# A STUDY OF STUDENT-TEACHERS' READINESS TO USE COMPUTERS IN TEACHING: AN EMPIRICAL STUDY

By

**M. PADMAVATHI**

*Assistant Professor, The Oxford College of Education, Bangalore, India.*

***ABSTRACT***

*This study attempts to analyze student-teachers' attitude towards the use of computers for classroom teaching. Four dimensions of computer attitude on a Likert-type five-point scale were used: Affect (liking), Perceived usefulness, Perceived Control and Behaviour Intention to use computers. The effect of student-teachers' subject area, years of computer experience and computer competency on attitude towards the computers are also analyzed. The study has adopted 'Technology Acceptance Model' as its conceptual framework. Apart from mean analysis, correlation and Multivibrate Ananlysis of Variance (MANOVA) are carried out to elucidate statistical significance of the study variables. Major findings in this study are: (1) Student-teachers are found to have positive attitude towards the use of computers for classroom teaching; (2) Affect dimension of computer attitude is significant for subject area and computer experience; (3) A strong positive correlation between the computer experience and computer attitude was observed; (4) A significant correlation between the years of computer experience and perceived control, and computer attitude was observed; (5) The findings show a significant difference in computer attitude by subject areas: Languages, Science, Mathematics and Social Studies; and (6) Subject area and computer experience are significantly associated with an overall attitude towards computers. Implications for teacher training and suggestions for further research are provided in this study.*

*Keywords: Attitude Towards Computer Use, Affect, Perceived Usefulness, Perceived Control, Behaviour Intention, Computer Competency, Computer Experience.*

## INTRODUCTION

Technology Integration in classroom teaching is well recognized by Educationists, Researchers and Policy makers all over the world. In various countries, this has led to the provision of technology infrastructure and skill training for teachers at school level. Training of student-teachers in the use of computers as a pedagogical tool has also gained an equal importance. In India, the National Curriculum Framework for Teacher Education (NCTE, 2009) has emphasized the need to equip teachers with competency to use ICT for teaching and learning in schools.

Research studies show that, the use of technology in schools is only partially successful in spite of the availability of infrastructure for ICT mediated teaching. Several factors are found to influence the effective use of computers in schools. In addition to computer infrastructure, teachers'

perception, self-efficacy, behavioral intention, attitude, computer knowledge and the time available for preparation and presentation of learning activities affect use of computers. Various environmental factors such as subjective norm and support from peer group are also found to affect the actual use of computers in classroom teaching.

Researchers have tried out various models to explain the implementation of ICTs. The Technology Acceptance Model (TAM) developed by Davis (1989) with its modification and extension is applied by the researchers in various countries and cultural settings to understand the user acceptance of ICT, including School Education. The basic TAM model predicts usefulness as the main innovation factor and ease of use as the second factor that determines an individuals' attitude and subsequent acceptance of technology (Teo, Lee & Choy, 2008; Kumar,

Rose & D'Silva, 2008). To understand the attitude of student-teachers towards the use of computers for classroom teaching, the study uses the Technology Acceptance Model as its conceptual framework. Various dimensions of attitude towards the use of computers and its relationship to select characteristics of student-teachers were analyzed.

### Need for the Study

Baylor and Ritchie (2002) argued that, "regardless of the amount of technology and its sophistication, technology will not be used unless faculty members have the skills, knowledge and attitudes necessary to infuse it into the curriculum" (p. 398).

It is an undeniable fact that, it is the teachers who determine when, where and how to use technological tools in the classroom environment. The energy and investment on the Teacher Education in India can be productive only if the teachers develop positive attitudes and intention to use technology along with the pedagogy of teaching and learning. This calls for conducting research studies on student-teachers' preparedness to use technology in schools.

Educationists and Researchers believe that, technology integration in Indian schools is viewed only from the point of technology and fails to address the concerns of pre-service and in-service teachers. Within the Indian context, not many published studies have examined the preparedness of pre-service and in-service teachers in integrating technology in classroom teaching and learning. It is in this context that, the present study focuses on various factors that influence the student-teachers' readiness to use computers in teaching.

### Review of Related Literature

Studies show that several factors affect the successful use of computers in Schools. One of the factors is the attitude of teachers. Various dimensions of attitude of teachers towards the use of computer have been studied widely. These dimensions include perceived usefulness of computer, perceived ease of use, confidence, job relevance, behavior intention, subjective norm and self efficacy.

According to Yuen and Ma (2002) two major determinants

in TAM, namely, perceived usefulness and perceived ease of use were found to differ by gender. They found that: (a) perceived usefulness the influenced intention to use computers more strongly for females than males, (b) perceived ease of use influenced the intention to use computers more strongly for females than males, and (c) perceived ease of use influenced perceived usefulness more strongly for males than females.

