GENDER DIFFERENCES IN COMPUTER ATTITUDES AMONG SECONDARY SCHOOL STUDENTS IN SAUDI ARABIA

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ABSTRACT

This paper examines the gender differences in computer attitudes among secondary school students in Saudi Arabia. The Computer Attitude Scales (CAS) (13) was completed by 187 male and female students. Significant gender differences are found in scores recorded on CAS three subscales of Computer Anxiety, Computer Confidence, and Computer Liking. The results reveal that male students are less anxious about learning and using computers, more confident in their ability to use and learn about computers, and like or enjoy working with computers more than female students. Implications and future research are discussed.

INTRODUCTION

The rapid growth of the microcomputers in the late 80s and 90s has had a profound effect on business organizations and educational institutions. On the one hand, business employers require computer-skilled employees who have the capability to work with the computers, and on the other, schools are obliged to graduate students who are computer literate before they enter the work force. One's attitude toward computers is an important factor that influences computer awareness. Researchers have found a strong association between positive attitudes toward computer and computer systems success (1, 10, 11, 27). Stevens (22) emphasized two factors for successful implementation of computers in educational institutions: a) teachers' attitudes toward computers, and b) teachers' expertise in computers. Positive attitude toward computer enhances the knowledge and creativity of computer users, whereas negative attitude may hamper the use of computer as a learning and teaching tool.

Schools invest a significant amount of money to acquire computer resources for teachers' and students' use and, hence, to promote computer literacy and limit resistance to learning about computers. Yet no single study has investigated the secondary school students' attitudes toward computers in Saudi Arabia. This study attempts to fill this void and examines the computer attitudes within a sample of secondary school students. Specifically, this paper examines the gender differences in computer attitudes among secondary school students in the Eastern Province of Saudi Arabia.

After this short introduction, the education system in Saudi Arabia is described briefly, followed by the methodology used in this study, results, and discussion. Finally, conclusions and future research are presented.

EDUCATION SYSTEM IN SAUDI ARABIA

The education system in Saudi Arabia is divided into three categories: General Education, Technical Education and Vocational Training, and Higher Education (4). The General Education ladder consists of three stages. The elementary stage consists of six grades, first grade to sixth grade, and lasts six years from the age of six to 12. The intermediate stage consists of three grades, seventh grade to ninth grade, lasts three years from the age of 13 to 15. The secondary stage which consists of three grades, tenth grade to twelfth grade, and lasts three years from the age of 16 to 18. Students must pass the yearly promotion exams in order to progress to the next grade. Otherwise s/he must repeat the grade. The General Education in Saudi Arabia is supervised by two authorities: the Ministry of Education and the General Presidency of Girls Education for boys and girls, respectively.

Technical Education and Vocational Training is supervised by the General Organization for Technical Education and Vocational Training. Students who pass the Secondary stage of the General Education become eligible for possible admission to Technical Education and Vocational Training schools. One of the objectives of Technical Education and Vocational Training is to prepare students to work in the industrial, commercial, and agricultural fields. Another objective is to provide and upgrade technical and vocational skills of the indigenous work force.

Higher Education is supervised by the Ministry of Higher Education and the General Presidency of Girls Education for male and female students, respectively. The first institution of higher education is King Saud University. Now there are seven universities in Saudi Arabia, all under the auspices of the Ministry of Higher Education. The universities are King Saud University, King Abdulaziz University, King Faisel University, King Fahd University of Petroleum and Minerals, Islamic University, Umm Al-Qura University, and Imam Mohammed bin Saud Islamic University. All these universities enroll both male and female students except King Fahd University for Petroleum and Minerals and Islamic University. The General Presidency of Girls Education supervises Girls' Colleges where only female students are enrolled.

All male and female students in Saudi Arabia study

almost the same curricula in all education levels except for technical education and vocational training. Males and females are separated and taught by teachers of the same gender.

