

Gender Differences in Computer Attitudes and Skills

TENGGU FAEKAH BT TENGGU ARIFFIN

ABSTRAK

Kajian mengenai komputer dalam pendidikan telah mengambil kira pembolehubah jantina semenjak awal 1980-an. Namun begitu, dapatan kajian mengenai perbezaan jantina adalah tidak konsisten, terutamanya dari segi sikap terhadap penggunaan komputer. Kajian ini mengenalpasti sikap pelajar terhadap teknologi komputer dan tahap kemahiran mereka dalam menggunakan komputer. Maklumat untuk kajian ini diperolehi melalui soal selidik yang telah dijalankan ke atas 556 orang pelajar dalam Daerah Kubang Pasu, Kedah. Hasil kajian menunjukkan bahawa secara keseluruhannya, pelajar mempunyai sikap yang positif terhadap komputer, tetapi agak rendah tahap kemahiran berkomputer. Pelajar perempuan mempunyai sikap yang lebih positif, berbanding dengan pelajar lelaki, dari segi keyakinan dan persepsi terhadap kepentingan. Walaubagaimanapun, pelajar lelaki merasakan bahawa kemahiran mereka dalam komputer adalah lebih tinggi. Berdasarkan dapatan kajian ini, beberapa cadangan dikemukakan untuk tujuan memperkukuhkan lagi sikap positif yang sedia ada dan mengembangkan kemahiran berkomputer di kalangan pelajar.

ABSTRACT

Studies on computer use in education have taken into account the gender factor since the 1980s. However, results regarding gender differences have not been consistent, especially from the aspect of attitudes towards computers. This study identifies student's attitudes toward computer technology and their skills in using computers. Information for this study has been gathered from a survey on 556 students in the district of Kubang Pasu, Kedah. Results show that generally, students have positive attitudes toward computers, but they have low skills in using computers. Female students have more confidence and positive attitudes toward the importance of computers. Male students however reported having better skills in handling computers. This article offered suggestions to strengthen the positive attitudes and expand the skills of using computers among students.

INTRODUCTION

Before the eighties, the issue of students' attitudes towards computers barely existed. With the wider spread of computers in schools, the issue started to gain

more attention as of the mid-eighties. More research addressed it directly, for example, the work of Loyd and Gressard (1984), Loyd and Loyd (1985), Koohang (1989), Hunt and Bohlin (1993), Knezek and Miyashita (1993), King (1994), Sensales and Greenfield (1995), Yaghi (1997) and Mitra and Steffensmeier (2000).

The research literature on computer education has examined gender differences since the early 1980s. Research findings are inconsistent with regard to the relationship of gender and attitudes towards computers and/or computer skills. For example, using the Computer Attitude Scale (CAS) by Loyd and Gressard (1984) as the instrument, Koohang (1989) found significant differences in students' perceptions of computer usefulness and found that male students scored higher on this particular subscale, but not significantly higher on other three subscales, which are liking, confidence and anxiety.

Other researches with similar findings, showing that males have more favourable attitudes towards computers are that of Barba and Mason (1994), and Yaghi (1997). Yaghi, suggested that the difference in attitudes among males and females may be a reflection of cultural characteristics and that it could be a trace of oriental families' tendency for preferential treatment of male children. Therefore male students are given better access to computers at home. The same reason for gender gap in computing was also highlighted in the work of Miura (1986) and, Simonson and Thompson (1994).

Other reasons to explain gender difference in attitudes towards computers are: 1) the perception of computers as any other machines, meant for men and boys; 2) the lack of encouragement that teachers and parents give to girls in the area of computer; and, 3) the lack of female role models in the field involving computers. (McGrath & Thurston 1992)

However, there are also researchers who found no significant difference in attitudes towards computers with regard to gender. Hunt and Bohlin (1993) discovered that gender did not correspond with any significant differences in any 4 subscales of attitudes towards computers (as in the CAS of Loyd & Gressard 1984; and Koohang 1987).