A study by Luan et al. (2003) found that, pre-service teachers with prior IT skills and knowledge exhibited a positive attitude towards the use of Computer Technology. When student-teachers were exposed to various technological tools and applications during the course work, they expressed the need for more technological preparation in order to integrate technology in classroom teachings (Evans and Gunter, 2004). Appropriate technology training with required number of credit-hours (Hsieh et al. 2005) and inclusion of the use of technology during course work for the preparation of activities (Abbott and Farris, 2000) were found to increase perceived confidence and ability to use computers among the student-teachers. A study by Ma et al. (2005) on student teachers' attitude towards technology found that, perceived usefulness of Computer Technology has a direct significant effect on their intention to use it and perceived ease of use has only an indirect effect on intention to use Computer Technology.

In another study, the student-teachers' preparedness to use ICT in classroom in relation to their attitude, motivation and confidence were found to be determined by various social factors (Gill and Dalgarno, 2008). A study on Singapore student-teachers' perceptions in integrating ICT revealed that training is crucial and the trainees gained confidence after the practicum (Choy et al. 2008). Prior experience with technology is considered as a key factor to predict the attitude towards the use of computers. Pre-service teachers with limited access to computers and having less experience in use of computers were found to develop negative attitudes towards using computers. A study carried out by Teo et al. (2008) based on extended TAM framework found that, perceived usefulness, perceived ease of use and subjective norm were significant

determinants of student-teachers' computer attitude. Facilitating conditions did not influence computer attitude directly; but, exerted influence through perceived ease of use.

Based on a sample of 139 student-teachers from Singapore, Teo (2008) assessed the impact of gender, age and subject areas on four dimensions of computer attitude, namely, affect, perceived usefulness, perceived control, and behavioural intention on use of computers. The study found no gender or age differences among student-teachers on computer attitudes. However, there were significant differences for computer attitudes by the subject areas such as: Humanities, Sciences, Languages and General (Primary). Correlation analyses revealed significant associations between the number of years of computer use, level of confidence and computer attitude. In a study among the Chinese student-teachers, except gender, all other factors such as constructivist teaching beliefs, teaching self-efficacy, computer self-efficacy and computer attitudes were associated with the prospective use of ICT (Sang et al. 2009).

A study by Chen (2010) revealed that, pre-service teachers' self-efficacy of teaching with technology had the strongest influence on technology use, which was mediated by their perceived value of teaching and learning with technology. Moreover, the effect of student-teachers' training on student-centered technology use was mediated by both perceived value and self-efficacy of technology. According to Al-Ruz and Khasawneh (2011), technology self-efficacy, technology proficiency and usefulness of technology along with support structure determine the student-teachers' efforts to integrate technology during field training.

Wong et al. (2013) reported that student-teachers' attitude towards computer use is determined by the perceived usefulness and attitude has a significant influence on intention to use computers. Further, perceived ease of use did not have a significant influence on student-teachers' attitude towards computer use. Saricoban (2013) reported that the Turkish pre-service teachers had a high overall attitude towards computer use, and the affective components had a significant positive correlation with

behavioral intention, but had a significant negative correlation with perceived usefulness.

Teo, Fan & Du (2015) studied the gender difference in perceived usefulness, attitude towards technology, intention to use technology among the pre-service teachers. The study found no significant difference in the attitude towards the use of computer among male and female respondents, but females scored low on perceived ease of use.

Sadaf, Newby & Ertmer (2016) have investigated the factors that predict pre-service teachers' intentions and actual uses of Web 2.0 tools in their classrooms. Results of the study showed that, perceived usefulness, self-efficacy, and student expectations were the strongest predictors of pre-service teachers' intentions and actual use of Web 2.0 tools in the classroom. However, the study had also found that, a few were unable to use Web 2.0 tools due to limited access of technology resources and unsupportive mentor teachers.

Teo, Milutinov & Zhou (2016) reported that five variables (perceived usefulness, perceived ease of use, subjective norm, facilitating conditions, and technological complexity) influenced the attitude of Serbian Mathematics pre-service teachers. This study also investigated whether socio-demographic variables (e.g., gender, age, and course of study) had any effect on the attitudes. Results showed that, 64% of the variance in attitudes towards computer use was explained by the five variables. However, only perceived usefulness, perceived ease of use, and technological complexity were found to be significant predictors on attitudes towards computer use, while subjective norms and not facilitating the conditions. Using MIMIC modelling, the results showed that, Gender, Age, and Course of study had no significant influence on pre-services teachers' attitudes toward computers use.