METHODOLOGY

A 30 item Computer Attitude Scale (CAS) was administered by the classroom teachers in four public and private secondary schools to 187 students during the Spring semester of 1994. The CAS was developed by Loyd and Gressard (13) and tested for validity and reliability (8, 14, 15, 25). This instrument was translated into Arabic before it was administered. The CAS is composed of three subscales to measure three components of computer attitudes: 1) anxiety or fear of computers, 2) confidence in ability to use or learn about computers, and 3) liking or enjoying working with computers. Each subscale is comprised of ten positively and negatively worded items. The items for each subscale are distributed alternately throughout the questionnaire. The survey uses five-point Likert formats and responses to the items are coded as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. For subscale analysis, responses are recorded so that high score on the Computer Anxiety subscale corresponds to low anxiety, whereas high scores on the Computer Confidence and Computer Liking subscales reflect high confidence and liking respectively. Other variables related to age, sex, frequency of use, computer ownership, and education level/class are collected through single item questions. Respondents are assured that their responses would be anonymous. In this paper, the schools are given disguised names of One, Two, Three, and Four.

Of the 187 respondents, 81 are males and 106 are females. Of the schools studied, school Three is a private school with two separate sections for male and female students. Only female students were drawn from schools One, Two, and the female section of school Three, whereas male students were drawn from school Four and the male section of school Three. Ages range from 15 to 26 with an average of 17.27 and a standard deviation of 1.84 years. More than 61% of the sample owns computers. Fifty and 71% of the males and females own computers, respectively. About 61% prefer to play games with the computer whereas 39% prefer to do programming. Approximately 39% are first year and 23% are second year students. Sixty-two percent use computer between one and five times a week, and 28% never used computers. The sample characteristics are shown in Table 1.

TABLE 1
Characteristics of the Respondents

Variable	Total N=187		Male N=81		Female N=106	
	N	%	N	%	N	%
School						
One	19	10.2	0	-	19	19.9
Two	68	36.4	0	-	68	64.2
Three	52	27.8	33	40.7	19	17.9
Four	48	25.7	48	59.3	0	-
Year:						
First (10th grade)	69	38.8	22	27.5	47	48.0
Second (11th grade)	41	23.0	12	15.0	29	29.0
Third (12th grade)	68	38.2	46	57.5	22	22.4
Computer Ownership:						
Owns	114	61.6	39	49.4	75	70.8
Doesn't Own	71	38.4	40	50.6	31	29.2
Preference Use:						
Games	112	60.9	31	39.7	81	76.4
Programming	72	39.1	47	60.3	25	23.6
Frequency of Use:						
More than 5 times	17	9.2	11	13.9	6	5.7
1-5 times	115	62.5	51	64.6	64	61.0
Never	52	28.3	17	21.5	35	33.3

RESULTS AND DISCUSSION

Table 2 presents the mean and the standard deviation scores of the total sample, male and female subsamples, and the reliability coefficients of the total Computer Attitude Scale and the three subscales, namely Computer Anxiety, Computer Confidence, and Computer Liking. The mean scores revealed by this study draw our attention to the generally favorable attitudes to computers for the total sample and for the male and female subsamples on the total scale as well as on the subscales. The reliability coefficients for computer Anxiety, Confidence, Liking, and overall Attitude are 0.76, 0.82, 0.81,

and 0.93, respectively, indicating that both subscales and total scale provide reliable measures of computer-related attitudes. When grouped by gender, t-tests reveal that there are significant gender differences between the mean scores of male and female students on the three subscales and on the overall Attitude scale.

In the item analysis, there are both significant and marginal gender differences in the instrument items of the Anxiety and Liking subscales and almost in all the items of the Confidence subscale (Tables 3, 4, and 5).

TABLE 2
Gender Differences in the Computer Attitude Scale

Scale	Number of Items	α	Total Mean (SD)	Male Mean (SD)	Female Mean (SD)	t	df	p
Anxiety	10	0.76	3.96 (0.64)	4.07 (0.58)	3.87 (0.68)	2.14	185	0.0335
Confidence	10	0.82	3.64 (0.72)	3.95 (0.59)	3.40 (0.72)	5.60	185	0.0000
Liking	10	0.81	3.58 (0.73)	3.81 (0.57)	3.41 (0.79)	4.06	184	0.0001
Overall Attitude	30	0.92	3.72 (0.64)	3.94 (0.53)	3.56 (0.67)	4.39	185	0.0001

