

**COMPUTER ANXIETY AND PERCEIVED  
CAUSES OF THE ANXIETY AMONG  
COLLEGE STUDENTS IN DESSIE**

**BY**

**MULUGETA MELAKU**

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**JUNE 2006**

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**BY  
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***A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of Master of  
Arts in Educational Psychology***

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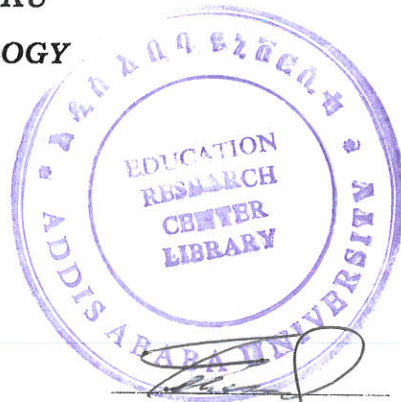
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BY  
**MULUGETA MELAKU**  
**EDUCATIONAL PSYCHOLOGY**

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## **ABSTRACT**

*The purposes of this study were to examine levels of computer anxiety, to identify the gender differences in computer anxiety, to explore the influence of experience on computer anxiety, and to indicate the perceived causes of computer anxiety among college students. A questionnaire and an interview were administered to collect data. 104 Information and Communication Technology college students were involved in the study. Analysis of variance and percentage were employed to analyze the data. According to the results, there is considerable computer anxiety among Information and Communication Technology college students in Dessie. The results also indicated statistically significant gender- and experience-differences in computer anxiety. The significant differences were in favor of male students and highly experienced students. Moreover, some of the perceived causes of computer anxiety were identified. Finally, practical implications of the results and recommendations are indicated.*

# ***1. Introduction***

## ***1.1. Background of the Study***

Educational tools, in general, computer, in particular, at this time are vital or major assets in today's business and education world. For example, a study indicated that the use of the internet promotes education in educational institutions (Lepper and Gurtner, 1989) as in the main campus of Addis Ababa University (Wakshum, 1999). In previous periods, the application of computer was not spread over the world because this technology was not in a position that we see it today. Particularly, in our country, even at this time, it is in question that everybody knows computer very well due to various reasons like socio-economic status of our people, educational background of the society, cultural and other factors.

The ubiquitous observation that some individuals are unusually anxious about working with computers has led to the proposal of a condition called computer anxiety to describe this state. An increasing number of individuals are making hands-on use of computers in their work. But a number of researches report that some of these individuals resist using computer. Some of the possible causes of such resistance include negative attitudes toward computers, anxiety toward computer use, and limited skill in computer use (Marcoulides, Mayes, and Wiseman, 1995; Mahar, Henderson and Deane, 1997; Harrison and Rainer, 1992; Henry, 1994; and Teo and Lim, 1996).

As cited in Morgan (1997), Cambre and Cook noted that anxiety is by and large, a twentieth-century phenomenon, whereas for Spielberger anxiety is increasingly recognized as a powerful influence in people's everyday lives and is reflected in much of what they do. Even though anxiety is a powerful influence, there has been little or no agreement on the definition of anxiety. For this, as cited in Morgan (1997), May defined anxiety as "an apprehension cued off by a threat to some value that the individual holds essential to his existence as a personality"; Caplan and Jones also noted "the anxious person sees the danger as threat either in the near future or in the most distant future"; and Levitt describes anxiety as "an exaggerated state of fear that motivates a variety of defense behaviors, including physical signs, conscience apprehension, or disorganization". In a more general term, Spielberger (cited in Morgan, 1997) regarded anxiety as "a principal causation agent for such diverse behavior consequences as insomnia, immoral and sinful acts, instances of creative self-expression, and debilitating psychological symptoms of endless variety". In defining anxiety, terms like stress (borrowed from the physical science and it refers to a situation containing stimuli that arouse uneasiness or "tension" in a person), are used interchangeably without regard to fine distinctions of meaning. For this study, anxiety is more specific, that is, ones fear, frustration and/or irritation to use something, computer.

According to Elder *et al.* (cited in Morgan, 1997), the presence of 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. Moreover, Garden *et al.* (cited in Morgan, 1997) indicated the three categories of computer anxiety as normal, computer anxious and phobic. Phobic of computer is identified by acknowledging a combination of reported symptoms including avoiding using a computer, feelings of unreality, fear of loosing control, sweaty palms, pounding heart, tightness or pain in the chest, trembling or shaking, shortness of breath, and dizziness or light headedness when faced with a computer. The computer anxious avoid computers when possible and might be uncomfortable in situations requiring their use but rarely report the physical symptoms present in true phobias.

Test and math anxiety is a much studied phenomenon that somewhat resembles computer anxiety. As cited in Morgan (1997), some psychologists and educators (for instance, Cambre and Cook) proposed that computer anxiety is comparable to test and math anxiety as a situational expression of the general anxiety construct. Raub (cited in Morgan, 1997) also suggested that computer anxiety inhibits computer learning in a similar way that test anxiety reduces test performance and math anxiety decreases math achievement. This implies that, like test and math anxiety, computer anxiety should be identified, measured, and prevented in order to facilitate the successful education and other things affected by it.

Johnson and White (1980) hypothesized that inexperience and unfamiliarity with computers cause high level of anxiety. They and others (Mahar, *et al.*, 1997, Lee, 1986)

have proffered anxiety as a source of interference in the completion of computerized tests and/or the performance of users in computer based tasks. Johnson and White used a between subjects design to compare computerized test scores obtained with prior training with those obtained without prior training. They found that increased training with the computer prior to testing significantly enhanced the test scores of their elderly examinees. Johnson and White attributed the improvement in scores to the amelioration of anxiety by the training. Their results suggest that those who have more past experience with computers are at an advantage when taking a computerized test.

Szajna (1994) conducted an extensive study of computer anxiety and computer attitudes as predictors of performance on non-programming related aspects of introductory and intermediate level business computer courses. She found significant negative correlations between computer anxiety and the performance of computer tasks (grades from hands-on exams using several commercial software packages) only early in the course. Once the students had gained more several experience with computers, this correlation disappeared. Szajna thus suggested that computer experience may interfere with attempts to detect the effects of computer anxiety, and hence that there is a need for research on the nature of the relationship between these two variables.

One of the purposes of this study is to explore the hypothesis that past computer experience has an impact on the subjects' computer anxiety. This in turn affects

performance on computer related activities. That is, anxiety might negatively affect one's performance.

Previous research investigating significant gender differences between male and female students' attitudes toward computers have been inconsistent and conflicting (Whitrow, 1999). As cited in Whitrow (1999), the results of gender-related computer attitude studies, therefore, differ depending on the components of the computer attitude scales as: cultural differences, role models (Busch), socio-economic status of students, geographical location of students, and age of the sample population (Kay) are some of the potential reasons for gender differences determined in computer attitude investigations.

To verify this, Whitrow (1999) cited a number of researches to support the idea that student attitudes toward computers are significantly different between males and females. For instance, in a study of high school students (Shashaani) and pre-university students (Yaghi) males were found to have significantly more positive interest and confidence in using computers. In a study of college students, males had significantly more positive attitudes after one year of studying word processing and spreadsheet (Busch). Similarly, in a study of American university students, males had more positive attitudes toward computers (Badaglicco).

On the other hand, as cited in Whitrow (1999), other researches support the idea that there are no significant computer-related differences between males and females. Such

researches include a study of undergraduate students in Israel (Katz *et al.*), a study of the attitudes of undergraduate students in the United Kingdom (Francis and Evans), a study of college students' computer attitude including the components: anxiety, confidence and liking (Busch), and a study investigating computer anxiety, confidence and liking subscales of college students, despite a significant difference in perceived computer usefulness (Koohang). Although this study would show whether there is gender difference towards computer anxiety or not in the place where the target population were taken, the literature suggested that gender might be an influencing factor in students' attitudes toward computers.

As cited in Whitrow (1999), in addition to gender difference, prior computer use/experience is positively correlated with attitudes toward computers (Levine and Donitsa-Schmidt; Yaghi; Fann *et al.*; Miyashata; and Necessary, J. and Parish, T.). Furthermore, prior computer experience influences the development of positive computer-related attitudes (Jones and Clarke, cited in Whitrow, 1999).

According to Dupin-Bryant (2002), age and its relationship to computer anxiety have been the focus of many research studies like that of gender in relation to attitude toward computer. Dupin-Bryant also suggested that to reduce anxiety in the learning environment, instructors should use humor to build rapport, start lessons with basic concepts, use computer language only when educationally necessary, and make sure all lessons are hands-on.

Morgan gathered data from 100 participants in 1990 and 100 participants in 1997 to examine relationships among demographic variables, computer experience, training, anxiety, and administrative support. The survey shows that the levels of experience and training have not drastically changed between the survey in 1990 and the survey conducted in 1997. Morgan's survey result showed that age and gender are not significantly correlates in the case of computer anxiety.

### ***1.2. Statement of the Problem***

The results of previous researches on gender- and experience-differences towards computers have been inconsistent and conflicting. Thus, the major purposes of the study were to see these conflicting issues in case of college students. In short, the purposes of this study were to answer the following research questions:

1. What is the level of computer anxiety shown by college students in Dessie?
2. Is there a statistically significant gender difference in computer anxiety?
3. Does a difference in experience have an impact on computer anxiety?
4. What are the perceived causes of computer anxiety?

### ***1.3. Significance of the Study***

Computer, in the twenty-first century, is the vital or major asset in education, medicine, and business. After conducting the study,

- If there is significant gender-difference on computer anxiety, I want to propose some suitable suggestions to reduce the anxiety. This can help to create conducive

learning environment and/or to increase users' performance on computer-related tasks.

- Based on the results of the other objective of the study, if experience-difference has an impact on computer anxiety and/or performance of users in any computerized activities, I want to propose some mechanisms to solve this problem by the concerned body.
- By identifying the perceived causes of computer anxiety that are indicated by the subjects, this study can serve as a starting point to conduct a number of studies.

Therefore, based on the results of this study, individuals who are whether students in different colleges or employees in different organizations are benefited since, at this time, all activities are directly or indirectly linked with the application of computer. For instance, researchers and students usually use computer for searching a number of concepts in their field of study and to update their previously acquired knowledge.

#### ***1.4. Delimitation of the Study***

The major intention of this study was to investigate whether or not there is gender- and experience-difference on computer anxiety among college students in Dessie, a city about 400 Km north of Addis Ababa. Together with this, the perceptions of students for the causes of the computer anxiety were going to be discovered. Although the study would include different individuals from different colleges, the study was delimited to the selected colleges in Dessie out of the many in Ethiopia due to financial and time constraints.

### ***1.5. Limitation of the Study***

The absence of adequate written materials and research works especially regarding the relationships of gender- and experience-differences towards computer anxiety in our campus restricted the researcher to justify his study in terms of some theoretical explanations of the study in Ethiopian context. The other limitation of the study lies on the analysis part, that is, the number of students of Information and Communication Technology in Admass College of Dessie Branch is small, due to this the researcher is unable to include type of college (whether private or government) as factor in examining computer anxiety.

### ***1.6. Operational Definitions***

***Computer Anxiety:*** is a fear and apprehension or hesitation to specific computer-related situations.

***Computer Experience:*** is the process of acquiring computer knowledge or skill over a period of time by taking a number of computer courses.

***Highly experienced individual:*** is an individual who has taken at least eight computer courses at college level.

***Less experienced individual:*** is an individual who has taken three or less computer courses at college level.

***Perception:*** is the view or opinion towards computer and computer-related activities.

## *2. Review of Related Literature*

This section presents a critical assessment of empirical findings of previous research on computer anxiety. That is, differences of gender and experience towards computer anxiety and other related topics are discussed in this part. The review will initially deal with the existence of computer anxiety and then the effects of gender and experience towards computer anxiety with factors that affect computer anxiety. In short, this section contains the topics: prevalence of computer anxiety, types of computer anxiety, gender and levels of computer anxiety, experience and computer anxiety, other correlates of computer anxiety, and summary.

