# Factors Influencing the Usage of Ict in Secondary Schools: A Case Study in Telangana State of India

Dr.P.Lalitha
Assistant Professor, Department of Economics and Finance, BITS-PILANI, Hyderabad Campus

Dr. Ch. V. V. S. N. V. Prasad
Assistant Professor,  Department of Management, BITS-PILANI, K.K.Birla Goa Campus

## Abstract

Results are reported from a study in which teachers' views on usage and impact of information and communication technology in secondary schools, were compared between private and government schools and between the state board (SSC) syllabus and CBSE board syllabus. The main purpose of the study was to answer the following questions:

Firstly, How socio economic parameters can impact the ICT usage, Secondly, What differential role does ownership (Public/Private) of the management has an impact on the usage of ICT and Thirdly, How the board of education can have an impact on the usage of ICT in secondary schools? The key finding the study are as follows

First, Gender, age group has no impact on ICT usage, Secondly, the ownership of management i.e Government schools Vs private schools has no impact on the usage of ICT in secondary schools, Thirdly,  it's been observed that there is a significant impact of board of education , i.e State board Vs CBSE board on the usage of ICT in secondary schools

**Keywords:** Gender, age, income, StateSecondary Certificate (SSC), Central Boardfor Secondary Education(CBSE), ICT, government, private

## Introduction

The acceleration of technological advancement has led to a new globalization era. This new global era has serious implications for the nature and purpose of educational institutions. The access to information is expected to grow exponentially. In this scenario schools cannot remain as mere venues for the transmission of a prescribed set of syllabus from teacher to student over a fixed period of time. In fact they are meant for acquisition of knowledge and skills that make possible continuous learning over the lifetime.

In this connection, radio, television, computers and the internet –are identified as a part of Information and communication technologies (ICTs), which are enabling tools for educational change and reforms. When used appropriately, different ICTs are said to help expand access to education and strengthen the relevance of education to workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life. Especially, the role of ICT in science education it is necessary to identify the objectives of that education and then disaggregate the various forms of ICT in order to discuss the potential relevance or otherwise of each. Where investigative science plays a central part, there are applications of ICT which can both support 'live' bench work and some which can replace it, providing a virtual system to investigate using the same principles as in the laboratory. Moreover, models of the idealised system can be animated alongside a simulation of the real system to reinforce the relationship between practice and theory (Angela McFarlane &Silvestra Sakellariou,2002),

However, the effective integration of ICTs into the educational system is a complex, process that involves not just technology, but also curriculum and pedagogy, institutional readiness, teacher competencies and long-term financing, government policies relating to ICT in schools etc.,

## 1.  ICT Policy in India

The Information and Communication Technology (ICT) in Schools Scheme in India was launched in December, 2004 to provide opportunities to secondary stage students to mainly build their capacity on ICT skills and make them learn through computer aided learning process.  The Scheme is a major catalyst to bridge the digital divide amongst students of various socio economic and other geographical barriers.  The Scheme provides support to States/UTs to establish computer labs on sustainable basis.  It also aims to set up smart schools in KendriyaVidyalayas and NavodayaVidyalayas which are pace setting institutions of the Government of India to act as "Technology Demonstrators" and to lead in propagating ICT skills among students of neighbourhood schools. Based on the experience gained so far, the Scheme was revised, in July 2010 (ict_school,2014).

## 2.  Research Questions

The research questions addressed in this study are as follows:

1. At what level are teachers' ICT competence, frequency and functional use of ICT?

(a). Does age group, income, and gender of teachers have animpact on the usage of ICT

(b). Does the teachers' skill set like, subject, computer knowledge and skills, computer availability at home, experience, time spent, internet connectivity have an impact on the usage of ICT,

2. What differential role does ownership of the management has an impact on the usage of ICT?

a. Does ownership of the management in terms of public and private schools has an impact on ICT usage by the teachers.

3. How the board of education can have an impact on the usage of ICT in secondary schools?

a. Does the board of education like SSC board of Andhra Pradesh and CBSE have an impact on the usage of the ICT by the teachers?

## 3. Methodology

To fulfill the research objectives of this study, a comprehensive survey methodology using questionnaire was designed to capture the facts as well as qualitative responses about the usage of ICT in secondary schools.Survey research is one of the most frequently employed approaches in social science. It involves the gathering of data or information from a sample using a standardized method, such as questionnaires or interviews. The samples tend to be large, and the emphasis is not usually on individuals in a sample but rather on the generalized statistics derived from all the individual cases (Adams and Schvaneveldt, 1985). A survey research is undertaken to study and describe the ground realities or current state-of-the art of a situation, group of persons or institutions. The answers sought are what, when and where by gathering the facts and verbal data.