TABLE 3
Gender Differences in the Computer Anxiety Subscale

Statements	Male Mean (SD)	Female Mean (SD)	t	df	p
Computers don't scare me at all.	4.12 (0.91)	4.09 (1.04)	0.21	184	.8334
Working with computers would make me very nervous.	1.97 (1.04)	2.08 (1.15)	-0.67	182	.5033
I don't feel threatened when others talk about computers.	4.12 (1.22)	3.90 (1.27)	1.19	183	.2349
I feel aggressive and hostile toward computers.	1.77 (1.11)	1.82 (1.11)	-0.24	181	.8069
It wouldn't bother me at all to take a computer course.	4.44 (1.04)	3.97 (1.37)	2.64	184	.0091
Computers make me feel uncomfortable.	1.90 (1.02)	2.12 (1.07)	-1.38	181	.1688
I would feel at ease in a computer class.	4.27 (0.98)	3.42 (1.26)	5.24	184	.0001
I get a sinking feeling when I think of trying to use a computer.	2.78 (1.31)	2.28 (1.19)	2.72	183	.0073
I would feel comfortable working with a computer.	4.19 (0.90)	3.67 (1.06)	3.53	180	.0005
Computers make me feel uneasy and confused	1.94 (1.07)	2.01 (1.03)	-0.46	183	.6444

Computer Anxiety

In subscales analysis, there is a statistically significant difference between males and females on the Anxiety subscale (p=0.0335). Male students tend to be far less anxious than female students about learning using and computers. A possible explanation for the differences might be due to the association between computer anxiety and math anxiety. There is a perception among females that computer and mathematics belong to the male domain. This result conforms with the results reported by Igbaria (10, 11), Gilroy and Desai (7), and Temple and Lips (23) and contrasts with previous research findings reported by Francis (5), Heinssen, et al. (9), Robertson, et al. (19), Wilson (24), Loyd and Gressard (13), and Igbaria (11). However, as shown in Table 3, both genders have similar level of disagreement with the items "Computers don't scare me at all," "Working with computer would make me very nervous," "I don't feel threatened when others talk about computers," "I feel aggressive and hostile towards computers," "Computers make me feel uncomfortable," and "Computers make me feel uneasy and confused." Male students are more likely to agree with the items "It wouldn't bother me at all to take computer course" (p+0.0091), "I would feel at ease in a computer class" (p=0.0001), and "I would feel comfortable working with a computer" (p=0.0005). Although both males and females tend to disagree with the item "I get a sinking feeling when I think of trying to use a computer," female students are more likely to disagree (p=0.0073).

Computer Confidence

Significant differences in computer confidence between male and female students are observed at both Confidence subscale and the individual items of the subscale, as shown in Tables 2 and 4. All items reveal significant gender differences. This is overwhelming evidence that males have greater confidence in their ability to use or learn about computers. The only item which shows marginal gender difference is "I don't think I could handle a computer course" (p=0.0765). A possible explanation for lower females' confidence may be attributed to what Siann, et al. (21) referred to as the "we can, I can't" paradox where females tend to be unsure of their own individual ability to learn about and use computer but are sure in their ability as a group. Another explanation might be that females underestimate their own computer ability. This result about gender differences in computer confidence is in accord with the recent results reported by Robertson, et al. (19) and Shashaani (20) on one hand and contrary to the results reported

by Francis (5), Loyd and Gressard (13), and Wilson (24) on the other.

Computer Liking

As shown in Table 5, males show greater enthusiasm for working with computers (p=0.0005), stick with the computer problem until they have the answer (p=0.0006), find it hard to stop working with the computer (p=0.0001), and continue thinking about a computer problem if left unsolved in class (p=0.0000). There are marginal gender differences with the items "I think working with computers would be enjoyable and stimulating" (p=0.0808), "Figuring out computer problems doesn't appeal to me" (p=0.0840), and "I will do as little work with computers as possible" (p=0.0517). Males and females alike indicate similar perception to these items: "The challenge of solving problems with computer doesn't appeal to me," "I don't understand how some people can spend so much time working with computers and seem to enjoy it," and "I don't enjoy talking with others about computers."