### *2.1. Prevalence of Computer Anxiety*

After all, today, computer is part of everyday life, and nowhere is that more the case than with high school and college students (Gos, 1996). Computer interaction will be, or already is, an integral part of most academic majors (Rosen, Sears, and Weil, in Gos, 1996).

At any time somebody can raise a question on the existence of computer anxiety. That is, “*Does computer anxiety exist?*” To answer this question, over the years, researchers have formulated many definitions of computer anxiety as:

*“Computer anxiety is the irrational anticipation of fear evoked by the thought of using (or actually using) computers, the effects of which results in avoiding or minimizing computer usage”* (Brosnan, in Joiner *et al.*, 2005).

*“Computer anxiety is the complex emotional reactions that are evoked in individuals who interpret computers as personally threatening.”* (Raub, in Morgan, 1997)

Similarly, Maurer (in Maurer and Simonson, 1993/94) developed a definition for computer anxiety as: *“the fear and apprehension felt by utilizing computer technology, or when actually using computer technology.”*

Much interest has been exhibited in the literature to date relating to the effect of computers on students. In particular, the construct of computer anxiety and its measurement has received considerable attention (Miller and Rainer, 1995; Szajna, 1994, Harrison and Rainer, 1992). This interest has encompassed studies of correlates of computer anxiety, including the relationship of computer anxiety to prior experience (Bradley and Russell, 1997; Gos, 1996; Lui and Michael, 1992; Lee, 1986; and Johnson and White, 1980), and gender (McGerty, 2000; Odell *et al.*, 2000; Shaw and Gant, 2002; Sherman *et al.*, 2000; Weiser, 2000; and Harris and Grandgenett, 1996). To strengthen this idea, Bandalos and Benson (cited in King, 1994/95) concluded that computer anxiety is a multidimensional construct with highly correlated factors such as math, age, gender, academic major, and specially, experience.

One past research by Bradley and Russell (1997) has shown computer anxiety to be present in a sizable minority of school teachers, and has identified some of the personal and school-based correlates of this anxiety. Similarly, Hakkinen (1994/95) conducted a research on 29 education students to investigate the changes in computer anxiety, attitudes toward students after their participation in a basic course in computer science. The results of her study indicate that, all other things being constant, the computer science course reduced anxiety.

As cited in Hakkinen (1994/95), a number of researchers (for instance, Harrington, McElroy and Marcoulides) reported that computer revolution has not been universally accepted because many people resist the use of computers. Their resistance may emanate from a lack of computer knowledge or a more generalized fear of computers and technology. Computer anxiety interferes with the communicative nature of human-computer interaction and can be seen as a specific form of anxiety (Hakkinen, 1994/95).

Hakkinen (1994/95) also compared anxiety to that of phobia, that is, for her, phobia is an uncontrollably fearful response to an object or situation while anxiety, on the other hand, is the result of psychological stress and it consists of two parts, trait anxiety (a relatively stable condition and is personality related) and state anxiety (which is situational and it results directly from some stress-producing situation during the period of time). In addition to this, she indicated that computer users compare

themselves to other users, and this also creates pressure. By referring other researchers, Hakkinen differentiate computer phobia from computer anxiety as: computer phobia is a resistance to talking about computers or even thinking about them, fear or anxiety toward computers, and hostile or aggressive thoughts about computers, whereas computer anxiety is a fear or a prejudice that appears when one is using computer technology or when one is thinking about the consequences of its use. As Hakkinen (1994/95), a person gets anxious about computer use even though the computer itself is not threatening. That is, the term “computer anxiety” has been used to describe the hesitation and fear that is typical of people who are unfamiliar with computers.

People’s attitudes to computers have been investigated extensively. A meta-analysis and review of 81 research studies by Rosen and Maguire (cited in Bradley and Russell, 1997) concluded that a small proportion (less than 10%) of people appear to suffer severe computer anxiety including the physical reactions indicative of an acute anxiety disorder, whilst an additional 20-30% of people display some wariness, discomfort and/or mild anxiety in relation to computers.

According to Dorinina (1995), persons who have technocratic approach give rise to technophobia and false notions that computerization itself is inhumane, and it produces a negative attitude towards computers themselves. For Dorinina, one of the consequences of the technocratic approach to computerization, this still dominates in society and in the consciousness of potential users, is that it induces emotional and

psychological discomfort when one interacts with a computer techno-stress, fear of computer, puts up a barrier that keeps “non-professionals” away from computer capabilities.

According to Vasiliuk (cited in Dorinina, 1995), in a state of computer anxiety, a person’s behavior is characterized by excessive timidity in using computers, negative comments against computers and information science, attempts to reduce the amount of time spent using computers, and even the avoidance of computers in the places where they are located.

As cited in Harris and Grandgenett (1996), computer anxiety is an example of a concept-specific anxiety; anxiousness that regularly occurs in a specific type of situation (Oetting). Although there is no general agreement upon an exact definition of computer anxiety, its presence in educational research literature implies that there is tacit agreement as to its existence (Jones and Wall, cited in Harris and Grandgenett, 1996).

From this brief review, one can easily see the existence of computer anxiety.

## ***2.2. Types of Computer Anxiety***

Once the existence of computer anxiety is discussed, the other major thing to be discussed is: *What are the types of computer anxiety?* To show this, a number of researchers conducted different studies and reviewed concepts in relation to types of computer

anxiety. From these researchers, Dorinina (1995) reported the different types of computer anxiety as follow:

- the first type of computer anxiety is related to the person's fear that he/she might wreck or break something; his/her feeling of ignorance or ineptness; his/her fear of technology and mathematics; fear about his/her health; fear about anything new and unfamiliar; the sense of threat to his/her intellectual self-assessment, as manifested in mistrust of, or too much trust in, computers; and a feeling of having too little time.
- the second type of computer anxiety was linked subjectively to innovation troubles. The subjects stated that the computer, like anything new, does not come easily; the unfamiliar terminology is intimidating, as are the quantity of new information and the difficulty of linking the newly acquired knowledge with previous experience, and so forth. Computer anxiety of this type was most often reported by older persons who were undergoing retaining, although difficulties in assimilating the new information and language were also reported by younger users, but these were less important and less painful.
- the other type of computer anxiety is one that can be characterized as "time panic," the feeling that it is impossible to understand and remember everything and solve the task in the allotted time. The state of panic is manifested especially when there is a control assignment that has to be completed in a certain amount of time.
- a feeling of the intellectual superiority of computers represents another kind of dissonance when interacting with a machine that relates to characteristics of new

information technologies. Today, people are worried about two factors: a considerable concentration for information in one medium and the unprecedented rapid means of manipulating knowledge. The intellectual barrier is linked to the computer's specific image and does not arise for all users. This type of computer anxiety is manifested in the person's desire to trust implicitly the entire computer's advice—or, conversely, to protest against that which is incomprehensible. The person thinks that the computer has defeated him/her intellectually and that he/she might as well give up thinking independently.

- another type of computer anxiety is linked to the fact that working on the computer might lead to the deteriorating health due to the radiation from the monitors. This type of computer anxiety is very often manifested indirectly, as it were—the person's own anxiety is suppressed and shifted to others. Parents, teachers, and educators do not want to seat children in front of computers, and they justify their anxiety by reference to the issue of harmfulness.

Although several types of computer anxiety are singled-out, it should be pointed out that, generally, one type of anxiety predominates, while the others accompany and aggravate the state of discomfort.

### ***2.3. Gender and Computer Anxiety***

Educators and students are encouraged to teach and learn through online courses, communicate electronically, and generate and collect information by accessing list servers (Li, Kirkup, and Hodgson, 2001). Thus, the use of the computer, in general, and the

internet, in particular, for teaching and learning purposes in higher education seems potentially boundless and unproblematic. However, there are some problems that remain unanswered. From these problems, I would like to examine whether the gender issues of the "real world" are non-existent on computer anxiety. That is, "*is there any significant gender difference in computer anxiety?*" is one of the major issues to be discussed in this study.

Although most researches are quick to point out that the evidence for specific gender difference in computer cognitions and usage is conflicting and inconclusive, a widespread belief that computers are male-biased technologies still persists (Morahan-Martin, in Shaw and Gant, 2002)

Computer anxiety has long been found to be negatively related to computer use and attitudes towards computers, with females, generally reporting higher levels of computer anxiety than males (Chua, Chen, and Wong, in Joiner *et al.*, 2005)

A number of researches (for example, Shaw and Gant, 2002; Sherman *et al.*, 2000) indicated the existence of a gender gap in computer use. Several studies reported that men spend much more time online than women and that both sexes use the internet for different purposes. It was found that females use the internet more to look things up and e-mail. Males use the internet more to follow the news, visit newsgroups, listen to and copy music, play online videogames, and visit pornographic sites (Odell, *et al.*, 2000;

Sherman *et al.*, 2000; and Weiser, 2000). In addition to this, Weiser summarized his findings by saying that males use the internet mostly as a leisure time activity and for recreation, while women use it more for interpersonal communication.

According to Shaw and Gant (2002), a more consistent pattern that has emerged in internet research shows that males and females use the internet for different purposes. That is, internet use is generally broken down into three components or motives: communication, information gathering, and entertainment. Females are most commonly associated with the communication motive (Weiser, 2000; Shaw and Gant, 2002), while males are linked to the information gathering (Shaw and Gant, 2002) and entertainment motives (Weiser, 2000; Shaw and Gant, 2002; Palesh, Saltzman, and Koopman, 2004)

However, some studies discovered that male and females uses differed in the ways they accessed the internet, males accessed the internet more frequently. For example, Odell and colleagues (2000) found that, in a sample of 843 students, males used the internet for an average of 7.1 hours per week, versus 5.4 hours per week among female participants.

Similarly, as cited in Odell *et al.* (2000), Morahan-Martin and Schumacher conducted a research to compare male and female college students with respect to time spent on line and level of internet expertise. They found that a male undergraduate passes greater internet skill and spend more time on line than their female classmates (7.14 versus 3.14 hours per week).

Supporting the notion that different motivations drive males and females to log on, data show that females tend to use email more than males, whereas males report more frequently accessing the World Wide Web (Sherman *et al.*, 2000).

Sherman *et al.* (2000) conducted a research to see the internet gender gap among college students. Their study was done on 829 (69% women and 31%men) freshman and sophomore completed college students for three consecutive years (from 1997 to 1999). This study investigated the internet gender gap among college students by comparing the usage patterns and attitudes of three cohorts of students in 1997, 1998, and 1999. In addition to this, they examined longitudinal changes from 1997 to 1998 in a sub sample of their participants.

On both behavioral and attitudinal measures, the results of cross-sectional findings of Sherman *et al.* (2000) show gender difference that contradict the notion that men and women participate equally in internet activities. Furthermore, men and women seem to have different assessments of the technology, particularly in terms of how positive they regard its role in college courses importantly, the sizes of the behavioral and attitudinal general differences in the studied population do not seem to be smaller with more recent cohorts of students.

On the other hand, the data of the longitudinal findings of Sherman *et al.* (2000) show that college men and women who were first observed in 1997 changed over a year's time in

their level of participation in internet activities and their attitudes participation in internet activities and their attitudes toward technology. Students significantly increased their participation in some internet activities such as using E-mail, World Wide Web, and news groups. However, gender differences on these activities did not become smaller over time. That is, men were consistently more positive on the attitude items than women although the longitudinal comparisons did not show statistical significance.