An opposite type of relationship between gender and attitudes was also noted in findings of some researches, such as the work of McGrath and Thurston (1992), which found that girls have more favourable attitudes towards computers as compared to boys. Girls liked computers significantly more than boys did, and the girls, more than the boys, believed they would use computers in their future. Despite the fact that girls had more positive attitudes in terms of liking and perceived usefulness, the findings of the same study also indicated that boys were more confident than girls, in using computers. Young (2000) also found similar results; the females showed more positive attitudes than the males in perceived usefulness, but the males indicated greater skills than the females. The fact that males rated themselves as having significantly greater skills than females is consistent with another study by Houtz and Gupta (2001).

ATTITUDES TOWARDS COMPUTERS

Attitudes do matter. If students are to adopt computer technologies, they must have the right kind of attitudes towards computers. Researchers have investigated the relationship between computer attitudes and computer adoption or uptake. The importance of attitudes and beliefs for learning to use new technologies is widely acknowledged (Loyd & Gressard 1984).

Regarding the meaning of attitudes, different researchers gave different but somehow related definitions of the word. Aiken (1980) described attitudes as “learned predispositions to respond positively or negatively to certain objects, situations, concepts, or persons”. Some other researchers used psychological constructs to explain attitudes. Loyd and Gressard (1984), for example, divided the construct ‘attitudes’ into four different variables, which are: 1) computer liking; 2) computer anxiety; 3) computer confidence, and: 4) perceived usefulness of the computer.

There are researchers who seemed to be satisfied with Loyd and Gressard’s definition, like Koochang (1989) and, Necessary and Parish (1996), while others only seemed to agree with only part of it, such as Divine and Wilson (1997) who defined attitudes as “the level of affect one has for computer” and thus, they are contented with ‘computer liking’ as the uni-dimensional perspective of computer attitudes, whereas the rest of the factors are treated as the causal antecedents of this attitude.

On other occasions, researchers looked at attitudes towards computers, by using or adding other dimensions, such as self-efficacy (Delcourt & Kinzie 1993), motivation towards learning computer skills (Knezek & Miyashita 1993) and various other aspects of human attitudes in general.

The differences in the perceptions of computer attitudes among researchers have resulted in the development of different useful tools for assessing attitudes towards computer, be it among students, teachers, or individual in general. Kay (1993) surmised that researchers had assessed more than 15 different constructs to attitudes towards computers in more than a decade. Among the commonly used instruments for computer attitude measurement are, the Computer Attitude Scale (CAS) by Loyd and Gressard (1984), the Bath County Computer Attitudes Inventory (BCCAS) by Bear, Richards and Lancaster (1987), the Computer-Anxiety Index (CAIN) by Simonson, Maurer, Montag-Torardi and Whitaker (1987) and numerous others.

COMPUTER SKILLS

Simonson, et. al (1987) defined computer literacy as a combination of these factors: 1) having a positive attitude including anxiety free, willingness or desire to use the computer, confidence in using them and a sense of computer

responsibility; 2) the ability to responsibly evaluate, select and implement a variety of practical computer applications to do meaningful and efficient work based on an understanding of general types of applications, capabilities and limitations of types of applications, and societal impact of specific applications; 3) the appropriate knowledgeable use of hardware and software necessary for computer applications; and, 4) the ability to direct the operation of the computer through the skillful use of programming languages.

From this definition, we could clearly see that computer skills are a big part of the requirements for an individual to be said as computer literate. Other than that, it is also clear that computer skills can be divided into perhaps two or three subcategories. Nafisah, (1997), for example, has divided it into two, "Basic computer skills" and "Software application skills". Another way of categorization made was, by the way individuals use skills. Abdul Malek (1999), in designing an instrument to measure computer skills, has put them under two different categories, which are termed as "Skills in instruction and research applications" and "Skills in web and multimedia development applications."

