SECONDARY SCHOOL PRINCIPALS' AND TEACHERS' ATTITUDE TOWARDS ICT AND ITS IMPLEMENTATION IN UTTAR PRADESH (U.P) AND JAMMU AND KASHMIR (J&K)

ABSTRACT OF THE THESIS
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Abstract

Today we are living in a world which is characterized by globalization, speed and change. The geographical, physical, political and sociological boundaries have vanished digitally by the Internet transforming the world to a ‘global village’. In recent years it has been seen that Information and Communication Technology has brought about profound changes in almost all domains of life. Information and Communication Technology has a central role to play in education. It can bring laurels in the education system if school administrators, teachers and students are endowed with innovative ICT skills. Department of School Education and Literacy, Ministry of Human Resource Development Government of India invested a great deal of funds to facilitate implementation of Information and Communication Technology at secondary level of education. In spite of disbursement of funds, the potential for Information and Communication Technology to change Principals’ use of ICT tools for administrative purposes, teachers teaching methods and students learning process in Indian secondary schools have not been fully realized. The reason behind this is that many secondary school Principals and teachers in India do not use ICT tools for administrative purposes and in teaching learning processes because different ICT tools were provided with no additional measures that would have enabled Principals and teachers of these schools to develop positive attitude towards ICT and to use it in their schools.

The present study, against this backdrop, aimed to investigate secondary school Principals’ and teachers’ attitude towards ICT and its implementation in Uttar Pradesh and Jammu and Kashmir and to suggest guidelines to the government, administrators and teachers for the successful implementation of ICT in secondary schools.

The World Bank’s InfoDev programme states, ‘there is widespread belief that ICT can and will empower teachers and learners (...). However, there are currently very limited, unequivocally compelling data to support this belief.’ While examining the implementation of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir, it is still at an early stage and already faces several setbacks that may undermine the various initiatives undertaken by Ministry of Human Resource Development, Government of India to promote the use of computers in schools, to
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develop ICT skills in students and to provide ICT training to the teachers. Based on the extensive review of related literature, this may be attributed to the fact that secondary school Principals and teachers possess significantly positive attitude towards Information and Communication Technology but on an average the implementation of ICT in schools is considerably less. The guidelines for the proper ICT adaptation in secondary schools exists in ICT policy in education but the implementation is done haphazardly with no systematic approach.

The status of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir is at an introductory stage which was established from the available literature. The respondents in the current study consisting of secondary school Principals and teachers from whom information was gathered through self constructed scales/questionnaires in order to ascertain their attitude towards ICT and its implementation in secondary schools. Scales and documentation technique were used to triangulate the data gathered from secondary school Principals and teachers. Data were statistically analyzed and the findings of the study revealed that the secondary school Principals and teachers hold positive attitude towards Information and Communication Technology. The results of the study also indicated that secondary school Principals and teachers of Uttar Pradesh were more positive in their attitude towards Information and Communication Technology than the secondary school Principals and teachers of Jammu and Kashmir. The results also revealed that the level of implementation of Information and Communication Technology in the secondary schools of Uttar Pradesh and Jammu and Kashmir is considerably less. It was found that the secondary school teachers were using different ICT tools haphazardly in the schools without following any guidelines of any ICT policy. It was also seen that some secondary schools were having computer laboratories but were found defunct. The level of implementation of Information and Communication Technology by the secondary school Principals and teachers of Uttar Pradesh for instructional, administrative and teaching purposes is significantly more as compared to the level of implementation of ICT by the secondary school Principals and teachers of Jammu and Kashmir.

Based on the findings and experiences got from intensive reviewing of some related studies and projects, a set of guidelines were framed for the government,
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school administrators and teachers for the successful implementation of Information and Communication Technology in education at secondary stage.

Review of Related literature

The review of related literature provides some insight into the strong points and limitations of the previous studies. It enables the investigator to locate a ‘research gap’ where the study can be easily and suitably kept. The previous studies were analyzed by keeping their objectives, methodology and research findings under consideration so as to strengthen the rationale of the present study. One of the most important factors responsible for bringing laurels in the overall education system and for implementing the new innovations like ICT is the attitude of Head of the institution and the attitude of teachers. Kaur and Chan (2014) investigated the knowledge level, attitude towards the use of ICT in teaching-learning and hindrances faced by the in-service teachers in secondary schools. The findings of the study revealed that teachers were comfortable with the use of certain ICT applications. The respondents demonstrated a positive attitude towards using ICT. It was also found that the attitudes of teachers on use of ICT vary with their years of experience and level of knowledge on ICT. Bolandifar, et al (2013) investigated the attitudes of Malaysian English language teachers toward integrating the Internet technology in English language classes. The results revealed that Malaysian teachers showed positive attitudes toward Internet usage in general. Norma (2013) investigates the relationship between the leadership styles of public school principals in Lebanon and their attitudes and the level of use of technology for educational purposes in their schools. Findings suggest the existence of positive correlation between the autocratic leadership styles of school principals and their negative attitudes towards the use of ICT for educational purposes. The result of the study also showed that positive correlation existing between principals’ attitudes towards the use of ICT for educational purposes and the level of its use by their teachers in schools. Abdelaziz (2013) investigated the relationship between the age of teaching staff and their attitude toward ICT. The results showed that there is a moderate and positive relationship between the age of participants and their attitude towards ICT. Isman, et.al (2012) investigated the Saudi Secondary school Teachers’ Attitudes towards using Interactive Whiteboard in the classrooms. The results indicated that there were appositive attitude towards using Interactive Whiteboard. Samira (2011) investigated
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Egyptian teachers' attitudes towards computers in terms of gender and years of teaching experience. Findings showed that the Egyptian public school teachers' hold positive attitude towards ICT. There were no significant differences in terms of gender and teaching experience. Prabhu (2013) investigated higher secondary school teachers' attitude towards Information and Communication Technology. The findings of the study revealed that as much as 0.60% of teachers manifested a highly favourable attitude towards Information and Communication Technology, also 22.90% of them show a favourable level of attitude towards Information and Communication Technology and 76.50% of them show a neutral level of attitude towards Information and Communication Technology. The findings also revealed that there is a significant difference between the male and female higher secondary school teachers in respect of their attitude towards information and communication technology. Emmanuel Achor and Joshua Shaibu (2013) investigated the attitude dimensions of secondary school social studies teachers towards computer usage in Kogi State Nigeria. Qualification and Gender influence on their use was examined. The findings of the study revealed that Social studies teachers with higher qualification have higher negative attitude towards the use of computer than those with lower qualification. Male social studies teachers have higher negative attitude towards the use of computer than their female counterparts. However, no significant difference was established between male and female social studies teachers and use of computer.

Eid Al harabi (2014) investigated successful implementation of ICT in education. The findings indicate that ICT implementation should begin with the identification of an educational problem and deciding what students, teachers or schools want to achieve, not with the provision of technology. Effective ICT implementation requires using ICTs as knowledge construction tools rather than instructional tools. Furthermore, ICT becomes significant when its use is linked to teachers visions and levels of knowledge.