Shaw and Gant (2002) conducted a research on 40 undergraduate students (12 males and 28 females) at the University of North Carolina at Chapel Hill to explore the gender gap in internet use. Unlike most of the studies that use e-mail as internet application, Shaw and Gant use Chatting. The result of Shaw and Gant is surprising, that is, they found the total lack of gender differences which disprove the results of a number of studies. From this result, one can conclude whether the lack of gender differences in this study reflects a rapidly narrowing gender gap among younger generations or the methodology that is used by Shaw and Gant is quite different from other researchers. That means, since chatting is clearly motivated by a desire to communicate, unlike email, which can be much more utilitarian. However, two recent studies suggest that chatting is not gendered in the way email is gendered, one found that males actually chat more than females (Sherman *et al.*, 2000), while the other found no difference (Odell *et al.*, 2000). That is, Odell *et al.* (2000), however, found little evidence (which is not statistically significant) of an overall gender gap in internet use, their results do reveal significant differences between the sexes in purposes for using the internet. That is, more female than male college students use the

internet for E-mail and also for school research but significantly more males use the internet visit sex sites, research purchases, check the news, play games, and listen to or copy music.

As cited in Li, Kirkup, and Hodgson (2001), most studies found that women are not enthusiastic about computers (Durnell, MacLeod, and Siann), less confident in computer technology, spend less time on computers (Popovich, Hyde, Zakraisk, and Blumer), and are not likely to choose a computer-related career (Meredith, Helen and Woodcock)

After conducting a research on 1058 Flemish adults, Broos (2005) discovered that women were found to be more computer anxious than men and show more negative attitudes toward computers and the internet.

Many have regarded the internet as a technological "boy toy," an electronic pathway to riches of information and entertainment that was developed by men for men (Weiser, 2000). As indicated by Weiser, data from a variety of empirical sources confirms the assertion that internet use is principally a male-dominated ritual and a statistic of numerous earlier studies found gender differences in attitudes and time spent using computers.

Zhang (2002) conducted a research on 976 individuals (296 College students and 680 industrial employees) to explore internet attitudes between these two different samples.

The result of this study indicated that female college students show more positive attitudes than male students, and male employees show more positive attitudes than female employees. Moreover, a significant difference was found in internet anxiety, which showed that males felt more comfortable with the internet than females.

As cited in Zhang (2002), Gatiker, Purlusz, and Bohmann pointed out that women spent less time on the Web, had less positive attitudes on the internet, were more concerned about privacy, and assigned more importance to communication. That is, in their model for understanding Web behavior in industrial purchasing contexts, demographic characteristics were assumed processing, purchasing context, and Web beliefs and behavior. Similarly, Tsai, Lin, and Tsai (in Zhang, 2002) conducted a research on 753 Taiwan high school students, the result did not show statistical differences in the perceptions of the potential usefulness of the internet between male and female students and among various internet experiences. But male students reported more positive attitude, lower anxiety, and higher confidence toward the internet than female students did. Numerous empirical studies supported the assertion that internet use was primarily a male-dominated ritual (Weiser, 2000).

A meta-analysis and review of 81 research studies by Rosen and Maguire (in Bradley and Russell, 1997) suggested the existence of a slight trend for females to express more anxiety than do males.

From this brief review of literature one can easily see the inconclusive and/or the conflicting results on whether a statistically significant gender difference towards computer and computer-related activities is existed or not.

#### ***2.4. Experience and Levels of Computer Anxiety***

The question "*Does a difference in experience of computer have an impact on computer anxiety?*" is still unanswered and /or conflicting results have been published. Computer anxiety levels have been found to be better predictors of success in using computers than extent of prior computer experience (Marcoulides, in Harris and Grandgenett, 1996).

Bross (2005) conducted a research on 1058 (46% men and 54 % women) Flemish adults who were 18 years and older. The result of his study indicated a positive relationship between Information and Communication Technology (ICT) experience and ICT attitudes.

As cited in Harris and Grandgenett (1996), although computer experience alone does not eliminate computer anxiety (Rosen and Maguire), there is some evidence that computer anxiety does decrease with structured, practical computer use in educational contexts (Camber and Cook; Gilroy and Desai; and Lambert and Lenthall ) or regular computer use at home (Colley, Gale and Harris).

Hakkinen (1994/95) conducted a research to investigate the changes in computers, and feelings related to computers among 29 (25 women and 4 men) first-year students after their participation in a basic course in computer science. The results of Hakkinen indicated that under pleasant learning environment: the computer science course reduced anxiety; experience with computer equipment and the use of computers was also found to reduce anxiety; experience with computer equipment and the use of computers was also found to reduce anxiety; and if the course is related to new technology and/or on feelings related to computers, it reduced the fear of failure and the desire to escape.

As hypothesized by Bradley and Russell (1997), computer anxiety was inversely related to the quality of prior computer learning experiences and to the extent of current school support for computer usage. They also indicated that past computer experience plays an important role in the development of competencies and attitudes.

Rosen and Maguire (in Bradley and Russell, 1997), in a report of a meta analysis and review of 81 research studies, indicated that there is small negative correlation between prior computer experience and computer anxiety, with the extent of prior experience accounting for less than 10% of the variance in computer anxiety.

According to Broos (2005), individuals who use the computer for a longer period of time and with a higher self-perception of experience show less computer anxiety. That is, there is a positive relationship between the extent of computer use, self-perceived computer

experience, and computer anxiety attitudes on the basis of the data, it can be concluded that computer experience (the period of computer use) as well as self-perceived experience play an important role in reducing computer anxiety.

Broos (2005) also indicated that the impact of computer experience (period of computer use) works in different ways between males and females. That is, usually prior computer uses male immediately show less computer anxiety, while for females the diminution of computer anxiety starts at a later stage of computer use and the effect of the period of computer use on computer anxiety attitudes appears to take longer. In other words, men who have only recently been using a computer already become very computer confident and show less computer anxiety, while for women computer anxiety only diminishes noticeably when they have been using a computer for one year.

Moreover, for self-perceived computer experience, the effect on computer anxiety differs for men and women. That is, men who perceive themselves as being ahead of others and that come to computer experience show less computer anxiety than men who see themselves as being behind or at the same stage as others. But for females, there is almost no difference between those who perceive themselves as being ahead of others and those who see themselves as being behind others. In short, self-perception of computer experience seems not to have much effect on computer anxiety in women whereas for men self-perception of computer experience has a positive influence on decreasing computer anxiety.

## ***2.5. Other Correlates of Computer Anxiety***

According to Russell and Bradley (1996), people may be apprehensive about machines, in general, and new information technology or computer, in particular, for a number of reasons. That is, they may fear that the technology will outsmart them, control them, displace them, destroy their environment, and/or make their future uncertain.

The report of Bradley and Russell (1997) also indicated that significant negative correlations were obtained between computer anxiety and the four variables: quality of the respondent's major learning experience in relation to computers, comfort with new technology, mechanical ability, and preference for a 'high technology' holiday. From this, one can easily deduct, the four variables can be the causes of or factors that affect computer anxiety. In addition to this, for Bradley and Russell (1997), the major sources of computer anxiety were "getting stuck and not knowing what to do next" and "not understanding the computer jargon and messages it gives". This suggests that, as these factors are the major sources of computer anxiety, and that strategies aimed at anxiety reduction should be targeted at these factors.

As indicated in Shaw and Gant (2002), researchers tend to predict that males and females will differ fundamentally in the ways that men will be more comfortable with and less anxious about internet and/or computer technology. They have proposed a variety of explanations for these predictions, often focusing on technophobia—the idea that females are more afraid of technology and therefore slower to adapt to technological

advances—and the enduring male bias in computer technology in general (for example, computer game designers targeting their products primarily towards males), which might deter females from exploring and embracing the internet.

Similarly, according to Sherman *et al.* (2000), an important aspect of students' experiences with technology in college courses is the sex of the instructor and the model the instructor provides for dealing with technology. Cole (cited in Sherman *et al.*, 2000) asked undergraduate men and women to indicate the gender of “the person who was most influential in getting me to use computers and the internet.” Nearly all of the men, 83%, indicated a male was their greatest influence, whereas only 47% of the women did. The majority of women respondents (53%) identified a woman as having the greatest influence on them to go online. Thus, it may be that women in internet-oriented or computer-related courses taught by male instructors are not as likely to see the technology as personally relevant compared to women in courses where the instructor is female. In short, role model can be one of the causes of computer anxiety.

One apparent commonality between cultures is the tendency for a gender split with respect to usage and attitude patterns. That is, women have been reported to engage in “computer-related” behavior less frequently than do men (Palesh, Saltzman, and Koopman, 2004). Moreover, culture plays a very important role in influencing the ways people think about, feel about, and view new technology (Li, Kirkup, and Hodgson, 2001). Li, Kirkup, and Hodgson also said, in different cultures (for instance, in China and

United Kingdom), people might have different perceptions and uses of computers. Thus, culture is one of the causes for computer anxiety.

As indicated in the findings of Odell *et al.* (2000), access to a computer affects time spent online or using a computer. That is, students who own a personal computer spend more time using the computer and/or the internet than those who have to use either friend's computers or the school's facilities to get online. This, in turn, affects one's computer anxiety. Thus, access of the computer is one of the causes for computer anxiety.

The perception of women is also one of the causes of computer anxiety. That is, many women simply may consider the internet to be a threatening place, which means, pornography, online sexual harassment, "flaming," and other malevolent aspects of the internet potentially lurk behind each click of the mouse (Shade, in Weiser, 2000).

As cited in Teo and Lim (1996), factors influencing personal computer usage include perceived usefulness, subjective norms and behavioral intentions (Davis, Bagozzi, and Warshaw), perceived fun (Igarria, Schiffman, and Wieckowski), voluntariness, relative advantage, image, compatibility, trial ability, result demonstrability and visibility (Moore and Benbasat; and Rogers), complexity, job fit, long-term consequences, affect, social factors and facilitating conditions (Thompson, Higgins, and Howell), and self-efficacy (Igarria and Iivari).

According to Mayers and Halpin (2002), lack of confidence to pursue a task on their own and lack of motivation and/or prior experience are the causes for computer anxiety.

## ***2.6. Summary***

Today, computer is an integral part of peoples' everyday life. That is, computer and/or internet is used to access information by both educators and researchers to facilitate the teaching-learning activity and to conduct research; and serves as a marketing tool, a conduit of information, a means of communication, a forum for debate, a facilitator of social interaction, and a source of entertainment for most people around the world.

Although there may be agreement as to the usefulness of computers and/or internet for both individuals, there are some differences in perceptions of whether computers are easy to use or not. This, in turn, directs a number of individuals to conduct a research on gender differences and/or impact of prior experience towards computer anxiety.

A number of studies indicated that there is a statistical significant gender difference in computer anxiety. That is, women or females show more anxiety than men or males in different activities that use computer. On the other hand, some research results show no significant gender difference and some others studies show females are less anxious than males in some applications of computer activities.

In case of prior experience of computer, the results of studies on the impact of prior experience towards computer anxiety is inconsistent and conflicting. That is, some said the more the experience one has, the less the anxiety towards computer but others said once one get the basic skill of computer, experience has no effect on his/her level of computer anxiety in the future, whatever he/she took a number of computer courses or not.

A number of researchers forwarded the respective causes and/or sources of computer anxiety. Some of the causes of computer anxiety are: role model, culture, perception of individuals toward computer and/or internet, access of a computer, and time and financial constraints.

### *3. Design of the Study*

#### *3.1. Participants*

A pilot study, the objectives of which were to test and improve the instrument and to create working relationships in the study site, was carried out on 30 students of Information and Communication Technology (ICT) students. The subjects were randomly selected from Dessie College of Business and Management.

The reasons for selecting the study site (Dessie) in relation to computer anxiety were: (i) on the basis of the researcher's experience and observations, the problem is not sufficiently studied in Dessie but its effect is seen in students of Information and Communication Technology students; and (ii) the researcher's good relationship with the community and administrators of the colleges in the study area also facilitates the data collection processes.

