbing evidence that girls confronted gender bias and stereotypes in the classroom. Teachers and school administrators began incorporating gender equity issues into classroom materials. Educators began paying greater attention to the different ways they interacted with girls and boys.

Six years later, the close approach of the new millennium invited a new look at the status of girls in school. What was different for girls? How had new educational reforms and new technologies impacted girls in school? The 1998 AAUW report, *Gender Gaps*, measures schools' progress in providing girls with a fair and equitable education.

Gender Gaps, a synthesis of 1,000 studies, was researched by the American Institutes for Research, based in Washington, D.C. The report reviews issues of historic concern for girls—math and science enrollment, high-stakes standardized testing,

extracurricular activities, and health and development risks—as well as new areas such as technology and career preparation programs. It explores all educational gaps, those that favor girls as well as those that favor boys and, to the degree that the data allow, gaps that divide students by race, ethnicity, and financial status.

All such gaps warrant attention, as the report makes clear. In fact, if the United States is to maintain the quality and integrity of its public educational system, there are few educational problems more compelling than closing these gaps. To ensure that all students meet high academic standards, educators must address the learning needs of diverse groups of students.

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PROGRESS

At least in one key area, math and science enrollment, *Gender Gaps* provides grounds for encouragement.

Over the past decade, U.S. girls' dramatically lower participation in math and science has been the focus of national concern. Out of this concern has grown experimentation with alternative teaching methods, community-sponsored programs such as Family Math tutorials and science camps, and new attention to equity in the classroom.

The efforts have paid off. Today there is a sharp new awareness that the courses students take in high school affect the choices open to them for years to come. College enrollment, receipt of scholarships, and career opportunities all hinge on student course-taking decisions and performance in courses. *Gender Gaps* found that girls' participation has steadily improved in math and, to a lesser degree, in science since 1992.

Overall, girls and boys are now taking similar numbers of math and science courses. More girls enrolled in algebra I and 2, geometry, precalculus, trigonometry, and calculus in 1994 than in 1990. This change is particularly noteworthy because

completion of algebra I and geometry early in high school is a major predictor of a student's going to college. Boys are still more likely than girls to take all three core science courses—biology, chemistry, and physics. Of these courses, physics shows the largest and most persistent gap.

PROBLEMS

But girls' race toward parity in math and science has no counterpart in computer science and technology.

Schools across the country are investing millions to wire their classrooms for computer technology. As educators begin to focus on this new medium, discussion has centered almost exclusively on the critical issues of class, race, and access. Computer access is touted, for example, as a way to bridge the educational gap between rich and poor students.

Yet little attention is being given to technology's impact on gender equity. Girls make up only a small percentage of students in computer science classes. While boys program and problem solve with computers, girls tend to use them for word processing, the 1990s version of typing. And boys are more likely to enroll in advanced computer science courses: only 17 percent of advanced placement test takers in computer science were girls in 1996.

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Boys also have more experience with computers outside of school. Such experience leads them to exhibit higher self-confidence and more positive attitudes about computers than do girls.

Video games and school software programs often reinforce gender bias and stereotypical gender roles, with very few powerful, active female role models. One 1995 study of elementary mathematics software found that of the 40 percent that had gender-identifiable characters, only 12 percent of the characters were female. Furthermore, the study by Carol Hodes found that

STUDENTS AT RISK

Gender Gaps, the 1998 report from the AAUW Educational Foundation, looks not only at academic matters but also at tough issues facing students such as violence, pregnancy, and harassment—issues that can interfere with students' ability to learn. It finds that girls and boys face different risks and that some students succeed in the face of such risks while others do not.

The four most serious threats to girls' health and education are depression, delinquency, substance abuse, and pregnancy. One in five girls says she has been sexually or physically abused, one in four shows signs of depression, and one in four does not get health care when she needs it.