Computer in education has been introduced in Malaysia more than a decade ago, but to date, we know little of the skills and attitudes among students regarding the use of this technology. Thus, it is impossible to determine how far we have succeeded in achieving our goals of preparing the future generations with computing skills and knowledge required, to be able to compete in this information age. How positive students' attitudes towards computers, how skillful they rated themselves as and are there differences between the girls and the boys in their attitudes and skills, must also be clearly identified. Based on the information gathered, recommendations can be made to the relevant parties, such as, teachers, school administrators, administrators at the educational department level and also curriculum planning groups, to focus on areas of weaknesses and to instill more positive insights of this new technology among our students.

Thus, this study seek to shed some light with regard to the following questions:

1. What are the attitudes and skills of the students concerning the use of computer technologies?
2. What are the differences between girls and boys in computer attitudes and skills?

It would be beneficial to know what girls and boys in schools really think of, expect from, fear and know about these new technologies; and whether their opinions and feelings are different. Information from this study will be useful in upgrading the quality of computer teaching in schools.

METHODOLOGY

POPULATION OF THE STUDY

This study was conducted using the students in the district of Kubang Pasu, Kedah, as the target population. A total of 554 Form Four students were selected as the subjects, 291 (52.5%) of them are girls and the remaining 263 (47.5%) are boys.

Data was gathered by a likert type of questionnaire , comprising mainly of 40 items measuring attitudes and another 13 items for self-rated skills.

INSTRUMENTATION

The first section, Demographic was designed mainly to gather information about gender (male/female).

The second section of the questionnaire, “Attitudes Towards Computer” is the likert-type instrument, which is adopted from the Computer Attitude Scale (CAS) by Loyd and Gressard (1984). This section consists of 40 items categorized under the terms: i) computer anxiety; ii) computer confidence; iii) computer liking; and, iv) computer usefulness. A study to test the reliability and validity of this instrument was carried out by the researcher, and it was estimated that the total score for its internal consistency reliability (Cronbach’s alpha) was 0.95 (0.9, 0.89, 0.89 and 0.82 for anxiety, confidence, liking and usefulness subscales, respectively). Sample statements, which were included in this section, are “Computers make me feel nervous” and “I would like working with computers”. Respondents were required to check one of the five descriptors ranging from “Strongly disagree” to “Strongly agree”.

The third section, which is the “Computer Skills” assessment, was adopted from the study carried out by Abdul Malek (1999). In this section, respondents were to indicate their skills in using computer technologies (“write papers, reports, letters or other documents”, “search library databases”, etc.) by checking one of the descriptors ranging from “Not well at all” to “Very well”. All together there are 13 items for this part. The translated version of the entire questionnaire was re-checked by an expert in this field.

To answer Research Question 1, descriptive statistics, which include frequency counts, and percentages on all variables were used to illustrate the attitudes and skills of computer technologies among the respondents. Mean scores on selected variables were highlighted to determine priority of importance.

To answer Research Question 2, the t-tests were used to determine if there exist differences between girls and boys, against the other variables, which are the differentiated variables of computer attitudes (comfort-anxiety, liking, perceived usefulness and confidence) and computer skills.

FINDINGS

Research question 1: What are the attitudes and skills of the students concerning the use of computer technologies.

1. Computer Attitudes (Comfort/Anxiety)

The first construct in discussion is comfort/anxiety. With regard to comfort/anxiety, as a whole, students portrayed positive attitudes towards computer technologies, stating that they were not anxious, but in fact, quite comfortable towards computers or using computers. Table 1 shows that four of five items had more than 50 % of the responses in the two most positive categories of answers (Strongly Agree and Agree). A combination of the percentages for responses in the three positive categories (Strongly Agree, Agree and Rather Agree) was more than 85 % for all items.

Students' positive attitudes for this construct were further supported by the high percentage (more than 75 %) of the responses in the two most negative descriptors (Strongly Disagree and Disagree), which are considered as positive responses for the negatively stated items.

2. Computer Attitudes (Liking)

Students' attitudes (liking) towards computers are shown in Table 2. The responses for the two most positive answers for positive statements ranged from 43.0 % to 82.1 %. As for the negative statements, the responses given for the two most negative descriptors were from 44.4 % to 90.6%. In other words, 43.0 % to 90.6 % of the students reported like or would like to work using computers.