### 3.1 Questionnaire

The questionnaire used in the survey was pilot tested by school administrators, school teachers for its content validity. Wherever necessary, questions are reworded to improve its validity and clarity. The questionnaire used to collect data for this study had three sections, section1: Personal Information, Section 2, had 8 questions on the ICT usage in teaching and learning, Section:3 had 8 questions on the school characteristics for instance year of establishment, ownership, location, board of education. All the variables in the questionnaire were mostly categorized.

Data collection

The data were gathered in the year 2014, with a questionnaire directed to teachers in twenty schools in Hyderabad in the state of Telangana, India . Ten schools were public schools of which 5 schools were with SSC syllabus and 5 schools were with CBSE syllabus, remaining 10 schools were private owned, of which 5 schools were with SSC syllabus and   5 schools with CBSE syllabus.

### 3.2 Data analysis

The data collected from survey were analyzed in several ways. First, a frequency distribution generating absolute and cumulative frequencies, and percentages is calculated for each question. Frequency is a statistic that tells as how many times a given score occurs in a collection of data. Frequency is therefore used to describe the demographic characteristics of the respondents. Percentile is also calculated from frequencies. Second, a measure of central tendency (mean) is calculated for the purpose of comparison of data with other questions. Lastly, Analysis of variance (ANOVA) was used as thestatistical methodology to compare the differencesin mean values of the constructs among demographic variables of the teacher such as age, income, gender and school characteristics such as ownership, location, board of education and medium of instruction.

3.3 ANOVA

ANOVA is the hallmark of statistical methodology pioneered by I.A. Fisher. Analysis of variance is a statistical technique for examining the differences among means for two or more populations. The null hypothesis typically is that all means are equal.   The alternative hypothesis is that there is significant difference in the mean values. ANOVA is a collection of statistical models, and their associated procedures, in which the observed variance is partitioned into components due to different explanatory variables. In its simplest form ANOVA gives a statistical test of whether the means of several groups are all equal. The essence of ANOVA is that the total amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specific causes. There may be variation between samples and also within sample items. The basic principle of ANOVA is to test for differences among the means of the populations by examining the amount of variation within each of these samples, relative to the amount of variation between samples. In ANOVA, statistical significance is tested using $F$ -statistic.

$$F = \left[ \frac{\text{(Row total for the row of that cell)?}}{\text{(Coloumn total for the column of that cell)}} \right]$$
$$\frac{}{\text{(Grand total)}}$$

The steps for finding $F$-ratio are:

(i) Obtain the mean of each sample namely $\overline{X}_1, \overline{X}_2, \overline{X}_3, .... \overline{X}_k$

(ii) Find the mean of sample means as follows

$$\overline{\overline{X}} = \frac{\overline{X}_1 + \overline{X}_2 + \overline{X}_3 + .... + \overline{X}_k}{No. of\ samples\ (k)}$$

(iii) Find sum of squares for variance between samples $SS_{between}$

$$SS_{between} = n_1 \left[ \overline{X}_1 - \overline{\overline{X}} \right]^2 + n_2 \left[ \overline{X}_2 - \overline{\overline{X}} \right]^2 + .... + n_k \left[ \overline{X}_k - \overline{\overline{X}} \right]^2$$

(iv) Find mean square between samples $MS_{between}$

$$MS_{between} = \frac{SS_{between}}{k-1}$$

(v) Find sum of squares for variances within samples $F$

$$SS_{within} = \sum \left( X_{1i} - \overline{X}_1 \right)^2 + \sum \left( X_{2i} - \overline{X}_2 \right)^2 + ... + \sum \left( X_{ki} - \overline{X}_k \right)^2$$

Where $i$ = 1, 2, 3…….

(vi) Find mean squares within samples $MS_{within}$

$$MS_{within} = \frac{SS_{within}}{n-k}$$

(vii) Determine $F$ - ratio using

$$F = \frac{MS_{between}}{MS_{within}}$$

This $F$ - ratio is used to judge whether the difference among several samples means is significant or is just a matter of sampling fluctuations.

