Computers, Gender Bias, and Young Children

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This article discusses the discrepancy that exists with regard to the girls’ and boys’ access and use of computers in classrooms and suggests strategies to minimize gender biases before stereotypic behaviors are established. It is argued that differences between genders in computer usage can be attributed to gender biased classroom practices, lack of female role models, computer gender gap in homes, and the scarcity of bias-free software programs. It is suggested that increased awareness on the part of teacher and parents with regard to sex role stereotyping in conjunction with selection of antibias software programs, and equitable use of computers and software in classrooms can minimize biased attitudes towards technology. A proactive rather than a retroactive approach to dealing with biases will prepare children to be competent users of this technology in the 21st century.

The use of microcomputers in schools has increased dramatically in the last decade. The rapid infusion of technology has taken place at all educational levels. Schools are steadily increasing the amount of money spent both on hardware and software. In a recent survey it was noted that 62% of the schools are connected to the Internet and 50% of teachers stated familiarity with technology (Winans, 1996). However, while looking from a societal/social perspective rather than from a merely technological one, there is
a growing concern about the long-term social and economic ramifications of computers and software in classrooms (Mangione, 1995). One of the issues that is becoming problematic is that males are still the predominant users of this technology (Durnell, 1995). According to Shashaani (1994), while there was an increase in the number of women who earned degrees in computer science and related courses, that number of women in such courses has been steadily declining. The gap between girls and boys in math and science classes is being replicated in computer labs as well (Bakon, Neilson, & Mckenzie, 1983).

In the 1980s it was believed that there was a gender bias with regard to computer use. It was, however, also believed that as computers became a routine piece of equipment in every classroom, and class projects involved the use of computers, the gender bias would diminish. The computer, according to Watt (1984), was seen as the great equalizer. More recent analysis of computer access and usage suggests, however, that socioeconomic status, ethnicity and gender still determine who uses computers and how they are used (Mangione, 1995).

Societal norms of gender behavior strongly influence young children’s behavior. By the age of four children already demonstrate some gender specific behaviors and accept that girls and boys are supposed to behave differently. It is critical that adults enhance the self-concept of girls in relation to computers and introduce computer literacy early before gender stereotypes emerge. According to Derman-Sparks (1989), the main goals for preschool children while learning about and dealing with gender equity are to free children from constraining, stereotypic definitions of gender roles and to develop children’s skills for challenging sexist stereotypes and behaviors. Thus, it becomes increasingly important to provide opportunities for non-sexist thinking and acting from an early age (Fagot, 1994; Kramer, 1988; Sparks, 1989). The National Association for the Education of Young Children’s position paper (1996) on technology and young children states that computers are intrinsically compelling for young children, and that when use appropriately technology can support and extend traditional materials in valuable ways. However, research findings identify trends suggesting that if early childhood educators do not incorporate technology into their classrooms and do not ensure equal access to technology social and economic inequity will increase. Thus, if children were exposed to computers early enough, and if schools maintained equal access through computing, girls would become competent computer users.
The purpose of this paper is to:

- Emphasize the importance of providing both boys and girls equal opportunities in the use of computer technology.
- Increase teachers’ and parents’ awareness of the sex role stereotyping with regard to the software programs being used in the classrooms.
- Suggest criteria in the selection of antibias software programs.
- Provide strategies for antibias use of computers and software in classrooms.

BIASES REGARDING ATTITUDES TOWARDS GIRLS’ COMPUTER USE

Research has indicated that the young girls at schools are not using computers and are thus not as computer literate as their male counterparts (Koch, 1994). According to Nelson & Watson (1995), from preschool years boys consistently have more computing experiences than girls. In addition because of their perceived relationships to math and science, and the association of computers with technological progress and male power (Pryor, 1993), girls in general view computers and technology as being beyond their capabilities and realm of understanding. As a result, girls form the following perceptions about computer technology:

- Computers are meant to be, and are used mainly by boys.
- Computers are associated with math, and math ability being perceived as a male characteristic.
- Computers are seen as machines and girls are uncomfortable around machines.