The report found that boys repeat grades and drop out of school at a higher rate than girls. But girls who repeat a grade are more likely to drop out than boys who are held back. Not only is being held back more harmful to girls; so is dropping out. Girls who drop out are less likely to return and complete school. The link between substance abuse and dropping out appears stronger

for boys, and the link between substance abuse and criminality appears stronger for girls.

Dropout rates are especially high among Hispanic girls. In 1995, 30 percent of Hispanic females 16 to 24 years old had dropped out of school and had not yet passed a high school equivalency test. In contrast, dropout rates for white students and black males have remained stable. Dropout rates for Hispanic males and black females have declined.

Teenage pregnancy continues to be a problem for Hispanic girls, according to the report. While the teen birthrate dropped by 17 percent among African Americans between 1991 and 1996 and by more than 9 percent among non-Hispanic whites, there was no similar decline for Hispanic teens.

To help combat these risks, *Gender Gaps* suggests that educators can try to increase students' coping skills by building on the cultural and social strengths of students and their communities.

—Janice Weinman & Lisa Cain

the female characters appeared in the passive and stereotypical roles of mother and princess. In stark contrast, male characters appeared as heavy equipment operators, factory workers, shopkeepers, mountain climbers, and hang gliders.

TECH CHECK

The presence of computer technology in the classroom clearly is not enough to advance social equity in education. That's why *Gender Gaps* calls for new programs to increase girls' enrollment in computer science classes. The report suggests that model school programs using technology in a challenging and equitable way must be identified and shared with school districts across the country.

AAUW has launched a Tech Check for Schools initiative that is helping school personnel and students evaluate their computer environments. Tech Check is a simple-to-use technology self-assessment. Using this tool, AAUW branches around the country are working with their local schools to see that technology includes and encourages both boys and girls.

Schools are free to keep their results confidential if they wish or share them with AAUW. Parents can join educators to ensure that girls and boys are introduced to technology, from teaching materials to computer labs and extracurricular activities, in an equitable and challenging learning environment.

A NEW COMMISSION

Gender Gaps found that teachers receive little or no training in how to use technology. The rush to put computers in classrooms will not benefit anyone unless teachers know how to encourage both boys and girls to become effective users of technology.

While many teachers do not receive even the most basic training in computers, they are still expected to teach their students the appropriate skills and to use technology in a challenging and equitable manner. One 1997 study found that on national average, only 15 percent of student teachers had received nine hours or more of technology training. How can educators convey enthusiasm for technology to their students when the potential advantages of classroom technology in promoting learning are not entirely clear to educators themselves?

To examine the role of teacher preparation in the technology equation, the AAUW Educational Foundation created in 1998 a National Commission on Gender and Technology. The commission first convened last November in Washington. It is the first commission to examine differences in girls' and boys' use of computer-based technologies and to consider what teacher strategies appear most effective in ensuring equity in the classroom.

Co-chaired by Sherry Turkle, professor of sociology at the Massachusetts Institute of Technology, and Patricia Diaz Dennis, an executive with SBC Communications, the commission includes 13 outstanding figures in research, development, and education, including Mae Jemison, the first African American woman astronaut, and Jane Metcalfe, president of Wired Ventures, Inc.

Over a period of 18 months the commission will analyze trends, review research, and make policy recommendations, which will be summarized in a comprehensive report in 1999.

The gender gap that girls face in the classroom today will profoundly impact their careers in the future. Technology skills

aren't important just for students interested in pursuing a job in information technology. More and more careers, from architecture to fashion design to meteorology, require computer fluency. Economists have predicted that by the turn of the millennium 65 percent of all jobs will require technology skills.

The gender gap in computer science continues into college. This trend is particularly startling because computer science is a relatively new field that has been open to college women since its beginning approximately 25 years ago. In 1995 only 28 percent of bachelor's degrees and 26 percent of master's degrees in computer science and only 16 percent of both bachelor's and master's degrees in engineering-related technologies were held by women.