In India, studies on attitude and use of computers among pre service and in-service teachers are scanty. Especially studies using TAM in the field of Teacher Education and Education Technology is very rare. Hence, a few research papers available in this context are reviewed here. Annaraja and Nima (2006) studied the teacher trainees'

attitude towards ICT and found that, 68% of the teacher trainees have high level of attitude towards ICT and 32% of them have moderate level of attitude towards ICT. In a study among the teacher trainees in Andhra Pradesh, Srinivasa Rao (2008) studied the attitude of pre service teachers using computer attitude scale of Loyd and Loyd (1985). He found that, experience with computers in the Under Graduation influenced the teacher trainees' attitude towards technology. In the city of Aurangabad, Naaz (2011) found that, the teacher trainees have positive attitude towards computer technology. A study conducted by Dasari and Mallu (2012) in Andhra Pradesh shows that tribal student-teachers had a positive attitude towards the use of computer and no gender and sub-community differences were found in their computer attitude.

To summarize, the research studies show that, providing technology infrastructure alone is not sufficient for integration of Technology in Schools, but positive attitude and adequate training in use of technology as Pedagogical tool is the current need. Further, a main concern of most technology initiatives worldwide is their focus on the technology itself, with little attention paid to the human factor involved in the implementation process (Albirini, 2006). Hence, an understanding of the characteristics of the student-teachers and their attitude towards the use of computer will go a long way in integrating technology in classroom teaching.

## Objectives of the Study

1. To analyze student-teachers' attitude towards use of computers;

2. To study the correlation between various dimensions of attitude: affect, perceived usefulness, perceived control and behavioral intention; and

3. To find The relationship between subject areas, years of computer experience and computer competency with the overall computer attitude and its four dimensions.

## Methods and Material

### Sample

Present study is carried out among the student-teachers enrolled for Bachelor of Education (B.Ed.) programme of one-year duration in Puducherry. Self-administered questionnaires are distributed to 110 student-teachers who volunteered to participate in the survey. All participants are females falling in the age-group between 21 and 25 years. Among the 110 participants, Language discipline constitute 43, followed by 40 in Science, 22 in Mathematics and 5 in Social Studies. For the sample studied, the average years of computer experience is 1.4 years (SD=.940) with the experience in computer familiarity ranging from 'no experience' to a maximum of 3 years of experience.

### Procedure

The data are collected from 110 participants using self-administered survey questionnaire towards the end of the academic year so that student-teachers have completed the practice teaching in Schools and also understood the Teacher Education programme better. The respondents are provided with the survey questionnaire and the purpose of the survey explained to them. The respondents took about 20 minutes to complete the questionnaire. No question was left unanswered.

### Hypotheses

*H1a-d:* There exists a significant correlation between Student-teachers' attitude towards computer use and its four dimensions.

*H2a-c:* Student-teachers' attitude towards computer use will be significantly influenced by (a) subject areas, (b) computer experience and (c) computer competency.

*H3a-d:* Student-teachers' (a) perceived affect (liking), (b) perceived usefulness, (c ) perceived ease of use and (d) behaviour intention to use computers will be significantly influenced by subject areas.

*H4a-d:* Student-teachers' (a) perceived affect (liking), (b) perceived usefulness, (c ) perceived ease of use and (d) behaviour intention to use computers will be significantly influenced by computer experience.

*H5a-d:* Student-teachers' (a) perceived affect (liking), (b) perceived usefulness, (c ) perceived ease of use and (d) behaviour intention to use computers will be significantly influenced by computer competency.

*Instrument Used*

The Computer Attitude Scale (CAS) developed by Selwyn (1997) is used to measure the student-teachers' attitude towards computer use. It is a 21 item 'Computer Attitude Scale' (CAS) consisting of four dimensions of computer attitude. All items were on a Likert's Scale with five-point response: 'Strongly Agree=5'; 'Agree=4'; 'Undecided=3'; 'Disagree=2' and 'Strongly Disagree=1'. For negative items, reverse coding is followed.

The first dimension of CAS, 'Affect' has six-items that measure respondents' feeling towards computers. The second dimension, 'Perceived Usefulness' has six-items to measure the individuals' beliefs about usefulness of computers in their job. The third dimension, 'Perceived Control' with five-items measures the perceived comfort level of using computers. The fourth dimension, 'Behavioral Intention' consists of five-items that measure intentions and actions with respect to the use of computers. In addition, the questionnaire elicits information on years of computer experience and subject area studied by the student-teachers in their graduation.

A Computer Competency (CC) scale consisting of 13-items has been developed to assess the competency of the student-teachers on computer knowledge and skills that they posses at the time of this study. The responses in Computer Competency Scale are coded as: 'Very Competent=3'; 'Competent=2' and 'Not Competent=1'. It contained no negative items.

## Data Analysis and Results

The reliability of overall CAS and its subscales, and Computer Competency (CC) are tested using the Cronbach's alpha. As shown in Table-1, the overall CAS had an alpha value of 0.878 and its four subscales had alpha values varying from 0.712 to 0.821. The alpha for CC is 0.966.

