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ABSTRACT

Biases based on gender and ethnicity in computer software available to schools were investigated in this study. A random sample of 15 software programs were selected and evaluated on the bases of gender and ethnicity. Data were gathered on the number of male and female characters portrayed and on the cross-cultural dimensions of the software in order to determine if it would appeal to a cross section of children from varying backgrounds, or whether it had been prepared with a particular audience in mind, e.g., Anglo-Saxon males. The data showed that, from a quantitative perspective, patterns of gender and ethnic imbalance previously documented in textbooks are also present in current educational software available to students. Of the 1,942 characters noted in the graphics and text of the evaluated software, 63% were males and only 3% of the characters could be identified as ethnic. In order to clearly understand the dimensions of these biases, a quantitative examination of the roles and activities found within the software was undertaken. Similar ethnicity and gender trends were found, with males dominating the character roles (63%) while observable ethnic characters were limited to only 3%. When these roles and activities were divided into separate categories, males were portrayed in more categories, and as more active characters, including adventure, military, and science and technology roles, while females were limited to 41 more passive roles. Ethnic roles were also limited, but ethnic female roles were even more limited than ethnic males roles. (5 tables, a list of the 15 evaluated software packages, and 6 references) (EW)

INEQUALITIES IN CLASSROOM COMPUTER SOFTWARE

by

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The computer "bandwagon," heavily loaded with professional educators and fueled by millions of scarce budget dollars, continues to roll unchecked through our schools. While the virtues of the computer revolution are well publicized, it might behoove educators to ask themselves if proper attention has been paid to the lasting social and economic effects of classroom computers and software. In particular, it is important to ask whether all students receive the same exposure to computers, and whether computers and their software can actually narrow current inequities based on gender, ethnicity or socioeconomic status. Before educators become more deeply involved with integrating computer assisted instruction and computer literacy courses within the curriculum and classroom, it may be wise to assess the potential for computers to actually widen, rather than reduce, the current inequities which exist among students.

Written texts, and more recently, computer software tend to control knowledge as well as transmit selected values and role models to students. And as these educational materials are usually generated within a society's dominant culture, they often reinforce cultural values of the majority, concomitant with inequities embedded within that society. Moreover, when we use these materials as learning tools within the classroom, we tend to exclude from full intellectual participation those children who do not readily identify with the dominant culture.

Educators have long known that students learn better if new knowledge is linked to a student's previous knowledge and experiences.

Yet when a student can not identify with the value-orientations, characters, or historical themes within textbooks or computer software these linkages, and subsequent mastery of the material, frequently do not occur. Omission of female or minority role models for example, tends to discourage these students from identifying with selected subject matter areas, thus severely limiting their ability to absorb specific content, as well as curtailing their future educational and career options.

Research focusing on patterns of gender differentiation within educational materials is both extensive and well known. In Weitzman and Rizzo's work, "Sex Bias in Textbooks" (1975) for example, much stress is laid on the "latent content" of texts which provide girls with specific role models and values. After analyzing the distribution of activities - which underscored the lack of female role models - the authors hypothesize that it will be harder for female students to identify with the book's characters, and therefore make it more difficult for them to assimilate their lessons. Weitzman and Rizzo suggest that the omission of female role models tends to discourage girls in selected subject matter areas, thus severely limiting their educational opportunities and future career expectations.

Messages limiting students' participation remain problematic, whether they are recorded on paper or floppy disk. And the issue is not limited to gender, but encompasses the domains of class and ethnicity as well. According to Gollnick and Chinn (1986) "Because children need strong positive role models for the development of their self-esteem, the omission of members of their own microculture is

serious. It often teaches members of those groups that they are less important and less significant in our society than are majority males" (p. 250). Effective instructional materials should also be free of biases and stereotypes that discourage children who do not readily identify as Anglo-middle class males.

To pursue the goal of teaching all of our children well, teachers must not only be cognizant of the pluralistic nature of their classroom and nation, but must also be critical of instructional materials, including both texts and computer software, which might alienate or discourage students.

Critical and revisionist literature such as Campbell (1984), Noble (1984), Apple (1987) and Bowers (1988), suggest that computers and not neutral, and that they may simply widen the disparities between students instead of giving all students true equal educational opportunity. Questions about accessibility, differentiation of computer experiences (CAI v programming), and software content (e.g., gender role models) suggest serious equity issues that need to be addressed before computers and their accompanying software packages are infused within the school curriculum.

Analyses of computer access and usage patterns suggest that socioeconomic status, ethnicity, and gender determine <u>who</u> uses computers and <u>how</u> they are used. Affluent suburban schools often use computers for programming and more creative experiences. Less affluent and urban/rural areas are more apt to use CAI for rote drills and basic skills acquisition. Research also tells us that girls are more likely to be left out of this "computer revolution," when the more aggressive male students gain control of the limited computer

resources within the school. The association of computers with mathematics, as well as documented teacher behaviors which often defer computer handling to male students, suggest to female students that they are neither needed nor wanted within the realm of technology and computers.

