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# IMPACT OF COMPUTER EXPERTISE, LOCUS OF CONTROL AND SELF-ESTEEM ON COMPUTER-INDUCED STRESS

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## Abstract

*The present study considered the influence of self-esteem, locus of control and computer expertise on computer-induced stress in a cross sectional survey. One hundred and fifty cyber café users drawn from 10 cyber cafes randomly chosen from University of Ibadan and its environs participated in the study. Of the 150 respondents, 27 (31.3%) were females while 103 (68.7%) were males; mean age was 25.41 with a standard deviation of 7.00. Result indicated that the main effect of self-esteem was significant,  $F(1, 142) = 6.32, P < .05$ . Computer expertise also had a significant effect on computer-induced stress  $F(1, 142) = 28.04, P < .001$ . As hypothesized, high self-esteem persons reported lower level of computer-induced stress than low self-esteem persons. Also, people with higher level of computer expertise reported lower computer-induced stress than people with less computer expertise. The implication and results were discussed and suggestions for further studies were highlighted in the light of the findings.*

## Introduction

Technological progress taking place daily all over the world has led to a strong impetus to produce more capable and less expensive information technology to assist all human activities, thus, computers have become attractive and a key element in today's world. Computers were viewed largely as a technological curiosity in the 1790's. However,

the emergence of computers and information systems has been perhaps the biggest factor influencing individuals and organizations during the past three decades (Ivanovitch, Najjar & Wetherbe, 1983). Word processing software has almost entirely replaced typewriters in offices. Sophisticated information technology tools such as computer-assisted designs are being used to create information and artifacts. Whether it is in the office, home, factory, or the college, computer has become an everyday feature similar to the television and cell phones. This is evident in various activities on the Internet cyberspace, hypertext, e-mail and so on. In developed countries where computer use is highly advanced, there have occurred dramatic changes in the education, work and leisure and these have led to the emergence of what is often referred to as "computer culture" in those countries. Developing countries, such as Nigeria, are probably at a stage of development of computerized information systems, a stage where most of these developed countries were some thirty years ago, though the global technology and competitive environment is markedly different from those in the developed countries (Azad, Erdem & Saleem, 1999).

Researchers are sharply divided over the issue of the potential impact of the information age on people and societies. While economist and other business-oriented researchers often emphasize advantages such as enhanced productivity, growth and development in computer use, others such as psychologists, sociologists and humanists among other things are concerned about the potential negative effects of the computer on people's lives. While some people find the acquisition of computer knowledge and the task of using computer systems not only easy but fulfilling, others exhibit negative reactions such as computer phobia, anxiety, stress, exclusion, depersonalization and so on (Slam, Levi, & Young, 1990). Whatever these views are, a fact that cannot be disputed is that the introduction of computers is capable of transforming or changing human, social and psychological structures, and some of these changes may have negative health implications.

Computer users' well being is of vital importance. Individuals are pressurized to react to certain information provided by the computer in diverse ways with consequences for their psychological and social situations. Notable among the problems are fatigue, computer addiction and obsession, cumulative trauma disorders, stress and issues related to occupational safety. Other health-related problems include repetitive stress injuries (RSI) which are a group of conditions generally caused

by placing too much pressure on body joints and they vary in type and severities, computer-related injuries (CRI); which ranges from eye strain, wrist or hand strain, neck problems and so on. There are also social problems associated with computer use. Noteworthy are isolation, alienation and depersonalization. Craig (1984) referred to these computer-induced problems as "techno stress" and feels that techno stress is a modern disease of adaptation caused by inability to cope with the new computer technology in a healthy manner.

Studies have shown that a number of factors can exacerbate or attenuate computer-induced stress. For instance, low self-esteem and externally oriented computer irritability, headache, nightmares, resistance to learning about the computer or outright rejection of the technology than high esteem and internal locus of control users (Fredin and David, 1998). Cyberphrenia is a term that is used to describe addiction to new computer technology when it totally dominates an individual's life. Cyberphobia, an excessive fear of new computer technology have been reported to be more common among low self esteem computer users than high self-esteem users. Hatlie and Fitzgerald (1983), in a quest for a better understanding of computer-related stress, identified several correlates, including mathematics anxiety, trait anxiety, gender, age, knowledge of computer, self-esteem, and cognitive thinking style. Bozionelo (1996) found that computer phobia prevalence rate for women doubled that for men. Women also seem to be more negative in their attitudes to computer than men. Even as early as kindergarten, boys and girls view video games as more appropriate to boys than girls (Igbaria & Chakrabrati, 1990; Igbaria & Parasuramen, 1991). With regards to age, Rosen, Sears and Weil (1987) found that older student were more computer anxious but they did not have more negative attitudes towards computer use than young students. Rosen et al. (1987) also reported that feminine identity students showed more anxiety and negative attitudes than did *masculine identity students, regardless of gender.*