AAUW is committed to ensuring that all students receive an excellent education that opens new opportunities for future studies and careers. If girls do not learn technology skills, they will be ill prepared for the challenges of the 21st century. As other educational gender gaps shrink, it is imperative that girls be equipped to take advantage of emerging trends in employment and technology.

If the current gender gap continues, women will continue to be relegated to lower-paying, low-skill jobs without room for advancement.

BEYOND THE NUMBERS

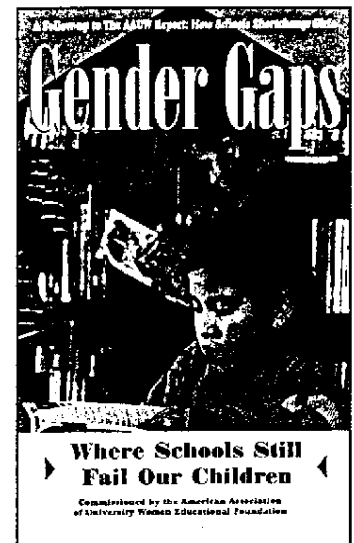
The technology gender gap is not simply a problem of girls' underenrollment in technology classes, majors, and careers. That's why the AAUW Educational Foundation's Technology Commission is exploring not only how many girls and women pursue these fields but also how they use computer technology.

Some research suggests that girls and boys may be using technology for different ends and in different ways. Students who simply understand computers in a general sense will find their career paths limited to low-wage jobs. Students who are able to use computers for higher-order thinking, to problem solve and analyze, will have a wider range of opportunities available to them.

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AND BEYOND TECHNOLOGY

In addition to the technology findings, *Gender Gaps* measures the overall progress schools have made in providing an equitable education to girls since 1992.



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In many respects, girls have made significant strides. In addition to their improvement in math and science, girls are taking higher-level courses overall. Girls' enrollment in advanced placement and honors courses are now comparable to that of boys, except in advanced placement physics and computer science. However, girls do not score as well as boys on the voluntary course-end advanced placement exam that can earn them college credit, even though more girls take the tests.

If girls are to achieve economic independence and participate fully in the boom industries of the 21st century, educators need to ensure their inclusion in new emerging fields.

In a number of areas, girls actually outpace boys. In crucial subjects such as English, sociology, psychology, foreign languages, and fine arts, girls outnumber boys. And girls take more advanced placement courses in English, biology, and foreign languages. Just as math, science, and technology skills are essential for future careers, so are communication skills. Schools must ensure that boys develop these necessary skills.

Despite this success, however, testing continues to be a problematic area. On high-stakes tests, including the Scholastic Assessment Test and the American College Testing program, often used in college admissions, boys continue to score significantly higher than girls on both the math and verbal sections. The gender gaps are widest among high-scoring students. For

reasons that are not entirely clear, girls consistently earn better grades than boys but score lower on standardized tests.

WHAT'S NEXT?

Have schools made progress toward equity since 1992? In critical areas such as math and science, the answer for girls is a definitive yes. However, as *Gender Gaps* makes clear, troubling areas remain. Public education is ever changing. And so, even as historic gaps narrow, new ones emerge; technology is the prime example.

In the 21st century, U.S. public schools must serve the needs of an increasingly diverse student body. Gender equity research and practice will have to take into account the unique needs of diverse students.

For all students to do well in school, educators, parents, and policymakers must develop strategies to address differing learning styles. They must give all public school students the chance to learn, excel, and achieve educationally.

If girls are to achieve economic independence and participate fully in the boom industries of the 21st century, educators need to ensure their inclusion in new emerging fields. Similarly, as the United States participates in a more information-based global economy, they need to encourage boys to develop communication skills. Equity and excellence in education go hand in hand. ◀

For more information about AAUW, visit www.aauw.org or call 1-800-326-AAUW.

To purchase a copy of *Gender Gaps*, call 1-800-225-9998.