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Computer Attitude and Computer Self-Efficacy: A Case Study of Thai Undergraduate Students

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Abstract

This study aims at evaluating computer attitude and computer self-efficacy of 151 Thai undergraduate students. The computer attitude questionnaire by Loyd & Loyd (1985) and the computer self-efficacy questionnaire by Kinzie, Delcourt, & Powers (1994) are utilized to gather the data. The computer attitude survey measures four subscales, namely, computer anxiety, computer confidence, computer liking, and computer usefulness. Another survey measures self-efficacy in using word processing, e-mail, spreadsheet, database management, statistical, and presentation software. Generally, the survey results address that students possess moderately positive attitudes on computer technology and neutral confidence in using computer applications. Moreover, a number of significant relationships among computer attitude and computer self-efficacy subscales are discovered.

1 Introduction

In recent years, the government of Thailand has been investing continuously and strategically in information technology. The Ministry of Information and Communication Technology (ICT) (http://www.mict.go.th/) has been established to promote IT deployment in various sectors including the academic area. The National ICT Learning Center and SchoolNet Thailand are examples of Thai government projects that place significance on reforming Thai educational systems by emphasizing learning with ICT with an ultimate goal of building a knowledge-based society in Thailand. Following the national ICT policy, higher educational institutions mandate to use computer technology as classroom tools for teaching, learning, and communicating among students and instructors. Students in any fields of study are expected to be proficient in necessary computer applications and the Internet such as WWW, email, word processing, spreadsheet, and presentation software.

With the increased use of educational technology, student attitudes toward computers must be investigated since the intention of computer use and actual use are influenced by such attitudes, according to the Technology Acceptance Model (TAM) by Davis, Bagozzi, & Warshaw (1989). Undoubtedly, students have various backgrounds, computer skills, beliefs, and interests which challenge instructors to introduce ICT into classrooms to facilitate learning process. Such differences cause different attitudes toward computers. Factors such as age, gender, personality, and computer experience have proven to be determinants of computer attitudes (e.g., Hunt & Bohlin, 1993; Miller & Varma, 1994; Raub 1981). Additionally, much attention in previous research has also been measured such attitudes. A number of researchers have developed survey instruments in this matter such as Raub (1981), Chen (1986), and Reece & Gable (1982). For example, the instrument by Loyd & Loyd (1985) contains 40 items divided into four subscales, namely, computer anxiety, computer confidence, computer liking, and computer usefulness. Chen (1986)'s instrument consists of 32 items with five subscales, namely, computer interest, gender equality in computer use, computer confidence, computer anxiety, and respect through computers.

Another factor that has been reported as an influencing factor of intention and computer use is computer self-efficacy (e.g., Compeau & Higgins, 1995; Taylor & Todd, 1995). Computer Self-Efficacy refers to individuals' beliefs on their capabilities to use computers and apply these capabilities to other computer tasks (Compeau &

Higgins, 1995). Computer self-efficacy consists of three dimensions; namely, magnitude, strength, and generalizability (Compeau & Higgins, 1995). First, the magnitude of computer self-efficacy refers to the levels of support needed. Users who possess high magnitude believe that they can accomplish tasks with less support. Second, the strength of computer self-efficacy is the confidence in beliefs of their capabilities in using computers. Lastly, the generalizability refers to the levels of beliefs in using computers in various platforms such as various software and operating systems.

A number of survey instruments have been developed to assess computer self-efficacy. For example, Kinzie et al., 1994 developed a survey which has 46 items to measure computer self-efficacy of various types of computer applications. Murphy, Coove, & Owen (1989) developed a survey which has 32 items to evaluate three subscales, namely, beginning, advanced, and mainframe computer tasks. Research evidence shows that users who have greater computer self-efficacy tend to have higher beliefs in perceived ease of use of computers (Venkatesh & Davis, 1996), less computer anxiety, greater beliefs in perceived usefulness, and more computer use (Igbaria & Iivari, 1995). Moreover, various studies point out factors that affect levels of CSE such as computer experience, age, computer usage, computer anxiety, computer attitudes, and gender (e.g., Torkzadeh & Koufterous, 1994; Whitely, 1997; Murphy et al., 1989).

