Effects of User Characteristics on Computer Attitudes Among Undergraduate Business Students

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A study survey is used to investigate the computer attitudes of 238 business students attending a major university in Saudi Arabia. The findings show that computer experience, degree of access, and computer ownership have a significant effect on computer anxiety, computer confidence, computer liking, computer usefulness, and overall computer attitude. Age and class standing do not appear to be related to any of the computer attitude scales. The number of computer-using courses strongly affects computer confidence, usefulness, and overall attitude, but weakly affects computer anxiety and liking. The student Grade Point Average is associated with computer confidence, and overall attitude, but not with computer anxiety, liking, or usefulness.

The proliferation of computers has affected the way of doing business, conducting research, and teaching students. In the business community, computers help organizations to be more efficient, effective, and competitive in the marketplace through the use of productivity software, electronic data interchange, integrated office systems, computer-conferencing, and video-teleconferencing. In the education community, where teaching and research are the main occupations, computers are part of the educational scene. In a recent survey study, Richards and Pelley (1994) have identified the most valuable components of an information systems education, one of which is the PC environment.

Business schools invest substantial sums of money in installing microcomputer labs for faculty and student use. All the 160 business schools surveyed by Render and Stair (1987) had microlabs. The fifth annual UCLA survey estimated that the average computer operating budget was US$181,000 per business school (Frand and Britt, 1989). Yet, very few studies have investigated business student attitudes toward computers in the context of a developing country, such as Saudi Arabia. Given the extent of the available literature on computer attitudes, little research has been done to explore computer attitudes in environments other than Europe and North America.

The importance of this study stems from the fact that awareness of user attitudes toward computers is a critical factor in enhancing the acceptance of computers as well as understanding current user behavior and shaping future behavior, such as computer usage.

This paper presents the results of an exploratory study on computer attitudes and investigates the effect of user characteristic variables, such as age, computer-using courses (courses), grade point average (GPA), class standing (class), computer ownership, computer accessibility, and computer experience, on computer attitudes among undergraduate business students attending a major university in Saudi Arabia.

Background

According to Fishbein and Ajzen (1975), attitude is defined as "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (p. 6). In the case of computer attitude, the given object is understood to be a computer.

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Researchers have suggested that a positive attitude (satisfaction) toward computers is an indicator of computer system success (Igbaria, 1993; Igbaria and Nachman, 1990; Yaverbaum and Nosek, 1992; Abdul-Gader, 1990). Stevens (1982) emphasized two factors that affect the successful implementation of computers in educational institutions: (1) teacher attitudes toward computers, and (2) their level of expertise with computers. Positive attitudes enhance the knowledge and creativity of computer users, whereas negative attitudes may limit the use of computers as learning and teaching tools and inhibit information technology assimilation in the classroom. In his study, Abdul-Gader (1990) argued that education and training reduce computer alienation significantly among college students and thus improve attitudes toward information technology. Yaverbaum and Nosek (1992) found a significant positive shift in student attitudes after they had completed a course in management information systems, suggesting a connection between satisfaction/attitude and education and training.

Four types of attitude toward computers are thought to be important for end user achievement of end users: anxiety or fear of computers; confidence working with computers; computer liking or enjoying working with computers; and the perceived usefulness of computers in present or future work.

The literature indicated that user characteristics such as age, courses, GPA, class, computer ownership, computer accessibility, and computer experience are of great concern to most educators when assessing attitudes regarding computers.

Previous studies on the relationship between age and attitude produced mixed results. Woodrow (1991) found that age was not a significant contributor toward the computer attitudes of student teachers while Nickell and Pinto (1986) found that age correlated negatively with computer attitudes. However, Marshal and Bannon (1986) reported a positive correlation between age and computer attitudes.

The number of computer-using courses attended is considered as a general measure of computer training. In their study, Nelson and Cheney (1987) found a positive relationship between the computer-related training a user receives and his/her computer-related ability.

A student's GPA can be considered as a general measure of ability to learn, motivation to learn, or learning performance. Wilson and Daubek (1992) found a positive relationship between GPA and computer attitude.

Class standing may be considered as a general measure of academic experience. It is reasonable to assume that students of high standing have more positive attitudes than students of low standing students. For example, senior students are older and have completed more courses than juniors.

A strong relationship between computer ownership and attitudes is documented in the literature, where those who own computers have more favorable attitudes than those who do not (Marshal and Bannon, 1986; Gattiker and Hlavka, 1992).

Computer accessibility is an important factor that influences computer utilization (Schiffman et al., 1992; Rahman and Abdul-Gader, 1993). Accessibility can be enhanced through facilitating conditions such as availability, support, and proximity to users (Bergeron et al., 1990).

Prior experience with computers has been demonstrated to be an important variable in promoting favorable attitudes among users (Loyed and Gressard, 1984; Levin and Gordon 1989).