• Significance of the Study

The study focuses on Secondary School Principals’ and Teachers’ attitude towards ICT and the level of its implementation in Secondary schools of Jammu and Kashmir and Uttar Pradesh in India. The result from this study will be of value to
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Principals' and teachers' in Secondary schools of Uttar Pradesh and Jammu and Kashmir struggling with the challenge of ICT implementation. The significance of this study lies in the fact that the guidelines suggested can have a bearing on how policymakers and decision-makers view Principals and teachers attitude which is a prerequisite entity for the implementation of ICT. It could even receive a nationwide acceptance, with subsequent adoption, in secondary schools where the need for ICT implementation is recognized. If proper guidelines for ICT Implementation are suggested, then decision-makers will find it a valuable tool to overcome the setbacks they have so far encountered in strengthening the quality of education through innovative techniques like ICT. With no previous implementation process being based on research, this study could help stakeholders in Secondary schools to clearly identify the areas of concern – many of which were ignored.

❖ Statement of the Problem

The research problem is stated as;

'Secondary School Principals' and Teachers' attitude towards Information and Communication Technology (ICT) and its implementation in Uttar Pradesh and Jammu and Kashmir'

The implementation of Information and Communication Technology (ICT) in secondary schools of India is still at an early stage, and already faces several setbacks that may undermine the various initiatives undertaken by governments and the private sector to promote the use of Information and Communication Technology applications in schools. In fact, guidelines for proper ICT implementation in secondary schools exist but implementation cases were done haphazardly with no systematic approach. The current study, in this background, aims to understand the secondary school Principals and teachers’ attitude towards Information and Communication Technology and its implementation in Uttar Pradesh and Jammu and Kashmir.

❖ Objectives of the Study

The study is undertaken with the following objectives:

1. To determine the level of attitude of Secondary School Principals' of Jammu and Kashmir towards ICT.
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2. To identify the level of attitude of Secondary school principals' of Uttar Pradesh towards ICT.
3. To explore the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals' attitude towards ICT.
4. To explore the level of attitude of Secondary school teachers of Jammu and Kashmir towards ICT.
5. To ascertain the level of attitude of Secondary school teachers of Uttar Pradesh towards ICT.
6. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers attitude towards ICT.
7. To study the level of implementation of ICT by the secondary school Principals' of Jammu and Kashmir.
8. To verify the level of implementation of ICT by the secondary school Principals' of Uttar Pradesh.
9. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals' level of implementation of ICT.
10. To examine the level of implementation of ICT by the secondary school teachers of Jammu and Kashmir.
11. To check the level of implementation of ICT by the secondary school teachers of Uttar Pradesh.
12. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers level of implementation of ICT.

Research Hypothesis

Keeping the above research objectives in view the investigator has formulated the following null- hypothesis to be tested. For the sake of convenience the null-hypotheses have been classified into four sections; viz. section A, section B, section C and section D and a separate section (E) for the Research Question.
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Section A

*Ho1*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Jammu Kashmir towards ICT.

*Ho2*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school Principals of Uttar Pradesh towards ICT.

*Ho3*: There is no significant difference and influence of interaction on attitude of secondary school Principals towards ICT according to their gender (male and female) and region (J&K and U.P).

*Hypothesis (3a)*: There is no significant difference in secondary school Principals attitude towards ICT with respect to their gender (male and female).

*Hypothesis (3b)*: There is no significant difference in secondary school Principals attitude towards ICT with respect to the region (J&K and U.P).

*Hypothesis (3c)*: There is no significant influence of interaction between gender and region on secondary school Principals attitude towards ICT.

Section B

*Ho4*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Jammu Kashmir towards ICT.

*Ho5*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Uttar Pradesh towards ICT.

*Ho6*: There is no significant difference and influence of interaction on attitude of secondary school teachers towards ICT according to their gender (male and female) and region (J&K and U.P).

*Hypothesis (6a)*: There is no significant difference in secondary school teachers’ attitude towards ICT with respect to their gender (male and female).

*Hypothesis (6b)*: There is no significant difference in secondary school teachers’ attitude towards ICT with respect to the region (J&K and U.P).

*Hypothesis (6c)*: There is no significant influence of interaction between gender and region on secondary school teachers’ attitude towards ICT.

Section C

*Ho7*: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the Principals of Jammu Kashmir.

*Ho8*: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the principals of Uttar Pradesh.
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Ho9: There is no significant difference and influence of interaction on implementation of ICT by the secondary school Principals according to their gender (male and female) and region (J&K and U.P).

Hypothesis (9a): There is no significant difference in the implementation of ICT by the secondary school Principals according to their gender (male and female).

Hypothesis (9b): There is no significant difference in the implementation of ICT by the secondary school Principals with respect to the region (J&K and U.P).

Hypothesis (9c): There is no significant influence of interaction between gender and region on secondary school Principals’ implementation of ICT.

Section D

Ho10: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Jammu Kashmir.

Ho11: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Uttar Pradesh.

Ho12: There is no significant difference and influence of interaction on implementation of ICT by the secondary school teachers according to their gender (male and female) and region (J&K and U.P).

Hypothesis (12a): There is no significant difference in the implementation of ICT by the secondary school teachers according to their gender (male and female).

Hypothesis (12b): There is no significant difference in the implementation of ICT by the secondary school teachers with respect to the region (J&K and U.P).

Hypothesis (12c): There is no significant influence of interaction between gender and region on secondary school teachers’ implementation of ICT.

Section E

In order to understand the government initiatives and background of Information and Communication Technology Scheme in Schools of Jammu and Kashmir and Uttar Pradesh following research question has been formulated and analyzed through documentation technique.

Research question: What is the status of Information and Communication Technology scheme in secondary schools of Jammu and Kashmir and Uttar Pradesh?
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Design of the study

After extensive review of related literature, descriptive survey design was found most suitable for the current study. Thus in the present study, descriptive survey method of research was followed. However, the investigator used the mixed mode research approach in the current study. For comparing the two states in terms of the level of attitude and implementation of ICT of secondary school Principals and teachers, the study was a comparative one.

Sampling

The investigator selected a total of 76 Secondary Schools from the two states, thirty (30) from district Pulwama of Jammu Kashmir and forty six (46) from district Aligarh of Uttar Pradesh. However there were only thirty (30) government higher secondary schools in district Pulwama of Jammu and Kashmir and the investigator had selected all of them. Also the investigator selected all the (46) CBSE affiliated secondary schools from district Aligarh. The investigator had selected all Principals of the selected secondary schools. However, after determining the actual number of secondary school teachers from the concerned departments, the secondary school teachers were selected through stratified random sample technique.

The initial sample consists of 631 respondents (76 secondary school Principals, 5 vice- Principals and 550 secondary school teachers i.e. 300 from U.P and 250 from J&K). The investigator deleted some subjects due to the following reasons:

- Some respondents were outside the country/ state.
- Respondents were busy in conducting exams.
- Some scales were incomplete as some respondents left some statements blank in one or more scales.
- Scales were returned totally blank.
- Few respondents were on either maternity or paternity leave.
- Some respondents have not returned the scales.

Finally after deleting some subjects, a sample of 529 was used in the current study from whom the relevant data was gathered by administering different research tools.