3. Computer Attitudes (Confidence)

The results for students' attitudes (confidence) are shown in Table 3. Respondents showed that they were confident with computer technologies. Out of five items that were positively stated, four items had more than 50 % of the respondents checking the last two positive responses (Strongly Agree and Agree). All five items had more than 75 % of the respondents choosing the positive descriptors, from Rather Agree to Strongly Agree.

The results for the negatively stated items confirm students' positive attitudes in terms of confidence. More than 65 % of the students checked either Strongly Disagree or Disagree for four of the five items that were negatively stated. This indicated that they gave positive responses for their confidence towards computer technologies.

TABLE 1. Computer attitudes (comfort/anxiety)

Computer Attitudes	NA	Strongly Disagree	Disagree	Rather Agree	Agree	Strongly Agree	Mean	SD
	(0)	(1)	(2)	(3)	(4)	(5)		
	N	N	N	N	N	N		
	%	%	%	N%	%	%		
<i>(Positively worded items)</i>								
It wouldn't bother me to use computers		13 2.3	53 9.6	145 26.2	249 44.9	94 17.0	3.65	0.95 0
I don't feel scared to use computers		16 2.9	53 9.6	161 29.1	229 41.3	95 17.1	3.60	0.97 4
I don't feel threatened when others talk about computers		30 5.4	106 19.1	167 30.1	186 33.6	65 11.7	3.27	1.06 9
I feel comfortable when using computers	80 14.4	8 1.4	17 3.1	103 18.6	217 39.2	129 23.3	3.36	1.60 7
I feel comfortable in computer classes	80 14.4	11 2.0	30 5.4	130 23.5	182 32.9	121 21.8	3.24	1.60 8
TABLE 1 (cont.)								
<i>(Negatively worded items)</i>								
Computers make me feel uneasy		229 41.3	265 47.8	43 7.8	16 2.9	1 0.2	1.73	0.74 1
Computers make me feel uncomfortable		224 40.4	263 47.5	42 7.6	18 3.2	7 1.3	1.77	0.82 1
I feel hostile towards computers		220 39.7	260 47.0	50 9.0	18 3.2	6 1.1	1.79	0.82 0
Working with computers makes me nervous		155 28.0	279 50.4	81 14.6	28 5.1	11 2.0	2.03	0.89 9
I get a sinking feeling when I think of having to use a computer		148 26.7	260 46.9	96 17.3	35 6.3	15 2.7	2.11	0.96 2

TABLE 2. Computer attitudes (Liking)

Computer Attitudes	NA	Strongly Disagree	Disagree	Rather Agree	Agree	Strongly Agree	Mean	SD
	(0)	(1)	(2)	(3)	(4)	(5)		
	N	N	N	N	N	N		
	%	%	%	N%	%	%		
<i>(Positively worded items)</i>								
I think using computers is enjoyable		6 <i>1.1</i>	11 <i>2.0</i>	82 <i>14.8</i>	253 <i>45.7</i>	202 <i>36.5</i>	4.14	0.81 8
I (would) like to use computers		8 <i>1.4</i>	13 <i>2.3</i>	78 <i>14.1</i>	206 <i>37.2</i>	249 <i>44.9</i>	4.22	0.87 6
I would stick with any computer related problems till answered	80 <i>14.4</i>	5 <i>0.9</i>	50 <i>9.0</i>	140 <i>25.3</i>	189 <i>34.1</i>	90 <i>16.2</i>	3.12	1.60 7
Once I start to work with the computer, I find it hard to stop	80 <i>14.4</i>	13 <i>2.3</i>	74 <i>13.4</i>	149 <i>26.9</i>	156 <i>28.2</i>	82 <i>14.8</i>	2.96	1.55 0
The challenge of solving problems using computers appeal to me	80 <i>14.4</i>	16 <i>2.9</i>	30 <i>5.4</i>	76 <i>13.7</i>	257 <i>46.4</i>	95 <i>17.1</i>	1.87	1.16 1
<i>(Negatively worded items)</i>								
I will do as little work with computers		277 <i>50.0</i>	226 <i>40.8</i>	36 <i>6.5</i>	11 <i>2.0</i>	4 <i>0.7</i>	1.63	0.75 6
I don't like computers at all		314 <i>56.7</i>	188 <i>33.9</i>	28 <i>5.1</i>	14 <i>2.5</i>	10 <i>1.8</i>	1.59	0.84 4
I don't understand how people can spend a lot of time on computers		77 <i>13.9</i>	169 <i>30.5</i>	160 <i>30.5</i>	118 <i>21.3</i>	30 <i>5.4</i>	2.74	1.10 6
I don't like talking about computers		162 <i>29.2</i>	293 <i>52.9</i>	58 <i>10.5</i>	28 <i>5.1</i>	13 <i>2.3</i>	1.98	0.90 1
Figuring out computer problems does not appeal to me	80 <i>14.4</i>	80 <i>14.4</i>	231 <i>41.7</i>	123 <i>22.2</i>	30 <i>5.4</i>	10 <i>1.8</i>	1.95	1.15 0