As computer technologies become a crucial part of academic systems, computer attitudes and computer self-efficacy still need researcher studies to keep investigating these issues. Some studies attempt to develop, replicate, and validate the survey instruments with new samples. For instance, Barbeite & Weiss (2004) have developed new instruments and validate existing instruments of computer self-efficacy and compute anxiety with Internet respondents. Some continue updating and searching for predictors of computer attitudes, computer anxiety, and computer self-efficacy. For instance, Durndell & Haag (2002) investigate gender effects on computer anxiety, computer self-efficacy, attitudes to the Internet, and Internet experience of Romanian university students. The results show that females have less Internet usage, less positive attitudes, more computer anxiety, and less computer self-efficacy than do males. Hayashi, Chen, Ryan & Wu (2004) explore computer self-efficacy in E-learning. They found no relationship among computer self-efficacy, perceived usefulness, confirmation, and satisfaction. Whereas, Fagan & Neill (2004) address that computer self-efficacy show significant relationships with computer experience, support, anxiety, and usage. This present study examines computer attitude and computer self-efficacy of Thai undergraduate students and explores relationships among these two areas.

2 Research Questions

This research was undertaken in order to answer these following research questions:

- What are the levels of computer attitude and computer self-efficacy among Thai undergraduate students?
- Are there significant relationships among computer attitude subscales: anxiety, confidence, liking, and usefulness?
- Are there significant relationships among computer self-efficacy subscales: word processing, e-mail, spreadsheet, presentation, database management, and statistical software?
- Are there significant relationships among computer attitude subscales and computer self-efficacy subscales?
- Do different computer skills affect different levels of computer attitude and computer self-efficacy?

3 Method

This section details the methodology of this study. The topics include respondents, instrumentation, procedure, and data analysis.

3.1 Respondents

Data are obtained from 151 undergraduate students from the Faculty of Management Sciences, Prince of Songkla University, Thailand, in three sections of the Computer Application in Business class at the beginning of the first semester, 2004. About 24 percent are males and 76 percent are females. Ages of the respondents are between 17-20 years old. The average age is 18.36 years old. The majority of the students (74.2%) are freshmen majoring in accounting.

3.2 Instrumentation

The Thai survey distributed to the respondents contains five sections, namely, demographic information, computer and Internet usage, computer trainings, computer attitude, and computer self-efficacy. To evaluate computer attitudes, which is the widely-used survey developed by Loyd & Loyd (1985), is utilized. The survey comprises 40 Likert-scale items in four subscales, namely, computer anxiety, computer confidence, computer liking, and computer usefulness. Each subscale contains ten items. The original survey with four-point items is modified to have five points. The neutral rating scale is added to gain more precise comments from Thai students. The respondents rate their attitudes in using computer technology on the following scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. Among 40 survey items, 20 statements of the survey are negatively worded. Scores of these statements are reversed thereby the scores of all items are consistent. Higher scores indicate more positive attitudes and less anxiety. To measure computer self-efficacy, the survey developed by Kinzie, et al. (1994) is employed. The original survey comprises six sub-sections, namely, word processing software, e-mail software, database management software, spreadsheet software, statistical software, and CD-ROM databases. The last sub-section is replaced with the presentation software sub-section for a more complete set of the current commonly-used software suit. Additionally, the original survey which contains 46 four-scale items is added with one more scale. As such, the modified survey contains five categories: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

3.3 Data Analysis

The obtained survey data are analyzed with SPSS version 11.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations are calculated. Correlation analysis is also utilized to compare the relationships among computer attitude subscales and computer self-efficacy subscales.

4 Results

This section contains findings of this study, namely, computer and Internet usage, computer attitude, and computer self-efficacy.