In a computer phobia reduction program, Rosen, Sears and Weil (1989) established that computer anxiety was related to computer phobia and that frequent exposure to computing systems dramatically reduced both computer phobia and anxiety. Rosen, Sears and Weil (1987) had earlier found that computer anxious student exhibited lower computer aptitudes, literacy and interests than their less anxious counterparts, implying that computer expertise influences computer-induced stress, other researches have also reported a significant negative relationship between computer expertise and computer

related stress (Igarria & Chakrabati, 1990; O'Brien, 1993; Delveccio, 1995; Balance & Balance, 1996).

The present study examined the influence of self-esteem, locus of control and computer expertise on self-reported experience of counter-induced stress in underdeveloped country. Based on empirical evidence, the researchers hypothesized that there will be significant (main and interaction) effect of self-esteem, locus of control and computer expertise on computer-induced stress among computer user. More specially, we hypothesized that internals with high self-esteem and high level of computer expertise will report a (comparatively) lower level of computer-induced stress.

## **Method**

### **Design and Participants**

The present study considered the influence of self-esteem, locus of control and computer expertise on computer-induced stress in a cross sectional survey. Participants consisted of 150 cyber café users drawn from 10 cyber cafes randomly chosen from University of Ibadan and its environs. Of the 150 respondents, 27 (31.3%) were females while 103 (68.7%) were males, mean age was 25.41 with a standard deviation of 7.00. Duration of computer use was one month to eight years. In terms of formal education, 88 (58.7%) of the respondents were school certificate holders, 47 (31.3%) were in tertiary institutions, while 15 (10.0%) had already completed their graduate study.

### **Instrument**

Computer-induced stress was measured with Computer information Problems and Internet Hassles from Hudiburg, 1989. computer Hassle Scale-revised (CHS-R). The scale is scored along a 4-point format, 0 (not at all), 1 (somewhat severe), 2 (moderately severe), 3 (extremely severe), with higher scores denoting high computer-induced stress. In this study the coefficient alpha is 0.88 and the Spearman Brown of the split-half reliability was 0.78.

Self-esteem was assessed with the Adanijo and Oyefeso (1986) 15 items general self-esteem scale. Response to the scale is along a 5-point Likert format ranging from 1 (strongly disagree) to 5 (Strongly agree), with high score denoting low self-esteem. The author reported a split half reliability coefficient of 0.79 among bank officials and a reliability coefficient of 0.74 and 0.92 between undergraduate and high school students 0.90, while the Spearman brown of the split half reliability was 0.77.

Craig, Franklin and Andrews (1984) 17 items locus of control scale was used to assess locus of control in the present study. The widely used instrument is scored along a five point Likert format ranging from 1 (strongly disagree) to 5 (strongly agree) with high scores indicating a tendency towards externality. The authors reported a coefficient alpha of 0.79 for the scale. In the present study, a coefficient alpha of 0.74 and a Spearman Brown of the split half reliability of 0.71 were obtained.

Computer expertise was assessed with the computer Expertise Scale (Ajayi, Olatokun & Tiamiyu, 2001). The scale consists of items asking respondent to indicate the computer related education and training they have had as well as the computing activities that they had performed or could perform. Weighting and summing the scores on indicated knowledge and proficiency yielded an index of computer expertise for each respondent.

Socio-demographic variables such as age, sex educational status and marital status were tapped in the first of the questionnaire by single items.

### **Procedure**

Three trained research assistants collected data for the study. Using cluster-sampling technique, Ibadan metropolis was clustered into three zones based on availability of cyber café/computer-related service providers. The University of Ibadan and environs was chosen for the study being the busiest in terms of cyber cafes/computer-related service providers and preponderance of computer users. Ten popular cyber-cafes were used in this study. Two hundred questionnaires (200) were administered (20 at each center). Out of the 200 questionnaires distributed, only 163 were returned, and 150 contained usable data. The 150 questionnaires were scored and analyzed with the SPSS software (version 10) for data analysis.