With a mean score of 3.62 for the overall computer attitude scale, the student-teachers have exhibited a positive attitude towards the use of computers. It is observed that, the student-teachers have a positive perception towards usefulness of computer (mean of 4.01), closely followed by their behavior intention (mean of 3.60) to use computers and 'affect' dimension (mean of 3.53) of computer attitude. The mean value of 2.15 (on a three-point scale) for computer competency among the student-teachers illustrates that, most of the respondents are 'competent' in using computer. The data shows that, 14% have recorded as 'not competent', 58% as 'competent' and 28% as 'very competent' in using computers.

Table 2 presents the mean value of overall attitude and its four dimensions towards computer use across all independent variables. The data on gender and age of the respondents are not considered for analysis as all the participants are females and are in the age-group of 21 to 25 years. The results illustrate that, the sample respondents' studies have exhibited a significant positive attitude towards computer use.

A marked difference is observed in the overall computer attitude across subject areas. Student-teachers with Math (M=4.28) and Science (M=3.91) background have more positive attitudes than Student-teachers with Social (3.37) and Language (3.15) background.

| Scales | No. of Items | Mean | SD | Cronbach's Alpha |
|---|---|---|---|---|
| 1. Overall Computer Attitude | 21 | 3.62 | 0.341 | 0.878 |
| (a) Affective | 6 | 3.53 | 0.783 | 0.712 |
| (b) Perceived Usefulness | 5 | 4.01 | 0.660 | 0.733 |
| (c) Perceived Control | 6 | 3.42 | 0.801 | 0.821 |
| (d) Behavioral Intention | 4 | 3.60 | 0.831 | 0.765 |
| 2. Computer Competency | 13 | 2.15 | 0.633 | 0.966 |

Table 1. Mean, SD and Alpha values for scales used

| Independent Variables | Dimensions of Attitude Towards Computer Use | | | | Overall Attitude Towards Computers |
|---|---|---|---|---|---|
| | Affect | Perceived Usefulness | Perceived Control | Behavioral Intention | |
| Subject Area | | | | | |
| Science | 3.74 | 4.29 | 3.75 | 3.98 | 3.91 |
| Mathematics | 4.14 | 4.28 | 3.75 | 4.24 | 4.08 |
| Language | 3.03 | 3.67 | 2.99 | 2.94 | 3.15 |
| Social Studies | 3.50 | 3.60 | 3.00 | 3.45 | 3.37 |
| Computer Experience (Yrs.) | | | | | |
| 0 | 3.11 | 2.92 | 1.91 | 2.83 | 2.67 |
| 1 | 3.21 | 4.17 | 3.67 | 3.41 | 3.60 |
| 2 | 3.87 | 4.34 | 3.77 | 4.16 | 4.00 |
| 3 | 4.27 | 4.26 | 3.82 | 3.94 | 4.08 |
| Computer Competency | | | | | |
| Very Competent | 3.89 | 4.20 | 3.87 | 3.86 | 3.95 |
| Competent | 3.42 | 4.16 | 3.56 | 3.64 | 3.68 |
| not competent | 3.28 | 3.00 | 1.89 | 2.90 | 2.74 |

Table 2. Mean values of Attitude Towards Computers and its Dimensions by Subject Area, Computer Experience and Computer Competency

Further, respondents with Math and Science subjects in Graduation scored higher means for all the dimensions of computer attitude. However, the sample size for social studies is very small (N=5) and the results presented cannot be considered as conclusive.

The mean value for computer attitude and its four dimensions are found to increase as the years of computer experience and computer competency increases. Table 2 shows that, more the experience and higher the level of competency in using computers, the student-teachers' attitude towards computer use has also increased.

*Correlation Analysis*

In order to understand the relationship among the four dimensions of attitude, Pearson correlation is calculated using IBM-SPSS version-20. The results are presented in Table-3. The attitude towards computer use and its four dimensions of are found to be correlated significantly at $p < .01$ level and the coefficients vary from 0.332 to 0.824. Based on the strength of correlation, the author may suggest that, all the four dimensions are fairly independent of each other and can be used separately to analyze their effect on attitude towards computers. Hence, the proposed hypothesis (H1a-d) that "there exists a significant correlation between student-teachers' Attitude towards computer use and its four dimensions"' is found accepted.

Similarly, an examination of all the three independent variables with that of attitude and its dimensions reveals that, they are correlated statistical at $p<.01$ level and the coefficients vary from 0.266 to 0.828. The computer experience has a strong correlation with overall attitude towards computers (0.729) followed by perceived control (0.638) and usefulness (0.576). Computer Competency is significantly correlated with perceived control (0.828) and usefulness (0.660). The subject area is only moderately correlated with all four dimensions of computer attitude. On the whole, there exists a significant correlation between overall computer attitude and the three independent variables.

*MANOVA*

The results of one-way Multivariate Analysis of Variance (MANOVA) of computer attitude for subject area, years of computer experience and computer competency of student-teachers are shown in Table 4.

