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## Abstract

The fear or apprehension experienced by people when they plan to interact, or actually interact, with computers is called computer anxiety (Rohner & Simonson, 1981). The purpose of this paper is to review the literature on computer anxiety, the factors that influence it, and the methods to reduce its effects.

COMPUTER ANXIETY

A Graduate Research Paper

Submitted to the

Division of Communication & Training Technology

Department of Curriculum and Instruction

UNIVERSITY OF NORTHERN IOWA

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

By

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July, 1996

This Research Paper by: Tien-chen Chien

Titled: COMPUTER ANXIETY

has been approved as meeting the research requirement for the

Degree of Master of Arts.

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## CHAPTER I

## Introduction

<u>Background</u>

The evolution of the computer has resulted in computers being introduced into businesses, various types of organizations, and even homes. This has enabled people to access much more information than ever before. People nowadays are living in the "information society," created by advanced communication technologies coupled with computers (Naisbitt, 1984).

Computers have been recognized as powerful tools for managing information and increasing productivity, and as efficient tools for teaching and learning. With computers appearing in many workplaces, schools, and homes in an increasing number, people cope with the increasing demand of being computer literate. In business, office workers face a new phenomenon- the electronic desk (Craig, 1994). They have to be able to operate these machines to perform their jobs. In schools, teachers and students are confronted with fundamental changes in the teaching-learning process brought

on by computer-assisted instruction.

As people are pushed into the increasing interaction with computers, some respond with enthusiasm and a desire to become the master of the machines; others, however, approach the situation with fear and apprehension. Some people hesitate or resist using computers, although they understand that the utilization of computers can bring various advantages to their lives. These people feel anxious about using computers and try to avoid the machines whenever possible (Rohner & Simonson, 1981).

Purpose of the Study

The fear or apprehension experienced by people when they plan to interact, or actually interact, with computers is called computer anxiety (Rohner & Simonson, 1981). The purpose of this paper is to review the literature on computer anxiety, the factors that influence it, and the methods to reduce its effects.

Significance of the Study

Computer utilization is a growing demand in many occupations and at all levels within organizations. According to the

U. S. government, there were over fifty-one million workers using computers on their jobs in 1993 (U. S. Bureau of the Census, 1995).

The anxiousness about using computers bothers millions of people. This anxiety affects their productivity and working effectiveness. When companies total their expenses of employee training ever year, computer anxiety is a problem that costs them the most money and time, and reduces their effectiveness in teaching their employees to use technology.

The study of computer anxiety can help the reader to understand the nature of problem and develop proper treatments to reduce its effects, benefitting not only business but also education and home users.

CHAPTER II

Literature Review

What Is Computer Anxiety?

Several studies (Jordan & Stroup, 1982; Maurer, 1983; Rohner & Simonson, 1981) have established that individuals often exhibit a complex array of emotional reactions in situations requiring the utilization of computer technology. Overbaugh and Reed (1993) stated that "anxiety can be caused by exposure to new material, new teachers, or new technologies and manifests itself in a variety of emotional and/or physiologies forms ranging from an elevated heart rate to actual disorders" (p. 75). Therefore, computer anxiety is caused by exposure to computer technology.

Howard (1986) defined computer anxiety as "fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer" (p. 18). Rohner and Simonson (1981) defined computer anxiety as "the mixture of fear, apprehension, and hope that people feel when planning to interact or when actually interacting with a computer" (p. 151). Appelbaum

and Primmer (1990) said that "cyberphobia," commonly referred to as computerphobia or computer anxiety, "refers to an intense anxiety about computers that can produce physical symptoms ranging from sweaty palms to dizziness, shortness of breath, heart pounding, and feelings of unreality" (p. 8). They pointed out that in business and industry, computer anxiety is more common than other phobias. Individuals with this technology related phobia "tend to avoid computers whenever possible and are uncomfortable in situations that require their use" (p. 8). Rohner and Simonson (1981) also found that when given the option of using or not using a computer, college students who are uncomfortable with computers often choose not to use them.