The below given diagram shows the distribution of samples:
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Total Sample
N= 529 (Secondary School Principals and Teachers)

Secondary School Principals
(N)=73
J&K (N) =35
Male (N) = 27
Female=8
U.P (N) = 38
Male= 26
Female= 12

Secondary School Teachers
(N)= 456
J&K (N) = 236
Male= 212
Female= 24
U.P (N) = 220
Male= 72
Female= 148

Description of Data collection techniques

The data collection techniques are the research instruments used for the collection of data. The selection of research tool depends on the nature of research problem to be investigated and the research hypotheses to be tested or the research questions to be answered. The research tools used in the present study are self constructed scales and document analysis. The investigator has used the following four scales for the collection of data:

1. A self constructed scale for measuring secondary school Principals attitude towards ICT.
2. A self constructed scale for measuring secondary school teachers’ attitude towards ICT.
3. A self constructed scale for assessing the implementation of ICT by the secondary school Principals.
4. A self constructed scale for assessing the implementation of ICT by the secondary school teachers.
Abstract

- **Document analysis**

  Documentation was not the focus of this study. In order to gain a broad insight into the background of Information and Communication Technology Scheme in schools and implementation of ICT in secondary schools of Jammu Kashmir and Uttar Pradesh the investigator analyzed documents emanating from different perspectives: (a) national governmental documents like Census 20011 and Indian statistics; (b) the DISE Reports; (c) National Policy on Information and Communication Technology (ICT) in School Education (Revised Draft 2011); (d) Reports from Department of School Education and Literacy Ministry of Human Resource Development Government of India; and (e) documents of Project Monitoring and Evaluation Group.

- **Statistical Techniques used**

  Both Descriptive and Inferential statistics were used in the current study. The various descriptive and inferential statistical techniques that were used includes percentage, mean, graphic representations, standard deviation, T-test, Pearson’s Correlation coefficient and 2x2 Factorial Design ANOVA.

- **Delimitation of the study**

  India is a biggest democracy in the world. There are twenty nine states and seven Union Territories making a total of 36. The number of schools is very high in the country. It is not possible to study the schools of the whole nation in a single study. Thus the study was limited to secondary stage only. The number of secondary schools is very high in the whole country. It is not feasible to incorporate all secondary schools in a single study. So the investigator has set boundary and selected secondary schools of only two states: Jammu and Kashmir and Uttar Pradesh. There are twenty two districts in the state of Jammu and Kashmir and seventy five districts in the state of Uttar Pradesh. It is impracticable to include all the districts from both the states in a single investigation. So the study was confined to district Pulwama (south Kashmir of Kashmir Division) of Jammu and Kashmir and district Aligarh of Western Uttar Pradesh only. Since the number of Secondary schools and senior secondary schools in district Aligarh as per the information obtained from the website of UP Board (U.P.B) Allahabad, Council of Indian School Certificate Examination (CISCE) New Delhi, and Central Board of secondary Education (CBSE) New Delhi
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and AMU School Board, Aligarh Muslim University (AMU) is 411. Out of 411 institutions there are forty six (46) secondary schools affiliated to CBSE, New Delhi. The investigator has selected all these (46) secondary schools from district Aligarh, Uttar Pradesh.

The information received from the office of the Chief Education Officer the number of Government Higher secondary schools in district Pulwama is thirty (30). The investigator has included all the thirty (30) government higher secondary schools in the present study. The findings could have been more convincing and accurate if a large size sample of secondary schools would have been taken from both the states. The study is laying emphasis on secondary schools only. Therefore, the result may not be generalized to Teachers and Principals of other levels of schooling. The extent to which the findings may be considered applicable to other situations will depend on the similarity between the population under study and the group under observation.

❖ Major Findings

The major inferences drawn from the analysis of data are presented in the sections that follow;

❖ Findings based on Secondary school Principals attitude towards Information and Communication Technology

Section- I

(1) The results revealed that there is a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school Principals of Jammu Kashmir. As the real mean (100.62) is significantly more than the assumed mean (72) and the t-value (17.6) is significant at (0.05) level (significance value is .00). Therefore secondary school principals of Jammu Kashmir manifested positive attitude towards ICT.

(2) The result indicated that there is a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school principals of Uttar Pradesh. As the real mean (108.24) is considerably more than the assumed mean (72) and the t-value (31.6) was significant at (0.05) level. So the secondary school principals of Uttar Pradesh exhibited positive attitude towards ICT.

(3) It was observed that the F value (4.38) for gender was significant at 0.05 levels. It means that the mean score of attitude towards ICT of male and female secondary
school Principals differs significantly. Thus the results revealed that gender influenced the secondary school Principals attitude towards ICT. The mean score value of attitude towards ICT for male secondary school Principals is (103.37) whereas for female secondary school Principals it is (108.15) which shows that female secondary school Principals were found more positive in their attitude towards ICT than male secondary school Principals.

The F value for region is (9.59), which was significant at 0.05 levels. It means that mean score of attitude towards ICT of secondary school Principals’ according to region (J&K and U.P) differs significantly. The mean score of attitude towards ICT of secondary school Principals of Uttar Pradesh (108.42) is higher than the mean score of attitude towards ICT of secondary school Principals of Jammu and Kashmir (100.62). So, secondary schools Principal of Uttar Pradesh were found more positive in their attitude towards ICT than the secondary school Principals of Jammu and Kashmir.

- Findings based on Secondary school teachers’ attitude towards Information and Communication Technology

**Section- II**

(4) The findings indicated a significant difference between the real mean and the assumed mean of scores of attitude towards ICT of secondary school teachers of Jammu Kashmir. As the real mean (95.05) is higher than the assumed mean (90) and the t-value (11.33) was significant at (0.05) level (significance value was .00). It means that secondary school teachers of Jammu Kashmir reflected noticeably positive attitude towards ICT.

(5) The results showed a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school teachers of Uttar Pradesh. As the real mean (97.59) is higher than the assumed mean (90) and the t-value (14.2) was significant at (0.05) level indicating that secondary school teachers of Uttar Pradesh exhibited positive attitude towards ICT.

(6) It was observed in the results that the F value (6.65) for gender was significant at 0.05 levels. It means that the mean score of attitude towards ICT of male and female secondary school teachers differs significantly. Thus the results revealed that gender influenced secondary school teachers’ attitude towards ICT. The mean score of attitude towards ICT for male secondary school teachers is (95.06) whereas for female secondary school teachers it is (98.27), which indicated that female secondary
school teachers manifested obviously more positive attitude towards ICT than male secondary school teachers.

The value of F (1.63) for region (J&K and U.P) was not significant at 0.05 level of confidence. It means that mean score of attitude towards ICT of secondary school teachers' according to region (J&K and U.P) do not differ significantly.

- **Findings based on Implementation of Information and Communication Technology by the Principals of secondary schools**

  **Section- III**

(7) The result indicated that there is a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school Principals of Jammu Kashmir. As the real mean (70.00) is more than the assumed mean (54.00) and the t-value (9.21) was significant at (0.05) level. So, secondary schools Principals of Jammu Kashmir have shown noticeable high level of implementation of ICT.

(8) The findings revealed a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school principals of Uttar Pradesh. The real mean (82.26) is higher than the assumed mean (54) and the t-value (30.9) was significant at (0.05) level. It shows that the level of implementation of ICT by secondary school Principals of U.P is obviously high.