*Model Summary*

$R = .770; R^2 = .592;$ Adjusted $R^2$ .581

*Predictors:* Subject Area, Computer Experience and Computer Competency.

*Dependent Variable:* Computer Attitude.

The subject area and computer experience of student-teachers are found to be significantly associated with overall attitude towards computers ($p < .05$), although, the strength of relationship is weak as shown by the smaller value of partial eta squared for these two independent variables. The computer competency has no significant effect on the overall computer attitude.

Hence, the proposed hypothesis (H2a-c) that "Student-teachers' attitude towards computer use will be significantly influenced by (a) the subject areas and (b) computer experience are accepted, while for (c) computer competency" is rejected.

Summary of multivariate analysis between Predictor variables (subject area, computer experience and computer competency) and the dependent variable (computer attitude) show a coefficient of adjusted $R^2$ 0.581. By implication, combination of all three

| Sub scales | Affect | Perceived Usefulness | Perceived Control | Behaviour Intention | Computer Attitude | Subject | Computer Experience |
|---|---|---|---|---|---|---|---|
| Perceived Usefulness | .415** | | | | | | |
| Perceived Control | .332** | .682** | | | | | |
| Behaviour Intention | .477** | .524** | .391** | | | | |
| Computer Attitude | .742** | .824** | .795** | .736** | | | |
| Subject | .353** | .305** | .322** | .481** | .466** | | |
| Computer Experience | .522** | .576** | .638** | .503** | .729** | .414** | |
| Computer Competency | .328** | .660** | .828** | .473** | .570** | .266** | .680** |

** Correlation is significant at the 0.01 level (2-tailed)

Table 3. Correlation Matrix for Subscales and Independent Variables

| Variable | Wilks' Lambda | F | Significance | Partial Eta Squared |
|---|---|---|---|---|
| Subject Area | .709 | 2.639 | .003* | .217 |
| Computer Experience | .517 | 5.374 | .000* | .243 |
| Computer Competency | .888 | 1.319 | .237 | .054 |

* P< .05 significant

Table 4. Multivariate Analysis of Variance of Computer Attitude

independent variables accounted for 58.1% of total variance in computer attitude.

An attempt is made to understand the impact of independent variables on four dependent variables rather on an overall computer attitude. For this purpose, one-way between-groups multivariate analysis is performed on the four dependent variables (affect, perceived usefulness, perceived control and behaviour intention) for subject area, experience and computer competency. The results are presented in Table 5.

From the results of Multivariate Analysis it is found that, the three independent variables together have contributed 49.2% of variance in affect (liking) and 48.1% variance in behaviour intention dimensions of the overall attitude towards computer use. This is followed by 72.3% of variance in perceived usefulness and 79.2% of variance in perceived control dimensions being explained by the three independent variables. It can be inferred that, the explanatory power of all three independent variables taken together is higher for perceived usefulness and perceived control dimensions as against affect and behaviour intension dimensions.

a. Affect: $R^2 = .790$ (Adjusted $R^2 = .492$)

b. Perceived Usefulness: $R^2 = .886$ (Adjusted $R^2 = .723$)

c. Perceived Control: $R^2 = .914$ (Adjusted $R^2 = .792$)

d. Behaviour Intention: $R^2 = .786$ (Adjusted $R^2 = .481$)

e. Observed Power: Computed using alpha = .05

The subject area and computer experience of student-teachers have significant effect only on 'Affect' and have no significant effect on other three dimensions of computer attitude. It may be inferred that the student-teachers with Science and Maths background are more inclined towards affect (liking) of use of computers as against their counter-parts from other subject areas. Similarly, it is true that, student-teachers having computer experience are more inclined towards affect (liking) of use of computers as against those with less computer experience.

The computer competency of the student-teachers has significant effect only on 'perceived control' and have no significant effect on other three dimensions of computer attitude. Then, it may be inferred that, the student-teachers with competent in use of computers will perceive to have control over use of computers as against those who are less competent in use of computers.

Hence, based on the results of multivariate analysis, the acceptance and rejection of proposed hypotheses are summarized in the Table 6.

## Discussion

Overall, the student-teachers showed positive attitude towards the use of computers for teaching and learning. The results of this study are in conformity with the studies conducted earlier in India (Srinivasa Rao, 2008; Dasari & Mallu, 2012). Given the importance and usefulness of computers for teaching and learning and their exposure to computers during training, it is realistic to expect that, the

| Independent Variables | Dimensions of Computer Attitude | df | Mean Square | F | Sig. | Partial Eta Squared | Observed Power |
|---|---|---|---|---|---|---|---|
| Subject | Affect | 3 | 1.337 | 4.282 | .010* | .222 | .833 |
| | Perceived Usefulness | 3 | .136 | 1.123 | .350 | .070 | .282 |
| | Perceived Control | 3 | .296 | 2.215 | .099 | .129 | .525 |
| | Behaviour Intention | 3 | .915 | 2.553 | .067 | .145 | .591 |
| Computer Experience | Affect | 2 | 1.640 | 5.252 | .009* | 189 | .808 |
| | Perceived Usefulness | 2 | .103 | .851 | .434 | .036 | .187 |
| | Perceived Control | 2 | .079 | .594 | .556 | .026 | .143 |
| | Behaviour Intention | 2 | .799 | 2.232 | .119 | .090 | .431 |
| Computer Competency | Affect | 22 | .413 | 1.324 | .209 | .393 | .784 |
| | Perceived Usefulness | 22 | .156 | 1.296 | .226 | .388 | .772 |
| | Perceived Control | 22 | .291 | 2.181 | .013* | 516 | .968 |
| | Behaviour Intention | 22 | .301 | .840 | .664 | .291 | .527 |

* P< .05 significant

Table 5. Effect of Independent Variables on Four Dimensions of Computer Attitude

| Hypothesis | Independent variables | Result |
|---|---|---|
| H3a-d | a) Subject area →Affect | Accepted |
| | b) Subject area →Perceived Usefulness | Rejected |
| | c) Subject area →Perceived Control | Rejected |
| | d) Subject area →Behaviour Intention | Rejected |
| H4a-d | a) Computer Experience →Affect | Accepted |
| | b) Computer Experience →Perceived Usefulness | Rejected |
| | c) Computer Experience → Perceived Control | Rejected |
| | d) Computer Experience → Behaviour Intention | Rejected |
| H5a-d | a) Computer Competency →Affect | Rejected |
| | b) Computer Competency → Perceived Usefulness | Rejected |
| | c) Computer Competency → Perceived Control | Accepted |
| | d) Computer Competency → Behaviour Intention | Rejected |

Table 6. Hypotheses Validation

www.manaraa.com

respondents have positive attitude towards use of computers.

The present study is in agreement with the study conducted by Rao (2008) where mathematics teachers show more positive attitude in using computers than teachers from other disciplines. The affect dimension of computer attitude is significant for subject area and computer experience. The mean score for the independent variables show that, those who studied Science and Mathematics in their Graduation have positive attitude and are willing to use computers as against those who belong to language and social studies disciplines. This could be because of their knowledge of the use of computers in their graduate studies, their exposure to educational CDs, which they might have used for their studies and the availability of Educational CDs for Science and Mathematics in the market.

Another reason could be that the student-teachers with Graduation in Mathematics or Science, commonly, study fundamentals of computer programming and MS Office as their subjects. Humanities and social studies graduates, generally, may not have computer related subjects in the Undergraduate programmes and those who are keen on learning computers do the courses, of various lengths, ranging from three months to one year in private institutes. Hence, it is pertinent that, pre-service training institutions have to concentrate, more specifically, on language and Social Studies teachers to give training in fundamentals of computers and its use as Pedagogical tool.

Technology Acceptance Model and Theory of Reasoned Action propose that, attitude combined with moderating factors like training and experience in using computers lead to actual use of computers. End users with more years of computer experience are more exposed to use of computers. Data show that years of computer experience had a positive effect on the use of computers. The present study observes a strong positive correlation between computer experience and computer attitude (r=.792). It is in conformity with earlier studies (Cavas et al., 2009; Hermans et al., 2008). By implication, training of student-teachers in the use of computers would inculcate a positive attitude and encourage them to use computers for teaching-learning.

The study finds that, the competency of student-teachers plays a role in their perceived confidence and control over the use of computers. Higher the student-teachers' competency in using computers, better the student-teachers' perceived control over the use of computers (r=.828). Nearly one third of the respondents reported that, they are competent in using computers. The findings of this study on identifying computer technology skills may offer an important insight in designing computer training suitable for student-teachers.

The correlation between attitude towards computers and computer competence is found to be positive (r =.570) which indicates that, competence improves the attitude which may in turn facilitates future use of computers by the respondents.

It is encouraging to note that, the three independent variables, subject area, computer experience, and computer competency explains a major portion of variance (58.1%) in student teachers' attitude towards computer use. Further, most of the student teachers have exhibited liking towards the use of computers and those with more computer experience exhibited control over the use of computers. Overall, it may be inferred that the sample respondents have a positive attitude towards computer use and have intention to use computers in classroom teaching.

In summary, many researchers have suggested that, with appropriate technology training, the use of technology during course work, for preparation of assignments /activities, during practice of teaching and school based practicum would increase student-teachers' perceived confidence and ability to use computers in teaching and learning (Hsieh, et al., 2005; Abbott & Farris, 2000; Choy, et al., 2008). Thus, continual training and up-gradation of skills among student-teachers is important to ensure successful integration of technology in classroom teaching. In addition, there has to be a greater role on the part of Teacher Educators to go beyond routine training of student-teachers and help them learn the Pedagogical importance of the use of computers in classroom teaching and learning with demonstration lessons.

