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A COMPARISON OF COMPUTER ANXIETY AMONG INDIAN AND IRANIAN UNIVERSITY STUDENTS

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ABSTRACT

The purpose of this study was to compare computer anxiety among Indian and Iranian university students in relation to country, faculty and gender. A total of 800 post–graduate students of different faculties and departments of Panjab University (India) and University of Tehran (Iran) were the subjects of the present study. The data were collected through computer anxiety rating scale (CARS) validated by Embi (2007). 2x2x2 ANOVA design was employed to study computer anxiety of Indian &Iranian male & female university students belonging to different faculties. The results indicated that country type, faculty type and interaction between country and faculty had significant effect on university students' computer anxiety scores.

Keywords: computer anxiety, country, faculty, gender.

INTRUDUCTION

Computer anxiety is a concept specific anxiety type; that regularly occurs in a specific type of situation (Harris & Grangennet, 1997). Today the computer is a part of everyday life, and the case is same with college students. According to Rossen, Sears and Weil (1987), computer interaction will be, or already is, an integral part of most academic majors . In 1993, researchers Rosen and Weil reported that some type of technophobia now afflicts one third of college students (Deloughry, 1993), and the numbers have never been higher. In the move towards computerizing education and the workplace, a substantial number of students and workers who have been left behind are computer anxious.

Computer anxiety, defined by Raub (1981), is "the complex emotional reactions that are evoked in individuals who interpret computers as personally threatening". One study (Mcdonald, 1983) estimated that approximately 30 to 35% of all computer users experience some level of anxiety when they first encounter computer technology. Computer anxiety manifests itself in many forms and results in a number of common fears. Users are afraid that they will break the computer or destroy vital information. They feel awkward and fear looking stupid. Computers seem to have almost human characteristics and their speed can make people feel like the machine is smarter than they are. They feel overwhelmed by the technology and their lack of understanding is expressed as "if I'm so far behind already, how will I ever catch up? (Raub, 1981).

Research has established firmly that stress and anxiety reduce performance effectiveness. Elder et al., (1987), Howard and Smith (1986) and Igbaria and Chakrabarti (1990) suggested that computer anxiety and stress may cause some individuals to avoid using computers completely. The presence of computer phobic and anxious people in the work- place can lead to other serious performance problems, including sabotage, decline in motivation, work quality and moral; and increase in mistakes, absenteeism, interpersonal conflicts, and turnover (Morgan, 1990).

Literature on computer anxiety offers conflicting theories. Researchers (Loyd & Gressard, 1984; Howard & Smith, 1986; Glass &Knight, 1988; Necessary & Parish, 1996) support the theory that increasing computer

experience will decrease computer anxiety. Necessary and Parish (1996) found that college students with little or no computer experience have more anxiety than those students that have computer experience. The results of their study revealed that "increased levels of computer experience and balance of weekly computer usage were both related with reduced levels of computer related anxiety".

It appears likely that students studying information systems and computer sciences will possess the lowest levels of computer anxiety due to their experience with technology and their interest in using technology. Sam, Othman & Nordin (2005) revealed that Undergraduates from the Faculty of Computer Science and Information Technology (FCSIT) had significantly better computer self-efficacy than undergraduates from Faculty of Applied and Creative Arts (FACA) (Ellis & Allaire, 1999; Sam, Othman & Nordin 2005).

Studies also suggest a discrepancy in computer anxiety levels among different demographic sectors, such as country type and gender. For example , studies by (Chua, , Chen and Wong ,1999 ; King , Bond and Blandford, 2002; Okebukola and Woda,1993 ; Todman , 2000) supported this idea that female university undergraduates are generally more anxious than male undergraduates, Earlier research has also indicated that computer anxiety is associated with country type . Rosen and Weil (1995) conducted a cross cultural comparison of university students in ten countries . Results indicated that each country possessed a unique culture-dependent model of computer anxiety. For two countries (United States and Australia), Interactive Computer Learning Anxiety included learning to operate a computer plus encountering computer problems. For the eight other countries, Interactive Computer Learning Anxiety captured only the aspect of learning to operate and program computers while a separate Computer Victimization factor dealt with anxiety surrounding computer problems. The Observational Computer Learning Anxiety and the Consumer Technology Anxiety factors also differed between countries.