Cambre and Cook (1985) summarized the definitions of computer anxiety as follows:

1. Researchers have found that some individuals give evidence, either through physiological changes or responses on self-reported messages, of a fear of using computers which they have termed computer anxiety.
2. Researchers attempting to define computer anxiety suggest that it involves a complex array of emotional reactions including fear, apprehension, hope, and personal threat.
3. Emotional reactions described as computer anxiety may be

triggered by consideration of the implications of utilizing
computer technology by planning to interact with a
computer, or by actually interacting with a computer.
4. Computer anxiety may occur even though the situation
poses no immediate or real threat.
5. Computer anxiety is probably an anxiety state rather than
an anxiety trait, and as such susceptible to change over
time. (p. 42)

Maurer and Simonson (1984) identified some traits that might

appear for a person with computer anxiety: the avoidance of

computers (and areas containing them), excessive caution in using

computers, negative remarks (about the machine), and minimized

usage. Bloom (1985) gave a list of fears which computer users may

have: breaking the equipment or costly errors, being perceived as

stupid, frustration of cryptic computer messages, perceiving the

machine as superior, inadequate documentation, loss of control and

power, lack of time to learn computers, disappointment of the

benefits, and the perceived instability of their jobs.

Furthermore, a term "technostress" was minted by a

psychotherapist Craig Brod. Brod (1984) used this term to describe

the type of stress unique to computer technology users and treated it

as a disease. He stated that "technostress is a modern disease of

adaptation caused by an inability to cope with the new computer technologies in a heathy manner" (p. 16). According to his description, the primary symptom of those people who have technostress is anxiety. "Technoanxiety" can be expressed in such ways as irritability, headaches, nightmares, and resistance to or outright rejection of computers. It often afflicts people who feel pressured to adapt to computer technology.

Adaptation can be divided into simple and complex types. Simple type adaptation is frequent in everyday life. It does not change people's outlook on life or social relationships. Changing one's diet is an example of a simple type adaption. The adaptation to computer technology is a complex type. It is stressful. People who have technostress either have fear of using computers or concentrate too much on computers without feeling other things in their lives. It is a double-sided problem, not being associated only with the fear but also in a form of overidentification with the technology (Brod, 1984).

Some people expect everything to be as fast, correct, and

efficient as computers. They lose their patience while dealing with human beings because they have been accustomed to immediate information and instant answers from computers. These people feel irritated or frustrated when the computers make errors. They also sometimes feel depressed or show no interest being with other people. "A very fine line separates successful adaptation and technostress. Whether technostress results from an individual's effort to adapt to computers is ultimately determined by an interplay of personal and situational factors" (Brod, 1984, p. 22).

Factors That Inference Computer Anxiety

A number of studies have examined the relationship between computer anxiety and a variety of variables. Some studies investigate relationship to gender, age, or personality traits, other studies look into the relationship between computer anxiety and computer experience. The results of these studies are mixed.

Some studies (Cambre & Cook, 1987; Kotrlik & Smith, 1989) found that females were more anxious about computers than males, while other studies (Dyck & Smither, 1994; Gorden, 1995; Loyd &

Gressard, 1984; Hayek & Stephens, 1989; Honeyman & White,

1987) found no significant gender difference. It has been pointed out

that gender bias often affects the results of these studies. Campell

(1989) found that male and female youth do not have equal access to

computers in the home because parents tend to purchase more

computers for sons than for daughters.

Some studies (Cambre & Cook, 1987; Todman & Lawerson,

1992) found that adults were more fearful about using computers

than children and teenagers. When older adults (fifty-five years and

above) were compared to younger adults (thirty years and under),

older adults were less anxious about computers than younger adults.

Older adults also had more positive attitudes toward computers

though they had less computer experience than younger adults (Dysk

& Smither, 1994).