Initial inquiries into the content and focus of educational computer software also suggest that this is male terrain. Campbell's (1984) article quotes a computer hardware/software developer who said "Computer software is designed for boys, about boys, by boys" (p. 5). However, beyond an analysis of the type of activities found within educational software, such as "an array of 'male' sports, battles, space wars and other macho forms of destruction," (p. 5) little critical analysis of the content of educational software has been conducted.

This paper focuses on the issue of software content by evaluating software packages currently available to schools. The purpose is to determine whether students are being exposed to programs which reinforce patterns of societal inequalities, or whether these software packages promote a diverse set of role models and expectations which value the worth and contributions of both boys and girls from varying ethnic backgrounds.

Methodology

To achieve these ends a random sample of 15 software programs was selected and evaluated on the bases of gender and ethnicity (both qualitatively and quantitatively). Data were gathered on the number of male and female characters portrayed in the software, the types of

interests and activities portrayed, and the cross-cultural dimensions of the software. That is, did the software appeal to a cross-section of children from varying social backgrounds, or was it prepared with a particular audience in mind (e.g., Anglo-male)?

Results

When the data are reviewed from a quantitative perspective, we find that patterns of gender and ethnic imbalance previously documented in textbooks are also present in current educational software available to students. The data in Table 1 suggest that software, like other instructional materials, is directed towards a male audience, with little sensitivity for the multicultural aspects of American classrooms. Of the 1,942 characters noted in the graphics and text of the evaluated software, we find that 1,231 (or 63 percent) are male, and 711 (or 37 percent) are female. Of those 1,942 characters, only 53 (or 3 percent) could be identified as ethnic (through references to microcultures such as "Indians", ethnic surnames, or inclusion of famous minority sports figures such as Jesse Owens). Among those ethnic characters identified, we find an even greater pattern of gender differentiation, with 77 percent of all ethnic characters identified as male.

To clearly understand the dimensions of gender and ethnic inequities which appear in current educational software however, we need to go beyond the quantitative aspects to ask what types of activities and role models are displayed within these programs. While generally we do not find the depth of character description or activities that are available in textbooks, software materials still

promote gender and ethnic imbalance through their character descriptions, role models and depicted actions. When all identifiable roles and activities found within the software are analyzed according to gender and ethnicity, we find trends similar to those associated with the quantitative data. Males dominate the character roles and activities (63 percent), while observable ethnic characters are limited to only 3 percent.

When these roles and activities are divided into specific categories (see Table 3), the differentiation between male and female comes into sharper focus. The only categories where more females than males appear are "Domestic" and "Laborer." In contrast, 90 percent or more of all characters featured in roles or activities related to "Adventure," "Military/Protective," "Political Leadership," "Agriculture," and even "Outlaws" were male. Also significant is the fact that 86 percent of all "Science/Technology" roles, including that of computer operator, were portrayed by male characters. What this pattern implies to students using the computer software is that females are not only marginal figures, but are cast in a limited and limiting set of roles. While male figures were portrayed in 69 separate roles or activities, females were cast in only 41 separate roles (see Table 3A).

This message of female marginality is further compounded when specific careers were classified as high status. Of those 195 high status careers (e.g., professor, scientist, president and king or queen), 63 percent were represented by males.

This bias with regard to the nature and breadth of roles is not limited to gender, but pervades ethnicity as well. When the roles and

activities of ethnic characters are expanded to describe specific categories, we find an even more restricted set of roles. As the data in Table 4 show, most ethnic characters are cast into the roles of author, athlete, chief, or artisan. Gender bias was again more severe within ethnic categories, with only 23 percent of all roles and activities portrayed by females. Like their macroculture counterparts, ethnic males were cast in most (75 percent) of the high status roles.

Conclusions

This paper set out to determine whether gender and ethnic biases so familiar to school textbooks were also embedded in educational software programs. The results of this preliminary study suggest that the software reviewed was at least, if not more, biased with regard to gender and ethnicity than the printed page. Though these outcomes may not have been intentional, the severity of their impact remains. Girls and ethnic minorities who use this type of software receive a simple, yet clear message. Technology in the form of computer software is not neutral, and is intended for Anglo males. All others may use it at their own risk!

If educators are to address the lack of equal educational opportunity within our schools, efforts must be made to promote educational materials which include, inspire, and provide role models for every student. To this end it is imperative that extensive study and revision of educational computer software be undertaken so that it might become an effective learning tool for all our children.