These perceptions cause girls to hesitate to enroll in computer classes. Research by Schofield (1995), indicates that girls are much less likely to be found in computer classrooms than their male counterparts. Educators across the country have noticed that while boys and girls do equally well in computer classes in school, boys are more enthusiastic about playing with computers after school and in enrolling in computer science courses in college (Sanders, 1984). Edwards (1984) gives an example of quantitative inequality wherein computers are placed in advanced math and gifted classes, while other classes have limited access to them. She writes that girls, minorities and the poor are often underrepresented in these classes.
According to Schofield (1995), social arrangements and educational practices (e.g. lack of female role models, decisions about content and location, gender stereotyped course material etc.) discourage many girls from seeking out opportunities to use computers. This affects the way computers are taught, where they are located, and the way they are used. Shashaani (1994), Chen & Lyod (1986), and Gresard (1984), found that differential computer experiences accounted for differences in attitudes. Boys showed more positive attitudes towards computers than girls, however boys also attended more computer classes, used computers more often, and had greater access to computers.

In addition, the experiences that girls have with the computers are very different from those of their male peers. The purpose of using technology for boys is to achieve a goal, while for girls relevant application appears to be more important. Furthermore, with regard to process, boys are interested in manipulating technology so “things happen,” while girls are interested in the process because it enables sharing with partners (Pryor, 1993).

Lack of female role models as competent computer users, is another factor that affects girls attitude towards computers. The lack of role models can be found in three areas:

- Inadequate use by female peers.
- Computers used in classes that mainly interest boys (e.g. limited use in art, language classes etc.).
- Predominant use by male teachers.

Some researchers state that the sex of the computer teacher seems to be a relatively unimportant factor in its use (Sanders, 1985; Sanders & Stone 1986). However, a large number of computer teachers are female particularly at the elementary levels. In these schools as primary computer users, women have been very creative and innovative in using the computer. At the secondary levels where there were more male teachers, particularly at schools located in higher socioeconomic status neighborhoods differences do begin to emerge (Becker, 1985).

BIASES REGARDING COMPUTER SOFTWARE

According to Hawkins (1985), the problems are two-fold; first there is inequity with regard to computer use, and secondly there is a lack of support to girls and women with regard to learning with computers. Sanders
and Stone (1986), emphasize the importance of using the computer as a tool as opposed to an object of study. They also recommend computer activities that encourage “group learning, social interaction, and cooperative problem solving” (p. 26). These correspond more effectively to a female way of learning. Closely related to this problem is the issue of appropriate biasfree software. Most of the currently available software is “designed for boys, about boys, and by boys” (Campbell, 1984, p. 5). According to Hodes (1995) and Biraimah (1989), results from evaluating computer software programs indicate that majority of the main characters were gender identifiable, and of these the largest percentage were male. In addition, females were represented mainly in traditional roles, while high status positions and active roles were assigned to males.

Ware and Struck (1985) explored the representation of males and females in computer magazines and found that the portrayals were extremely gender stereotypic. Research also indicates that even when software programs use androgynous figures, children, particularly boys, tend to assign a male gender to the “neutral” figures (Bradshaw, Clegg & Trayhurn, 1995). Very young children have limited classification skills and their beliefs about gender stereotypes are very rigid. In addition the majority of software available is designed with a male perspective and tends to be game oriented (Mangione, 1995). Even educational software programs are designed with male characteristics.

The lack of software appropriate to the girls’ way of learning, affects the girls’ attitudes toward computers. The majority of available software is more appealing to boys than to girls. Software that requires a high level of familiarity with computer functions further frustrates inexperienced users. In addition there is a lack of computer application skills that appeal to girls; for example, while boys are interested in what the computer can do, girls are more interested in the things the computer can do for them.

**BIASES REGARDING TEACHERS AND PARENTS’ PERCEPTIONS AND EXPECTATIONS OF BOYS AND GIRLS**

The electronic media (television, video games, computers) transmit to a large extent the values and roles of society. Gender stereotyping and inequality in software programs add to sexist attitudes. It is well documented that children develop sex role stereotypes very early in life. Sylvia Kramer (1988) has suggested a number of socializing agents in early childhood, including parents, television, books, toys, and so forth. that contribute to per-
petuating these biases. In some instances social norms may even override children’s own first hand experience.