Some studies (Chu & Spires, 1991; Hayek & Stephens, 1989)

reported that individuals who had computers at home or had used

computers had lower computer anxiety than those who did not. It

was also found that individuals who had taken two or more computer

courses were less anxious about computers than individuals who had

taken fewer than two computer courses (Chu & Spires, 1991). After

taking a computer course, individuals who had previous high

computer anxiety experienced a great decrease in their anxiety

(Cambre & Cook, 1987; Chu & spires, 1991; Honeyman & white,

1987; Leso & Peck, 1992). These findings suggested that computer

anxiety was associated with computer experience and/or exposure.

Some studies (Marcoulides, 1988; Rosen, Sears & Weil, 1987)

reported that individuals' previous computer experience was not

associated with their computer anxiety. Experienced users suffered

from computer anxiety as much as novice users. It is not clear

whether less computer anxiety enables people to get more computer

experience, or more computer experience causes less computer

anxiety.

Some researchers examined the relationship of math anxiety to

computer anxiety. Merchant and Sullivan (1983) reported that

students with lower GPAs and lower math scores had higher

computer anxiety. Lindbeck and Dambrot (1986) supported that

math ability affected math anxiety and computer anxiety. Students

who had higher math ability had lower math anxiety and computer

anxiety than those who had lower math ability. However, Fletcher

and Deeds (1994) reported that math ability had no effect on

computer anxiety. Additional research (Todman & Lawrenson,

1992) also indicated that math anxiety was not related to computer

anxiety.

Some researchers measured the effects of cognitive style on

computer anxiety. Chu and Spires (1991) found that sensing style and

feeling style people had more anxiousness about computers than

intuitive style and thinking style people.

Comparing different cultural backgrounds, Marcoulides and

Wang (1990) found that American students and Chinese students had

a similar degree in computer anxiety. This study shows that there is

not much difference in computer anxiety between Chinese and

American cultural backgrounds. One study is not enough to prove

the relationship of various cultural backgrounds to computer anxiety.

In order to provide more evidence, more studies need to be done in

this area.

   Computer anxiety is often considered as an attitude toward computers. "Positive attitude included an anxiety free willingness or desire to use the computer" (Simonson, Maurer, Montag-Torardi & Whitake, 1987, p 234). In the Computer Attitude Scale designed by Loyd and Gressard (1984), computer anxiety was used to assess individuals' computer attitudes. Also, a person's negative attitude towards computers was identified as a characteristic of a person with computer anxiety (Maurer & Simonsom, 1984). However, Kernan and Howard (1990) treated computer anxiety and computer attitude as separate segments, their study showed that individuals who suffered high computer anxiety did not necessarily have negative computer attitudes.

   Some researchers examined the relationship of personality traits to computer anxiety. Rohner and Simonson (1981) used brain hemisphere dominance and field dependence as variables of personality. It was revealed that left-brain-dominant persons had slightly higher computer anxiety than right-brain-dominant persons.

Whereas field-dependent persons and field-independent persons had

no difference in computer anxiety.

Winer and Bellando (1989) measured college students'

computer anxiety using the Holland Model which categorized

vocational personality into six types. The results suggested that

artistic and social types had higher computer anxiety than other four

types: realistic, investigative, enterprising, and conventional. Since

the personality traits described as artistic and social types are more

described as right-brain dominance personality, which has been

found have less computer anxiety, these two studies seem to have

contradictory results (Maurer, 1994).

A later study (Lankford, Bell & Elias, 1994) used personality

tests to examine computer anxiety and drew a conclusion that:

"standardized normative distributions on personality tests may not be

applicable to computerized personality tests" (p. 497). This might

explain the reason why the results of some previous studies were not

in agreement. Different methods of measurement lead to different

results. An applicable instrument needs to be designed to examine the

relationship of personality traits to computer anxiety.

How to Reduce Computer Anxiety?