Table 1

QUANTITY OF CHARACTERS IN SOFTWARE
(by Gender and Ethnicity)

	Total	Males	Females
All Characters	1,942	1,231 (63%)	711 (37%)
Ethnic	53	38 (72%)	15 (28%)
Percent	(3%)	(3%)	(2%)

Table 2

IDENTIFIABLE ROLES AND ACTIVITIES WITHIN SOFTWARE
(By Gender and Ethnicity)

	Total	Males	Females
All Characters	839	528 (63%)	311 (37%)
Ethnic	26	20 (77%)	6 (23%)
Percent	(3%)	(4%)	(2%)

Table 3

CATEGORIES OF ROLES AND ACTIVITIES IN SOFTWARE
(by Gender)

Category	Total	Males	Females
1) Arts/Communication	283	161 (57%)	122 (43%)
2) Sports	144	87 (60%)	57 (40%)
3) Domestic	116	48 (41%)	68 (59%)
4) Education	69	38 (55%)	31 (45%)
5) Adventure	47	43 (91%)	4 (9%)
6) Military/Protective	39	36 (92%)	3 (8%)
7) Science/Technology	37	32 (86%)	5 (14%)
8) Political Leadership	29	27 (93%)	2 (7%)
9) Business/Service	27	20 (74%)	7 (26%)
10) Agriculture	15	14 (93%)	1 (7%)
11) Outlaws	13	13 (100%)	0 -
12) Laborers	11	4 (100%)	0 -
13) Miscellaneous	9	5 (56%)	7 (67%)
TOTAL	839	528 (63%)	311 (37%)
High Status Careers[a]	309	195 (63%)	114 (37%)

[a] See Table 3A for designated high status careers, marked with (*)

Table 3A

EXPANDED CATEGORIES OF ROLES AND ACTIVITIES IN SOFTWARE
(by Gender)

Category	M	F
1) Arts/Comm.		
Author*	125	111
Actor/ress	18	8
Musician	10	1
Photographer	3	0
Artist	2	1
Newscaster	2	1
Fashion Design.	1	0
2) Sports		
Soccer	13	5
Track	17	6
Swimming	15	22
Soft/Baseball	11	8
Basketball	6	0
Football	5	0
Dirt Bike	4	0
Olympian	3	0
Athlete	3	4
Surfer	2	0
Horse Rider	1	0
Race Cars	1	0
Field Hockey	0	5
Golf	0	4
Gymnastics	0	1
Skiing	0	1
Tennis	0	1
3) Domestic		
Father/Mother	39	47
Uncle/Aunt	4	2
Husband/Wife	2	9
Grandpa/ma	2	5
Baby-sitter	1	2
Housekeeper	0	3

Category	M	F
4) Education		
Student	27	24
Teacher	7	7
Professor*	3	0
Principal*	1	0
5) Adventure		
Hunter	33	0
Hero/Heroine	4	1
Explorer	3	0
Camper	1	0
Mt. Climber	1	0
Traveler	1	2
Guide	0	1
6) Military/Protect.		
Firefighter	7	0
Detective	6	3
Sailor	6	0
Sea Captain*	5	0
Soldier	5	0
Knight	2	0
Police	2	0
Mil. General*	2	0
Sheriff	1	0
7) Science/Tech.		
Scientist*	25	1
Astronaut*	4	0
Computer Op.	2	1
Doctor*	1	0
Aviator	0	2
Nurse	0	1
8) Pol. Leadership		
Pol. Leader*	10	0
President*	9	0
King/Queen*	4	1
Chief*	2	0
Prince/cess*	2	1

Table 3a (Continued)

Category	M	F
9) Business/Serv.		
Letter Carrier	10	0
Business Person	3	0
Salesperson	3	0
Boss*	2	0
Milk Route	1	0
Landlord/lady	1	1
Secretary	0	4
Real Estate Agent	0	1
Waitor/Waitress	0	1
10) Agriculture		
Cowboy/girl	8	0
Farmer	3	1
Fisher	3	0
11) Outlaws		
Thief/Outlaw	10	0
Pirate	3	0
12) Labor/Worker		
Worker	2	7
Construction	1	0
Truck Driver	1	0
13) Miscellaneous		
Wizard	4	0
Witchdoctor	1	0
Warlock/Witch	0	3
Slave	0	1
TOTAL CATEGORIES	69	41

Table 4

EXPANDED ROLES AND ACTIVITIES OF ETHNIC CHARACTERS
(by Gender)

Category	Total	Males	Females
1) Author*	7	4 (57%)	3 (43%)
2) Athlete	6	6 (100%)	0 -
3) Chief*	5	5 (100%)	0 -
4) Arts	2	2 (100%)	0 -
5) Music	2	2 (100%)	0 -
6) Farmer	1	1 (100%)	0 -
7) Guide	1	0 -	1 (100%)
8) Slave	1	0 -	1 (100%)
9) Wife	1	0 -	1 (100%)
TOTAL	26	20 (77%)	6 (23%)
High Status Careers[a]	12	9 (75%)	3 (25%)

[a] High Status Careers designated by (*)

SOFTWARE

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8 Library Adventure, David R. Mack and Christian B. Newton, Learning Well, 1984.

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10 One Hunter: An Adventure in Counting From 1 To 10, Pat Hutchins, adapted by Sally Tobin, Millennium, Kidware, 1984.

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