4.1 Computer and Internet Usage

Forty-three percent report that they have neutral typing skills, while other 43 percent possess slow typing skills. Additionally, nearly half of the respondents specify moderate skills in using computer applications, opposed to 47 percent that have few skills in this matter. Moreover, a majority of the respondents (57.0%) own a personal computer. The survey results also reveal that about 17 percent has been using the Internet for less than one year and other 17 percent has 1-2 years of Internet usage. Thirty percent and 36 percent are the proportions of the respondents with 2-3 years and more than 3 years of Internet usage, respectively. Further, a majority of respondents indicate that they ever took training courses on Web browsing, e-mail, Word processing, and spreadsheet applications. The percentages are 58.9, 52.3, 85.4, and 62.9, respectively. Contrastingly, 81.5 percent, 98.7 percent, and 46.4 percent report no training courses on database management software, statistical package, and presentation software. In addition, Table 1 presents the percentages of computer usage of various applications. The survey results reveal that major percentages (38.4, 35.8, 46.4, and 36.4) use word processing applications, e-mail, Web browsing, and games at least once a week, respectively. About 25 percent, 66 percent, and 89 percent never use online chat, database management applications, and statistical packages. About 39 percent and 40 percent use spreadsheet applications and presentation applications at least once a year.

Table 1: Distribution of Types of Computer Usage

Computer Usage	Never (%)	At least once/year (%)	At least once/month (%)	At least once/week (%)	Everyday (%)
Word processing e.g., MS Word	7.30	12.60	37.10	38.40	4.60
Email	14.60	10.60	29.10	35.80	9.90

Computer Usage	Never (%)	At least once/year (%)	At least once/month (%)	At least once/week (%)	Everyday (%)
Web browsing	4.00	7.30	31.10	46.40	11.30
Chat	24.50	19.20	20.50	23.20	12.60
Games	13.20	14.60	26.50	36.40	9.30
Spreadsheet e.g., MS Excel	27.80	39.10	25.20	7.90	0.00
DBMS e.g., MS Access	66.20	21.20	9.90	1.30	1.30
Statistical Package e.g., SPSS	88.70	7.30	2.60	0.00	1.30
Presentation e.g., MS PowerPoint	29.10	40.40	24.50	6.00	0.00

4.2 Computer Attitude

The survey results in Table 2 present means, standard deviations, and percentages of each computer attitude statement categorized under a subscale. The results reveal that the respondents agree with 10 out of 20 positive-worded statements (Means = 3.60 to 4.49), neither agree nor disagree with 8 out of 20 positive ones (Means = 3.17 to 3.45), and strongly agree with 2 out of 20 positive ones (Means = 4.56). Additionally, from the total 20 negative-worded statements, the respondents disagree with 12 statements (Means = 3.52 to 4.34), neither agree nor disagree with 6 statements (Means = 2.78 to 3.36), and strongly disagree with 2 statements (Means = 4.50 to 4.52). While considering anxiety, confidence, liking, and usefulness subscales, the average scores are ranked between 3.23 and 4.01, between 2.78 and 4.07, between 3.21 and 4.34, and between 2.79 and 4.56, respectively.

Table 2: Distribution of Computer Attitudes

Item#	Variables	Mean (SD)	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
	Computer Anxiety						
1	Computers do not scare me at all.	3.67(.82)	16.60	39.70	37.70	6.00	0.00
5*	Working with a computer would make me very nervous.	3.76(.81)	0.00	7.90	23.20	53.60	15.20
9	I do not feel threatened when others talk about computers.	3.30(.99)	10.60	31.80	39.70	12.60	5.30
13*	I feel aggressive and hostile toward computers.	4.01(.71)	0.00	0.00	24.50	50.30	25.20
17	It would not bother me at all to take computer courses.	3.91(.91)	31.80	32.50	30.50	5.30	0.00
21*	Computers make me feel uncomfortable.	3.94(.84)	0.00	7.30	16.60	51.00	25.20
25	I would feel at ease in a computer class.	3.85(.78)	19.20	51.00	25.20	4.60	0.00
29*	I get a sinking feeling when I think of trying to use a computer.	3.81(.88)	0.00	10.60	17.90	51.00	20.50
33	I would feel comfortable working with a computer.	3.45(.87)	9.30	42.40	32.50	15.90	0.00
37*	Computers make me feel uneasy and confused.	3.23(.87)	0.00	21.90	39.70	31.80	6.60
	Computer Confidence						
2*	I'm no good with computers.	2.78(.94)	11.30	23.80	40.40	24.50	0.00
6	Generally, I would feel OK about trying a new problem on the computer.	3.18(.77)	6.00	21.90	56.30	15.90	0.00
10*	I don't think I would do advanced	3.95(.88)	0.70	4.00	25.20	39.70	30.50