### **Result**

A 2X2X2 ANOVA was performed to examine the main and interaction effects of self-esteem, locus of control and expertise on computer induced stress. Result indicated that the main effect of self-esteem was significant,  $F(1, 142)=6.32, P<.05$ . The influence of locus of control was not significant,  $F(1, 142)=2.04, P n.s$ . computer expertise also had a significant effect on computer-induced stress  $F(1, 142)=28.04, P<.001$  (see Table 1). As hypothesized, high self-esteem

persons reported lower level of computer-induced stress ( $\chi=71.25$ ) than low self-esteem persons ( $\chi=85.11$ ). Also, people with higher level of computer expertise reported lower computer-induced stress ( $\chi=60.08$ ) than people with less computer expertise ( $\chi=87.62$ ).

**Table 1: 2×2×2 ANOVA showing influence of self-esteem, locus of control and computer expertise on computer-induced stress.**

Variable	SS	DF	MS	F	P
Self-esteem (A)	985.98	1	985.98	6.31	<.05
Locus of control (B)	93.58	1	93.58	2.04	n.s.
Computer expertise (C)	9351.29	1	9351.29	28.93	<.001
A×B	148.46	1	148.46	0.46	n.s.
A×C	4783.79	1	4783.79	14.83	<.001
B×C	1011.22	1	1011.22	6.83	<.05
A×B×C	236.60	1	236.60	1.79	n.s.
Error	2351.94	142	144.22		
Total	45800.34	149	322.54		

**Table 2: Mean table group differences on computer-induced stress.**

Variables	Levels	N	Mean
Self esteem	High	62	71.25
	Low	88	85.1
Locus of control	Internal	64	80.15
	External	86	82.66
Computer	High	71	60.08
	Low	79	87.62

The result in Table 1 reveal that there was a significant interaction effect of self-esteem and computer expertise on computer-induced stress  $F(1, 142) = 14.83, P < 0.01$ . High self-esteem persons who scored high in computer were lower in computer-induced stress than other categories of respondents (See Table 3). The self-esteem/locus of control interaction was not significant.  $F(1, 142) = 0.46, P \text{ n.s.}$  The locus of control/computer expertise interaction, however was significant  $F(1, 142) = 6.83, P < 0.05$ . Respondents with internal orientation who scored high in computer expertise were lower in computer-induced stress than other groups. The three-way interaction effect did not indicate a significant effect  $F(1, 142) = 1.79, P \text{ n.s.}$



**Table3: Mean table showing group difference (interaction effects) of self-esteem, locus of control and computer expertise on computer-induced stress.**

Group	N	X
LSE XLCE	42	70.85
LSE XHCE	53	75.66
HSE XLCE	24	67.43
HSE XHCE	31	60.11
LSE XILC	44	66.41
LSE XELC	18	67.03
HSE XILC	39	69.11
HSE XELC	49	70.81
ILC XLCE	61	68.19
ILC XHCE	30	62.05
ELC XLCE	21	69.83
ELC XHCE	38	67.33

NOTE:

**LSE**=low self-esteem

**HSE**=high self-esteem

**LCE**=low computer expertise **HCE**=high computer expertise

**ILC**=internal locus of control **ELC**=external locus of control

These results suggest that computer expertise and self-esteem exert influence on computer-induced stress. More specifically, high expertise/high self-esteem persons ( $x=60.11$ ) were lower in computer-induced stress than low expertise/high self-esteem ( $x=67.4$ ), low expertise/low self esteem ( $x= 73.85$ ) and high expertise/self-esteem ( $x=87.66$ ) individuals. In a like manner, internal with high computer expertise persons ( $x=62.05$ ) reported lower level of stress than internals with low computer expertise ( $x=68.19$ ), externals with high computer expertise ( $x=67.33$ ) and external with low computer expertise ( $x=69.83$ ).