Research has documented the differential treatment of girls and boys in schools (Cushner et al., 1992). This has resulted in significantly different educational experiences in terms of teacher interactions, curriculum needs and an unmistakable male bias in the culture of the school. Gilliland (1984) argues that the actions of parents and society demonstrate to girls that computers are not for them. Documented teacher behaviors often defer computer handling to the male students and thus suggest to the females that they are not needed or wanted near computers, and that they definitely cannot contribute. It is, therefore, not surprising that while girls start out ahead in a variety of developmental areas particularly verbal ability, eye-hand coordination and mathematical ability, by seventh grade they fall behind boys and lose interest in science and math. Research has indicated that the same pattern is being replicated as far as computer technology is concerned (Koch, 1994; Nelson & Watson, 1991; Shashaani, 1994). As a result, beginning with the middle school, the computer gender gap is evident in schools and the work place, where men far outnumber women in the use of computers and to access time to computers. The one area where women are well represented in computer courses is in word processing classes (Becker & Sterling, 1987; Fetler, 1985) and consequently choose careers as “word processing secretaries, a relatively low status low paying occupation” (Sanders & Stone, 1986, p.8). Factors that discourage girls’ active interest in computer technology are:

- A biased societal assumption that computers are more appropriate for boys is reflected in the attitudes of both teachers and parents, and soon becomes a self-fulfilling prophecy.
- Computers use in classes that mainly interest boys (e.g. limited use in art, language classes, etc.).
- Boys “hog” and are allowed to capture a majority of the computer time.
- Girls tend to be nonassertive in their demands for equitable computer time.
- Unorganized computer time resulting in limited computer use by girls during free time.
- Different expectations of boys and girls in terms of their success in using computers.

In addition to school settings, the computer gender gap seems to exist in homes and in summer camps. Research indicates that twice as many boys
as girls use their home computers, and that boys use them for longer periods of time than girls (Shashaani 1994; Miura & Hess, 1985; Miura & Hess, 1983; Fisher, 1984). This may reflect both the levels of interests of boys and girls vis-à-vis computers as well as “parents willingness to pay for computer enrichment experiences for their sons as opposed to their daughters” (Sanders & Stone, 1986, p. 6).

STRATEGIES FOR CHANGING BIASED ATTITUDES TOWARD COMPUTERS

The National Association for the Education of Young Children’s position statement on Technology and Young Children (1996) supports the need for equal access to technology for all children and calls for attention to be paid to eliminating gender stereotypes. A change in attitude is necessary in order to ensure that girls are not deprived of educational and professional opportunities and advancement in the future. Research suggests (Bakon et al., 1983; Marrapodi, 1984) that aggressive affirmative action strategies as well as strong support networks are essential to make girls comfortable and competent in this technological world. The goal is not to make the computer more accessible and attractive to girls than boys, but to ensure that this tool is available to all students in the school (Fisher, 1984). Both girls and boys will benefit from computer opportunities.

There are strategies teachers can use to prevent biased attitudes towards computer use:

- Provide female models of competent computer use by:
  - actively seeking opportunities for students to observe female role models through field trips in a variety of settings and model competent computer use
  - focusing on women’s use of computers as a learning tool, as an entertainment tool, as a means to communicate to people, and as a means to access and create knowledge
  - inviting female guest speakers to talk about their work and to demonstrate the multiple use of computers in a variety of tasks and assignments
  - regularly asking girls to help the teacher introduce software to the class
  - ensuring that computers are not viewed as “math machines” and being careful not to always place them in the “math and science center”

- Work with all students to promote confidence and competence with new software by:
- scaffolding children’s use of computers and software so they can gradually become more independent
- ask open-ended questions that allow children to test their constructed notions about the software programs and the computer use
- providing verbal and nonverbal assistance by organizing the environment and materials, demonstrating the tasks when necessary, and providing ongoing assistance

- Mediate children’s learning experiences involving computer and software use by:
  - sharing children’s interest and excitement about computers
  - helping children to relate their computer experiences to other types of learning experiences
  - regulating and guiding the use of computers and software so the children become comfortable with the demands of the computer programs
  - conveying a feeling of competence to the learners so they become comfortable volunteering with the teacher on how to explore new software, or do it themselves

- Introduce computers as equally useful tools for both genders early in the child’s development, before gender stereotyping is established.