**4.  Results**

Of the 200 respondents (N=200), 67.5 % were females and 32.5 % were males, after segregation between private and public schools, in private schools 73.33 % were females and 26.66% were males, in public schools 58.75% were females and 41.25% were males. The percentage of male teachers to female teachers was found to be more in public schools than in private schools. In the category of age group, 38 % of the teachers are in the age group less than 35 years, 50.5% of them are between 35-50 years and only 23% of the teachers are in the age group of more than 50 years. Age was a consideration in that many student teachers had themselves grown up with extended experiences of using ICT. It appeared that these experiences had given them a strong sense of identity as an ICT user and left them with a 'habitus (Reynolds,2011). In terms of annual income data revealed that 45.5% are in the income group less than 2 lakhs per annum, 37.5% are in the income group between 2-5lakhs per annum, only 8% of them are earning more than 5 lakhs per annum. It is noteworthy that 9% of them were not willing to reveal their income.

Of the 200 respondents, it's been observed that 38 respondents, i.e 19 %, have ticked 'No' for the question, Do you use ICT facilities for teaching and learning? Of the remaining 162 respondents, ANNOVA test is conducted to see the impact of gender on the usage of ICT,table.4.1 reveals that F value 0.93, there is no impact of gender on the usage of ICT in secondary schools.As per the findings of  (Jimoyiannis&Komis, 2007) indicate that that the gender factor still seems to be critical in fostering positive beliefs about ICT in education in teachers despite the fact that its importance appears to be falling relative to a previous study in the area.

Table.4.1:Impact of gender on the usage of ICT in teaching and learning

|  | Number of obs = | 162 | R-squared | = | 0.0000 |
|  | Root MSE = 2.40064 | | Adj R-squared = −0.0062 | | |

| Source | Partial SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| Model | .037466834 | 1 | .037466834 | 0.01 | 0.9358 |
| Gender | .037466834 | 1 | .037466834 | 0.01 | 0.9358 |
| Residual | 922.09292 | 160 | 5.76308075 | | |
| Total | 922.130387 | 161 | 5.72751793 | | |

In order to understand the impact of income earned by the teachers' has any impact on the usage of ICT in learning and teaching, ANNOVA results in table:4.2, F value 0.15, indicates that there is impact of income on the usage of ICT,

Table:4.2 Impact of income on the usage of ICT in teaching and learning

|  | Number of obs = | 162 | R-squared | = | 0.0229 |
|  | Root MSE = 2.38047 | | Adj R-squared = | 0.0106 | |

| Source | Partial SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| Model | 21.1383879 | 2 | 10.569194 | 1.87 | 0.1582 |
| Income | 21.1383879 | 2 | 10.569194 | 1.87 | 0.1582 |
| Residual | 900.991999 | 159 | 5.66661634 | | |
| Total | 922.130387 | 161 | 5.72751793 | | |

The teachers who have advanced ICT competence use ICT frequently in education. The majority of teachers do not have the means or knowledge to fully use ICT in promoting learning. Still there are contradictions between the formal structures of educational institutions and daily classroom practices (Sipila,2013). Results in table: 4.3 indicate that subject, computer knowledge, availability of computer at home has no impact on the usage of ICT, whereas experience, time spent, and internet connectivity is showing a significant impact on the usage of the ICT in teaching and learning. In the data collected it is found that, it not the computer availability at home, which is an important factor, it is the availability of internet at home and in the office which is going to play an important role Many teachers clearly felt that using the internet at home gave them an edge in the preparation of lesson content and the interactive whiteboard could be used to improve the clarity of their presentation (Steve Hurd,2009)

Table:4.3 Impact of teachers' skill set on the usage of ICT in learning and teaching.
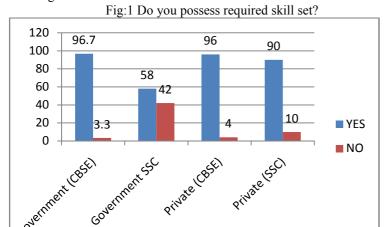
|  | Number of obs = | 162 | R-squared | = | 0.3320 |
|  | Root MSE = 2.09764 | | Adj R-squared = | 0.2318 | |

| Source | Partial SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| Model | 306.115026 | 21 | 14.576906 | 3.31 | 0.0000 |
| Subject | 80.5165452 | 14 | 5.7511818 | 1.31 | 0.2104 |
| Experience | 51.6967715 | 2 | 25.8483857 | 5.87 | 0.0035 |
| ComputerK~e | .368757559 | 1 | .368757559 | 0.08 | 0.7726 |
| TimeSpent | 27.8844438 | 2 | 13.9422219 | 3.17 | 0.0451 |
| InternetC~y | 28.4893292 | 1 | 28.4893292 | 6.47 | 0.0120 |
| Computer | 2.22447109 | 1 | 2.22447109 | 0.51 | 0.4783 |
| Residual | 616.01536 | 140 | 4.40010972 | | |
| Total | 922.130387 | 161 | 5.72751793 | | |