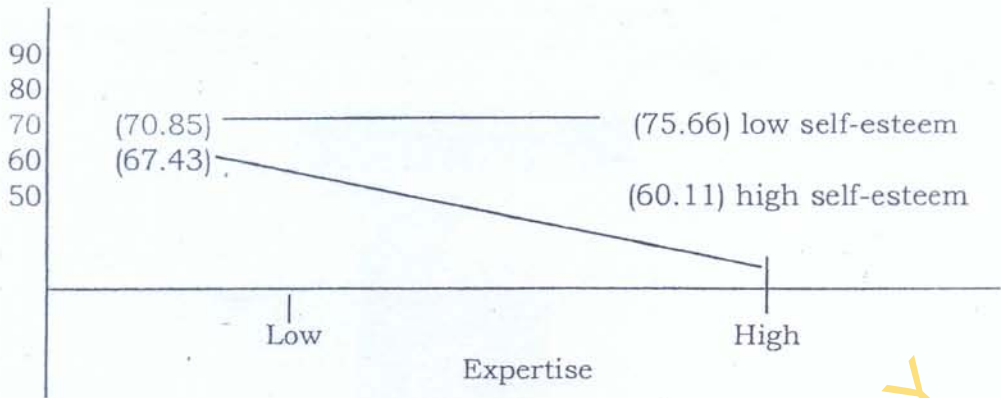


Fig. 1 Interaction of computer expertise and self-esteem on computer induced stress

### Discussion

The present study examined the influence of self-esteem, locus of control and computer expertise on computer-induced stress. Although, more Nigerian are daily accepting and using computer technology, there is a dearth of empirical research examining the psychosocial impact of computer technology on Nigerians. As a result, most people are oblivious of the fact that computer use can be deleterious in its effect.

The result of the present study has further lent credence to the assertion that there is a need for more awareness creation among the populace regarding personality factors and computer use. For example, the findings revealed that high self-esteem persons reported relatively lower levels of computer-induced stress than their low esteem counterpart. This is consistent with empirical evidence linking self-esteem to some goal directed behaviour such as clarity of purpose, ability to cope better under frustration and persistence in goal directed behaviour (Adebayo, 1990). Also, the result is in congruence with past research findings that have found significant relationship between self-esteem and effort to performance outcome (motivation). In other words, the present study does not suggest that high self-esteem persons do not experience computer-induced stress, but they do not readily perceive a situation as stressful because of their somewhat high level of motivation and tolerance (Bandura, 1977). This result further emphasized the importance of self-esteem, which relates to the evaluation individuals make of the self and their situation (Judge

1997). For example, people who consider themselves to be good and competent would adjust and cope with computer-induced stress better than those who see themselves as being unworthy and incompetent.

As hypothesized, result confirmed that high expertise computer users reported less computer-induced stress, a finding that corroborates Igbaria and Charkrabarti (1990)'s findings that computer expertise and experience correlated with positive attitude to computer, and that higher levels of computer training was associated with lower level of computer induced anxiety.

The finding is also in agreement with that of Rosen et al (1987) that computer training and expertise dramatically reduced both computer phobia and anxiety. This result suggests that computer expertise resulting from education and training is essential. It means that knowledge obtained through training could reduce stress related to lack of clarity or ambiguity in computer use. Although Kay (1980) found that locus of control was not an effective predictor of commitment to the use of computers and does not contribute, in one way or the other, to computer stress; finding corroborated by the present study. !

Other researchers have however reported that the degree of perceived control (locus of control) affects the level of stress experienced on the computer (Kraut & Dumais, 1990). One would have expected that internals would report lower levels of computer-induced stress relative to external, but the present study showed otherwise. However, locus of control became relevant when interacted with computer expertise. More specifically, internals with high level of computer expertise have computer-induced stress while such impact was not noticed among internals with low computer expertise. The plausible explanation for the interaction effect of internal locus of control with high computer expertise is that the belief that the individuals know what the task entails and the perception that they are in control of the situation and outcomes could also be stressful. This result implies that although computer expertise is essential, its interaction with internal locus of control may be detrimental.

The findings generally indicated that computer-induced stress results from correspondence between expertise and internalized standards. Self-assessment and formal training were found to impact on the stress experienced by users. It is thus important for would-be users to engage in self-development and computer training programs in order to derive maximum satisfaction from computer use. This is particularly important in a country like Nigeria where vast majorities

of the people do not have personal computers, but must go to business centers and cyber cafes to use one.

As user friendly as these computers are, most users can only get acquainted with necessary aspect of the computer if he or she has access to one, but because of the economic situation of the country, a great number of users patronize the business centers. In this situation, they meet with countless hassles and frustrations without adequate knowledge. So it is imperative that users get familiar with the computer as much as they can before using it.

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