To conduct this study, the researcher planned to include about 50% of the total relevant population. The main study was conducted on a random sample of 106 students that were proportionally selected from two colleges (Admas College and Dessie College of Business and Management) in Dessie. Complete data were not available for two participants since their response to the scale was inappropriate. Thus, the samples for the main study comprised of 104 Information and Communication Technology students. Out of these, 36 (17 Females and 19 Males) were taken from Admas College whereas 68 (35

Females and 33 Males) were taken from Dessie College of Business and Management. Those students that were involved in the pilot study were not included in the main study.

To obtain the sample colleges, the main criterion was the existence of Computer Science and /or Information and Communication Technology as major in the particular colleges. Thus, out of the four colleges in Dessie, only two colleges (Admas College and Dessie College of Business and Management) have students of ICT major. To select the participants from these colleges, first I put Information and Communication Technology students of each college into four groups on the basis of gender and experience (less experienced females, less experienced males, highly experienced females, and highly experienced males), and then the names of the students were arranged alphabetically for the four groups and finally random selection was made proportionally from Admas College and Dessie College of Business and Management.

### ***3.2. Instruments***

To examine the anxiety of students towards computer, the major instruments used to gather data were questionnaire and structured interview. The questionnaire, which was used is a Liker-scale, five point scales ranging from strongly disagree (1) to strongly agree (5). The questionnaire was composed of 25 statements. From these 25 items, 19 items of self-reporting Computer Anxiety Rating Scale (CARS), that has internal-consistency reliability coefficient of .87, developed in 1987 by Heinssen, Glass, and knight (as cited in Harrison and Rainer, 1992; and Miller and Rainer, 1995), were adapted

and the other 6 items were developed by the researcher based on his readings and observations. All the items in the questionnaire were then translated (from English into Amharic) in order to make the statements easily understandable by students.

The questionnaire was administered to students of the pilot sample and was found reliable. Item analysis was also carried out and some items were discarded. Consequently, the questionnaire for the main study comprised of 21 statements. In addition to the 21 items, nine questions were administered to all students of the main study to collect background information and to collect data that are related to perceived causes of computer anxiety. The other instrument that was used in this study was structured interview. Similar to some of the nine items, the interview, which was administered to some randomly selected students, was used to collect data that are related to the perceived causes of computer anxiety.

### ***3.3. Data Collection Procedure***

In the pilot study, only the questionnaire was administered. The questionnaire was conducted in the students' free time (outside the class hours). This was done not only to check whether or not the items are ambiguous but also to see their correlation and reliability.

In the main study, both the questionnaire and the interview were administered consecutively. Similar to the pilot study, both administrations of the questionnaire and the interview were conducted in the free time of the students (outside the class hours).

The questionnaires and the interview were administered by the investigator. There was no time limit to fill the questionnaire.

### ***3.4. Data Analysis***

Computer anxiety as a dependent variable, two independent variables (gender and experience) were included in this study. To analyze and interpret the data, both descriptive and inferential statistics were used. Mean, standard deviation, Pearson product moment correlation, and percentage were used to see the gender- and experience-difference of Information and Communication Technology students towards computer anxiety and to analyze students' response that are related to the perceived causes of the anxiety. Since, this study consisted of two levels of gender (Females and Male) and two levels of experience (Less experience and High experience ) as independent variables and one dependent variable (computer anxiety), two-way analysis of variance (ANOVA) was employed to see how gender- and experience-difference related to computer anxiety.

## ***4. Results***

The data that were collected after administering one of the major instruments, the questionnaire, to the samples of the pilot study were analyzed by using Pearson Product Moment Correlation ( $r$ ). Thus, the items that have observed value of  $r$  less than the tabled value (the critical value) for the appropriate level of significance (0.05 in two-tailed test) and degree of freedom ( $N-2$ ), and that have relatively low variance were discarded. The Chronbach alpha reliability index of the items that were selected was 0.86.

The results of the main study are presented in the following pattern: the anxiety of college students towards computer and the students' opinion or perceptions towards the causes of computer anxiety.

### ***4.1. Computer Anxiety***

The research questions handled in this section are: (i) *What is the level of computer anxiety shown by college students in Dessie?* (ii) *Is there a statistically significant gender difference in computer anxiety?* and (iii) *Does a difference in experience have an impact on computer anxiety?* . The dependent variable was computer anxiety and ANOVA was performed by using gender and experience as independent variables. The following table (Table 1) shows the number of participants ( $n$ ), means, and standard deviations (Sd) of students' computer anxiety in both Admas College and Dessie College of Business and Management.

**Table 1**  
**Results of Computer Anxiety Assessment**

<i>Institution</i>	<i>Mean*</i>	<i>Sd</i>	<i>N</i>
<i>Admas College of Dessie Branch</i>	86.11	6.79	36
<i>Dessie College of Business and Management</i>	88.07	6.06	68
<i>Both Colleges</i>	87.39	6.36	104

\* *The maximum possible score is 105.*

As shown in *Table 1*, there is a considerable computer anxiety among Information and Communication Technology students of the two colleges.

Just to indicate the results more specifically, a table showing detailed information is provided below (See *Table 2* below).

**Table 2**  
**Number of Participants, Means, and Standard Deviations for Students' Computer Anxiety by Levels of Gender and Experience**

<i>Institutions</i>	<i>Gender</i>	<i>Experience</i>					
		<i>Less Experienced</i>			<i>Highly Experienced</i>		
		<i>N</i>	<i>Mean</i>	<i>Sd</i>	<i>n</i>	<i>Mean</i>	<i>Sd</i>
<i>Admas College of Dessie Branch</i>	Female	7	76.57	5.97	10	85.90	4.63
	Males	7	87.57	4.08	12	91.00	3.93
<i>Dessie College of Business and Management</i>	Female	19	82.42	4.79	16	89.63	5.25
	Males	19	88.74	3.91	14	93.07	5.24

\* *The highest possible score and the lowest possible mean score of computer anxiety were 105 and 21 respectively.*

\*\* *High mean score in computer anxiety indicates less anxiety towards computer.*

\*\*\* *The average number of courses that have been taken by less experienced students and highly experienced students was 3 and 10 respectively*

Computer Anxiety for all Participants

Table 3 presents the results of the analysis of variance for all participants. The table shows that the gender- and experience-difference towards computer were statistically significant.

Table 3  
Two-Way ANOVA Summary Table for All Participants

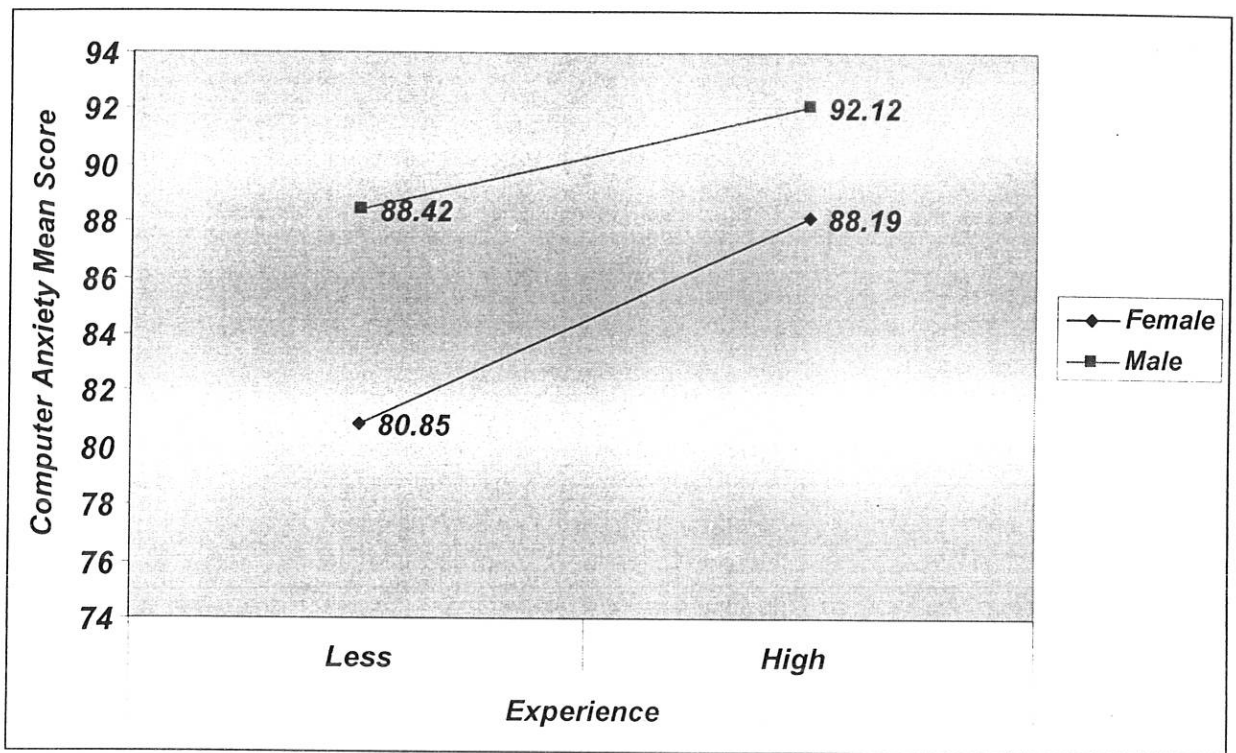
<u>Source of Variation</u>	<u>SS</u>	<u>Df</u>	<u>MS</u>	<u>F</u>
<i>Gender (G)</i>	859.63	1	859.63	35.38*
<i>Experience (E)</i>	792.01	1	792.01	32.59*
<i>GXE</i>	86.78	1	86.78	3.57**
<i>Residual</i>	2430.42	100	24.30	
<i>Total</i>	4168.84	103		

\* $P < .001$

\*\*  $P < .05$

The associations of gender, experience, and the interaction of gender and experience on the dependent variable (computer anxiety) were computed on the basis of the sums of squares in Table 3. Thus, gender, the independent variable in the ANOVA, accounts for about 20% of the variance in the dependent variable, which is computer anxiety. Similarly, about 18% of the computer anxiety accounted for by computer experience (the other independent variable). In addition to this, the interaction of gender and experience in the ANOVA accounts for about 2% of the computer anxiety.

Furthermore, the gender-by-experience interaction was statistically significant (See Figure 1).



**Figure 1: Gender-by-Experience Interaction for All Participants**

The following results show the gender differences toward computer anxiety, the impact of experience on computer anxiety, and the corresponding interaction for the sample colleges independently.

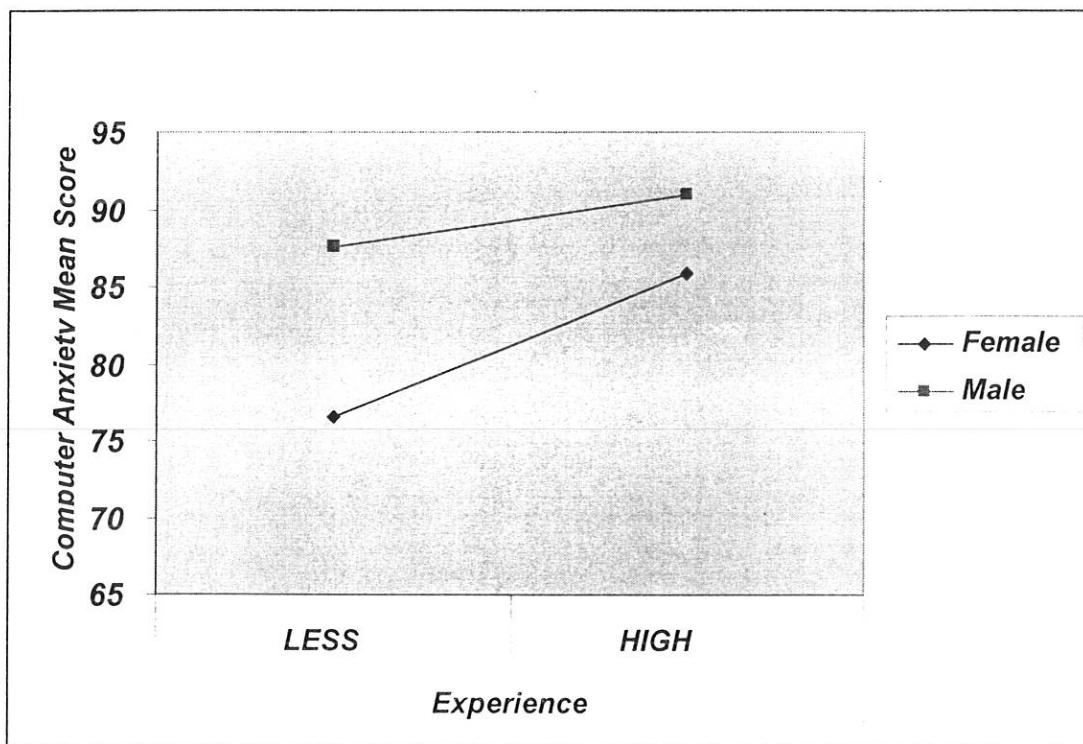
**(a) Computer Anxiety in Admas College**

Table 4 presents the results of the analysis of variance for Information and Communication Technology (ICT) students in Admas College. The table shows that the gender- and experience-difference towards computer were statistically significant.