TABLE 4
Gender Differences in the Computer Confidence Subscale

Statements	Male Mean (SD)	Female Mean (SD)	t	df	p
I'm no good with computers.	2.34 (1.13)	3.01 (1.08)	-4.07	181	.0001
I would feel OK about trying a new problem on the computer.	3.97 (1.26)	3.33 (1.26)	3.45	182	.0007
I don't think I would do advanced computer work.	2.56 (1.27)	3.26 (1.52)	-3.35	183	.0010
I'm sure I could do work with computers.	4.22 (0.87)	3.49 (1.34)	4.54	179	.0001
I'm not the type to do well with computers.	2.53 (1.16)	3.04 (1.16)	-2.96	181	.0035
I'm sure I could learn a computer language.	4.36 (0.82)	3.83 (1.19)	3.56	177	.0005
I think using computer would be very hard for me.	2.00 (1.10)	2.40 (1.12)	-2.42	183	.0165
I could get good grades in computer courses.	4.27 (0.94)	3.70 (1.04)	3.78	181	.0002
I don't think I could handle a computer course.	2.10 (1.17)	2.42 (1.26)	-1.78	182	.0765
I have a lot of self-confidence when it comes to working with computers.	4.19 (0.83)	3.82 (1.12)	2.57	184	.0110

TABLE 5
Gender Differences in the Computer Liking Subscale

Statements	Male Mean (SD)	Female Mean (SD)	t	df	p
I would like working with computers.	4.56 (0.82)	4.03 (1.22)	3.52	182	.0005
The challenge of solving problems with computers doesn't appeal to me.	2.90 (1.22)	3.00 (1.36)	-0.51	181	.6083
I think working with computers would be enjoyable and stimulating.	4.49 (0.81)	4.24 (1.01)	1.76	184	.0808
Figuring out computer problems doesn't appeal to me.	2.73 (1.18)	3.04 (1.19)	-1.74	182	.0840
When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.	3.84 (1.14)	3.23 (1.19)	3.51	183	.0006
I don't understand how some people can spend so much time working with computer and seem to enjoy it.	2.63 (1.42)	2.72 (1.53)	-0.39	177	.6966
Once I start to work with the computer, I would find it hard to stop.	4.35 (0.87)	3.70 (1.20)	4.22	179	.0001
I will do as little work with computers as possible.	2.37 (1.28)	2.73 (1.23)	-1.96	182	.0517
If a problem is left unsolved in a computer class, I would continue to think about it afterward.	4.00 (1.04)	3.10 (1.17)	5.38	182	.0000
I don't enjoy talking with others about computers.	2.46 (1.33)	2.78 (1.32)	-1.63	184	.1046

The Liking subscale reveals that male students tend to like or enjoy working with computers more than female students (p=0.0001). The result contrasts with previous findings reported by Francis (5), Robertson, et al. (19), Wilson (24), Norales (17), and Loyd and Gressard (13).

CONCLUSIONS AND FUTURE RESEARCH

The main conclusion to be drawn from this study is that both male and female students have positive attitudes toward computers. Educators should capitalize on this positive attitude

toward computers and design a comprehensive computer education package which deals with all social, economical, and technical aspects of computing. A second conclusion is that males' attitudes are significantly higher than their female counterparts. That is, males are less anxious about learning and using computers, more confident about working with computers, and perceive computers as more enjoyable than females. A third conclusion is that the problem of gender differences in computer attitudes begins as early as the secondary school level. A final conclusion is that gender differences in computer attitudes is a factor to be taken into account in structuring computer education programs.

This study does not investigate the explanatory variables for gender differences but many studies ascribe the differences to computer experience (2, 13, 21), peer and parental attitudes (20), computer ownership (6, 12), and locus of control (26). One important variable peculiar to Saudi Arabia that might explain the gender differences is the nature of the job opportunities for the females and the perception that computer is male dominated field. Almost all female graduates, with few exceptions, enter the teaching profession where computer skills are recommended but not necessary. No previous studies have examined the effects of these variables on computer attitudes among students in Saudi Arabia. Hence, further research is recommended to be pursued in this direction.

In spite of the importance of this study, the sample is drawn from the Eastern Province of Saudi Arabia. Consequently, caution is warranted regarding the generalization of the results to other Provinces of the country. Further research encompassing a wider sample of students than those represented in the present study is necessary to assess the applicability of the results to the general population of students. A longitudinal rather than cross-sectional study is also necessary to see whether there are any changes in computer attitudes or persistence of the gender gap in computing over time.

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