## Limitations and Future Research

There are some limitations in this study that needs concern. Firstly, student-teachers are the subject of this study, so their opinion wouldn't be the same as practicing teachers. Though the study helps to understand the opinion of future teachers, further research involving in-service teachers as sample would be of great value. Secondly, the technology-infrastructure at Schools, where the student-teachers have done their practice teaching might have influenced the opinion of the respondents which is not analysed in this study. Finally, the sample studied includes only female teachers. Gender difference in attitude towards use of computers need to be probed.

## Conclusion

In India, Policy Makers and Educationists have shown their concern in establishing required infrastructure to train the student-teachers for multimedia based instruction. Presently most schools, particularly Private Schools, have already started establishing Multimedia rooms and LCD projectors in the classrooms for teachers to implement computer mediated teaching. But the question is how far the student-teachers are equipped with the skills required to teach with computers. Though, ICT is a compulsory paper in teacher-training programme, the focus seems to be on theoretical aspects of use of ICT rather than its utilization as a pedagogical tool. National Curriculum Framework for Teacher Education (NCTE, 2009), affirm that, "Teacher education needs to orient and sensitize the teachers to distinguish between critically useful, developmentally appropriate and the detrimental use of ICT. In a way, ICT can be imaginatively drawn upon for professional development and academic support of the pre-service and in-service teachers"(p.14).

For translating the student-teachers' attitudes into actual use, they not only need exposure to the general use of computers, but, also their use for pedagogical purposes. The teacher educators should be proactive in use of computers by themselves in demonstration classes. This will facilitate the judicious use of computers for teaching-learning among the student-teachers. On priority, educators need to design suitable skill-training to student-teachers to enable them to use computers as a pedagogical tool. Such skill-training should focus on the use of technology for instructional purposes, identification of authentic sources of information in the internet, and ways of maximizing web resources for preparing lessons.

Success of any innovation in classroom practice depends on the acceptance of the change by the teachers. For achieving excellence in Schools, it is important to ensure that, teachers are convinced of the advantages of technology; so, they would be ready to integrate technology into the Curriculum. Developing positive attitudes will go a long way in using computers in classroom instruction.

## References

[1]. Abbott, J. A., & Farris, S. (2000). "Integrating technology into preservice literacy instruction: a survey of elementary education students' attitudes toward computers". *Journal of Research on Computing in Education*, Vol. 33 (2), pp. 149-161.

[2]. Albirini, A. (2006). "Teacher's attitudes toward information and communication technologies: the case of Syrian EFL teachers". *Journal of Computers and Education*, Vol. 47, pp. 373-398.

[3]. Al-Ruz, J. A., & Khasawneh, S. (2011). "Jordanian pre-service teachers and technology integration: a human resource development approach". *Educational Technology & Society*, Vol. 14(4), pp.77–87.

[4]. Annaraja, P., & Nima, M. Joseph (2006). "Teacher trainees' attitude towards information and communication technology'. *DESIDOC Bulletin of Information Technology*, Vol. 26 (2), pp. 37-40.

[5]. Baylor, A., & Ritchie, D. (2002). "What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms?". *Computers & Education*, Vol. 39(1), pp. 395-414.

[6]. Cavas. B., Cavas. P., Karaoglan. B. & Kisla. P. (2009). "A study on science teachers' attitudes towards information and communication technologies in education". *The Turkish Online Journal of Educational Technology*, Vol. 8(2), pp. 20-32.

[7]. Chen, R.J (2010). "Investigating models for pre-service teachers' use of technology to support student-centered

learning'. *Computers & Education*. Vol. 55(1), pp. 32-42.

[8]. Choy, D., Wong, A., & Gao, P (2008). "Singapore's pre-service teachers' perspectives in integrating information and communication technology (ICT) during practicum". *AARE Conference*, 2008.

[9]. Dasari, R.P., & Mallu, A.D. (2012). "Tribal preservice teachers' attitude towards use of computer: An Indian Study". In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference*, pp. 299-306.

[10]. Davis, F. D. (1989). "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *MIS Quarterly*, Vol. 13(3), pp. 319-340.

[11]. Evans, B. P & Gunter, A.G (2004). "A catalyst for change: influencing preservice teacher technology proficiency". *Journal of Educational Media and Library Sciences*, Vol. 41(3), pp.325-336.

[12]. Gill, L., & Dalgarno, B. (2008). "Influence of pre-service teachers' preparedness to use ICTs in the classroom". *Proceedings, Ascilite Melbourne*, 2008.

[13]. Hermans R., Tondeur J., Van Braak. J & Valcke. M. (2008). "The impact of primary school teachers' educational beliefs on the classroom use of computers". *Computers & Education,* Vol. 51, pp. 1499–1509.