(9) The results explored that the F value (2.02) for gender was not significant at 0.05 levels. It means that the mean score of implementation of ICT of male and female secondary school Principals do not differ significantly. Thus the results revealed that gender do not influence the level of implementation of ICT of the secondary school Principals. It was also found that the mean score of implementation of ICT of secondary school Principals of Uttar Pradesh (82.26) is higher than the mean score of implementation of ICT of secondary school Principals of Jammu and Kashmir (70.00). So, secondary school Principals of Uttar Pradesh exhibited clearly high level of implementation of ICT than the secondary school Principals of Jammu and Kashmir.
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* Findings based on Implementation of Information and Communication Technology by the teachers of secondary schools*

**Section- IV**

(10) The findings revealed a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school teachers of Jammu Kashmir. As the real mean (26.68) is less than the assumed mean (40.00) and the t-value (30.05) was significant at (0.05) level. It indicates that the teachers of Jammu and Kashmir show considerably low level of implementation ICT.

(11) The inferences indicated a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school teachers of Uttar Pradesh. The real mean (30.99) is less than the assumed mean (40.00) and the t-value (18.26) was significant at (0.05) level. It shows that the secondary school teachers of Uttar Pradesh have exhibited significantly low level of implementation of ICT.

(12) The findings exposed that the F value (0.63) for gender was not significant at 0.05 levels. It means that the mean score of implementation of ICT of male and female secondary school teachers do not differ significantly. Thus the results revealed that gender do not influence the level of implementation of ICT of the secondary school teachers.

The value of F (21.08) for region (J&K and U.P) was significant at 0.05 level of confidence. It means that mean score of implementation of ICT of secondary school teachers according to region (J&K and U.P) differs significantly. It was found that the mean score of implementation of ICT of secondary school teachers of Uttar Pradesh (30.99) is more than the mean score of implementation of ICT of secondary school teachers of Jammu and Kashmir (26.68). So, secondary school teachers of Uttar Pradesh exhibited considerably high level of implementation of ICT than the secondary school teachers of Jammu and Kashmir.

* Findings based on the Background of Information and Communication Technology scheme in schools*

**Section- V**

The major findings drawn from the documentation analysis are given below:

(1) The results revealed that in Uttar Pradesh out of 830 blocks the number of educationally backward blocks is 680 (81.92%) and non-educationally backward
blocks are only 150 (18.07%). While as in Jammu and Kashmir the total number of blocks is 215 with 97 (45.11%) educationally backward blocks and 118 (54.88%) non-educationally backward blocks. Thus, the percentage of educationally backward blocks is more in Uttar Pradesh than Jammu and Kashmir.

(2) It was found that number of schools approved by Project Monitoring and Evaluation Group for Uttar Pradesh was 2500 during the year (2007-08) while as the number of schools approved by Project Monitoring and Evaluation Group for Jammu and Kashmir was only 200 during the same year. Thus more schools have been approved for Uttar Pradesh than Jammu and Kashmir.

(3) It was found that Information and Communication Technology scheme in schools had given the approval of the establishment of 63 Smart schools in the country during the year 2011-12. Out of 63 smart schools, 5 (7.93%) schools were set up in Uttar Pradesh and no such school had been established in the state of Jammu and Kashmir.

(4) The results clearly indicated that during the year (2007-08) the government of Uttar Pradesh has made a budgetary provision of Rs. 6700.00 lakh for the establishment of 2500 schools in the state and no such provision was made by the government of Jammu and Kashmir for the establishment of 200 schools.

(5) The results clearly pointed out that Project Monitoring and Evaluation group held several meetings with the representatives of states and Union territories for the successful implementation of ICT scheme in schools. The Uttar Pradesh government sends its representatives for attending these meetings while the government of Jammu and Kashmir had not sent its representative for attending the meetings. This clearly indicated poor of no response towards the implementation of ICT scheme in the secondary schools of Jammu and Kashmir than Uttar Pradesh.

(6) The results of the study revealed that more funds were released under the scheme of ICT in schools for the state of Uttar Pradesh than Jammu and Kashmir which clearly depicted that the state of Jammu and Kashmir is lagging behind in implementing the innovations and innovative schemes like ICT scheme in the education system due to lack of financial assistance given to the states and union territories by the government of India.

(7) The findings of the study revealed that Department of School Education and Literacy, Ministry of Human Resource Development Government of India informed Secretary Education Jammu and Kashmir through a letter that 200 schools sanctioned under Centrally Sponsored Scheme of ICT in Schools in 2008-09 stands cancelled
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with refunding of unspent balance of Rupees 603 lakh lying with the state and the
government of the state agreed without any interference.

(8) The results of the study indicated that the percentage of secondary schools with
computer in Jammu and Kashmir is 57.30% while as in Uttar Pradesh it is only
26.73%.

(9) The findings revealed that 78.14% secondary schools in Uttar Pradesh are with
electricity facility while in case of Jammu and Kashmir only 70.02% secondary
schools are having the electricity facility.

(10) The results showed that 42.72% secondary schools in Jammu and Kashmir are
having Internet facility whereas 19.49% secondary schools in Uttar Pradesh were
found with Internet facility.

(11) The results revealed that 25.53% secondary schools of Uttar Pradesh were with
ICT laboratory facility whereas it was found that only 13.46% secondary schools are
having ICT laboratory facility in the state of Jammu and Kashmir.

❖ Conclusion

Total sample used in the study was (529). Out of (529) respondents, (236)
teachers and (35) Principals were taken from Jammu and Kashmir and (38) Principals
and (220) teachers were taken from Uttar Pradesh. Research tools were constructed,
Standardized and then used for the collection of data. The data so collected were
subjected to appropriate statistical treatments. Responses of the respondents
(secondary school Principals and teachers) were collected in order to assess their
attitude towards ICT and its implementation. In conclusion, the findings of the study
indicated that secondary school Principals and teachers possess positive attitude
towards ICT. However it was revealed that the secondary school Principals of Uttar
Pradesh manifested considerably more positive attitude towards ICT than the
secondary school Principals of Jammu and Kashmir. It was also indicated that the
secondary school teachers of Uttar Pradesh expressed noticeably more positive
attitude towards ICT than the secondary school teachers of Jammu and Kashmir. The
findings also revealed that the level of implementation of ICT by the secondary
school Principals and teachers of Uttar Pradesh is significantly higher than the level of
implementation of ICT by the secondary school Principals and teachers of Jammu and
Kashmir.
Several documents like DISE Reports, ICT policy document, Indian statistics, Census reports and the minutes of the meetings, recommendations and reports of Project Monitoring and Evaluation Group were analyzed to understand the initiatives taken by government of India to introduce Information and Communication Technology in education. These documents were also used to understand the status of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir. These documents were analyzed through documentation technique. In finale, the findings of the study revealed that the government of India has taken several initiatives to integrate ICT in education in the whole country. Funds were sanctioned, released and utilized, schools were approved to introduce ICT in education but the government of different state and Union Territories were varying in implementing the ICT scheme in schools.
Abstract

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Abstract


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SECONDARY SCHOOL PRINCIPALS’ AND TEACHERS’ ATTITUDE TOWARDS ICT AND ITS IMPLEMENTATION IN UTTAR PRADESH (U.P) AND JAMMU AND KASHMIR (J&K)

THESIS

SUBMITTED FOR THE AWARD OF THE DEGREE OF

Doctor of Philosophy

IN EDUCATION

By

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Under the supervision of
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( Associate Professor)

DEPARTMENT OF EDUCATION
ALIGARH MUSLIM UNIVERSITY
ALIGARH-202002, U.P, INDIA
2014
'Great dreams of great dreamers are always transcended'
Abdul Kalam

Dedicated to my Parents
Who dreamt and I make it true
Certificate

This is to certify that Mr. Showkat Ahmad Rather has carried out his Ph.D. research work entitled, "Secondary School Principals' and Teachers' Attitude towards ICT and its Implementation in Uttar Pradesh (U.P) and Jammu and Kashmir (J&K)" under my supervision and guidance. To the best of my knowledge and belief, the research work embodied in this thesis is the original work by the investigator and is suitable for submission for the award of the degree of Doctor of Philosophy (Ph.D) in Education in the Department of Education, Aligarh Muslim University.