Item#	Variables	Mean (SD)	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
	computer work.						
14	I am sure I could do work with a computer.	3.85(.70)	15.20	57.60	24.50	2.60	0.00
18*	I'm not the type to do well with computers.	2.93(.93)	4.60	28.50	41.10	21.20	4.60
22	I am sure I could learn a computer language.	3.60(.77)	11.90	41.10	41.70	5.30	0.00
26*	I think using a computer would be very hard for me.	3.53(.82)	0.00	11.90	31.80	47.70	8.60
30	I could get good grades in computer courses.	3.33(.71)	6.60	27.20	58.90	7.30	0.00
34*	I do not think I could handle a computer course.	4.07(.75)	0.00	2.60	16.60	52.30	28.50
38	I have a lot of self-confidence when it comes to working with computers.	3.17(.68)	4.00	21.20	62.90	11.90	0.00
	Computer Liking						
3	I would like working with computers.	4.06(.78)	29.80	49.70	17.20	3.30	0.00
7*	The challenge of solving problems with computers does not appeal to me.	3.80(.72)	0.00	3.30	27.80	54.30	14.60
11	I think working with computers would be enjoyable and stimulating.	4.04(.77)	27.80	52.30	15.90	4.00	0.00
15*	Figuring out computer problems does not appeal to me.	3.52(.79)	0.00	9.30	38.40	43.00	9.30
19	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.	3.36(.80)	9.30	29.10	50.30	11.30	0.00
23*	I don't understand how some people can spend so much time working with computers and seem to enjoy it.	3.36(1.01)	4.00	15.20	33.80	35.10	11.90
27	Once I start to work with the computer, I would find it hard to stop.	3.35(.79)	8.60	29.10	51.00	11.30	0.00
31*	I will do as little work with computers.	4.34(.65)	0.00	0.00	9.90	46.40	43.70
35	If a problem is left unsolved in a computer class, I would continue to think about it afterward.	3.31(.74)	5.30	31.80	51.70	11.30	0.00
39*	I do not enjoy talking with others about computers.	3.21(.85)	4.00	11.30	48.30	32.50	4.00
	Computer Usefulness						
4	I will use computers many ways in my life.	3.97(.84)	31.10	37.10	29.10	2.60	0.00
8*	Learning about computers is a waste of time.	4.50(.62)	0.00	0.00	6.60	37.10	56.30
12	Learning about computers is worthwhile.	4.49(.61)	55.00	39.10	6.00	0.00	0.00
16	I'll need a firm mastery of computers for my future work.	4.56(.60)	61.60	33.10	5.30	0.00	0.00

Item#	Variables	Mean (SD)	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)
20*	I expect to have little use for computers in my daily life.	3.83(.77)	0.70	3.30	25.80	53.00	17.20
24*	I can't think of any way that I will use computers in my careers.	3.95(.77)	0.00	4.00	19.90	53.00	23.20
28	Knowing how to work with computers will increase my job possibilities.	4.56(.60)	60.90	33.80	5.30	0.00	0.00
32*	Anything that a computer can be used for, I can do just as well some other way.	2.79(.72)	3.30	28.50	53.60	14.60	0.00
36	It is important to me to do well in computer classes.	4.22(.61)	31.80	58.30	9.90	0.00	0.00
40*	Working with computers will not be important to me in my life's work.	4.52(.59)	0.00	0.00	4.60	39.10	56.30

*Note: * indicates a negatively worded statement.*

To answer the first research question, means and standard deviations of each computer attitude subscale are presented in Table 3. The results indicate that the respondents generally have positive attitudes toward computers (Mean = 3.73, SD = 0.39). They are not nervous in using computers (Mean = 3.69, SD = 0.57). Moreover, they neither agree nor disagree that they are confident in using computers (Mean = 3.44, SD = 0.46). They also like working with computers (Mean = 3.64, SD = 0.47) and agree that computers are useful (Mean = 4.14, SD = 0.39).