[14]. Hsieh, K.J., Lin, M.F., & Pierson, E. M (2005). "An empirical study on the effects of a technology course on preservice teachers' computer attitudes and confidence". *Paper presented at Annual meeting of the Southwest Educational Research Association*, Dallas, Texas, February 5-7, 2004.

[15]. Kumar, N., Rose, R. C., & D'Silva, J. L. (2008). "A review of factors impinges computer usage in education". *Journal of Social Sciences*, Vol.4 (2), pp.146-157.

[16]. Luan, W.S., Abu Bakar, K., Rohani, R. H., Tarmizi, A., & Hong, T.S. (2003). "Assessing pre-service teachers' information technology (IT) preparedness at Universiti Putra". *Jurnal Teknologi*, Vol. 38(E), pp.1–14.

[17]. Ma, W. W., Andersson, R., & Streith, K. (2005). "Examining user acceptance of computer technology: an empirical study of student teachers". *Journal of Computer Assisted Learning,* Vol. 21, pp. 387–395.

[18]. Naaz, Shaikh Tahemina, (2011). "Attitude of prospective teachers towards computer technology: a study". *Indian Streams Research Journal*, Vol. 1(10), pp. 1-4.

[19]. NCTE., (2009). National Curriculum Framework for Teacher Education: Towards Preparing Professional and Humane Teacher. National Council for Teacher Education (NCTE), Government of India, New Delhi. Document 2009/10, 1-103.

[20]. Sadaf, A., Newby, T.J., & Ertmer, P. A (2016). "An investigation of the factors that influence preservice teachers' intentions and integration of Web 2.0 tools". *Educational Technology Research and Development*, Vol. 64(1), pp. 37-64.

[21]. Sang, G., Valcke, M., Van Braak, J., & Tondeur, J. (2009). "Factors support or prevent teachers from integrating ICT into classroom teaching: A Chinese perspective". In Kong, S.C., Ogata, H., Arnseth, H.C., Chan, C. K. K. et al. (eds.) (2009) *Proceedings of the 17th International Conference on Computers in Education (ICCE)*. Hong Kong: Asia-Pacific Society for Computers in Education. 808-815

[22]. Saricoban, A. (2013). "Pre-Service ELT Teachers' Attitudes Towards Computer Use: A Turkish Survey". *Eurasian Journal of Educational Research*, Vol. 53, pp.59-78.

[23]. Selwyn, N. (1997). "Students' attitudes toward computers: validation of a computer attitude scale for 16-19 education". *Computers & Education*, Vol. 28, pp.35-41.

[24]. Srinivasa Rao, G. (2008). "Attitudes of teacher trainees of Andhra University towards integration of computers. Navyavichar: Intel® Teach Seminar on Best Practices in Integration of Technology in Education". Retrieved from www.educationinindia.net

[25]. Teo, T. (2008). "Pre-service teachers' attitudes towards computer use: a Singapore survey". *Australasian Journal of Educational Technology*, Vol. 24(4), pp. 413-424.

[26]. Teo, T., Fan, X., & Du, J. (2015). "Technology acceptance among pre-service teachers: Does gender matter?" *Australasian Journal of Educational Technology*, Vol. 31(3), pp. 235-251.

[27]. Teo, T., Lee, C. B., & Choy, C. S. (2008). "Understanding

pre-service teachers' computer attitudes: applying and extending the technology acceptance model". *Journal of Computer Assisted Learning*, Vol. 24, pp. 128–143.

[28]. Teo, T., Milutinov, V., & Zhou. M. (2016). "Modelling Serbian pre-service teachers' attitudes towards computer use: A SEM and MIMIC approach". *Computers & Education*, Vol. 94, pp.77–88.

[29]. Wong, K.T., Osman, R., Goh, S.C., & Rahmat, M.K. (2013). "Understanding Student Teachers' Behavioural Intention to Use Technology: Technology Acceptance Model (TAM) Validation and Testing". *International Journal of Instruction*, Vol. 6(1), pp. 89-104.

[30]. Yuen, A., & Ma, W. (2002). "Gender differences in teacher computer acceptance". *Journal of Technology and Teacher Education*, Vol.10 (3), pp. 365-38.

## ABOUT THE AUTHOR

*Padmavathi is presently working as an Assistant Professor at The Oxford College of Education, Bangalore, India. She has obtained M.Sc., M.Phil in Zoology, M.Ed and Ph.D in Education. She has also obtained IDGC (International Diploma in Guidance and Counselling) from RIE, Mysore. She has worked as Science Teacher in a Secondary School for seven years and has been a Teacher Educator for nine years in Teacher Education Colleges at Pondicherry and also at Bangalore. Her areas of interest include Guidance and Counselling and Educational Technology. She has published Articles related to Technology Acceptance Among in-service and Pre-service Teachers.*

www.manaraa.com