Source: Results based on the field survey

Data when tested against the ownership, i.e Public or private owned, results revealed that ownership is not having any bearing on the usage of ICT in learning and teaching, When asked the respondents a question do you

possess required ICT skill set, the data is revealing in fig:1 that . The data reveals that 98.6 % of the teachers in government CBSE board and 96 % of the teachers in private CBSE board possess required skill set in usage of ICT, whereas only 58 % of the teachers in government SSC board and 90 % percent of the state private board posses required skill set. Which rightly matching with the F-test results in Fig:5, that board of education has a significant impact on the usage of ICT in teaching and learning. It is also found that, the ownership of the schools, whether public or private and location of the school has no impact on the usage of ICT in learning and teaching.

Fig:1 Do you possess required skill set?



Source: Filed Survey

Importantly, the board of education (BOE), which lays emphasis on the pedagogy, is playing an important role in the usage of the ICT in the secondary schools. the emphasis was *not* on innovative technology, but innovative practices that involved new or changed roles for teachers and pupils, and in which ICT played a part, (Harris,2002) Results in table:4.5 indicate that board of education has a significant bearing on the usage of ICT in teaching and learning.

Table: 4.5 Impact of Ownershipand Board of Education (BOE) on the usage of ICT in teaching and learning.

```
                 Number of obs =      162     R-squared     =  0.1217
                 Root MSE     = 2.27124       Adj R-squared =  0.0993

      Source |   Partial SS      df        MS            F       Prob > F

       Model |   112.24141        4   28.0603524        5.44      0.0004

   Ownership |  15.6654023        2   7.83270113        1.52      0.2223
    Location |  .137412854        1   .137412854        0.03      0.8706
         BOE |  77.0070793        1   77.0070793       14.93      0.0002
      Medium |           0        0

    Residual |  809.888977      157   5.15852852

       Total |  922.130387      161   5.72751793
```

**Conclusion**

The Information and Communication Technology (ICT) in Schoolsin India aims to set up smart schools in KendriyaVidyalayas and NavodayaVidyalayas which are pace setting institutions of the Government of India to act as "Technology Demonstrators" and to lead in propagating ICT skills among students of neighbourhood schools. This survey also proves that, board of education has an impact factor on the usage of ICT in learning and Teaching. The study also concludes that gender, age group and income of the teachers has no impact on the usage of the ICT in teaching and learning. Ownership of the schools has no bearing on the usage of ICT in teaching and learning.

**Reliability, limitations and future directions**

A part of the questionnaire used in this study, consisted of the questions, in which participants were asked to assess themselves on the competency in ICT etc., while analyzing this kind of a self-reported material it is important to acknowledge the limitations involved in generalizing these results. The future research may involve in understanding the differences in the pedagogy in state board and CBSE syllabus in implementing ICT in

teaching and learning.

**References**

Anderson, R. (2008). Implications of the information and knowledge society for education.In J. Voogt& G. Knezek (Eds.), International handbook of information technology in primary and secondary education (pp. 5–22). New York, NY: Springer.

Angela McFarlane &SilvestraSakellariou (2002) The Role of ICT in Science Education, Cambridge Journal of Education, 32:2, pp 219-232, DOI: 10.1080/03057640220147568

AthanassiosJimoyiannis&VassilisKomis (2007) Examining teachers' beliefs about ICT in education: implications of a teacher preparation programme, Teacher Development: An international journal of teachers' professional development, 11:2, pp 149-173, DOI: 10.1080/13664530701414779

Harris.S (2002), "Innovative pedagogical practices using ICT in schools in England", Journal of Computer Assisted Learning 18, pp 449-458

Reynolds, L.M.Hammod (2011) "How and why do student teachers use ICT?",Journal of Computer Assisted Learning , 27, pp 191–203, DOI: 10.1111/j.1365-2729.2010.00389.x

SipiläKeijo (2013) "Educational use of information and communications technology: teachers' perspective, Technology, Pedagogy and Education" Technology, Pedagogy and Education,30 July, DOI:10.1080/1475939X.2013.813407

Steve Hurd (2009) Why has Computer Assisted Learning made so little impactin secondary education? Lessons from an economics and business subject case-study, CurriculumJournal, 20:2, pp 139-159, DOI: 10.1080/09585170902948780

http://mhrd.gov.in/ict_school

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

## CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

**Prospective authors of journals can find the submission instruction on the following page:** http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

## MORE RESOURCES

Book publication information: http://www.iiste.org/book/

**IISTE Knowledge Sharing Partners**

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar