

COMPUTER SELF EFFICACY AND COMPUTER ANXIETY OF TRAINEE TEACHERS: ISSUE OF CONCERN

Santoshi Halder¹ and Sudip Chaudhuri²

¹University of Calcutta, Kolkata India,

²Gandhi Centenary B. T. College, Habra, India

santoshi_halder@yahoo.com, chaudhurusudip@yahoo.co.in

Recent years have witnessed burgeoning interest in the use of computers as novel tools in the field of education. But practically speaking there is still the need for resolving the hidden psychological barriers of the teachers (computer anxiety, lack of computer self-efficacy etc) who are entrusted with the responsibility to use ICT in classroom. Computer self efficacy means one's perception of their computer skills about computer use. Nowadays, computers are common tools in most schools, and are being used increasingly in all subject areas. Although some teachers are enthusiastic about using computers, others are more apprehensive. Motivated by this scenario, the present study was undertaken to explore the perception of secondary school teachers of West Bengal regarding their self efficacy in relation to computer use so that to understand their psychological barriers.

Keywords: ICT, Teacher trainee, self efficacy, computer anxiety.

INTRODUCTION

Bandura (1986) defined self-efficacy as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. Compeau and Higgins (1995a) defined computer self-efficacy as “a judgment of one’s capability to use a computer”. Also, it is defined as self assessment regarding one’s computer skills (Compeau and Higgins, 1995b). Computers are common tools in most schools and are being used increasingly in all subject areas. Although some teachers are enthusiastic about using computers, others may be more apprehensive. Faculty use of technology is a critical issue in education; administrators and students are expecting faculty instruction to incorporate technology in classroom teaching-learning. Competition is demanding technologically proficient graduates for schools and colleges. Research indicates that computer self-efficacy (CSE) and computer anxiety may be

crucial determinant of who uses technology and who does not.

Research in the area of student teachers’ knowledge of and attitudes towards computers has been conducted in various contexts over the past decade or so. In studies conducted in the UK during 1987 and 1988 (Summers, 1988, 1990), a substantial minority of students (34% to 43%) admitted to negative feelings about computers. The majority had little or no experience of computer use but generally agreed that knowledge of computers was important for teachers. A comparative study conducted in Australia during 1989 yielded generally similar results (Wilson, 1990) although only 24% of students in that study reported negative feelings about computers. In a longitudinal study of computer literacy skills among students entering a US teacher education course between 1991 and 1997 (Sheffield, 1998), students were asked to rate themselves for several computer related skills. Based on these studies, it seems that student teachers regard computers as being somehow important and useful for their future careers. However, many of them appear to lack confidence in their own capacity to make effective use of computers.

An observational study conducted by Diem (1989) found that, although the students had adequate technological knowledge, lack of attention to computer use in methods courses had left them unable to effectively integrate computers into their subject areas. If, as Oliver (1994) suggested, technical competence with computers is not sufficient to ensure teachers’ success with them in the classroom, it may be that the missing ingredient is belief in the capacity to use that competence. In other words, teacher educators need to attend to the development of teachers’ beliefs in their capacity to do what is required to succeed with computers.

Gender-related differences toward the use of computers are well established. Males have traditionally dominated the use of computers and their applications in technological fields. Many researchers have attributed

this gender gap in computer use to anxiety in using computers. Research has indicated that in West Europe males on average are often found to be more experienced about computing than females, and to have more positive attitudes and self efficacy (self confidence) towards computing than females (Durnell *et al.* 2000). Overall males were more confident than females in advanced computer skills, but of similar confidence for beginning skills. The 3 elements of the self efficacy scale — beginning, advanced and file and software skills — correlated positively with each other (Durnell *et al.* 2000).

Seferoglu (2007) examined the perceptions of students in the faculty of education regarding their self efficacy in relation to computer use. Results also indicate that participants' gender is significantly related with their computer self efficacy in relation to some specific aspects. However, it was concluded that for effective use of IT, it is essential that necessary conditions and institutional support should be made available (Seferoglu, 2007).

Ray *et al.* (1999) examined three research questions that compared the attitudes of men and women about (i) the value of technology in making users more productive, (ii) the impact of computer technology on people and their work environments, and (iii) the relative comfort of men and women when using computers. Analyses of the findings indicate that, contrary to earlier studies on these issues, women reflected more positive attitudes than men on all three scales. Females held more positive attitudes than males regarding the value of computers to make users more productive. Although neither men nor women in this group reflected concern about the impact of technology on people and their work environments, women were more positive than men in this regard. Women also reflected greater comfort in using computers than men. The results carry implications for both education and profession. Educators, trainers, and managers should reexamine their behaviors as they make decisions regarding career choices, on-the-job training opportunities, and job placement. Previous indicators that men are more receptive to technology in learning and training environments appear to have changed (Ray *et al.* 1999).