**Table 4**  
***ANOVA Summary Table for Participants in Admas College***

<b><i>Source of Variation</i></b>	<b><i>SS</i></b>	<b><i>Df</i></b>	<b><i>MS</i></b>	<b><i>F</i></b>
<b><i>Gender (G)</i></b>	528.93	1	528.93	25.02*
<b><i>Experience (E)</i></b>	373.85	1	373.85	17.68*
<b><i>GXE</i></b>	36.44	1	36.44	1.72
<b><i>Residual</i></b>	676.33	31	21.14	
<b><i>Total</i></b>	1615.55	35		

\*  $P < .001$



***Figure 2: Gender-by-Experience Interaction for Admas College***

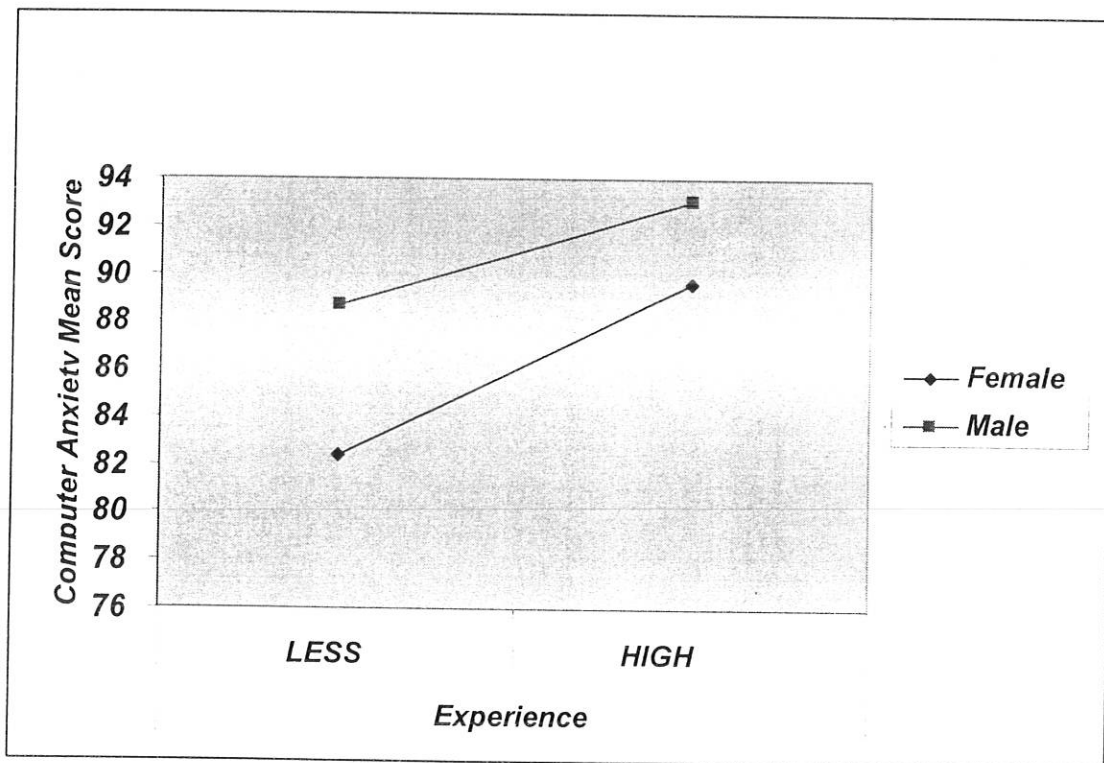
***(b) Computer Anxiety in Dessie College of Business and Management***

Table 5 presents the results of the analysis of variance for ICT students in Dessie College of Business and Management. The table shows that the gender- and experience-difference of students towards computer were statistically significant.

**Table 5**  
**ANOVA Summary Table for ICT Students in Dessie College of Business and Management**

<i>Source of Variation</i>	<i>SS</i>	<i>Df</i>	<i>MS</i>	<i>F</i>
<i>Gender (G)</i>	401.43	1	401.43	17.61*
<i>Experience (E)</i>	536.00	1	536.00	23.51*
<i>GXE</i>	66.21	1	66.21	2.90
<i>Residual</i>	1458.99	64	22.80	
<i>Total</i>	2468.63	67		

\*  $P < .001$



**Figure 3: Gender-by-Experience Interaction for ICT Students in Dessie College of Business and Management**

As shown in all Figure 1, Figure 2, and Figure 3 above, at each levels of experience, students with less experience of computer are more anxious than highly experienced students. In addition to this, the magnitude of the male-female-difference of the means of computer anxiety score was higher in less experienced students than in highly experienced students.

## 4.2. Students' Opinion for the Perceived Causes of Computer Anxiety

The other research question in this study was: *What are the perceived causes of computer anxiety?* To indicate some directions to this question, six questions were administered to all students. In addition, some students were interviewed (*See Appendix A & Appendix B*).

The following table (*Table 6*) shows the percent of interviewed students who ticked off the option(s) from the given alternatives as cause(s) or source(s) of their computer anxiety.

**Table 6**  
**Students' Response to the Causes of Computer Anxiety**

<i>Statements (about the Causes of Computer Anxiety)</i>	<i>% of Students who ticked off</i>
I feel anxious since	
1. when I practice, I deleted the program(s) of the computer.	17
2. I don't have the ability of understanding computer messages.	8
3. when I practice, I make mistakes by hitting a wrong key.	8
4. I don't know what to do next.	17
5. there is no computer lab assistance during the practice time.	83
6. I don't have time to practice computer course(s).	58
7. my instructors do not encourage to practice the computer course(s).	17
8. there is no enough computer accessories when I learn and/or practice computer course(s).	83

*N.B.* To see all the components that are included in the structured interview, see Appendix B.

The following table (*Table 7*) shows the six general items that were administered for all participants and their respective responses. To analyze the responses for these questions, percentage test was used.

***Table 7***  
***Students' Response for Questions to Show their Opinions or Views***

<b><i>Statements(Questions)</i></b>	<b><i>% of Students Responding as:</i></b>	
	<b><i>Yes</i></b>	<b><i>No</i></b>
A. Is there any problem in relation to:		
1. teaching-learning process as explanations (clarity of language, clarity of steps, ...), opportunity for asking questions, instructor's understanding or encouragement, etc?	<b><i>51</i></b>	<b><i>49</i></b>
2. time given to the computer course(s)?	<b><i>72</i></b>	<b><i>28</i></b>
3. practice time for the computer course(s)?	<b><i>36</i></b>	<b><i>64</i></b>
4. materials like computers and computer books used for the course(s)?	<b><i>23</i></b>	<b><i>77</i></b>
5. assessment method and grades obtained?	<b><i>50</i></b>	<b><i>50</i></b>
B. Do you have computer access other than the computer lab of your college?	<b><i>27</i></b>	<b><i>73</i></b>

*N.B.:* To see how these questions and others administered to all students, see *APPENDIX A*.

From *Table 6 above*, one can easily see that the absence of computer lab assistance at the time of practicing computer course(s), shortage of computer accessories, and time constraints to practice computer course(s) are the major sources of students' computer anxiety. That is, at the time of the interview, students indicated that materials like computer accessories are not enough. Due to this some courses are conducted theoretically even if the courses are more of practical. The other thing that the students raised is the problem of computer lab assistant so if the computer is failed at the time of practice they can't get any solution to continue their activities. In addition to these problems, female students reported that they do not have time to practice in the college lab as male students since in the mean time, they support their parents in different house works like cooking. And finally, students raised one major issue. That is, the numbers of students in a class is large and due to this four or more students use one computer at the time of practical computer classes. Therefore, they cannot get enough knowledge in the class.

Similarly, as shown in *Table 7*, the major problems indicated by all participants are problems related to:

- Access of computer That is, 73% of the participants reported that they have no computer access other than the computers in the colleges' computer lab.
- Time constraint for computer courses. In relation to time given to each computer course, a number of students (more than 72%) said that the time allotted to each course is inadequate.

- Teaching-learning process with regard to explanations (clarity of language, clarity of steps, and etc.), opportunity for asking questions, and instructor's understanding or encouragement. This is also the major problem that the students faced in the college. In addition to this, students of Dessie College of Business and Management reported that most of their computer instructors are foreigners due to this there is problem of communication in the teaching-learning process.
- Assessment method and grading. Here about 50% of the participants reported that there is problem in relation to assessment method and grading procedures.

In relation to practice time for computer courses and materials like computers and computer books, students who reported the existence of the problem are only 36% and 23% respectively.

## ***5. Discussion***

### ***5.1. General Level of Computer Anxiety***

Results of computer anxiety assessment of Information and Communication Technology (ICT) college students in Dessie, as indicated in *Table 1* of the result section, revealed the existence of computer anxiety. That is, while the maximum possible score for computer anxiety was 105 and the lowest possible score was 21, the mean score for all participants of ICT college students in Dessie was 87.39 (but the mean score of computer anxiety of ICT students of Admas College and ICT students of Dessie College of Business and Management were 86.11 and 88.07 respectively). In short, the evidence suggested that the ICT college students in Dessie show considerable computer anxiety.

### ***5.2. Gender- and Experience-difference in Computer Anxiety***

As indicated in the result section of this study, male students had significantly less anxiety towards computer than female students,  $F(1, 100) = 35.38, P < .001$ . This result provides an answer to the question (which asked as: *Is there a statistically significant gender difference in computer anxiety?*) That is, as shown in the result section of this study, the mean of computer anxiety scores of male students of Information and Communication Technology (mean = 90.27) is greater than the mean of computer anxiety scores of female students of Information and Communication Technology (mean = 84.52). Besides this, the result of this study revealed that about 20% of the variance in the dependent variable (computer anxiety) accounted for by gender. Other studies have found a similar general

result at college level (Sherman *et al.*, 2000; Lui and Reed, 1992; and Palesh, Saltzman, and Koopman, 2004) and at the work place (Broos, 2005; and Zhang, 2002).

An explanation for the finding (that revealed significant gender difference in favor of male students in computer anxiety) probably lies in the students' life style which discourage the education of female students. That is, most of the time females do house works like cooking in their home due to this, they have very little time to practice and to study their computer courses. On the other hand, parents freely leave their sons to practice and study different things in relation to their educational activities. That is, males as compared to females have enough time to practice and study their computer courses. From this explanation, one can see two basic things: (i) although the family background or the attitude of parents toward computer did not examine in this study, parental expectation for educational activities favors males over females. Thus, this might be one of the reason for the significant gender difference; and (ii) though the relationship of time spend on computer and computer anxiety needs further research, one may infer that students who spend little time on computer are more anxious than students who spend more time on computer. This explanation is supported by Ellen Israel Rosen (cited in Weiser, 2000).