Erkan (2008) also found that not only country type played an important role on computer anxiety scores but also gender differences was affected by different culture. His results indicated that Turkish students have significantly higher computer anxiety levels than the Dutch students. The students' computer anxiety levels do not differ depending on gender. However, post-hoc analysis revealed that Turkish female students have significantly higher computer anxiety levels than the Dutch female and Dutch male students. Brosnan and Lee (1998) investigated gender differences between university students of United Kingdom and Hong Kong. For the United Kingdom sample, there were no gender differences in computer anxiety. For the Hong Kong sample, males reported greater computer anxiety than females.

AIM OF THE STUDY

Above literature review provides a theoretical framework construct to find correlates of computer anxiety among Indian and Iranian university students. Because there is a general belief among people in developed countries that students in developing countries are in the high level of computer anxiety (Ede and Panigrahi 1998). By identifying the correlates of computer anxiety; researchers, managers, educators, and trainers may be better able to structure learning and training experiences to minimize deleterious effects of computer anxiety (Broome and Havelka , 2oo2) .

Thus, the present study was performed to study computer self-efficacy of Indian and Iranian university students in relation to :
Gender
Different faculties (science, Arts)
Interaction between country type and Gender
Interaction between country type and different faculties (Science, Arts)
Interaction between gender and different faculties (Science, Arts)
Interaction between country and different faculties (Science, Arts), Gender.

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Hypotheses

H1: There is no significant difference between computer anxiety scores of Indian and Iranian university students.

H2: There is no significant difference between male and female university students' scores on computer anxiety.

H3: There is no significant difference between Indian and Iranian students computer anxiety scores belonging to different faculties, Arts / Education and science.

H4: There is no significant interaction between country type and gender with regard to students' computer anxiety scores.

H5: There is no significant interaction between country type and faculty with regard to students' computer anxiety scores.

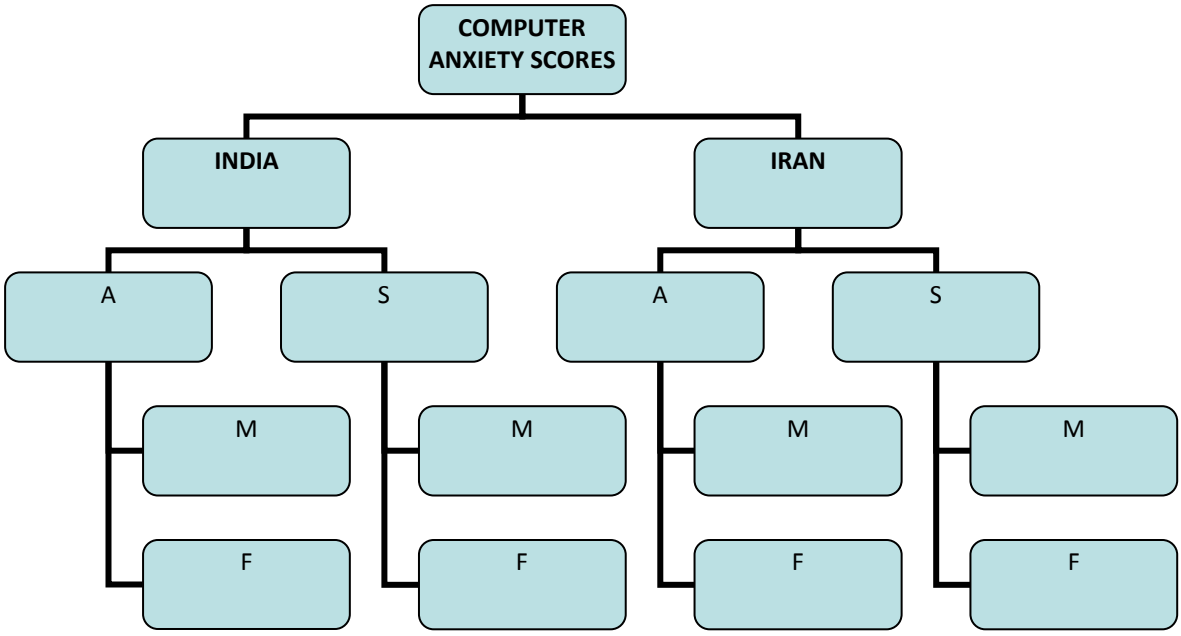
H6: There is no significant interaction between gender and faculty with regard to students' computer anxiety scores.

H7: There is no significant interaction among country type, faculty type and gender with regard to students' computer anxiety scores.