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I, Showkat Ahmad Rather, Department of Education certify that the work embodied in this Ph.D thesis is my own bonafide work carried out by me under the supervision of Dr. Salma Kuraishy at Department of Education, Aligarh Muslim University. The matter embodied in this Ph.D thesis has not been submitted for the award of any other degree.

I declare that I have faithfully acknowledged, given credit to and referred to the research workers wherever their works have been cited in the text and the body of the thesis. I further certify that I have not wilfully lifted up some other's work, para, text, data, result etc., reported in the journals, books, magazines, reports, dissertations, thesis, etc., or available at web sites and included them in this Ph.D thesis and cited as my own work.

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Showkat Ahmad Rather
Acknowledgments

In the name of Allah, the Most Gracious, the Most Merciful

It is the providence of Almighty Allah who showered His blessings up on me and endowed me with the power of determination, devotion, perception and knowledge that are the pre-requisites for a work to lead it towards completion.

Behind every success there is undeniably a concealed entity and power and that existence and authority is the reality and control of Almighty Allah, but an aspiration is a pre-requisite or an eternal condition for success which is achievable at perfection in things by those who are in good association with their predecessors, mentors, teachers, family members and friends.

This research work is the outcome of the strength and insight endowed to me by the Almighty Allah who carried me through the complicated moments. My profound gratitude and love are here addressed to Almighty Allah for making this piece of work a reality and for being on my side throughout the course of this study.

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Nevertheless, I must own the responsibility for the errors committed, discrepancies made and for the misapprehensions in this research work.

Afgarkh

Dated: 27-11-2014

Showkat Ahmad Rather
SUMMARY

Today we are living in a world which is characterized by globalization, speed and change. The geographical, physical, political and sociological boundaries have vanished digitally by the Internet, thus transforming the world into a 'global village'. In recent years it has been seen that Information and Communication Technology has brought about profound changes in almost all domains of life. Information and Communication Technology has a central role to play in education. It can bring laurels in the education system if school administrators, teachers and students are endowed with innovative ICT skills. Department of School Education and Literacy, Ministry of Human Resource Development Government of India invested a great deal of funds to facilitate implementation of Information and Communication Technology in education. In spite of disbursement of funds, the potential for Information and Communication Technology to change Principals' use of ICT tools for administrative purposes, teachers teaching methods and students learning process in Indian schools have not been fully realized. The reason behind this is that many secondary school Principals and teachers in India do not use ICT tools for administrative purposes and in teaching learning processes because different ICT tools were provided to the secondary schools with no additional measures that would have enabled Principals and teachers of these schools to develop positive attitude towards ICT and to use it in their schools.

The present study, against this backdrop, is aimed to investigate secondary school Principals' and teachers' attitude towards ICT and its implementation in Uttar Pradesh and Jammu and Kashmir and to suggest guidelines to the government, administrators and teachers for the successful implementation of ICT in secondary schools.

The World Bank's InfoDev programme states, 'there is widespread belief that ICT can and will empower teachers and learners (...). However, there are currently very limited, unequivocally compelling data to support this belief.' While examining the implementation of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir, it is still at an early stage and already faces several setbacks that may undermine the various initiatives undertaken by Ministry of Human Resource Development government of India to promote the use of computers in schools, to develop ICT skills in students and to provide ICT training to the teachers. Based on
the extensive review of related literature, this may be attributed to the fact that secondary school Principals and teachers possess positive attitude towards Information and Communication Technology but on an average the implementation of ICT in schools is considerably less. The guidelines for the proper ICT adaptation in secondary schools exists in ICT policy in education but the implementation is done haphazardly with no systematic approach.

The status of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir is at an introductory stage which was established from the available literature. The respondent in the current study consists of secondary school Principals and teachers from whom information was gathered through questionnaires in order to ascertain their attitude towards ICT and its implementation in secondary schools. Questionnaires and documentation technique were used to triangulate the data gathered from secondary school Principals and teachers. Data were statistically analyzed and the findings of the study revealed that the secondary school Principals and teachers hold high attitude towards Information and Communication Technology. The results also revealed that the implementation of Information and Communication Technology in the secondary schools of Uttar Pradesh and Jammu and Kashmir is not satisfactory. It was found that the secondary school teachers were using different ICT tools haphazardly in the schools without following any guidelines of any ICT policy. It was also seen that some secondary schools were having computer laboratories but were found defunct. The results of the study also indicated that secondary school Principals and teachers of Uttar Pradesh possessed more positive attitude towards Information and Communication Technology than the secondary school Principals and teachers of Jammu and Kashmir. It was also pointed out that the implementation of Information and Communication Technology by the secondary school Principals and teachers for instructional, administrative and teaching purposes in secondary schools of Uttar Pradesh is more than Jammu and Kashmir.

Based on the findings and experiences got from intensive reviewing of some related studies and projects, a set of guidelines were framed for the government, school administrators and teachers for the successful implementation of Information and Communication Technology in education at secondary stage.

**Key terms:** Information and Communication Technology; Implementation of ICT; Ministry of Human Resource Development; Attitude
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<td>CBSE</td>
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<tr>
<td>CLASS</td>
<td>Computer Literacy and Studies in Schools</td>
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<td>CSDMS</td>
<td>Centre for Science, Development and Media Studies</td>
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<td>CIET</td>
<td>Central Institute of Education Technologies</td>
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<td>CISCE</td>
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<td>ET</td>
<td>Educational Technology</td>
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<td>EDUSAT</td>
<td>Education Satellite</td>
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<td>GeSCI</td>
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<td>Indian Space Research Organization</td>
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INTRODUCTION

1.1 Introduction

1.2 Information and Communication Technology (ICT) in Education in India - A Historical perspective

1.3 Policy level framework for the use of ICTs in school education in India

1.4 Information and Communication Technology (ICT) in Schools Scheme

1.5 Initiatives for using ICT in Education in India

1.6 Attitude

1.7 Statement of the Problem

1.8 Significance of the study

1.9 Definitions of different terms

➢ Secondary school Principals
➢ Secondary school teachers
➢ Attitude
➢ ICT
➢ Implementation

1.10 Objectives of the study

1.11 Research hypotheses

1.12 Delimitation of the study

1.13 Organization of the study
Technology has played a vital role in improving teaching and learning in view of educational reforms around the globe (Kahveci et al., 2011). Information and communication technology in education is understood to contribute to educational equality due to its motivating effects on students and the opportunities it offers for facilitating differentiation and individualization (Becta 2006). It plays an important role in teaching and learning processes. It increases the motivation of students, improves teaching and increases the outcome of learning. Thus, Information and Communication Technology as an innovative tool need to be utilized in education. With the help of Information and Communication Technology highly qualitative and competent educational programs can be delivered in educational institutions. Information and Communication Technologies have brought about a revolution in the overall system of education.

Information Communication and Technologies (ICT’s) have brought remarkable changes in the twenty-first century and has affected the demands of modern societies (Jamieson-Proctor, Burnett, Finger & Watson, 2006). The emergence of Information and Communication Technologies resulted in many alterations and innovations in all the sectors of the economy across the globe. Information and Communication Technologies have revolutionized the world and transformed it into a global village. The World Development Report 1998/99 (World Bank, 1998), notes,

"Poor countries – and poor people – differ from rich ones not only because they have less capital, but because they have less knowledge"

Information and Communication Technology is designing the future of educational system (Khan, 2008). However, in developing countries where the repercussions of poverty, unemployment, and lack of resources are widespread, the large-scale and sustainable implementation of ICTs in schools is yet to be realized, particularly in those institutions that are under-resourced. Research has indicated that, despite the provision of infrastructure, ICT adoption is not necessarily a viable outcome (Bytheway et al., 2010).

The integration of Information and Communication Technology in education has received global attention. It must be integrated in a way as to benefit student and teacher community in particular and others associated with the system of education in
general. But the main concern is how the integration of Information and Communication Technology in education should be done as its introduction is effected by several factors. The various factors which influence the assimilation of ICT in education are; personal and professional, cognitive and efficacy, lack of technological expertise and repertoire of technological skills, and unfavorable socio-economic conditions (Fanni et al., 2010). The educators have a pivotal role in the integration of ICT in education, as is the case with most educational innovation (Demitriadis et al. 2003).

The deployment of Information and Communication Technology in teaching and learning can enhance delivery of subject matter, and simultaneously improve the quality of education, provided that there is appropriate attention to pedagogy (Louw et al., 2008). Education is in the process of major change. The educational institutions are being given an opportunity to work for the benefit of the students by means of employing new expertise in teaching methodology. Papert (1984) was of the opinion that the computer will demolish the structure of the school. The school is defined as something where there are classes, teachers running exams, people structured in groups by age, and following a curriculum. The whole system is based on a set of structural concepts that are incompatible with the presence of the computer.

Information and Communication Technology has made the process of communication easy and effective than never before. It has increased the magnificence, competence and effectiveness to the teachers teaching. Information and Communication Technology helps educators in communicating together much more easily, vividly and effectively. It has transformed the mode people communicate and conduct business during the past decade (UNESCO, 2002).

Information and Communication Technology can improve decisive thinking in students, develop problem solving capacity, raise educational quality and extend access to education. In technologically advanced countries the Information and Communication Technology has been successfully integrated in education. However, little or no statistics of successful ICT integration into the classroom are available from India.

The effective integration of Information and Communication Technology in education is a complex process which requires teacher competencies, adequate

"Many governments stand at the threshold of the twenty-first century without clearly-defined plans and strategies about the use of educational technology— but they are making major new investments anyway".

A lack of careful planning may result in wasted resources or ineffective implementations. Merely buying of hardware and software, wiring of schools and distributing ICT equipments cannot be accepted as proper execution of Information and Communication Technology in education. Effective and novel type of leadership is a prerequisite entity for the integration of Information and Communication Technology in education. The implementation of ICT in the teaching-learning processes is dependent on the preparation and training of teachers. It is in the schools where the learners are endowed with the basic technological skills which enable them to understand the use of technology in different domains of life in order to solve real life problems.

Scientific and technological advances are changing the educational system around the globe. In recent years the integration of Information and Communication Technology in education has gained currency and became the key term in most national policies (Vallance 2008). The need to incorporate Information and Communication Technologies into education is now unpreventable (Goktas and Yildirim, 2003). Technology integration means the use of technology to achieve learning goals and to empower students learning throughout the instructional program (Koçak -Usluel, Kuşkaya-Mumcu and Demirslan 2007). The successful implementation of ICT in education will be dependent largely on the recognition of the importance of Information and Communication Technology application to education. The choice to integrate Information and Communication Technologies in education is motivated by the potential and actual benefits that accrue from the use of Information and Communication Technology.

Robert Heckman (USA) in 2005 said that,

"The learning industry is undergoing a transformation process through the use of innovative products and tools from the ICT revolution. However it is important that
the tools are evaluated for appropriateness, effectiveness and usability from the user's point of view. This understanding can assist educators in choosing the best product and in managing the tools for optimum benefit."

The implementation of Information and Communication Technology into education is an issue of great concern. ICT implementation is not a product; rather, it is a process (Yalin, Karadeniz, and Sahin, 2007). The success of Information and Communication Technology implementation in education means implementing ICT "effectively and efficiently in all dimensions of the processes" (Yalin, et al., 2007). ICT has had a vital role in enhancing the quality of education. The role of ICT is to serve education in particular, by helping students to learn and teachers to perform their teaching profession more effectively (Goktas and Yildirim, 2003). There has been considerable interest in the use of information and communication technologies in the education sector worldwide. ICT will largely contribute to achieving universal education through the delivery of education and the training of teachers (UNESCO, 2005).

The use of Information and Communication Technology has fundamentally changed the education industry and the way knowledge is being transmitted from teachers to the students (Haghighi and Eskandari 2012). Schools cannot prepare students to function within society if the curriculum fails to cover the equipment and skills they will need to use in the real world. Thus curriculum should be designed in a way as to incorporate all necessary for inculcating the technological awareness and innovative skills in the students. The academic achievement of students or the overall educational system cannot be improved without integrating technology in it (Donahoo & Whitney 2006). Students must be able to use technology if they are going to live and work successfully in an increasingly complex and information-driven society (Miller 2007). Students must be technology literate in order to excel in future jobs and to be productive citizens (Griffin 2003). Computers and the Internet, creates new opportunities for teaching and learning. As Hew and Brush (2007) stated, computers and Internet technologies can help students improve their scores on standardized tests. An effective use of Information and Communication Technology in schools can have an immediate positive impact on the schools' learning environments. Technology cannot change education until and unless it is stitched with and incorporated into learning environment (Muir-Herzig 2004). The accessibility and use of Information
and Communication Technology is not sufficient to enhance teaching and learning but quality of both of them and achievement can be increased. Information and communication technology enables the students to find out the current information. It facilitates them to apply their academic expertise for solving the real life problems. Conventional educational practices do not provide students with all the required skills necessary for success in today’s world (Miller 2007). The success of technology depends up on the way it is being used in the classroom.

Use of ICTs can offer a rich choice of learning experiences that are suitable to needs, ambitions and learning styles (Flood 2002). With the help of Information and Communication Technology learning and training could become interactive in contrast to the one way delivery system of traditional face to face teaching. It even promotes self learning skills (Deryn 2004). ICTs can be used to provide reliable training, reduced delivery cycle time, and improved access to information resources and education (Gregorian 2002).

The overall school administration can be improved by developing and inculcating technological skills, technological expertise and positive attitude towards the innovations of technology in the school administrators and teachers. Good school administration and management can improve the quality of education in a better way (Wango, 2009). However, the problems of educational administration in the information age cannot be ignored. The need for creative, divergent and unexpected solutions to school situations and problems require a challenging approach to the field of educational management (Steyn & Kamper, 2001). There is global revolution in education and it is need of the hour to improve the school system, to develop technological awareness among teachers and to develop the innovative technological skills in them so the pursuits of education can be easily and effectively achieved.