A survey of education faculty revealed varying degrees of Computer Self Efficacy (CSE); out of 127 respondents, 14 had low levels of CSE; 68 were at a moderate level, and 45 self-evaluated themselves to have high CSE (Saleh 2008). The author argues that although other barriers may deter the implementation of technology in teaching, strategies and techniques for increasing CSE should be developed.

Sam *et al.* (2005) examined differences in computer anxiety, computer self efficacy, attitudes toward the

Internet and reported use of the Internet for undergraduates with different demographic variables. The findings suggest that the undergraduates had moderate computer anxiousness, medium attitudes toward the Internet, and high computer self-efficacy and used the Internet extensively for educational purposes such as doing research, downloading electronic resources and e-mail communications. This study challenges the long perceived male bias in the computer environment and supports recent studies that have identified greater gender equivalence in interest, use, and skills levels. However, there were differences in undergraduates' Internet usage levels based on the discipline of study.

A more important factor in determining computer self-efficacy could be the discipline of study and undergraduates studying computer related disciplines appeared to have higher self-efficacy towards computers and the Internet. Undergraduates who used the Internet more often may not necessarily feel more comfortable using them. Possibly, other factors such as the types of application used, the purpose for using, and individual satisfaction could also influence computer self-efficacy and computer anxiety. However, although Internet usage levels may not have any impact on computer self-efficacy, higher usage of the Internet does seem to decrease the levels of computer anxiety among the undergraduates. Undergraduates with lower computer anxiousness demonstrated more positive attitudes toward the Internet in this study (Sam *et al.* 2005).

The knowledge of secondary school teacher trainees' computer self-anxiety and self-efficacy is crucial for understanding the outcomes of the present days' teaching-learning process. Till date, not much is known regarding the computer self-anxiety and computer self-efficacy of the secondary school teachers of West Bengal. The present study was undertaken to explore the perceptions of Secondary School Teachers of West Bengal regarding their computer self-efficacy and computer anxiety in relation to computer use.

METHODOLOGY

Research Questions

1. What is the extent of computer Self-Efficacy and Computer Anxiety of trainee teachers?
2. Whether there is any influence of discipline of study on Computer Self-Efficacy and Computer Anxiety of trainee teachers?
3. Whether there is any effect of gender on Computer Self-Efficacy and Computer Anxiety of trainee teachers?

4. Whether there is any effect of residential status on Computer Self-Efficacy and Computer Anxiety of trainee teachers?

5. Irrespective of gender and discipline of study whether Computer Self-Efficacy of the trainee teachers are related with Computer Anxiety and Internet usage.

Sample

The subjects for this study were 84 in-service secondary school teachers from various parts of West Bengal who were pursuing B.Ed Programme at University of Calcutta. The demographic characteristics of the subjects are displayed in Table 1.

Research instruments

Tools Developed:

1. General Information Schedule (GIS): The first section comprised of demographic characteristics of the subjects such as age, gender, and academic discipline. The second section included information regarding internet use.

Tools adopted:

1. The Computer Self-Efficacy Scale (Murphy et al 1989).

2. Computer Anxiety Scale (Ceyhan and Namlu, 2000; Heinssen, Glass and Knight, 1987)

Matching criteria

(i) Age (30-40 years)

(ii) Only those teachers who at least have a preliminary/working knowledge of computers were taken in to consideration. Teachers who have never used computers have been excluded from the final study.

Data collection and data analysis

The data were collected from the subjects at the end of their B.Ed programme (Session 2009-2010). Data analyses (t-tests, One-Way ANOVAs and Pearson's correlations) were carried out with the help of Origin 6.1 software.

RESULT AND DISCUSSION

Based on the secondary school teacher trainees' responses to the tools in the study, they showed moderate computer anxiousness. Likewise, the trainees exhibited moderate computer self-efficacy. However, the male trainees had high computer self-efficacy and lower computer anxiety. With reference to Table 2, there were significant differences in computer anxiety levels and computer self-efficacy based on gender. Male respondents recorded significantly lower scores of self anxiety on computer self-anxiety scale than females did whereas, females recorded significantly lower scores in

computer self efficacy than males (Figure 1). Trainees from different faculties also show significant differences in their computer anxiety as well as computer self-efficacy levels (Table 3, Figure 2). Trainees from the Faculty of Science have significantly greater computer self-efficacy and lower computer anxiety than trainees from the Humanities Faculty centers. The results of one way ANOVA (Table 5) has indicated that depending on the residential status, trainee teachers exhibit significant differences in their computer self-efficacy and computer anxiety. Teacher trainees of urban origin exhibit highest computer self-efficacy and lowest computer anxiety while the reverse is true for the rural teacher trainees (Figure 5).