In addition to this, the effect of role models might also be the other reason of the statistical gender difference of ICT students in computer anxiety. That is, most of the instructors of computer science courses are males so female students may consider

computer as a discipline of males. A number of researchers, for instance, Cole (cited in Sherman *et al.*, 2002), support this justification as one of the factors of the variations of males and females in computer anxiety. But to examine the effect of role models in computer anxiety, there is a need of conducting further research.

Similarly, the result of this study shows, less experienced students had significantly more computer anxiety than highly experienced students,  $F(1, 100) = 32.59, P < .001$ . This result provides answer to the other major research question (which was: *Does a difference in experience have an impact on computer anxiety?*) In other words, the mean of computer anxiety of less experienced students (mean = 84.63) is less than the mean of computer anxiety of highly experienced students (mean = 90.15). In addition to this, the result shows about 18% of the variations in computer anxiety is accounted for by computer experience of students. Consistent with this result, previous studies, for instance, Hakkinen (1994/95), Bradley and Russel (1997), and Hong and Koh (2002), found similar result.

The character of the initial stage of the students' interaction with the computer is a key factor in the etiology of computer anxiety. That is, training in working on computers during which this anxiety does not develop or is eliminated must meet the requirements of shaping the students' innovative readiness to take in, process, and assimilate the new information and master the necessary abilities and skills. This innovative readiness includes shaping the necessary motivational structure of activity, restructuring the

thinking process and unleashing creative components of activity, and mastering techniques of emotional-purposive regulation of the personal-situational interaction. Innovative openness can be achieved in the training by utilizing individual characteristics to perceive and interpret the present situation of interaction with a computer and linking it to previous experiences of anxiety, by making certain changes in the structure of traditional instruction, and by introducing specialized diagnostic and individually oriented training procedures.

Here, although computer anxiety can be reduced by increasing experience with computers, the first experience with computer technology have strong effects on attitudes toward computers. That is, unpleasant experiences often provoke negative attitudes, which make learning more difficult. Pleasant experiences, on the other hand, generate positive attitudes, including eagerness and a desire to learn new things, and successful experiences strengthen positive attitudes. Thus, when trying to reduce computer anxiety, it is also necessary to influence attitudes. This becomes especially important when people have computer anxiety in spite of their experience with computers, for example when they use computers in their occupation and are still anxious because of the continuing development of computer experience (students take a number of computer courses), some may lack necessary skills until they learn the requirements of new equipment or new systems. From this, one can see the previous experiences of computer have an impact on computer anxiety of Information and Communication Technology college students.

More important in the analysis of computer anxiety, however, was the trend of gender differences in computer anxiety across the levels of experience and this was enhanced by the significant gender-by-experience interaction,  $F(1, 100) = 3.57, P < .05$ . The result also shows that the interaction of gender and experience in the ANOVA accounts for about 2% of the variance in computer anxiety. That is, as indicated in the result section, at each level of experience (less experience and high experience), male ICT students had substantially higher computer anxiety mean score than their female counterparts. In other words, the difference in computer anxiety depends on the degree or level of experience.

In addition to this, the magnitude of the male-female students' mean difference of computer anxiety scores was higher in less experienced students than in highly experienced students. That is, the mean difference of computer anxiety scores of less experienced male students (mean = 88.42) and mean of computer anxiety scores of less experienced female students (mean = 80.85) is greater than the mean difference of computer anxiety scores of highly experienced male students (mean = 92.12) and mean of computer anxiety scores of highly experienced female students (mean = 88.19). In short, the male-female mean difference in computer anxiety scores for less experienced students is 7.57, whereas the male-female mean difference in computer anxiety scores for highly experienced students is 3.93.

When gender differences in computer anxiety and the impact of experience on computer anxiety examined for each sample college, the result of both Admas College and Dessie

College of Business and Management shows a statistically significant difference. The other thing that one can easily see in *Table 1* of the result section was the variation of mean scores of computer anxiety of students in Admas College and in Dessie College of Business and Management. An explanation for this variation probably lies in the students' entrance criteria to private- and/or government-colleges and universities in Ethiopia. That is, in Ethiopia, most of the higher achievers from all students that can fulfill the entrance criteria are entered in government colleges. Due to the limited number of ICT students in Admass College, the researcher failed to compare ICT students' computer anxiety of the two colleges by considering type of college as factor. To examine whether or not the type of college really has an impact on computer anxiety, there is a need of conducting further research.

### ***5.3. Perceived Causes of Computer Anxiety***

The major problems, as indicated by college students of Information and Communication Technology, are related to: access of computers and/or computer accessories, time given to computer courses, teaching-learning process, and assessment method and grading. Although the items that are administered to all students of Information and Communication are somewhat general, the students' responses for these items give some hint for indicating the perceived causes of computer anxiety in educational institutions.

If students have their own computer (or access to get computer at any time), they can daily practice and improve their Information and Communication Technology skill. By

improving students' skill, one can probably increase students' interest and/or attitude toward computer and computer related activities, and its end is a decrease in computer anxiety. For Information and Communication Technology students the computer is not a luxury item; rather, it is a necessity. This explanation is supported by previous researchers. For instance, Odell *et al.* (2000), support this by saying, access to a computer affects one's time spent in using a computer. That is, the more one uses a computer (practices a computer course), the more he/she knows the computer (or the more he/she is familiar to the computer) and the less the anxiety he/she has towards computer. Therefore, problems in relation to access of computer and time (time to cover computer courses and to practice the computer courses) can be the causes of computer anxiety.

The other major problem as indicated by students is problems related to teaching-learning process. In relation to this, a number of researchers, for instance Desai (2000) and Dupin-Bryant (2002), noted that to decrease anxiety, instructors should create comfortable learning environment. Some of the mechanisms to decrease computer anxiety are: starting the lessons with basic concepts, that is, instructors should avoid jumping into complicated computer concepts without laying the groundwork for basic computer operation even if students will have a variety skill levels; avoiding the use of computer jargon, which means learning to use computer is hard enough without the added distraction of listening to an instructor speak in a foreign dialect; and also instructors can help reduce computer anxiety by familiarizing students with computers and making them active learners. That is, instructors should help students with problems by providing verbal guidance or by

using another computer for demonstration, and they should try to avoid grabbing a student's mouse or keyboard and leave the students to do their work for them.

In addition to this, in view of the aforementioned challenges underlying learning and performance of computer applications, the traditional classroom lecture, discussion and demonstrations alone are not sufficient in transferring the computer abilities and skills. What occurs here is a transformation of individual skill development from a no technology or low technology to a high technology level. The question then is, given the prior findings that a high level of anxiety inhibits computer ability and performance, how can individuals' anxiety be reduced and motivation towards this major change enhanced? For this, the Force Field Analysis of learning computer skills proposed by Lewin (cited in Desai, 2000) can help to understand and influence the propensity to change in the individual. According to the Force Field Analysis, the strength of various positive and negative forces that influence change in reducing anxiety and increasing the propensity to learn and perform, will determine the effective implementation of the desired change. Thus, the positive forces or drivers such as course orientation, providing required computer courses, acquiring new skills, and grade incentives (tests and the like) should be strengthened and the negative forces or barriers like lack of prior exposure, fear of failure, test taking time constraint, and task complexity and/or task demand should be reduced, reducing the barriers being more effective. Therefore, instructors should target on these factors to reduce computer anxiety.

Though the relationship between computer anxiety and performance of students was not examined in this study, previous studies (for instance, Johnson and White, 1980) have indicated that anxiety can be a source of interference in the completion of computerized tests and/or the performance of users in computer based tasks. That is, the effect of anxiety may be reflected on the performance of students in computer courses. The data in the present study indicated the existence of computer anxiety in ICT students. Therefore, instructors of computer courses should target on mechanisms that reduce computer anxiety among students including the transparency and visibility of their assessment and grading procedures.

From the data of the structured interview (*Table 6*), the major sources of computer anxiety for Information and Communication Technology students in Dessie are: the absence of computer lab assistance at the time of practicing computer course(s), shortage of computer accessories when they learn and/or practice computer course(s), and time constraint that females faced to practice their computer course(s). As these are the major causes of computer anxiety, strategies aimed at anxiety reduction should be developed.

## ***6. Summary, Conclusion and Recommendation***

The objectives of this study were to assess the level of computer anxiety shown by college students in Dessie, to examine gender- and experience-difference towards computer anxiety, and to explain some of the perceived causes of the anxiety based on the students' perception. Accordingly, the following specific questions were formulated for investigation:

1. What is the level of computer anxiety shown by college students in Dessie?
2. Is there a statistically significant gender difference in computer anxiety?
3. Does a difference in experience have an impact on computer anxiety?
4. What are the perceived causes of computer anxiety?

There were four colleges in Dessie. Out of these, two of them were selected since Information and Communication Technology as major was existed in these colleges. From these colleges, 104 male- and female-students were randomly selected from the two colleges proportionally on the basis of their experience.

Two instruments, questionnaire and structured interview, were used to collect data. The analyses disclosed that there were statistically significant gender- and experience-differences in computer anxiety among college students in Dessei. That is, for the case of gender differences toward computer anxiety, the results were in favor of male students.

Similarly, for the case of the impact of experience on computer anxiety, the result was in favor of highly experienced students. In other words, male students were less anxious than female students; and highly experienced male- and/or female-students were less anxious than the corresponding less experienced male- and/or female-students. However, the magnitude of the male-female-difference of the adjusted means of computer anxiety was found to decrease with levels of experience.

Moreover, analysis of the responses to the items that related to the perceived causes of computer anxiety, in the view or opinion of students, revealed that the major problems are related to: access of computer and availability of computer accessories, time constraints to learn and/or practice computer courses, teaching-learning process, and assessment method and grading.

The mass development of computerization is causing psychologists to realize the necessity of analyzing not only the positive but also the negative aspects of the interaction of humans and computers. Computer anxiety is one negative phenomenon that substantially reduces the effectiveness of mastering and using computers. It is an indicator of the subjective uneasiness of the situation of personal-situational interaction; its development is conditioned by actualizing previous experiences of anxiety and, accordingly it has individual features. A psychological analysis of individual characteristics of computer anxiety makes it possible to single out the components of the

interaction situation that constitute stress-producing and frustrating factors, and to determine methods and individual ways to cure the fear of computers.

The present finding seems to have practical implications to computer and/or computer related education and to conduct further research. These implications include the need to:

- improve students' attitude towards computer by reducing computer anxiety. To this effect, it would be advisable for institutions and/or instructors to focus not only on the cognitive aspects of the discipline (computer science or Information and Communication Technology) but also with the affective domain like creating favorable learning environment and improving the assessment and grading procedures to reduce computer anxiety. Moreover, there are a number of mechanisms to reduce computer anxiety. Some of these are: increasing computer-based trainings, enhancing computer competence, increasing computer confidence, and improving computer perception.
- conduct further research to examine the existence of gender differences in computer anxiety and the impact of experience on computer anxiety at different levels of education. In doing this, one can include other variables such as age, college type, ownership of computers, role models, method of teaching and the like to determine the variation in computer anxiety of males and females and to identify mechanisms in reducing computer anxiety.

Finally, I also recommend the following:

- i. Instructors of computer should get different courses that are related to science of teaching (pedagogy) like measurement and evaluation, general methodology, subject methodology, and etc. By this, instructors can improve their session of computer courses by creating comfortable learning environment and encouraging students to reduce computer anxiety.
- ii. The motivation of female Information and Communication Technology students towards computer should be increased by using different mechanisms like providing frequent counseling. By this, the gap between male students and female students in education (particularly in computer and/or computer related disciplines) can be reduced.
- iii. Students should get ample materials like computer books, computers and/or computer accessories at the time of learning and/or practicing the computer course(s) in their institution.
- iv. Institutions should motivate researchers who want to conduct research on reducing computer anxiety by considering different factors like culture, age, school type/college type, and etc. in relation to computer anxiety.