1.2 Information and Communication Technology (ICT) in Education in India- A Historical perspective

The education system in India is administered by the Ministry of Human Resource Development at the Center and the different Departments of Education at the state level. The Government of India provides the overall policy framework, financial support and guidelines to ensure a national standard of education; implementation of any policy or scheme is primarily done at the state level.

-6-
The information age is characterized by the growth in information and knowledge. It is followed by the evolution of technologies. The evolution of technologies has increased the pace with which the growth in information and knowledge was going on (Pernia, 2008). So, every child must be exposed to this technology in order to understand its importance and relevance. The global adoption of computers has been the milestone on the educational panorama for the last few years (Albirini, 2006). The Electronic Numeric Integrator and Computer (ENIAC), the first computer was completed in 1946 (Besterfield et al., 2003). Computers have changed the way of communication. The effectiveness of the use of computers in education may be an important factor in determining which countries will succeed in the future (Harvey 1993). Every high school student should be acquainted with how to use a computer and the Internet. They must understand how a computer works and how to locate information on the Internet. They are generally expected to become familiar with how computers are used by the businessmen, the government, educational institutions and people in their homes. At least students should know how to type, how to use a word processor, how to “drive” an operating system and how to navigate the Internet (Chapman, 1998).

The conceptual and planning work related to the implementation of ICT in schools dates back in history to the early 1980s. This is supported by Feldner (2003) who asserts that computer technology entered schools with the desktop computer in the 1980s. The increased emphasis on the integration of technology into the system of education began during the 1990s (Baruch & Mioduser, 2005). It is by the 1985 that educational sector began to gain a business footing and is considered to possess a significant market force (Feldner 2003). It is from that very time that business approach was given to the schools and there was devolution of budgetary control to schools (Coulton, 2006). Since then, significant national efforts have been made in many countries of the world to plan the implementation of ICT and to allocate the required government funds.

As mentioned in the World Education Report (UNESCO, 1998a), education worldwide is facing a major challenge in preparing students and teachers for “our future ‘knowledge-based’ society during a time when most teachers are not prepared to use ICT and “the majority of existing school buildings, even in the most developed
countries, are not equipped to integrate the new information and communication technologies."

The importance of using ICT for improving education has been emphasized for over a decade in India; right from 1992 the National Policy on Education emphasized using educational technology to improve the quality of education. ICT has also figured comprehensively in the norms for schooling recommended by the Central Advisory Board of Education, in its report on Universal Secondary Education, in 2005. The global explosion of knowledge may either lift hundreds of millions of the world's poor out of poverty or it may create a widening knowledge gap, in which poor countries lag further and further behind. If this knowledge gap widens, the world will split further, not just by disparities in capital and other resources, but by the disparity of knowledge. Increasingly, capital and other resources will flow to those countries with the stronger knowledge bases, reinforcing inequality (World Bank, 1998).

The Eleventh Five-Year Plan also reflects the importance of ICT in the education scenario of India. While considering the role of ICT in delivering educational services, a national ICT initiative, the National Knowledge Network has been launched based on the recommendation of the National Knowledge Commission (NKC), with the collaborative effort of the Ministry of Human Resource Development (MHRD), Department of IT and Department of Telecom.

The National Mission on Education through ICTs launched by the Ministry of Human Resource Development aims to enforce the use of ICT to provide high-quality, personalized, and interactive knowledge modules over the Internet/Intranet to all learners in higher education institutions, any time anywhere.

1.3 Policy level framework for the use of ICT in school education in India

Over the last few decades, learners who have been brought up in a technologically rich environment can be termed as digital natives (Prensky 2001) or iLearners. Such learners have been profoundly influenced by the innovative interactive and individual technologies such as iPods, iPhones, iPads, Wii games consoles and Wi-Fi Internet access. In contrast, many of today's educators and teachers were largely brought up in a less technologically advanced world. Thus there
is a need of a policy level framework for the use of Information and Communication Technology in school education.

"The new technologies that are changing our world are not a panacea or a magic bullet. But they are, without doubt, enormously powerful tools for development."

Kofi Annan

A logical policy level framework for the use of Information and Communication Technologies in school education in India was recently initiated through a stakeholder dialogue on formulating a draft national policy for ICT in education. This dialogue was led by the Ministry of Human Resource Development, Global e-Schools Initiative (GeSCI), and Centre for Science, Development and Media Studies (CSDMS). Based on the feedback received after the dialogue, a draft "National Policy on ICT in School Education" has been made available in print. This draft policy document proposes to implement a programme on ICT literacy for all secondary schools in the whole country. It also recommends that all states will develop an ICT literacy curriculum to instill basic as well as advanced ICT skills among secondary school students. At the higher secondary stage, the draft policy states that ICT related elective courses will be offered in schools which will be taught by a postgraduate teacher with appropriate qualifications. The draft policy states that competent teachers will be encouraged and given the resources to adopt ICT-enabled practices in teaching-learning processes. For this purpose, the traditional classrooms will be replaced with Smart Classrooms (classrooms equipped with ICT facilities including computers, projectors etc are, used to teach the curriculum). The draft policy also states that each secondary school will be equipped with at least one computer lab and a minimum of a 10:1 student computer ratio will be maintained.

1.4 Information and Communication Technology (ICT) In Schools Scheme

The policy of secondary education aims at providing education of quality available, accessible and affordable to all youths in the age group of 14-18. Article 5, 13 and 14 of the International Covenant on Economic, Social and Cultural Rights (1966) pertinently states that "Secondary education in its different forms, including technical and vocational secondary education, shall be made generally available and accessible to all by every appropriate means". At present several centrally sponsored
schemes are targeted at secondary stage. The Information and Communication Technology (ICT) in schools is one of the schemes targeted and implemented at secondary stage.

The National Policy on Education 1986, as modified in 1992, emphasized the importance of educational technology for improving the quality of education. The policy statement led to the formulation of two centrally sponsored schemes—Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS). Computer Literacy and Studies in Schools (CLASS) as a pilot project was initiated in 1984-85 in 248 selected secondary/higher secondary schools in collaboration with the Department of Electronics and Department of Education. The main aim was to acquaint students and teachers with the range of computer applications and its potential as a learning medium. In pursuance of the objectives laid down in the National Policy on Education, an expanded programme was prepared in 1987-88 to cover 13,000 higher secondary schools all over the country. However, due to scarcity of funds and other administrative reasons, the proposal to cover 13,000 schools was not finalized. The Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) schemes led to the development of a comprehensive centrally sponsored scheme namely, Information and Communication Technology @ Schools in 2004. The remarkable role of Information and Communication Technology in education has also been highlighted in the National Curriculum Framework 2005.