Design of the study

The study adopted a descriptive survey research design to find out the correlates of computer anxiety among Indian and Iranian students.

2x2x2 ANOVA design was employed to study computer anxiety of Indian and Iranian male & female university students belonging to different faculties.



A : Arts S : Science M : Male F : Female

Figure 1 Design of the study

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RESEARCH DESIGN AND DATA COLLECTION

Sample design

800 post–graduate students of different faculties and departments of Panjab University (PU) and University of Tehran (UT), were the subjects of the present study.

Both Indian and Iranian students belonging to science and arts faculty were equally 50 per cent. Both Indian and Iranian students belonging to Computer science, biotechnology, statistics, physics, chemistry, education, mass communication, geography, psychology and political science departments were equally 10 percent.

About 46.5 per cent of the Indian students were male whereas 53 percent of Iranian students were male. Remaining 53.5 percent of the Indian students were female whereas 47 percent of Iranian students were female.

Instrumentation

There are many researchers who have developed scales to measure computer anxiety. This study used Computer Anxiety Scale by Embi (2007) who slightly modified the version of the Computer Anxiety Scale (CARS) developed by Hienssen Glass and Knight (1987). In the pilot test, questionnaire was distributed among 20 faculty members at UITM in Malaysia. The overall reliability coefficient of the scale was .74.

The instrument with 18 statements of which eight were positively and ten were negatively worded are based on a 4 point Likert type scale designed as: strongly disagree (1), moderately disagree (2), moderately agree (3) and strongly agree (4). The direction of item scores is reversed for negatively worded items, so that a response of strongly agree is given a value of 1, agree value of 2, and so on. All positively worded CARS response items (8 items) were reversed prior to analysis so that the higher scores on all items indicated a higher level of anxiety. The overall computer anxiety score varies from 18 to 72, showing the lowest level of computer anxiety to the highest level of computer anxiety.

Reliability

The reliability of the overall Computer Anxiety Scale and its domains have been derived by employing Cronbach's alpha for both Indian students (N=50) and Iranian students (N=50) separately by the researcher as demonstrated in Table 1.

Table 1
Cronbach's alpha reliability for different domains of computer anxiety

Country	Domain	Cronbach's alpha
India	General anxiety about ability to use computers	.70
	Confidence in ability to learn about computers	.68
	Motivation/necessity to learn about computers	.78
	Power and control of computers	.69

	Total computer anxiety scale	.81
Iran	General anxiety about ability to use computers	.78
	Confidence in ability to learn about computers	.67
	Motivation/necessity to learn about computers	.76
	Power and control of computers	.70
	Total computer anxiety scale	.84
Total	General anxiety about ability to use computers	.73
	Confidence in ability to learn about computers	.67
	Motivation/necessity to learn about computers	.77
	Power and control of computers	.71
	Total computer anxiety scale	.83

Further, in order to know the demographic characteristics of the university students, the tool also included the name of the country, the name of the faculty and gender.

Validation in Indian and Iranian Universities

The computer anxiety measures obtained from this scale have a close resemblance to the ratings given to the Indian and Iranian students on a 4 point scale: relaxed, generally relaxed, anxious and very anxious by students. The coefficient of correlation for Iranian students was .806 (N =50). The coefficient of correlation for Iranian students was .704 (N =50).

Data collection

Data were collected in 2009. It took about six months to collect data from 800 Indian and Iranian students. Before collection of the data selection of faculties and departments was done on the basis of randomization technique. It was necessary to take permission in some departments from the chairperson. Then, students of different sections of class in a particular department were selected randomly. It was also taken care to select both female and male students equally in each department. Rapport was established with them and standardized instructions were read out for each tool. Students were encouraged to give correct information and were assured that these are to be used only for research purpose and will remain confidential. Participants took between 15 and 25 minutes to complete the questionnaires. It was checked that they answered all the statements.

DATA ANALYSIS

1. The comparison of computer anxiety levels for Indian and Iranian university students

Total computer anxiety scores were computed by summing each respondent's computer anxiety values for all

18 questions. All positively worded statements (8 items) of the CARS were reversed scored prior to analysis so that the higher scores on all items indicated higher levels of computer anxiety. The possible total composite score of levels of computer anxiety ranged from 18 to 72 higher level of computer anxiety. The computed total computer anxiety scores were categorized as (a) very relaxed, 18 to 31; (b) generally relaxed, 32 to 45; (c) anxious, 46 to 59; (d) very anxious 60 to 72.