TABLE 3. Computer attitudes (Confidence)

Computer Attitudes	NA	Strongly Disagree	Disagree	Rather Agree	Agree	Strongly Agree	Mean	SD
	(0)	(1)	(2)	(3)	(4)	(5)		
	N	N	N	N	N	N		
	%	%	%	N%	%	%		
<i>(Positively worded items)</i>								
I am sure I can do work with the computer		10 1.8	27 4.9	124 22.4	272 49.1	121 21.8	3.84	0.88 1
I will surely get high marks for computer courses		12 2.2	61 11.0	184 33.2	196 35.4	101 18.2	3.56	0.98 1
I feel confident to use computers		8 1.4	40 7.2	173 31.2	252 45.5	81 14.6	3.65	0.86 8
I feel ok about trying a new software		22 4.0	107 19.3	212 38.3	141 25.5	72 13.0	3.24	1.03 4
I am sure I could learn computer language		15 2.7	24 4.3	139 25.1	231 41.2	145 26.2	3.84	0.95 2
<i>(Negatively worded items)</i>								
Using computers is difficult		108 19.5	262 47.3	106 19.1	59 10.6	19 3.4	2.31	1.01 3
I am not confident with my computer skills		59 10.6	190 34.3	189 34.1	105 19.0	11 2.0	2.68	0.96 6
I am not the type to do well in computers		192 34.7	237 42.8	80 14.4	80 356.3	10 1.8	1.98	0.95 3
I won't be doing advanced computer work		211 38.1	235 42.4	70 12.6	26 4.7	12 2.2	1.90	0.93 9
I don't think I could handle computer courses		140 25.3	256 46.2	88 15.9	47 8.5	23 4.2	2.20	1.04 2

4. Computer Attitudes (Perceived Usefulness)

Regarding perceived usefulness, on the whole, students indicated that they had positive attitudes in this matter. The responses given for four of the items that were positively stated were very positive. More than 78 % of the responses were either Strongly Agree or Agree. If another positive descriptor, Rather Agree, added to the two positive descriptors, the percentage of positive responses went up to more than 90 %. Only one item showed only 58% respondents had chosen the three positive responses.

Students also showed positive responses for the negatively stated items, by checking Disagree or Strongly Disagree as their answers. The percentages of students indicating either one of those answers ranged from 50 % to 95 %. However, one item, which is "I can't think of any way that computer will be useful in my career", had the opposite result whereby only 42.5 % showed positive response. The results for this construct of attitudes are displayed below, in Table 4.

5. Computer Skills

The results showed that students were not very skillful in computing. The total of percentage for the negative descriptors (Not Well At All and Not Very Well) exceeded the total of the rest three positive descriptors, for all items except two (*Write and Print Documents*). For these two items, more than 55 % of the respondents gave positive responses (Slightly Well, Well or Very Well). The other 11 items had 50 % to 78 % students giving the two most negative responses. Students' level of computer skills was still considerably low when we look at the percentages of those who marked 'Very Well' for the items. Only three out of 13 items had more than 10 % of students checking the descriptor 'Very Well'. These items are '*Send messages via e-mail*' (17.9 %), '*Search for information on the web*' (16.4 %) and '*Print documents or images*' (20.6 %). Table 5 shows the detail results for students' computer skills.