From the studies reviewed, it was found that no matter whether males or females are experienced users or novices they all can have computer anxiety. Since individuals who have computer anxiety are scattered among various age groups, occupations, and social-cultural backgrounds, making it difficult to develop one treatment that serves to reduce everybody's anxiety.

Howard (1986) summarized some important aspects of this computer phenomenon and separated them into three types according to the roots of computer anxiety: psychological root, knowledge root and operational root. Each type of computer anxiety needs a certain treatment. Sometimes, a combination of two or three treatments may be needed.

Howard suggested that to treat the psychological root of computer anxiety, it is necessary to change individuals' technological attitudes and beliefs first. This is difficult and usually will take a long time. Since the cause of knowledge root of computer anxiety is lack

of computer knowledge, the best way to treat it is to impart

computer knowledge, the difficulty is moderate and the time needed

is intermediate. To treat operational root of computer anxiety is

easier, individuals' computer anxiety can be reduced by providing

enough hands-on experience. The time needed to treat operational

root of computer anxiety is short in comparison to the others

(Howard, 1986).

Many researchers focused on the effect of providing computer

knowledge and experience to reduce computer anxiety, but not all of

them find positive results. It was pointed out that some computer

courses helped reduce individuals' computer anxiety, but some

computer courses had no effect of reducing computer anxiety (Leso

& Peck, 1992). What to teach and how to teach in an introductory

computer course became another issue.

Leso and Peck (1992) compared different types of computer

courses and found that a software applications course is more

effective in reducing computer anxiety than a programming course.

They also suggested that in order to achieve better results,

individuals who have higher computer anxiety are recommended to

attend other computer-related activities designed especially to reduce

anxiety at the same time. Additionally, it is advised to take

introductory courses which help to establish basic skills and concepts

before learners take programming courses (Leso & Peck, 1992).

It is important for computer instructors to develop proper

teaching strategies to reduce or minimize learners' anxiety. Lewis

(1988) gave some principles of teaching techniques for computer

teachers. First of all, teachers should point out that computers are

not something mystical. They are machines designed and

programmed by people and are supposed to be used by people. We

should be the masters of these machines instead of being controlled

by them. By taking a computer apart to show what is inside, a

teacher can help the students realize and ease their fear of using

computers (Lewis, 1988).

Some people hesitate in using computers for fear of making

mistakes. Some people think they may break the machines if they

don't operate them correctly. Teachers should explore the learners'

worst fears, then give proper treatments. For example, if computer

users hit a wrong key, there will be a "beep" or error message

returned by the computer. Teachers can tell students: "I'm going to

hit the wrong key." and demonstrate what will happen if they do so.

Thus let them understand that they will not break the machines by

doing this. While students are experiencing making mistakes,

teachers can show them that it is not worth it to be nervous as much

as they thought (Lewis, 1988).

# CHAPTER III

# Conclusion

Computer anxiety is a new phenomenon which accompanies the growing use of computers in our society. Almost every day, millions of computer users are affected by computer-related anxiety and stress. Though this topic has drawn researchers' interest during the last 10 to 20 years, until now, there have not been enough studies done.

In order to obtain a better understanding of this problem, we need to do more research. This can also provide more resources for further studies. New instruments need to be developed to measure computer anxiety precisely. More research about the details of the factors that cause computer anxiety needs to be done. Therefore, more effective methods of reducing computer anxiety can be designed.

In this field of study, there are some common problems that have been pointed out: "(a) Often the research questions are not clearly defined, building on previous research; (b) the treatments

used are often ill defined; and (c) the studies in this area do not seem

to form a thrust toward answering larger questions" (Maurer, 1994,

p. 374). These commands may be helpful for later studies to avoid

making the same mistakes and add more useful information to this

body of research.

Maurer gave this recommendation: "Do more research"

(Maurer, 1994, P. 374). This might be the most important thing that

we should do about this problem. If computer anxiety can be

successfully reduced, it will benefit millions of computer users. Then

the improvement of computer skills and increase in knowledge of

more computer users can be possibly accomplished.

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