Table 2 displays that 85 per cent of the Indian and 90 per cent of Iranian respondents were categorized as either very relaxed or relaxed. Only 13.8 per cent of Indian and 10.5 per cent of Iranian respondents were categorized as anxious. None of the Iranian respondents and only 1 per cent Indian students fell under the category of very anxious.

Table 2
The percentages of levels of university students' computer anxiety in India and Iran

Country	Very Relaxed		Generally relaxed		Anxious		Very anxious	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
India	129	32.3	212	53.0	55	13.8	4	1.0
Iran	169	42.3	189	47.3	42	10.5	-	-
Total	298	37.3	401	50.1	97	12.1	4	.5

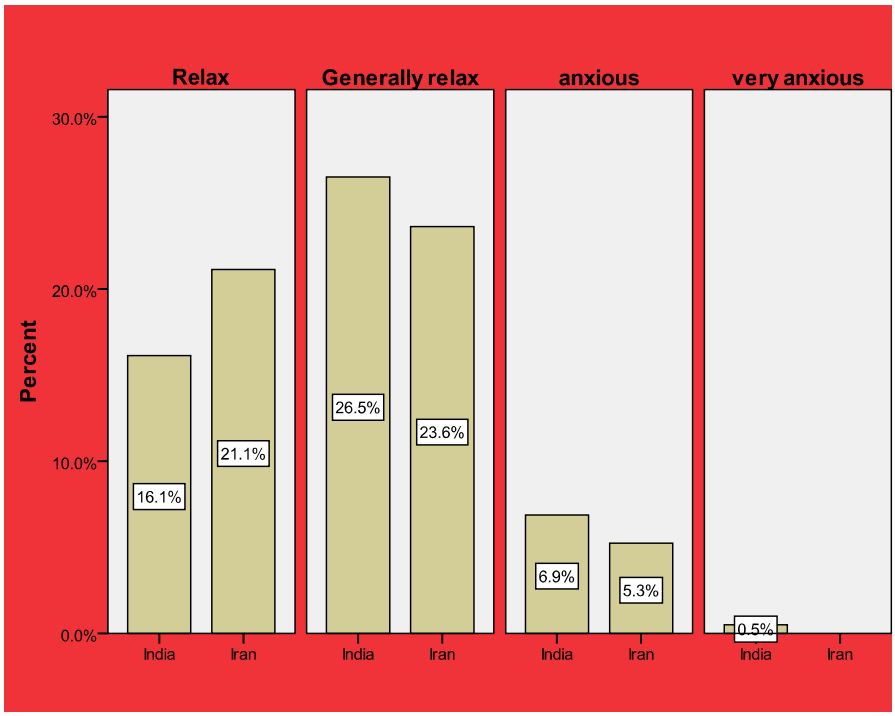

Figure 2 Bar diagrams showing the comparison levels of computer anxiety between Indian and Iranian university students.

2. Analysis of computer anxiety scores

2x2x2 ANOVA was employed for analyzing computer anxiety scores for the above mentioned hypotheses.

Table 4.15
Means and SDs of sub-samples of computer anxiety scores

Country	Gender	Faculty	Mean	Std. Deviation	N
India	Male	Science	36.3158	8.48686	95
		Arts	36.2857	8.60269	91
		Total	36.3011	8.52061	186
	Female	Science	36.0769	8.25879	104
		Arts	36.0818	9.59083	110
		Total	36.0794	8.94733	214
	Total	Science	36.1910	8.34809	199
		Arts	36.1741	9.13480	201
		Total	36.1825	8.74129	400
Iran	Male	Science	32.4727	8.26589	110
		Arts	35.5490	14.02517	102
		Total	33.9528	11.48160	212
	Female	Science	34.3736	9.11732	91
		Arts	36.5052	8.59763	97
		Total	35.4734	8.89357	188
	Total	Science	33.3333	8.69157	201
		Arts	36.0151	11.67942	199
		Total	34.6675	10.36148	400
Total	Male	Science	34.2537	8.56658	205
		Arts	35.8964	11.76017	193
		Total	35.0503	10.26022	398
	Female	Science	35.2821	8.68922	195
		Arts	36.2802	9.11942	207
		Total	35.7960	8.91625	402
	Total	Science	34.7550	8.63112	400
		Arts	36.0950	10.46541	400
		Total	35.4250	9.60962	800