## References

- Bernt, F. M. and Bugbee, A. C. (1990). Factors influencing student resistance to computer administered testing. *Journal of Research on Computing in Education*, 22(1), 265-275. [Available: <http://search.epnet.com>].
- Bradley, G. and Russel, G. (1997). Computer experience, school support and computer anxieties. *Educational Psychology*, 17(3), 267-285.
- Broos, A. (2005). Gender and information and communication technologies (ICT) anxiety: Male self-assurance and female hesitation. *CyberPsychology and Behavior*, 8(1), 21-31. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Desai, M. S. (2000). Computer anxiety and performance: An application of a change model in a pedagogical setting. *Journal of Instructional Psychology*, 28(3), 141-149.
- Dorinina, O. V. (1995). Fear of computers. *Russian Social Science Review*, 36(4), 79-95. [Available: <http://search.epnet.com>].
- Dupin-Bryant, P. (2002). Reducing computer anxiety in adults learning to use microcomputers. *Journal of Extension*, 4(5), <http://www.joe.org/joe/2002october/tt3.shtml>. Retrieved on 18 November 2004 03:25:44.
- Gos, M. W. (1996). Computer anxiety and computer experience: A new look at an old relationship. *Clearing House*, 69(5), 271-276. [Available: <http://search.epnet.com>].

- Hakkinen, P. (1994/95). Changes in computer anxiety in a required computer course. *Journal of Research on Computing in Education*, 27(2), 141-153. [Available: <http://search.epnet.com>].
- Harris, J. B. and Grandgenett, N. (1996). Correlates among teachers' anxieties, demographics, and telecomputing activity. *Journal of Research on Computing in Education*, 28(3), 300-317. [Available: <http://search.epnet.com>].
- Harrison, A. W. and Rainer, R. K. (1992). An examination of the factor structures and concurrent validities for the computer attitude scale, the computer anxiety rating scale, and the computer self-efficacy scale. *Educational and Psychological Measurement*, 52, 735-745.
- Henry, J. W. (1994). Resistance to computer-based technology in the workplace. *Executive Development*, 7(1), 20-23. [Available: [www.emeraldinsight.com/login](http://www.emeraldinsight.com/login)].
- Hong, K. and Koh, C. (2002). Computer anxiety and attitudes toward computers among rural secondary school teachers: A Malaysian perspective. *Journal of Research on Technology in Education*, 35(1), 27-48. [Available: <http://search.epnet.com>].
- Johnson, D. E. and White, C. B. (1980). Effects of training on computerized test performance in the elderly. *Journal of Applied Psychology*, 65, 357-358.
- Joiner, R., Gavin, J., Duffield, J., *et al.* (2005). Gender, internet identification, and internet anxiety: Correlates of internet use. *CyberPsychology and Behavior*, 8(4), 371-377. [Available: [www.liebertonline.com](http://www.liebertonline.com)].

- King, J. B. (1994/95). Fear or frustration? Students' attitudes toward computers and school. *Journal of Research on Computing in Education*, 27(2), 154-170. [Available: <http://search.epnet.com>].
- Lee, J. A. (1986). The effects of past computer experience on computerized aptitude test performance. *Educational and Psychological Measurement*, 46, 727-733.
- Lepper, M. R. and Gurtner, J. (1989). Children and computer: Approaching the twenty-first century. *American Psychologist*, 44 (2), 170-178.
- Li, N., Kirkup, G., and Hodgson, B. (2001). Cross-cultural comparison of women students' attitudes toward the internet and usage: China and the United Kingdom. *CyberPsychology and Behavior*, 4(3), 415-426. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Liu, M. and Reed, W. M. (1992). Teacher education students and computers: Gender, major prior computer experience, occurrence, and anxiety. *Journal of Research on Computing in Education*, 24(4), 457-467. [Available: <http://search.epnet.com>].
- Mahar, D., Henderson, R., and Deane, F. (1997). The effects of computer anxiety, state anxiety, and computer experience on users' performance of computer based tasks. *Personality and Individual Difference*, 22(5), 683-692.
- Marcoulides, G. A., Mayes, B. T., and Wiseman, R. L. (1995). Measuring computer anxiety in the work environment. *Educational and Psychological Measurement*, 55, 804-810.

- Maurer, M. M. and Simonson, M. R. (1993/94). The reduction of computer anxiety: Its relation to relaxation training, previous computer coursework, achievement, and need for cognition. *Journal of Research on Computing in Education*, 24(2), 205-219. [Available: <http://search.epnet.com>].
- Myers, J. M. and Halpin, R. (2002). Teachers' attitudes and use of multimedia technology in classroom: Constructivist-based professional development training for school districts. *Journal of Computing in Teacher Education*, 18(4), 133-140.
- McGerty, L. (2000). "Nobody lives in cyberspace": Gendered subjectivities and domestic use of the internet. *CyberPsychology and Behavior*, 3(5), 895-899. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- McInerney, V., McInerney, D. M. and Marsh, H. W. (1997). Effects of metacognitive strategy training within a cooperative group learning context on computer achievement and anxiety: An aptitude-treatment interaction study. *Journal of Educational Psychology*, 89, 686-695.
- Miller, M. D. and Rainer, R. K. (1995). Assessing and improving the dimensionality of the computer anxiety rating scale. *Educational and Psychological Measurement*, 55, 653-657.
- Morgan, A. (1997). Computer anxiety: A survey of computer training, experience, anxiety, and administrative support among teachers. <http://oas.ucok.edu/OJAS/97/T97/AMORG.HTM> Retrieved on 26 October 2004 10:54:30 GMT.

- Odell, P. M., Korgen, K. O., Schumacher, P., and Delucchi, M. (2000). Internet use among female and male college students. *CyberPsychology and Behavior*, 3(5), 855-862. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Palesh, O., Saltzman, K. and Koopman, C. (2004). Internet use and attitudes toward illicit internet use behavior in a sample of Russian college students. *CyberPsychology and Behavior*, 7(5), 553-558. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Russell, G. and Bradley, G. (1996). Computer anxiety and student teachers: Antecedent and intervention. *Asia-Pacific Journal of Teacher Education*, 24(3), 245-257. [Available: <http://search.epnet.com>].
- Shaw, L. H. and Gant, L.M. (2002). Users divided? Exploring the gender gap in internet use. *CyberPsychology and Behavior*, 5(6), 517-527. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Sherman, R. C., End, C., Kraan, E., *et al.* (2000). The internet gender gap among college students: Forgotten but not gone? *CyberPsychology and Behavior*, 3(5), 885-894. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Szajina, B. (1994). An investigation of the predictive validity of computer anxiety and computer aptitude. *Educational and Psychological Measurement*, 54 (4), 926-934.
- Teo, T. S. H. and Lim, V. K. G. (1996). Factors influencing personal computer usage: The gender gap. *Women in Management Review*, 11(8), 18-26. [Available: [www.emeraldinsight.com/login](http://www.emeraldinsight.com/login)].

- Wakshum Mekonnen (1999). Investigating the use of Internet in promoting education in the main campus of Addis Ababa University. *IER Flambeau*, 7, 81-97.
- Weiser, E. B. (2000). Gender differences in internet use patterns and internet application preferences: A two-sample comparison. *CyberPsychology and Behavior*, 3(2), 167-178. [Available: [www.liebertonline.com](http://www.liebertonline.com)].
- Whitrow (1999). Review of computer-related attitude studies and integrated computer program.  
<http://ehlt.flinders.edu.au/education/publications/THESES/WHIT99/CHAP3.HTM>  
Retrieved on 26 October 2004 09:51:00 GMT
- Zhang, Y. (2002). Comparison of internet attitudes between industrial employees and college students. *CyberPsychology and Behavior*, 5(2), 143-149. [Available: [www.liebertonline.com](http://www.liebertonline.com)].

# ***APPENDICES***

## ***APPENDIX A: Questionnaire of Computer Anxiety***

### ***a) Original Questionnaire of Computer Anxiety***

#### ***Questionnaire used to Measure Feeling of Students towards Computer***

### ***ADDIS ABABA UNIVERSITY GRADUATE PROGRAMME***

#### ***Computer Feeling Questionnaire*** (to be rated by students)

The objective of this questionnaire is to examine the feeling of students towards computer in college level. Since the success of the study highly depends on your honesty in rating the items, you are kindly requested to respond accordingly.

***Thank you.***

Code Name \_\_\_\_\_

Year \_\_\_\_\_

Semester \_\_\_\_\_

Age \_\_\_\_\_

Sex \_\_\_\_\_

Department \_\_\_\_\_

**INSTRUCTION 1:** Each of the statements in this scale expresses one's feeling towards computer. You are expected to indicate, on a five-point scale, the extent of agreement between the idea expressed in each statement and your own personal feeling. The five points are Strongly Disagree, Disagree, Undecided, Agree, and Strongly Agree. Mark (X) the point which best indicates how closely you agree or disagree with the feeling expressed in each statement as it concerns you.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. I feel apprehensive about using computers.					
2. It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key.					
3. I feel comfortable with computers.					
4. I have avoided computer since it is somewhat intimidating to me.					
5. You have to be a genius to understand all the special keys contained on most computer terminals.					
6. I think I would be able to learn a computer programming language.					
7. I like working with machines that are smarter than I am.					
8. I have avoided computer because it is unfamiliar to me.					
9. I feel content when I am working on a computer.					
10. I am afraid that if I begin to use computers I will become dependent upon them and lose some of my reasoning skills.					
11. I am confident that I can learn computer skills.					
12. I wish that computers were not as important as they are.					
13. I look forward to using a computer on my job.					
14. Learning to operate computers is like learning any new skill — the more you practice, the better you become.					
15. I experience anxiety whenever I sit in front of a computer terminal.					
16. The challenge of learning about computers is exciting.					
17. I wish that I could be as calm as others appear to be when they are using computers.					
18. I am sure that with time and practice I will be as comfortable working with computers as I am in working with a typewriter.					
19. Anyone can learn to use a computer if they are patient and motivated.					
20. I feel computer is not a necessary tool for educational and work settings.					
21. I feel that I will be able to keep up with the advances happening in the computer field.					

**INSTRUCTION 2:** Explain and/or describe your personal recollections and views for the following questions.

1. List computer courses that you took
- in your college.

---

---

- out of your college(if any).

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2. Is there any problem in relation to:

- teaching-learning process as explanations(clarity of language, clarity of steps, ...), opportunity for asking questions, instructor's understanding or encouragement, etc?

Yes  No

If your answer is yes, specify the problem.

---

---

- time given to the computer course(s)?

Yes  No

- practice time for the computer course(s)?

Yes  No

- materials like computers and computer books used for the course(s)?

Yes  No

- assessment method and grades obtained?

Yes  No

If your answer is yes, specify the problem.

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- other things (not indicated above)?

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3. Do you have computer access other than the computer lab of your college?

Yes  No

ተማሪዎች በኮምፒውተር ላይ ያላቸውን ስሜት ለማወቅ የሚረዳ መጠይቅ

# አዲስ አበባ ዩኒቨርሲቲ ድኅረ-ምረቃ መርሀ-ግብር

## በተማሪዎች የሚሞላ መጠይቅ

የዚህ መጠይቅ ዝግጅት ዋና አላማ የተማሪዎችን በኮምፒውተር ትምህርት ላይ ያላቸውን ስሜት ለመመልከት ያመች ዘንድ ነው። ጥናቱ በከፍተኛ ደረጃ በምትሰጠው/ጪው መልስ ላይ በመመርኮዝ የሚሠራ ስለሆነ መጠይቁን በፍላጎት/ሽ በመሙላት ትተባበረኝ/ትተባበሪኝ ዘንድ በትህትና አጠይቃለሁ።

## ስላደረግህልኝ/ስላደረግሽልኝ ትብብር ሁሉ በቅድሚያ አመሰግናለሁ።

ስም \_\_\_\_\_

የትምህርት ዘመን \_\_\_\_\_

ሴ.ሜስተር \_\_\_\_\_

ዕድሜ \_\_\_\_\_

ጾታ \_\_\_\_\_

የትምህርት ክፍል \_\_\_\_\_

መመሪያ አንድ

ከዚህ ቀጥሎ የቀረቡት ዐረፍተ ነገሮች ተማሪዎች በኮምፒውተር ላይ የላላቸውን ስሜት ለመመልከት የሚረዱ ናቸው ። ስለዚህ ከተሰጡት አምስት አማራጮች (በጣም አልሰማም፣ አልሰማም፣ ምንም ማለት አልቻልንም፣ እስማማለሁ እና በጣም እስማማለሁ) ውስጥ በአንተ/ቺ የግል አስተያየት የሚሰማህን በመምረጥ በዐረፍተ ነገሩ ትክክል በተሰጠው ቦታ የ "X" ምልክት አድርግ/ጊ።

	በጣም አልሰማም	አልሰማም	ምንም ማለት አልቻልንም	እስማማለሁ	ምጣም እስማማለሁ
1. ኮምፒውተር ስለመጠቀም ሳስብ ጭንቀት (ፍርሀት) ይሰማል።					
2. ኮምፒውተር በምጠቀምበት ጊዜ የተሳሳተ የኮምፒውተር አካል በመንካት ብዙ መረጃዎችን አጠፋለሁ ብዬ እሳቀቃለሁ ፡ ፡					
3. በኮምፒውተር ስሠራ ምቹት ይሠማኛል።					
4. ኮምፒውተር የማልጠቀመው ለኔ ያልተለመደ ስለሆነ ነው።					
5. እንደ ሰው ሁሉንም የኮምፒውተር አካል (ክፍል) ለመረዳት በጣም ብሩህ አዕምሮ ሊኖርህ/ሽ ይገባል።					
6. የኮምፒውተር ፕሮግራሞችን ቋንቋ መማር የምችል ይመስለል።					
7. ከኔ በላይ ሊሠሩ በሚችሉ አረፍ ማሽኖች ላይ መስራት እወዳለሁ።					
8. ኮምፒውተር የማልጠቀመው ለኔ አስፈሪ ስለሆነ ነው።					
9. በኮምፒውተር ስሠራ የተሻለ ነገር(ችሎታ፣ዕውቀት) ያለኝ ይመስለኛል።					
10. ኮምፒውተርን ለመጠቀም የሚያስፈራኝ የራሴን የማመዛዘን/የማሠብ ችሎታ የሚያሳጣኝና ጥገኛ የሚያደርገኝ ስለሚመስለኝ ነው።					
11. የኮምፒውተር ክህሎትን ለመማር እንደምችል እርግጠኛ ነኝ።					
12. ኮምፒውተሮች የሚወራላቸውን ያክል ጥቅም አይሰጡም።					
13. በወደፊት ስራዬ ላይ ኮምፒውተር የምጠቀምበትን ሁኔታ በገገጉት እጠብቃለሁ።					
14. የኮምፒውተር አጠቃቀምን መማር ሌላ አዲስ ክህሎትን እንደመማር ነው።- የበለጠ በተለማመድክ/ሽ ቁጥር የተሻለ ክህሎት ታዳብራለህ/ታዳብረያለሽ።					
15. በኮምፒውተር ቤተ-ሙከራ ውስጥ ለመስራት ስገኝ ፍራቻ ያድርብኛል።					
16. ስለኮምፒውተር መማር በጣም የሚያነቃቃ ነገር ነው።					
17. ሌሎች ኮምፒውተር ሲጠቀሙ ጸጥ ያለ ሁኔታን እንደሚያመቻቹ እኔም እነዲሁ እንዲሆንልኝ እፈልጋለሁ።					
18. ጊዜ ብስጠውና ብለማመድ በኮምፒውተር መስራት (ኮምፒውተርን መጠቀም) ልክ በታይፕራይተር እንደመስራት ቀላልና ምቹ እንደሚሆንልኝ እርግጠኛ ነኝ።					
19. ማንኛውም ሰው ትዕግስትና ተነሣሽነቱ ካለው የኮምፒውተርን አጠቃቀም መማር ይችላል።					
20. በትምህርትና በሥራ ቦታዎች ኮምፒውተር አስፈላጊ መሣሪያ አይደለም።					
21. በኮምፒውተር ላይ አዳዲስና ተጨማሪ የኮምፒውተር አጠቃቀም ስልቶች ሲመጡ ራሴን ከእነሱ ጋር ለማራመድ እጥራለሁ።					

መመሪያ ሁለት

ለሚከተሉት ጥያቄዎች የአንተን/ችን ሃሳብና አመለካከት መሰረት በማድረግ አብራራ/ሪ::

1. ሀ. በኮሌጁ ውስጥ የወሰድከው(ካቸውን)/የወሰድሽው(ሻቸውን) የኮምፒውተር ኮርስ(ኮርሶች) ጥቀስ/ሺ::

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ለ. ከኮሌጁ ውጭ የወሰድከው(ካቸው)/የወሰድሽው(ሻቸው) የኮምፒውተር ኮርስ(ኮርሶች) ካለ(ካለ) ጥቀስ/ሺ::

\_\_\_\_\_  
\_\_\_\_\_

2. ሀ. በመማር ማስተማር ሂደቱ (በገለፃ ጊዜ ለምሳሌ ከቋንቋ አጠቃቀምና የአሰራር ቅደም ተከተልን በአግባቡ ከማሳየት አንፃር፣ ጥያቄ የመጠየቅ እድል ከማግኘት አንፃር፣ መምህሩ ተማሪዎቹን ከመረዳትና ከማበረታታት አንፃር፣ ወዘተ... ) ችግር አለ?

አዎ  የለም

መልስህ/ሽ አዎ ከሆነ ችግሩን/ሮቹን ግለፅ/ጭ::

\_\_\_\_\_  
\_\_\_\_\_

ለ. በወሰድከው(ካቸው)/በወሰድሽው(ሻቸው) የኮምፒውተር ኮርስ(ኮርሶች) ላይ የጊዜ አጥረት ይታያል?

አዎ  የለም

ሐ. ለኮምፒውተር ኮርስ/ሶች በቂ የልምምድ ጊዜ ይመደባል?

አዎ  የለም

መ. በኮሌጁ ውስጥ በቂ የሆነ የመማሪያ ቁሳቁስ (ኮምፒውተር፣ የኮምፒውተር መጻሕፍት፣ ወዘተ ... ) አለ?

አዎ  የለም

ሠ. በምዘናና በግምገማ ጊዜ የሚታይ/ዩ ችግር/ሮች አሉ?

አዎ  የለም

መልስህ/ሽ አዎ ከሆነ ችግሩን/ሮቹን ግለፅ/ጭ::

\_\_\_\_\_  
\_\_\_\_\_

ረ. ከላይ ከተገለፁት ውጭ ሌሎች ችግሮች ካሉ ግለፅ/ጭ::

\_\_\_\_\_  
\_\_\_\_\_

3. ከኮሌጁ የኮምፒውተር ቤተ-መ-ከራ ውጭ የኮምፒውተር አገልግሎት በግል የማግኘት እድል አለህ/ሽ?

አዎ  የለም

## APPENDIX B: Structured Interview (ቃለ መጠይቅ)

### a) Original Structured Interview

1. ኮምፒውተር ኮርስ ስትሚር/ሪ ወይም ልምምድ ስታደርግ/ጊ ምን ያህል ትጨነቃለህ/ትጨነቁአለሽ ወይም ትሰጋለህ /ትሰጊያለሽ?  
 ፈፅሞ አልጨነቅም/አልሰጋም  በመጠኑ እጨነቃለሁ/እሰጋለሁ  
 በጣም እጨነቃለሁ/እሰጋለሁ
2. ኮምፒውተር ስትሚር/ሪ (ስትላማመድ/ጅ) መጠነኛ ወይም ከዚያ በላይ ስጋት የሚሠማህ/የሚሠማሽ ከሆነ ለምን ይመስልሃል/ይመስልሻል? (ከሚከተሉት ከአንድ በላይ መምረጥ ትችላለህ/ትችያለሽ::) ኮምፒውተር ስማር የምጨነቅበት ምክንያት :-  
 ቴክኒካል በሆነ/ኑ ኮርስ/ሶች ችሎታ ስለሌለኝ ነው  
 ልምምድ በማደርግበት ጊዜ የኮምፒውተር ፕሮግራም/ሞች አጠፋለሁ ብዬ ስለምሰጋ  
 የኮምፒውተር መመሪያዎችን የመረዳት ችግር ስላለብኝ  
 ቴክኒካል በሆነ/ኑ ኮርስ/ሶች ፍላጎት ስለሌለኝ ነው  
 ያልሆነ የኮምፒውተር አካልን በመንካት ስህተት እሠራለሁ ብዬ ስለማስብ  
 በቀጣይነት የምሠራውን ስለማላውቅ  
 ለልምምድ በተመደበው ጊዜ የኮምፒውተር ኮርስ መምህሩ ወይም ረዳት መምህሩ ባለመኖሩ  
 ለልምምድ የሚሆን ጊዜ በጣም ስለማሟያንለኝ  
 የኮምፒውተር መምህሮቹ የኮምፒውተር ኮርስ/ኮርሶቹን እንደላማመድ ስለማያበረታቱኝ  
 ኮምፒውተር ስማር (ስለማመድ) የኮምፒውተር መገጣጠሚያ እጥረት ስለሚያጋጥመኝ

*b) Translated Structured Interview*

1. When you learn or practice computer course(s), to what extent you feel anxious?

- I never feel anxious                       I feel anxious to some extent
- I feel anxious severely

2. When you learn or practice computer course(s), if you feel anxious to some extent or more, what do you think the cause(s) can be? (You can select one or more among the following alternatives.) I feel anxious since:

- I have not ability in technical course(s).
- when I practice, I delete the program(s) of the computer.
- I don't have the ability of understanding computer messages.
- I don't have interest in technical course(s).
- when I practice, I make mistakes by hitting a wrong key.
- I don't know what to do next.
- there is no computer lab assistance during the practice time.
- I don't have time to practice computer course(s).
- my instructors do not encourage to practice the computer course(s).
- there is no enough computer accessories when I learn and practice computer course(s).

***APPENDIX C: Computer Anxiety Score Distribution by Gender and Experience***

a) *Score Distribution of Computer Anxiety for Admas College Information and Communication Technology (ICT) Students*


<u>Less Experienced Students</u>		<u>Highly Experienced Students</u>	
<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>
81	88	88	92
82	89	89	87
85	79	90	89
71	92	85	87
70	89	82	92
73	87	90	86
74	89	89	93
		75	98
		85	97
		86	92
			87
			92

b) *Score Distribution of Computer Anxiety for Dessie College of Business and Management ICT Students*

<u>Less Experienced Students</u>		<u>Highly Experienced Students</u>	
<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>
77 81	90 86	88 91	103
86 84	84 86	93	95
73 86	87 91	96	96
79 82	85 88	91	90
82	89	84	90
91	80	88	91
77	90	98	90
86	96	90	88
87	84	93	103
86	94	87	93
86	92	81	95
79	91	86	95
80	90	81	85
76	91	98	89
88	92	89	

## *DECLARATION*

I undersigned declare that this thesis is my original work that has not been presented for a degree in any other university and that all sources of materials used for the thesis have been duly acknowledged.

A handwritten signature in blue ink, appearing to be 'Mulugeta Melaku', written over a horizontal line.

Mulugeta Melaku