Research Question 2: What are the differences between girls and boys in computer attitudes and skills?

The result of gender differences for attitudes towards computer technologies are presented along the four constructs of attitudes, which are comfort-anxiety, liking, confidence and perceived usefulness.

For the construct comfort-anxiety and liking, independent t-tests of the mean scores for gender showed that there were no significant differences between the male/female students.

However, with mean difference = 1.70, $t = 4.17$, $df = 552$ and $p = .001$, the girls showed significantly greater confidence than the boys. Similarly, for perceived usefulness, the girls (mean = 40.4) showed more positive attitudes towards computer usefulness than the boys (mean = 38.0), $t = 6.25$, $df = 552$ and $p = 001$.

TABLE 4. Computer attitudes (perceived usefulness)

Computer Attitudes	NA	Strongly Disagree	Disagree	Rather Agree	Agree	Strongly Agree	Mean	SD
	(0)	(1)	(2)	(3)	(4)	(5)		
	N	N	N	N	N	N		
	%	%	%	N%	%	%		
<i>(Positively worded items)</i>								
Computer knowledge will widen job opportunities		11 2.0	7 1.3	36 6.5	153 27.6	347 62.6	4.48	0.83 4
I'll need a firm mastery of computers for my future work		16 2.9	9 1.6	44 7.9	120 21.7	365 65.9	4.46	0.92 3
Learning to use computers is worthwhile		10 1.8	7 1.3	54 9.7	153 27.6	330 59.6	4.42	0.85 6
It is important for me to do well in computing		10 1.8	25 4.5	82 14.8	222 40.1	215 38.8	4.10	0.93 4
I use computers in many ways in my life	80 14.4	14 2.5	134 24.5	181 32.7	104 18.1	41 7.4	2.61	1.40 6
<i>(Negatively worded items)</i>								
Learning to use computers is a waste of time		325 58.7	205 37.0	16 2.9	5 0.9	3 0.5	1.48	0.65 4
I can't think of any way that computer will be useful in my career		79 14.3	156 28.2	133 24.0	126 22.7	60 10.8	2.88	1.22 5
Using computers is not important in my school life		249 44.9	229 41.4	44 7.9	24 4.3	8 1.4	1.76	0.88 1
I don't expect I'd be using computers in my daily life		144 26.0	266 48.0	93 16.8	42 7.6	9 1.6	2.11	0.93 1
I can do work effectively without using computers		76 13.7	205 37.0	192 34.7	60 10.8	21 3.8	2.54	0.98 4

TABLE 5. Computer skills

Computer Skills	Not Well	Not Very Slightly	Well	Very	Mean	SD
	At All	Well	Well	Well		
	(1) N %	(2) N %	(3) N N%	(4) N %		
Write documents (reports, articles, letters, etc.)	74 <i>13.4</i>	167 <i>30.1</i>	156 <i>28.2</i>	115 <i>20.8</i>	42 <i>7.6</i>	2.79 1.1421
Prepare spreadsheets (grades, budgets, etc.)	165 <i>29.8</i>	220 <i>39.7</i>	88 <i>15.9</i>	55 <i>9.9</i>	26 <i>4.7</i>	2.20 1.113
Scan documents or images	154 <i>27.8</i>	184 <i>33.2</i>	121 <i>21.8</i>	73 <i>13.2</i>	22 <i>4.0</i>	2.32 1.130
Edit images	170 <i>30.7</i>	178 <i>32.1</i>	105 <i>19.0</i>	70 <i>12.6</i>	31 <i>5.6</i>	2.30 1.190
Prepare slides for presentation	166 <i>30.0</i>	187 <i>33.8</i>	86 <i>15.5</i>	75 <i>13.5</i>	40 <i>7.2</i>	2.34 1.237
Send messages via electronic mail	155 <i>28.0</i>	138 <i>24.9</i>	83 <i>15.0</i>	79 <i>14.3</i>	99 <i>17.9</i>	2.69 1.461
Create web pages	228 <i>41.2</i>	170 <i>30.7</i>	78 <i>14.1</i>	46 <i>8.3</i>	32 <i>5.8</i>	2.07 1.184
Upload documents on the World Wide Web	255 <i>46.0</i>	170 <i>30.7</i>	68 <i>12.3</i>	32 <i>5.8</i>	29 <i>5.2</i>	1.94 1.133
Search for information on the web	151 <i>27.3</i>	131 <i>23.6</i>	102 <i>18.4</i>	79 <i>14.3</i>	91 <i>16.4</i>	2.69 1.426
Use software for Computer Assisted Learning	202 <i>36.5</i>	185 <i>33.4</i>	85 <i>15.3</i>	55 <i>9.9</i>	27 <i>4.9</i>	2.13 1.157
Print documents or images	122 <i>22.0</i>	107 <i>19.3</i>	112 <i>20.2</i>	99 <i>17.9</i>	114 <i>20.6</i>	2.96 1.441
Create databases	243 <i>43.9</i>	192 <i>34.7</i>	70 <i>12.6</i>	35 <i>6.3</i>	14 <i>2.5</i>	1.89 1.017
Write computer programmes	266 <i>48.0</i>	164 <i>29.6</i>	71 <i>12.8</i>	32 <i>5.8</i>	21 <i>3.8</i>	1.88 1.081

The results of the analysis of gender differences for computer skills indicated that despite the more positive attitudes showed by the female students, the male group showed higher level of skills than the female, with $t = 3.62$, $df = 552$ and $p = .001$.

Table 6 shows the group differences for the constructs of attitudes and also computer skills.

TABLE 6. Gender differences for attitudes towards computers and computer skills

Selected Variables	Mean	Group Differences ^a	t or F (df)	p
1. Attitude (Comfort-anxiety)				
Female (F)	38.08		$t = 1.66$	
Male (M)	37.26	F = M	(552)	.098
2. Attitude (Liking)				
Female (F)	35.70		$t = .53$	
Male (M)	35.43	F = M	(552)	.601
3. Attitude (Confidence)				
Female (F)	37.88		$t = 4.17$	
Male (M)	36.18	F > M	(552)	.001
4. Attitude (Perceived usefulness)				
Female (F)	40.44		$t = 6.25$	
Male (M)	38.03	F > M	(552)	.001
5. Skills				
Female (F)	28.55		$t = 3.62$	
Male (M)	32.02	M > F	(552)	.001

DISCUSSION

Generally, the results showed that students have positive attitudes towards computer technologies and low level of skills. There were significant differences in *gender*, in terms of their attitudes towards computer technologies and their level of computing skills.

Students exhibited positive responses in all the four constructs of attitudes, which are, *comfort/anxiety*, *liking*, *confidence* and *perceived usefulness*. Students showed more positive attitudes especially in the construct *perceived usefulness*. The results are somehow similar to that of Abdul Malek's (1999) when he found that faculty members of the university (Universiti Utara Malaysia) showed more positive attitudes in *usefulness* than in *comfort/anxiety*. The subjects perceived computers as an important tool for them and their teaching. In this study, many students thought that computers skills are important and learning

to use it will benefit them in the future. The percentages of students giving positive answers for most of the statements here were more than 85 %. More than 95 % of the students gave positive responses for the statements, "Computer knowledge will widen job opportunities", "I'll need a firm mastery of computers for my future work" and "Learning to use computers is worthwhile".

Besides perceived usefulness, students also showed preferences in terms of *liking*. More than 80 % disagree with the negative statements like "I will do as little work with computers", "I don't like computers at all" and "I don't like talking about computers".

A number of students did have some level of anxiety when they agreed with the statement "I feel threatened when others talk about computers". Some of them also failed to show high level of confidence in "trying new software" or when asked about the confidence that they have in their computer skills.