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Table 2
Summary of 2x2x2 ANOVA for computer anxiety scores

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Result
Country	430.682	1	430.682	4.717	.030	S
Gender	70.883	1	70.883	.776	.379	NS
Faculty	338.854	1	338.854	3.711	.050	S
Country * gender	131.944	1	131.944	1.445	.230	NS
Country * faculty	408.436	1	408.436	4.473	.035	S
gender * faculty	2.097	1	2.097	.023	.880	NS
Country * gender * faculty	11.016	1	11.016	.121	.728	
Error	72314.897	792	91.307			
Total	1077728.000	800				
Corrected Total	73783.500	799				

S - The mean difference is significant at the 0. 05 level
NS – The mean difference is not significant at the 0.05 level

Main effects

Country

F-ratio for the difference in the computer anxiety scores of Indian and Iranian universities was found to be significant at 0.05 level of confidence. This suggested that the university students of the two countries were significantly different in respect to their total mean scores on computer anxiety. An examination of the means of the two countries revealed that Indian students (mean = 36.1825) were more anxious as compared to Iranian students (mean =34.6675). Hence, H1 was rejected.

Gender

F-ratio for the difference in the computer anxiety scores of students of Indian and Iranian universities regarding to gender was found to be not significant even at 0.05 level of confidence. Hence, H2 was retained as both male and female university students in the two countries exhibited comparable computer anxiety scores.

Faculty

F -ratio for the difference in mean scores on computer anxiety of Indian and Iranian university students with respect to different faculties arts / education and science was found to be significant at the level of 0.05 level of confidence. Thus, H3 was rejected as students who belonged to science (mean = 34.7550) were less anxious about computers than students belonging to education /Art faculty (mean = 36.0950).

Gender x country (G X C)

F-ratio for the interaction between gender and country type was not found to be significant even at the 0.05 level of confidence. This suggests that gender and country type do not interact to yield significant difference on the students' computer anxiety scores. This study could not provide sufficient evidence to reject the null hypothesis H4.

Faculty x country (F X C)

F-ratio for the interaction between faculty and country type was found to be significant at the 0.05 level of confidence. Thus, H5 was rejected as faculty and country type interact to yield significant difference on the students' computer anxiety scores. Moreover , the observation of mean differences of two faculties regarding to two countries on computer self-efficacy scores show that mean differences of two faculties related to only Iranian students so that science students (mean =33.3333) had more self-efficacy than arts students (mean = 36.0151) .

Gender x faculty ~~type~~ (G X F)

F-ratio for the interaction between gender and faculty type was not found to be significant even at the 0.05 level of confidence. This suggests that gender and faculty type do not interact to yield significant difference on the students' computer anxiety scores. This study could not provide sufficient evidence to reject the null hypothesis H6.

Country x Faculty x Gender (C X F X G)

F-ratio for the interaction among country type, faculty type and gender was not found to be significant even at the 0.05 level of confidence. Thus, H7 was retained as the three variables were independent of one another with regard to computer anxiety scores.

FINDINGS

The descriptive results of this paper showed that 85 per cent of the Indian and 90 per cent of Iranian respondents were categorized as either very relaxed or relaxed. Only 13.8 per cent of Indian and 10.5 per cent of Iranian respondents were categorized as anxious. None of the Iranian respondents and only 1 per cent Indian students fell under the category of very anxious.

Findings related to analysis of computer anxiety scores revealed that country, faculty and interaction between country and faculty had significant effect on university students' computer anxiety scores. In other words, Indian students exhibited more computer anxiety as compared to Iranian students. Students who belonged to science were less anxious about computers than students belonging to education /Art faculty.

EDUCATIONAL IMPLICATIONS

Results of the study indicated high computer anxiety for those students from Faculty of Arts and Education than students who belonged to Science faculty. E– skills training programs for teachers and students should be included in the curriculum from the school level so that anxiety towards computers specifically and technology in general is reduced.

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REFERENCES

Broome , T & Havelka , D . (2002) Determinants Of Computer Anxiety In Business Students . *The Review of Business Information Systems* Volume 6, Number 2 .

Brosnan , M . , & Lee , W . (1998) A cross-cultural comparison of gender differences in computer attitudes and anxieties: the United Kingdom and Hong Kong. *Computers in Human behavior.* Volume 14 , Issue 14 , 1 December 1998, Pages 559-577 http://www.sciencedirect.com

Chua, S , L ., Chen , D , T & Wong , A , F , L (1999) Computer anxiety and its correlates: a meta-analysis . *Computers in Human behavior*. Volume 15, Issue 5 , September 1999, Pages 609-623 http://www.sciencedirect.com/

Deloughry, T. J. (1993). 2 Researches say "Technophobia May Afflict Millions of students", *the chronicle of Higher Education*(28 April): A25 –A26.

Ede, F, O,. & Panigrahi, B. (1998) Attitudes toward computers: A comparison of Indian and Nigerian students. *African Economic and Business Review*, Vol. 1, Num 2, Fall 1998.

Elder, V.B., Gardner, E. P., & Ruth, S.R. (1987). Gender and age in technostress: effects on white collar productivity. *Government Finance Review*, 3, pp.17.21.

Ellis, E,. Allaire , A. (1999) Modeling computer interest in older adults: The role of age, education, computer knowledge, and computer anxiety. *Human Factors.* 1999; 41: 345–355.

Erkan, T. (2008). Computer anxiety: A cross-cultural comparative study of Dutch and Turkish university students". *Computers in human behavior*, vol. 24. http://www.sciencedirect.com/ .

Glass, C.R., & Knight, L. A. (1988). Cognitive factors in computer Anxiety. *Cognitive Therapy and Research,*. 12, 351-366.

Harris. J., & Grandgennet, N. (1997)."Writing Apprehension, Computer anxiety and telecomputing : a pilot study ". WRITING…….. (29 September,1997) In computer Anxiety by L. V. Orr, Retrieved from http://www.usm.maine. edu/com/lindap~1.htm

Howard, G.S., & Smith, R. D. (1986). Computer Anxiety in management: Myth or Reality ?. In : Orr,L.,V. (1998) computer Anxiety. Retrieved from http://homepages.ed.ac.uk/jhaywood/papers/studentviews.pdf on 14 Decemeber 2009.

Igbaria, M., & Chakrabarti, A. (1990). Computer anxiety and attitudes towards microcomputer use. *Behavior and Information Technology*, 9, 229-241. In computer Anxiety by L. V. Orr, Retrieved from http://www.usm.maine.edu/ com/lindap~1.htm

King, J ., Bond, T ., & Blandford , S. (2002) An investigation of computer anxiety by gender and grade . *Computers in Human behavior*. Volume 18, Issue 18, January 2002, Pages 69-84. http://www.sciencedirect.com/

Loyd, B.H. & Gressard, C.P. (1984). The Effects of sex, Age and computer Experience on computer Attitudes. *ADES Journal* 40:67-77.

Mcdonald, T. F. (1983). Technostress lurks inside every manager. *Data Management*, 21, pp. 10-14.

Morgan, A. (1990). Computer Anxiety: A Survey of computer training, Experience, Anxiety, and Administrative Support Among Teachers. Retrieved from http://oas.uco.edu/OJAS/97/T97/AMORG.HTM

Necessary, J. R., & Parish, T. S. (1996). The relationship between computer Usage and computer Related Attitudes and Behaviors. *Education*, Spring 1996,v 116 n3 : 384-387, ATTITUDES. (24 November 1997)

Okebukola ,P , A and Woda , A , B (1993) The gender factor in computer anxiety and interest among some Australian high school students . *Educational Research* , Volume 35, Issue 2 Summer 1993 , pages 181 - 189

Raub, A.C. (1981). Correlates in computer anxiety and college students (Unpublished PhD. Dissertation) . University of Pennsylvania, philadelphia, P A. in : A. Morgan. (1990). Computer Anxiety: A Survey of computer training, Experince, Anxiety, and Administrative Support Among Teachers. Retrieved from http://oas.uco.edu/OJAS/97/T97/AMORG.HTM

Rosen, L.D., Sears, D.C., & Weil, M. M .(1987).Computer phobia. Behavior Research Methods, Instruments and Computers, 19(2), 167-179.

Rosen, L . D & Weil , M , M . (1995) Computer anxiety: a cross cultural comparison of university students in ten countries . *Computers in Human behavior*. Volume 11 , Pages 45-64 http://www.sciencedirect.com/

Sam, K.H., Othman,A.E.A.& Nordin, Z.S. (2005). Computer self-Efficacy, Computer Anxiety, and Attitudes toward the internet : A study among Undergratudes in Unimas. Educational technology & society, 8(4), 205 – 219.