Method

Instruments

The first part of the questionnaire gathered the attitudes of the respondents toward computers by using the Computer Attitude Scale (CAS). The CAS consists of four subscales: anxiety, confidence, liking, and usefulness. The CAS was developed by Loyd and Loyd (1985) and used by Wilson and Daubek (1992). This instrument has been tested for validity and reliability (Loyd and Loyd, 1985; Gressard and Loyd, 1986). In addition, Woodrow (1991) concluded that CAS subscales were stable enough to be used separately and the overall scale can be used to measure general attitudes toward computers. Appendix A shows the measures of the CAS subscales.

In response to the questionnaire statements, respondents are asked to choose one of five responses: strongly disagree, disagree, neutral, agree, or strongly agree. For the purpose of analysis the item responses are coded so that a higher number indicates a higher degree of confidence, liking, perceived usefulness, and a lower degree of anxiety. Since each attitude component has 10 items that are evaluated on a 1 to 5 point scale, the range for each will be from 10 to 50 points. Therefore, a higher score represents a more favorable attitude than does a lower score. By the same token, the overall scale ranges from 40 to 200. That is, 40 reports the least favorable overall attitude and 200 reports the most favorable overall attitude.

The second part of the questionnaire gathers data on user characteristic variables concerning age, courses, GPA, class, computer ownership, computer accessibility, and computer experience using single item questions (see Appendix B).

Sample

The study was conducted during the Spring Semester of 1994. A total of 300 questionnaires were distributed by the course instructor during class time. The courses were conveniently selected to cover different levels of classes. The number of usable responses received were 238, representing a response rate of 79%. More than half the sample took one or two courses while 15% took 5 or more courses. The mean age of the respondents was 22.5 years. The majority of the student GPAs ranged from 2.1 to 2.5 out of 4.00. More than 53% of the students in the sample owned computers. Thirty-six percent of the students were seniors and approximately one-quarter were freshmen. Half the sample had an average degree of access to computers. Ninety percent had a low to average level of experience. The average number of courses taken by students

Variable	Frequency	Percent
Age:		
Under 21	51	21.4
21-22	74	31.1
23-24	81	34.1
Over 24	32	13.4
Courses:		
One	29	13.1
Two	96	43.2
Three	42	18.9
Four	21	9.5
Five +	34	15.3
G.P.A.		
0.0 - 2.0	32	14.4
2.1 - 2.5	100	45.0
2.6 - 3.0	57	25.7
3.1 - 3.5	26	11.7
3.6 - 4.0	7	3.2
Class:		
Freshman	57	24.4
Sophomore	61	26.1
Junior	31	13.2
Senior	85	36.3
Ownership:		
Owns	125	53.6
Doesn't Own	108	46.4
Accessibility:		
Very Low	16	6.9
Low	27	11.6
Average	119	51.3
High	56	24.2
Very High	14	6.0
Experience:		
None	13	5.6
Low	98	42.0
Moderate	113	48.5
High	9	3.9

Table 1: Profile of Respondents

was 3.12 (2.38 standard deviation). Table 1 provides a profile of the sample.

Results and Discussion

Descriptive analysis, analysis of variance (ANOVA), and Pearson product-moment correlations are used to examine the computer attitudes along the four attitude components (anxiety, confidence, liking, and usefulness) and the relationship between each component and age, courses, GPA, class, computer ownership, computer accessibility, and computer experience.

Some descriptive statistics including means and standard deviations of the individual components and the overall scale are shown in Table 2. The mean scores of all the computer attitude components were moderately high, suggesting that the respondents were positive in their attitudes towards computers. The Cronbach alpha reliability coefficients were 0.78, 0.84, 0.77, 0.71, and 0.92 respectively for the anxiety, confidence, liking, and usefulness subscales, and the overall scale. All coefficients satisfy Nunnlly's (1978) suggestion that reliability coefficients of 0.70 or higher are adequate.

Effect of Age, Courses and GPA on Attitudes

Table 3 shows no significant correlation between age and any of the individual attitude components and the overall attitudes. This result may be attributed to the limited age spread among the respondents, the mean being 22.5 years and the standard deviation 1.9 years.

A significant positive relationship can be expected between the number of computer-using courses and level of attitude. The results in Table 3 show that students with more computer-using courses have a high degree of confidence in working with computers, perceive the usefulness of computers, and have more positive overall attitudes than those with few computer-using courses. Anxiety and liking, although they exhibit a positive correlation, seem to be less affected by the number of computer-using courses. It is discouraging to find that students with more courses do not appear to register a significant positive attitude on the anxiety and liking scales. One explanation might be attributed to the student's reason for

Scale	No. of Items	Mean	S.D.	Min.	Max.	Reliability
Anxiety	10	34.48	6.44	18	50	0.78
Confidence	10	35.45	6.62	18	50	0.84
Liking	10	34.13	6.12	16	50	0.77
Usefulness	10	38.54	5.46	20	50	0.71
Overall	40	142.60	20.99	40	199	0.92

Table 2: Descriptive Statistics

Variable	Anxiety	Confidence	Liking	Usefulness	Overall
Age	-0.13	-0.13	-0.04	-0.04	-0.08
Courses	0.11	0.13[A]	0.13	0.13[A]	0.15[A]
GPA	0.09	0.13[A]	0.13	0.13	0.14[A]
Class	-0.06	-0.05	-0.02	-0.09	-0.01
Ownership	0.28[C]	0.34[C]	0.36[C]	0.17[B]	0.34[C]
Accessibility	0.45[C]	0.47[C]	0.38[C]	0.21[C]	0.45[C]
Experience	0.32[C]	0.41[C]	0.32[C]	0.15[A]	0.36[C]

[A]p<=.05 [B]p<=.01 [C]p<=.001

Table 3: Pearson Product-Moment Correlation Coefficients

	Computer Ownership		
Scale	Ownership	Non-Ownership	Pr > F
Anxiety	36.17	32.48	.0001
Confidence	37.52	32.98	.0001
Liking	36.25	31.75	.0001
Usefulness	39.40	37.56	.0103
Overall	149.34	134.77	.0001

Table 4: Computer Attitude Means by Computer Ownership

taking the course.

Since GPA is a valid measure of student achievement, students with a high GPA can be expected to have a more positive attitude toward computers than those with a low GPA. Based on correlation analysis, our expectation was found to be true for confidence and overall computer attitude but not for anxiety, liking, or usefulness. One possible explanation for this unexpected result is that GPA measures the overall performance, and not necessarily computer-related abilities.

Effect of Class Standing on Attitudes

Correlation analysis indicates that there is no relationship between class standing and attitude. Duncan's multiple range test (Hines and Montgomery, 1980) shows that all students maintain the same level of anxiety, confidence, liking, usefulness, and overall attitudes, irrespective of their class standing.

Effect of Computer Ownership on Attitudes

Respondents were asked to indicate whether they owned a computer or not. In the questionnaire, computer ownership was coded 2 for ownership and 1 for non-ownership. The correlations (see Table 3) between ownership and attitude scales suggests that those who own computers have a higher degree of attitude than those who do not. The ANOVA analysis shown in Table 4 confirms the correlation results. That is, students who own computers have less computer anxiety, have more confidence in working with computers and have a more positive attitude concerning liking and usefulness.

Effect of Computer Accessibility on Attitudes

Accessibility was assessed by asking students to report their degree of access to computers. Responses were coded 1 for very low, 2 for low, 3 for average, 4 for high, and 5 for very high. Almost all the respondents have access to a PC lab, that is open during the working days form 8:00 A.M. to 8.00 P.M., located in the same building where they take courses, and supported with a proficient lab attendant for help and trouble shooting.

There was a strong significant correlation between accessibility and the computer overall attitude and the individual components of the attitude. Table 5 presents the ANOVA results, which reveals that there are significant differences between the degree of access and the attitude components. In general, the higher the degree of access the more favorable the attitude. Interestingly enough, the same pattern surfaced in anxiety, confidence, liking, usefulness, and overall attitude.

Effect of Computer Experience on Attitudes

Computer experience was assessed by asking students to report their level of experience. Responses were coded 1 for no experience, 2 for low experience, 3 for moderate experience, and 4 for high experience. The correlation coefficients, in Table 3, show positive and significant relationships between experience and attitude components as well as overall attitude. This finding suggests that more experienced users are likely to be less anxious, more confident in their ability to use computers, have a greater degree of computer liking, and have a greater perception of the usefulness of computers.

An analysis of variance, in Table 6, was also used to test significant differences in computer attitude and level of experience. An interesting observation is that a higher level of experience tends to promote a higher level of attitude but not perceived usefulness. All respondents have the same perception of the usefulness of computers, regardless of their experience level. Other attitude components show significant differences with levels of experience. Since a paired comparison of attitude means between various levels of experience was not

	Degree of Access					
Scale	Very Low	Low	Average	High	Very High	Pr > F
Anxiety	25.9	30.4	34.8	37.1	38.2	.0001
Confidence	27.6	31.9	35.0	39.1	39.9	.0001
Liking	27.8	31.2	34.1	36.8	36.8	.0001
Usefulness	38.2	36.2	38.0	40.0	41.9	.0036
Overall	119.6	129.7	141.9	153.0	156.8	.0001

Table 5: Computer Attitude Means by Degree of Access

	Level of Experience				
Scale	None	Low	Moderate	High	Pr > F
Anxiety	28.3	33.2	35.9	38.4	.0001
Confidence	28.5	33.4	37.4	41.1	.0001
Liking	29.9	32.4	36.0	36.3	.0001
Usefulness	36.6	37.8	39.3	39.3	.1252
Overall	123.4	136.8	148.6	155.2	.0001

Table 6: Computer Attitude Means by Level of Experience

investigated, it can not be ruled out that the difference between some means is not significant.