With regard to computer skills, students' level of it is low. Most of the students had slightly better skills in word-processing or web-based tasks (e-mailing and searching for information on the web). This supports the findings by Mitra (1998), who noted that students especially engaged themselves in word processing and communicating when they work on computers. Previous studies had also found several variables related to computer skills. Computer knowledge, interest in computer technologies and attitudes towards computers are some of the variables that are related to computer skills (Abdul Malek 1999).

The results for *gender* exhibited significant differences in the following constructs: *confidence* and *perceived usefulness*, favouring the females, and in computer skills, favouring the males. *Gender* did not bear any significant difference in the other two constructs of computer attitudes, *comfort/anxiety* and *liking*.

Hunt & Bohlin (1991) noted that gender did not correspond with attitudes, whereas Koohang (1989) found significant difference only in students' *perceptions of computer usefulness* and found that the male students, and not the females scored higher. Therefore, in terms of *perceived usefulness* and *confidence*, the results of these two studies are different from the ones exhibited in this study. The findings of gender differences in this study, to a certain extent, support some of the findings in the studies of McGrath and Thurston (1992), Young (2000) and Houtz and Gupta (2001), in that girls showed significantly more positive attitudes than boys in *perceived usefulness*. McGrath and Thurston (1992) stated that girls showed significantly more positive attitudes in terms of *liking* too, but there is no significant gender difference in *liking* exhibited in this study.

On the other hand, studies by Young (2000) indicated that boys were significantly more confident than girls. Also contradicting to the findings of this study is that of Barba and Mason (1994) and Yaghi (1997), which showed that boys were more positive in attitudes towards computers.

The one and only consistent result in terms of gender differences is in computer skills, whereby the males are always significantly better than the females in their computer skills. Consistently, McGrath and Thurston (1992), Young (2000) and Houtz and Gupta (2001) found that girls showed significantly more positive attitudes than boys in *perceived usefulness*, and yet boys had higher level of skills than girls.

Somehow, attitudes towards computers do not bring about much difference in the boys' confidence in computer skills or literacy. The boys always rate themselves as having significantly greater computer skills than the girls. On the other hand, no matter how positive the girls' attitudes towards computers are, they still feel lack of confidence when it comes to computer skills.

Since students portray positive attitudes towards computers, efforts in creating or instilling the right kind of attitudes towards computers among students simply means reinforcing existing positive attitudes. However, the complex nature of attitudes may require certain kind of attitude assessment to be conducted prior to computer instruction so as to determine the possible loophole in student attitudes that needs focus for improvement.

Students' level of computer skills is low. Therefore, students should be more exposed to hands-on experience, especially in school. Since not everyone can afford to have access of computers at home, school plays the role of being the main place that gives opportunities for students to use computers as frequently as possible. Furthermore, in school, teachers as educators can assure that students use computers in a productive manner, not just for recreational-type of activities like gaming and chatting on the Internet. Instead, activities involving the use of spreadsheet, databases and simple programming should be encouraged. Purposeful searching of the educational websites should also be emphasized, rather than general browsing on the Internet.

This study highlights some of the gender differences that exist. It is quite worrying that the female students, despite their positive attitudes, were still lacking in terms of computer skills. This should not be taken for granted. The length of time of computer use should perhaps be extended for girls so that they can catch up with the boys. Other than that, teachers must give motivation and encouragement to both the male and female students to excel in this field. In other words, students, especially the females, should be able to see this technology as a world for both, the male and female.

Parents should also play important roles in ensuring equal length of time be given to both the male and female children, so as to enable them to gain experience in using computers at home. Yaghi (1997) brought up the tendency of parents giving more opportunities for computer use to boys as opposed to girls. If possible, parents should also try to provide female, as well as male role models for computer use or in the computer field. The lack of female role models in the computer world was identified as one of the factors contributing to the gender gaps in computer skills (McGrath & Thurston 1992).

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Fakulti Sains Kognitif dan Pendidikan
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman
Malaysia