Since computers become a prevalent tool in our daily lives, regardless of whether one likes to use it or not, it is believed that gender would not be a factor influencing trainee teachers' computer anxiety, computer self-efficacy and attitudes toward the Internet in the near future. Thus the result of the differences in computer self efficacy and computer anxiety along gender of this study is found to be different from that reported previously. We were somewhat puzzled initially with this observation and we had to carry out further analysis of our results. It is only when it was observed that the gender biasness for computer self-efficacy disappears completely when only the trainee teachers from the faculty of Science are considered (Table 4), it appears that the gender bias observed on the total samples of our study is due to the teacher trainees of the faculty of humanities (Figure 2).

In the present study, there were differences in secondary school teacher trainees' Internet usage levels based on the faculty center. Teacher trainees from the Faculty of Science were found to use the Internet longer than those from faculties of Humanities. The present findings are consistent with a previous study by Shaw & Giaquinta where it was pointed out that the discipline of study is an important factor in determining computer self-efficacy and undergraduates studying computer related disciplines may in general have higher self-efficacy towards computers and the Internet (Shaw & Giaquinta, 2000).

Relationships between times spent on using the Internet, computer anxiety, and computer self-efficacy

Higher use of the Internet seems to decrease the levels of computer anxiety among the teacher trainees. The result shows (Table 6) that there were significant relationship between time spent in a week using the Internet and the secondary school teacher trainees' computer anxiety and computer self-efficacy. There was a significant positive correlation between time spent in a week using the Internet and computer self-efficacy.

| Samples | Category | N= 84 | Percentage (%) |
|---------------------|--------------------------------|-------|----------------|
| Gender | Male | 43 | 51.20% |
| | Female | 41 | 48.80% |
| Academic discipline | Science | 32 | 38.10% |
| | Humanities and social sciences | 52 | 61.90% |
| Residential Status | Urban | 26 | 30.95% |
| | Semi-urban | 28 | 33.33% |
| | Rural | 30 | 35.72% |

Table 1: The subjects' demographic characteristics.

| Variables | Gender | N | Mean | S.D | t-values | df | P |
|------------------------|--------|----|--------|-------|----------|----|---------|
| Computer anxiety | Male | 43 | 48.57 | 6.28 | 5.60* | 82 | P<0.05* |
| | Female | 41 | 56.32 | 6.40 | | | |
| Computer self-efficacy | Male | 43 | 126.28 | 11.14 | 8.20* | 82 | P<0.05* |
| | Female | 41 | 107.40 | 9.86 | | | |

*Significant at 0.05 level

Table 2: t-test results for differences based on gender

| Variables | Academic discipline | N | Mean | S.D | t-values | df | P |
|------------------------|-------------------------------|----|--------|-------|----------|----|---------|
| Computer anxiety | Science | 32 | 46.42 | 7.96 | 4.57* | 82 | P<0.05* |
| | Humanities and social science | 52 | 55.16 | 8.84 | | | |
| Computer self-efficacy | Science | 32 | 128.82 | 10.78 | 6.52* | 82 | P<0.05* |
| | Humanities and social science | 52 | 111.66 | 12.26 | | | |

*Significant at 0.05 level

Table 3: t-test results for differences based on Academic discipline

| Academic discipline | Gender | N | Mean | S.D | t- values | df | P |
|---------------------|--------|----|--------|-------|-----------|----|-----------|
| Science | Male | 19 | 128.00 | 12.20 | 0.14 | 30 | P>0.05 NS |
| | Female | 13 | 127.22 | 10.34 | | | |
| Humanities | Male | 24 | 125.84 | 14.20 | 3.43* | 50 | P<0.05* |
| | Female | 28 | 99.90 | 12.48 | | | |

NS = Not significant, *= Significant at 0.05 level

Table 4: t-test results for differences in self-efficacy between males and females based on academic discipline and gender

| Variables | Residential status | N | Mean | S.D | F | P |
|------------------------|--------------------|----|--------|--------|---------|----------|
| Computer Self-Efficacy | Urban | 26 | 127.96 | 192.84 | 11.53** | P<0.001* |
| | Semi-Urban | 28 | 114.39 | 210.69 | | |
| | Rural | 30 | 110.60 | 187.28 | | |
| Computer Anxiety | Urban | 26 | 45.62 | 14.25 | 33.08** | P<0.001* |
| | Semi-Urban | 28 | 54.28 | 33.62 | | |
| | Rural | 30 | 58.54 | 56.95 | | |

**Significant at 0.01 level

Table 5: One-Way ANOVA results of Computer Self-Efficacy and Computer Anxiety based on residential status.

| Variables | Computer anxiety | Computer Self- Efficacy | df |
|------------------------------|---------------------------|----------------------------|----|
| Time spent on using Internet | $r = - 0.41^* (t = 1.99)$ | $r = 0.49^* (t = 3.42)$ | 82 |
| Computer anxiety | | $r = - 0.632^* (t = 6.32)$ | 82 |

* P < 0.001

Table 6: Correlation between time spent on using Internet, computer anxiety and computer self-efficacy

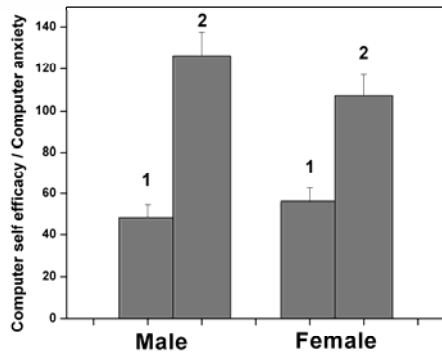


Figure 1: Graphical representation of computer anxiety and computer self efficacy based on gender. 1 indicates computer anxiety and 2 indicates computer self efficacy

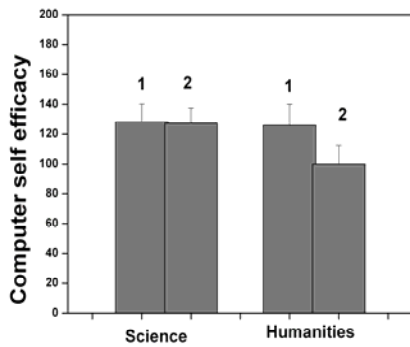


Figure 2: Differences in computer self-efficacy between males and females based on academic discipline. 1 stands for male and 2 stands for female.

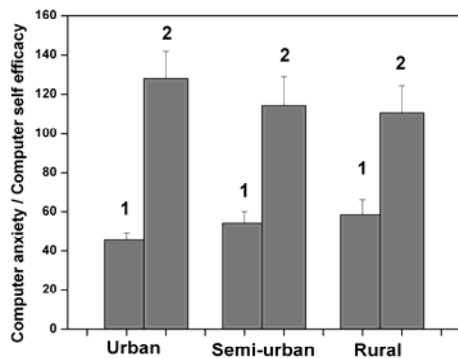


Figure 3: Computer Self-Efficacy and Computer Anxiety for differences based on residential status. 1 stands for male and 2 stands for female.

This finding seemed to indicate that higher levels of Internet usage did indeed translate into better computer self-efficacy among the secondary school teacher trainees. Such examples of the positive correlation between time spent in a week using the Internet and computer self-efficacy are available in the literature for other types of respondents (Sam, *et al.*, 2005). The correlation was found to be significantly negative between the times spent in a week using the Internet and computer self-efficacy. Furthermore, as expected there was a significant negative correlation between computer anxiety and computer self- efficacy (Table 6).

CONCLUSIONS

We have explored the differences in computer self efficacy and computer anxiety along three lines of conceptual separation: gender, residential status and faculty centers. The findings of this study reveal that participants’ gender is significantly related with their computer self efficacy. However, closer analysis reveals that the gender bias for computer self-efficacy observed is due to the teacher trainees of the faculty of humanities. There is no significant difference in computer self-efficacy based on gender among science teacher trainees. However, significantly higher self efficacy among the male trainee teachers of the faculty of Humanities explains the gender biasness of self efficacy. Furthermore, our results indicated that depending on the faculty center and residential status, trainee teachers exhibit significant differences in their computer self-efficacy and computer anxiety. Furthermore, science teachers exhibit relatively greater computer self efficacy than non-science teachers. Teacher trainees of urban origin exhibit highest computer self-efficacy and lowest computer anxiety while the reverse is true for the rural teacher trainees. Significant relationships were found to exist between time spent in a week using the Internet and the teacher trainees’ computer anxiety and computer self-efficacy. Such examples of the positive correlation between time spent in a week using the Internet and computer self-efficacy are available in the literature for other types of respondents (Sam, *et al.*, 2005).

Further extension of the present research to encompass comparative studies on computer self anxiety, computer self efficacy and the time spent in using the Internet among different systems, should be of considerable interest for researchers in relation to studies on improvement on teaching-learning situations, including its applications in classroom teaching in various cultural context in various other countries.

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