- Ensure that the computer software and other classroom materials are antibias.

- Make computer use social—perhaps even assign 2-3 students to a computer at a time.

**CRITERIA FOR SELECTING APPROPRIATE SOFTWARE**

The selection of developmentally appropriate antibias software can be a key to changing girls’ attitudes towards computer use. Selecting gender bias free software programs is a means of providing girls and boys with equal learning opportunities by using computer technology. When teachers, as evaluators, are aware and look for bias then they are more likely to be conscious and thus to find evidence of it (Mangione, 1995). In selecting antibias software the following criteria should be followed:

- Female and male characters are equally represented.
- The intensity of physical actions assigned to female is equivalent to those assigned to male characters.
- The extent and frequency of aggressive and/or destructive behaviors is very limited or nonexistent.
- Female characters are presented in problem solving roles and leadership roles.
- The characters are not stereotyped by occupational roles (e.g. female baby sitters and male police persons, etc.), and are free of sexist language.
- The types of emotional statements attributed to females and males are not stereotypic.
- The number of elements of competitiveness vs. cooperation among characters is balanced.
- The software programs provide opportunities for group interactions at the computer.
- Both female and male oriented rewards for correct answers are used (e.g., football sailing over a goal post, or cars racing across the screen to display scores).
- Rewards include both words and graphics or the opportunity to choose ones own token reward system.
- Nonhuman objects are not assumed to be male.
- Content and overall style of the program appeal to both girls and boys.

**STRATEGIES FOR CHANGING ATTITUDES OF TEACHERS AND PARENTS**

To work towards the change in girls/boys attitudes and perceptions about the technology in general, and computers in particular, teachers and parents must first realize the need for change in their own attitudes and expectations of boys and girls. Furthermore, because of the increased use of computers and technology in schools, teachers are presented with the opportunity to become instrumental in influencing both girls/boys and their parents’ attitudes towards computers, and to educate them about selecting appropriate software. The following are some strategies that can be used by teachers in their work towards achieving this goal:

- Advocate that both genders are equally capable of using computers as a learning medium.
- Communicate the feelings of competence by showing interest and sharing ideas (sharing may be teacher or child initiated).
- Provide positive nonverbal communication regarding computer use.
- Make a conscious effort to assign both girls and boys to computer related activities.
- Set up a schedule for computer use, and if the computer use is considered a “privilege,” ensure that all children get the opportunity to exert this privilege.
Create an attitude that computers, like books, are a means of gaining knowledge, are enjoyable, and can be used by all children as a means to accomplishing tasks.

Ensure that while using computers all children are actively involved, and that girls are more task focused and boys are more partner focused.

Encourage cooperation rather than competition.

Select appropriate software.

Treat computers as an essential part of the curriculum and integrated into every aspect of the curriculum.

Stress the usefulness of the program—girls see computers as a means to an end while boys see it as an end in itself.

Encourage home assignments done on the computer.

Eliminate linguistic bias—the generic use of “he” for all androgynous characters.

Select boys and girls for computer-related tasks rather than asking for volunteers.

Use all opportunities available to discuss with parents the need for both genders to become proficient in using computers, and help them choose appropriate software for their children to use at home.

The role of teachers in breaking the pattern of establishing sexist stereotypes and behaviors in young children is crucial. Increasing teachers’ awareness of gender bias with regard to computer usage necessary changes will be initiated. For the changes to be successful, it is essential to provide young children with positive experiences before biases have set in. A proactive rather than a retroactive approach to dealing with biases will prepare all children to be competent users of computer technology in the 21st century. Girls’ increased access to technology will result in more effective learning time at computers and the development of computer related skills. If used consistently from an early age, the strategies suggested in this article will increase the participation of girls in the use of computers and develop positive attitudes toward this technology.

References


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