Table 3: Means and Standard Deviations of Computer Attitude

Subscales	Mean	SD
1. Computer anxiety	3.69	0.57
2. Computer confidence	3.44	0.46
3. Computer liking	3.64	0.47
4. Computer usefulness	4.14	0.35
Overall	3.73	0.39

Additionally, the second research question can be answered by analyzing Pearson's correlations among the computer attitude subscales, as shown in Table 4. All possible relationships are statistically significant. Computer anxiety highly correlates with computer confidence (r = 0.77) and computer liking (r = 0.72) in a positive direction. In addition, computer confidence highly correlates with computer liking in a positive direction (r = 0.73). Lastly, computer usefulness moderately correlates with computer anxiety (r = 0.42), computer confidence (r = 0.47), and computer liking (r = 0.54) in a positive direction.

Table 4: Correlations of Computer Attitude Subscales

Variables	1	2	3
1. Computer anxiety			
2. Computer confidence	0.77**		
3. Computer liking	0.72**	0.73**	
4. Computer usefulness	0.42**	0.47**	0.54**

**p<.05, **p<.01, ***p<.001*

4.3 Computer Self-Efficacy

Other than computer attitude assessment, the respondents also rate their computer self-efficacy in six types of software. The complete survey is not shown because of space limitation of this paper. Examples of survey items of word processing software self-efficacy are "Making corrections while doing word processing" and "Moving blocks of text while doing word processing." Means and standard deviations of such assessment are presented in Table 5 to answer another part of the first research question. Generally, the respondents neither agree nor disagree that they have computer self-efficacy in those applications. The results also show that the respondents agree that they have confidence in using word processing software (Mean = 3.85, SD = 0.65) and e-mail (Mean = 4.09, SD = 0.86). However, they neither agree nor disagree that they are confident in using these following applications: spreadsheet software (Mean = 3.17, SD 0.92), database management software (Mean = 2.53, SD = 0.96), and presentation software (Mean = 3.28, SD = 0.56). Lastly, the lowest level of confidence is reported at the statistical software subscale (Mean = 2.23, SD = 0.86).

Table 5: Means and Standard Deviations of Computer Self-Efficacy

Subscales	Mean	SD
1. Word processing software	3.85	0.65
2. E-mail	4.09	0.86
3. Spreadsheet software	3.17	0.92
4. Database management software	2.53	0.96
5. Statistical package	2.23	0.86
6. Presentation software	3.38	1.08
Overall	3.28	0.56

Furthermore, a number of significant relationships among the subscales of computer self-efficacy are reported, as presented in Table 6 for answering the third research question. The self-efficacy in using statistical package highly correlates with the one in using database management software (r = 0.68). The self-efficacy in using word processing software moderately correlates with the ones in using e-mail (r = 0.52), spreadsheet software (r = 0.47), and presentation software (r = 0.42). Spreadsheet self-efficacy also moderately correlates with the self-efficacies in using database management software (r = 0.42) and presentation software (r = 0.44). Nevertheless, several weak relationships of self-efficacy are also reported within a pair of e-mail and spreadsheet software (r = 0.23), a pair of e-mail and presentation (r = 0.27), a pair of spreadsheet software and statistical package (r = 0.26), a pair of presentation software and database management software (r = 0.32), and a pair of presentation software and statistical software (r = 0.31).