Conclusion and Implications

The results of this study demonstrate that the respondents have positive attitudes toward computers and, therefore, have a general acceptance of computers as learning tools. At the component level, they tend to have a more positive attitude toward computer usefulness than toward computer anxiety, computer confidence, and computer liking. With regard to the association between computer attitudes and the study variables, the study shows that experience, accessibility of computer resources, and computer ownership tend to promote positive feelings toward computers whereas age and class standing have shown to be ineffective in developing favorable computer attitudes. The number of computer-using courses and GPA are found to be associated with computer confidence and overall attitude but not with computer anxiety or computer liking.

It is interesting to notice the difference between the effects of the number of computer-using courses and experience on attitudes. The number of computer-using courses may enhance a student's knowledge. However, the association between attitudes and experience is stronger than that of the number of computer-using courses. This reveals the importance of practical experience over theoretical knowledge. Educators should stress the hands-on use of computers in their courses. The primary recommendation emerging from this study is for schools and educators. Schools should invest in constructing computer labs that are equipped with user-friendly application software and multimedia learning kits and make them readily accessible to students. Educators should utilize and encourage students to use these facilities effectively and efficiently.

In conclusion, attitude may be a hindrance or a motivational factor to learning about and using computers. Negative attitudes may promote resistance to the acceptance and utilization of computer technology. On the other hand, positive attitudes may enhance student learning in classrooms and society computer awareness. It is of paramount importance to promote and maintain positive attitudes toward computers, especially among future generations.

Appendix A. Computer Attitude Scale

Measures of Computer Anxiety:

- Computers do not scare me at all. (reversed)
- Working with a computer would make me very nervous.
- I do not feel threatened when others talk about computers. (reversed)
- I feel aggressive and hostile toward computers.
- It wouldn't bother me at all to take computer courses. (reversed)
- Computers make me feel uncomfortable.
- I would feel at ease in a computer class. (reversed)
- I get a sinking feeling when I think of trying to use a computer.
- I would feel comfortable working with a computer. (reversed)
- Computers make me feel uneasy and confused.

Measures of Computer Confidence:

- I am no good with computers. (reversed)
- Generally I would feel OK about trying a new problem on the computer.
- I don't think I would do advanced computer work. (reversed)
- I am sure I could do work with computers.
- I am not the type to do well with computers. (reversed)
- I am sure I could learn a computer language.
- I think using a computer would be very hard for me. (reversed)
- I could get good grades in computer courses.
- I do not think I could handle a computer course. (reversed)
- I have a lot of self confidence when it comes to working with computers.

Measures of Computer Liking:

- I would like working with computers.
- The challenge of solving problems with computers does not appeal to me. (reversed)
- I think working with computers would be enjoyable and stimulating.
- Figuring out computer problems does not appeal to me. (reversed)
- 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.
- I don't understand how some people can stand so much time working with computers and seem to enjoy it (reversed).
- Once I start to work with the computer, I would find it hard to stop.
- I will do as little work with computers as possible. (reversed)
- If a problem is left unresolved in a computer class, I would continue to think about it afterward.
- I do not enjoy talking with others about computers. (reversed)

Measures of Computer Usefulness:

- I will use computers many ways in my life.
- Learning about computers is a waste of time. (reversed)
- Learning about computers is worthwhile.
- I'll need a firm mastery of computers for my future work.
- I expect to have little use for computers in my daily life. (reversed)
- I can't think of any way that I will use computers in my career. (reversed)
- Knowing how to work with computers will increase my job possibilities.
- Anything that a computer can be used for, I can do just as well some other way. (reversed)
- It is important to me to do well in computer classes.
- Working with computers will not be important to me in my life's work. (reversed)

Appendix B. Measures of User Characteristics

1. Age: _____ years.

2. Class:

freshman	sophomore	junior	senior	Graduate
1	2	3	4	5

3. Cumulative GPA:

< 2.0	2.1 - 2.5	2.6 - 3.0	3.1 - 3.5	> 3.5
1	2	3	4	5

4. How many computer-using courses have you taken? _____

5. Do you own a computer ?

No	Yes
1	2

6. Your degree of access to computers:

very low	low	average	high	very high
1	2	3	4	5

7. How do you categorize your experience in using computers ?

no experience	low experience	moderate experience	high experience
1	2	3	4

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