Computer anxiety

Tien-chen Chien

University of Northern Iowa
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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

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Tien-chen Chien

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Sharon E. Smaldino
Graduate Faculty Reader

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Date Approved

Leigh E. Zeitz
Graduate Faculty Reader

7/22/96
Date Approved

Peggy Ishler
Head, Department of Curriculum and Instruction
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CHAPTER I

Introduction

Background

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 healthy 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 Influence 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
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 & Whiske, 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 & Simonson, 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.
Reference


mathematics anxiety, and Holland vocational-personality types.