Table 6: Correlations of Computer Self-Efficacy

Subscales	1	2	3	4	5
1. Word processing software					
2. E-mail	0.52**				
3. Spreadsheet software	0.47**	0.23**			
4. Database management	0.14	0.12	0.42**		
5. Statistical package	-0.07	0.00	0.26**	0.68**	
6. Presentation software	0.42**	0.27**	0.44**	0.32**	0.31**

**p<.05, **p<.01, ***p<.001*

To answer the fourth research question, the Pearson's correlations are calculated, as shown inTable 7. The attitude subscales have no significant relationships with the self-efficacy on statistical package. Also, the computer usefulness subscale has no significant relationships with the self-efficacies on spreadsheet software, database management software, statistical package, and presentation software. The rest of relationships are statistically significant. Moderate, positive relationships are reported on computer anxiety with word processing software (r = 0.53), computer anxiety with e-mail (r = 0.48), computer anxiety with spreadsheet software (r = 0.40), computer liking with word processing software (r = 0.44), computer confidence with word processing software (r = 0.49), and computer confidence with spreadsheet software (r = 0.40). Lastly, weak, positive relationships are shown on anxiety with database management software (r = 0.24), anxiety with presentation software (r = 0.36), computer liking with e-mail (r = 0.34), computer liking with spreadsheet software (r = 0.33), computer liking with database management

software (r = 0.16), computer liking with presentation software (r = 0.27), computer confidence with e-mail (r = 0.39), computer confidence with database management software (r = 0.25), computer confidence and presentation software (r = 0.35), computer usefulness with word processing software (r = 0.27), and computer usefulness with e-mail (r = 0.21).

Table 7: Correlations of Computer Attitude and Computer Self-Efficacy Subscales

	Anxiety	**Liking**	**Confidence**	**Usefulness**
Word processing software	0.53**	0.44**	0.49**	0.27**
E-mail	0.48**	0.34**	0.39**	0.21**
Spreadsheet software	0.40**	0.33**	0.40**	0.15
Database management	0.24**	0.16**	0.25**	-0.08
Statistical package	0.11	0.03	0.07	-0.13
Presentation software	0.36**	0.27**	0.35**	0.08

**p<.05, **p<.01, ***p<.001*

To answer the last research question, the effects of computer skill on computer attitude and computer self-efficacy are analyzed, as shown in Table 8. Generally, novice users report lower levels of computer attitude and computer self-efficacy than do moderate-skill users. The major percentages of moderate-skill users who agree that they are confident and less anxious in using computers (34.9%, 34.2%) are higher that the major percentages of novice users who neither agree nor disagree on this matter (24.0%, 32.9%). Moreover, pluralities of both user groups agree that they like using computers (24.7%, 38.4%) and they think computers are useful (37.0%, 40.4%). In addition, the plurality of moderate-skill users totally agrees that they are confident in using e-mail (30.8%), whereas the plurality of the novice users agrees on this matter (17.8%). The pluralities of both groups agree with their confidence in using word processing software (28.1%, 32.2%). Also, the pluralities of both groups neither agree nor disagree with their confidence in using spreadsheet software (23.3%, 19.9%). The pluralities of both groups are not confident in using statistical package (24.7%, 21.9%). The plurality of novices is not confident in using presentation software (14.4%), whereas the plurality of the other user group is confident (19.2%). The plurality of the novice group is not confident in using database management software as well (20.5%), while the plurality of the moderate-skill users neither agree nor disagree on their confidence on this assessment (19.2%).

Table 8: Effects of Computer Skill on Computer Attitude and Computer Self-Efficacy

	Strongly disagree (%)		**Disagree (%)**		**Neither agree nor disagree (%)**		**Agree (%)**		**Strongly agree (%)**	
Subscales	**N***	**M***	**N***	**M***	**N***	**M***	**N***	**M***	**N***	**M***
Computer attitude										
Anxiety	0.00	0.00	1.40	0.00	24.00	6.80	21.90	34.90	1.40	9.60
Confidence	0.00	0.00	2.10	0.00	32.90	15.10	13.70	34.20	0.00	2.10
Liking	0.00	0.00	0.70	0.00	23.30	9.60	24.70	38.40	0.00	3.40
Usefulness	0.00	0.00	0.00	0.00	2.10	0.70	37.00	40.40	9.60	10.30
Computer self-efficacy										
E-mail	0.00	0.00	5.50	0.70	13.70	5.50	17.80	14.40	11.60	30.80
Word	0.00	0.00	3.40	0.00	14.40	4.80	28.10	32.20	2.70	14.40
Spreadsheet	2.70	0.70	12.30	6.20	23.30	19.90	8.90	16.40	1.40	8.20
Database	7.50	6.80	20.50	17.80	14.40	19.20	5.50	4.80	0.70	2.70
Statistics	8.90	10.30	24.70	21.90	11.60	14.40	2.70	4.10	0.70	0.70
Presentation	0.70	2.70	14.40	6.80	13.00	9.60	13.70	19.20	6.80	13.00

Note: N means novice computer users, M* means moderate-skill computer users.*

5 Discussion

The results reveal that the Thai undergraduate respondents possess moderately positive attitudes toward computers. On average, novice users report lower levels of computer attitude and computer self-efficacy than do moderate-skill users. Considering each subscale, the findings present reasonably low anxiety in using computers. The respondents also report a high level of perceived usefulness of computer technology and they tend to like using computers. Nevertheless, they show a neutral level of computer confidence, as is evident in direct questions which asking about their self-confidence in using computers, namely, question number 2, 28, and 38. This suggests that academic institutions need to provide more training on computer courses to their students, while maintaining students' positive computer attitudes by providing a pleasant learning environment. However, students' computer anxiety may increase when students enroll in new computer courses, particularly advanced or complex ones; therefore, a need of persistent evaluations on computer anxiety and computer attitude is crucial, which is supported by research evidence on strong relationships among subscales of attitudes toward computer technology. Such relationships point out that students with high anxiety are likely to have low level of computer confidence and computer liking. Also, students who are not confident in using computers tend to prefer computers less than those who have high self-confidence. These findings definitely support by many studies that have long been investigated (e.g., Igbaria & Parsuraman, 1989; Necessary & Parish, 1996). Note that almost all respondents are female, while various research studies show gender differences in relationship with computer attitudes where males have more positive attitudes toward computers than do females (e.g., Loyd & Gressard, 1986; Shashaani, 1993).

For another part of this study, the findings on computer self-efficacy or judgment on personal capabilities in using computers agree with the self-confidence findings. The respondents possess neutral computer self-efficacy. Reasonably high levels are found in e-mail and word processing activities, whereas moderately low levels are discovered at statistical software and database management software. More importantly, students who are not confident when using statistical software skills strongly tend to be diffident in their database management software skills. This suggests that task complexity may influence computer self-efficacy, as also indicated in a study by Chang (2004). In this study, it is unclear that experiences in using both software types direct these finding. Nevertheless, several studies express that positive computer experience tends to increase self-efficacy (e.g., Hill, Smith, & Mann, 1987; Kinzie et al., 1994). Additionally, no relationships are found between self-efficacy in using statistical package and computer attitude, but weak, positive relationships are reported between self-efficacy in using database management software and computer attitude. However, some moderate, positive relationships between computer anxiety, computer liking, and computer confidence and self-efficacies in using word processing, e-mail, and spreadsheet are evident. Note that, similarly to computer attitude findings, gender differences have been found to be an influencing factor to computer self-efficacy (e.g., Torkzadeh, G., & Koufterous, X., 1994).

6 Conclusions

Overall, the Thai undergraduate freshmen already have basic skills on some widely used applications. They also have positive attitudes on computer technologies, even before taking their required course on computer applications. Students with less computer anxiety tend to have more computer confidence and computer liking. Students who are more confident in using computers tend to like working with computers. Students who think that computers are moderately useful tend to have less anxiety, more confidence, and more computer liking. Moreover, novice users have lower levels of computer attitude and computer self-efficacy than do moderate-skill users. Notwithstanding, levels of computer self-efficacies are diverse. Students have more confidence in using e-mail and word processing software than other applications. Generally, students with higher self-efficacies on e-mail, word processing, and spreadsheet moderately have positive computer attitudes. The study suggests the need for improvements in computer-related curricula used in high schools and in the first year at universities. The curricula should provide overviews and hand-on experiences on all necessary computer applications. The reason is that novice users tend to have positive computer attitudes that increase their self-efficacy in using computers and their computer self-learning skills. Well-designed curricula that enhance the skills certainly yield worthwhile educational results.

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