The Information and Communication Technology in Schools (ICT) Scheme was launched on 15th December 2004, and revised in 2010, to promote computer education, both ICT based literacy and computer enabled learning, and usage of ICT in teaching in Government and Government aided Secondary and Senior Secondary schools in India. The ICT in Schools Scheme is expected to bring innovation in teaching learning process. The guideline of the revised ICT in Schools Scheme has been circulated to States and Union Territories in July 2010. The revised ICT scheme proposed to increase outreach to all Government and Government aided secondary and higher secondary schools, strengthen teacher capacity, provision of broadband connectivity and development of e-content.
Objectives of Information and Communication Technology (ICT) scheme in Schools

1. To promote computer enabled learning and the usage of Information and Communication Technology in teaching in higher secondary and secondary schools in rural areas.
2. To spread the availability of access devices, Internet connectivity and promotion of ICT literacy.
3. Development of a e-content, mainly through Central Institute of Education Technologies (CIET), six State Institutes of Education Technologies (SIETs) and 5 Regional Institute of Education (RIEs), and also through outsourcing.
4. To use ICT tools for the enrichment of existing curriculum and pedagogy.
5. To inculcate ICT skills in the students that will enable them to adjust in the digital world and to pursue higher studies and to get lucrative jobs.
6. To use ICT tools for providing effective environment for children with special needs.
7. To inculcate the habit of self learning in the students by employing ICT tools in the classrooms. This shall transform the classroom environment from teacher-centric to student-centric.
8. To promote the use of Information and Communication Technology tools in distance education.
9. To use ICT for enabling the students to compete globally and to participate in the establishment, sustenance and growth of a knowledge society.
10. To promote teachers related interventions, such as a scheme for national ICT award for teachers, provision for recruitment of elite teachers and capacity building of all teachers in ICT.

Components of Information and Communication Technology scheme in schools

The scheme of Information and Communication Technology has four components:

2. Establishment of Smart Schools which shall be technology demonstrators.
3. Universalisation of Computer literacy through the network of Kendriya Vidyalayas and Navodaya Vidyalayas to the neighboring schools.

4. The fourth component is related to State Institutes of Education Technologies (SIETs) which are concerned with the development of e-content.

*Financial assistance and cost norms of ICT scheme in schools*

The financial is given to the states for the procurement of computers, educational software, and training of teachers, setting up of smart schools, development of e-content and Internet connectivity. It is given to the states on the basis of the approval accorded by Project Monitoring and Evaluation Group chaired by secretary school education and literacy. The project cost is shared between Centre and States in the ratio of 75:25 except for North East states where it is 90:10.

*Monitoring and Evaluation of implementation of Information and Communication Technology (ICT) scheme*

The Project Monitoring and Evaluation Group headed by the Secretary of Secondary and Higher Education includes a representative of Ministry of Information Technology and representatives of organizations engaged in the field of computer education functions as the Monitoring Committee for the implementation of Information and Communication Technology at the national level. The evaluation of the progress of Information and Communication Technology (ICT) scheme is done at the state level by a separate unit created for the purpose. Third party evaluation of the scheme has been taken up by the States and Union territories. The States have also been advised to weigh up the scheme through external organizations like Indian Institute of Technologies (IITs), Indian Institute of Information Technologies (IIITs) and National Institute of Technologies (NITs) etc.

1.5 *Initiatives for using ICT in Education in India*

A large number of Initiatives taken by the government of India for using Information and Communication Technology in education are:

*ICT @School Scheme*

The ICT @ Schools scheme was launched in December, 2004. The objective of the scheme was to provide opportunities to students to develop their ICT skills and to use Information and Communication Technologies in the teaching learning process. The scheme is currently being implemented in all states and Union territories of India
in government and government-aided secondary and higher secondary schools. The scheme also aims to set up ‘Smart schools’ in Kendriya Vidyalayas and Navodaya Vidyalayas to act as “Technology Demonstrators” and to lead in diffusing Information and Communication Technology skills among students of neighboring schools. The setting up of ‘Smart schools’ is very important as they will enable the teachers and students to use Information Technology in teaching and learning processes. It is in the ‘Smart schools’ where the stress is laid on the use of Information Technology skills and the values that will be imperative in the times to come.

![Image of a view of 'Smart' Classroom](image)

**Fig 1.1: A view of 'Smart' Classroom**

- **EDUSAT—Education Satellite**  
  Indian Space Research Organization (ISRO) launched Education Satellite (EDUSAT) for serving the educational sector. Many projects have been initiated to impart education through the satellite. The important projects for imparting education through satellite are as under;

- **Virtual Classroom Technology for Rural Schools (VICTERS)**  
  The state government of Kerela initiated ‘Virtual Classroom Technology for Rural Schools’. It is an IT @ School Project. Under this project, Education Satellite (EDUSAT) is used to impart training to the teachers. The project also aimed to provide high speed Net connectivity to the schools. In this project EDUSAT is also used for implementing learning management solutions.
Rajiv Gandhi Project for Elementary Education (RGPEE)

This project is a collective endeavor of Indira Gandhi National Open University (IGNOU), Ministry of Human Resource Development (MHRD), and Indian Space research Organization (ISRO) for supporting elementary education. This project promotes the use of Education Satellite (EDUSAT) and encourages teachers having technological expertise to incorporate ICT in elementary education. Rajiv Gandhi Project for Elementary Education is operational in the states like; Madhya Pradesh, Chhattisgarh, Uttar Pradesh, and Bihar.

1.6 Attitude

An attitude is a hypothetical construct that represents "consistency in response to social objects" (Campbell, 1963). It represents an individual's degree of response (like or dislike) for an object. Attitudes are learnt, they are modifiable. According to Thurstone (1946), an attitude is the degree of positive or negative effect associated with some psychological object. Zimbardo et. Al (1999) defined attitudes as a positive or negative evaluation of people, objects, events, activities, ideas, or just about anything in your environment. So, attitudes are generally positive or negative views regarding person, place or event. "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence up on the individual's response to all objects and situations within which it is related" (Allport, 1935). Aiken (1980) described attitudes as learned predispositions to respond positively or negatively to certain objects, situations, concepts or persons. Thus an attitude is a predisposition to respond and is represented by consistencies in the response of individuals to social situations. In general, attitudes can be defined as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein & Aijzen, 1975). "An attitude is an idea charged with emotion which predisposes a class of action to a particular class of social situations" (Triandis, 1971). Formation, organization and change of attitude depend on the components. Attitudes have three components:

1) Cognitive
2) Affective
3) Behavioural
Attitude plays a pivotal role in introducing any innovative technique in an organization. Secondary school Principals and teachers positive attitudes are fundamental to the implementation of ICT. Research has indicated that teacher's positive attitude will facilitate students' motivation and learning. Teachers' positive attitude towards different ICT tools will develop a gamut of ICT knowledge in him. This will also enable him to employ different ICT tools in the classroom for making his teaching more and more effective. Research has indicated that the success in the introduction of any innovative technology in the classroom depends upon the attitudes of teachers involved. Researchers have also found that the major predictors of the use of innovative technologies in the classroom depend largely on the teachers' attitude.

In recent years several steps were taken by the Ministry of Human Resource Development, government of India to integrate Information and Communication Technology in education by providing necessary infrastructure to the schools with a hope to improve the quality of education and to equip students with ICT skills. Information and Communication Technology infrastructure was made available to secondary schools in many states of the country with a hope that the potentiality of technology can improve the quality of education. Special attention has been granted to the process of diffusion of innovative Information and Communication Technology practices in all aspects of school life, including the curriculum and administration (Baruch & Mioduser, 2005). In spite of the steps taken by the Ministry of Human Resource Development, government of India to incorporate Information and Communication Technology in education, the present study as an endeavor in this background, aimed at investigating Secondary School Principals and Teachers attitude
towards Information and Communication Technology (ICT) and its implementation in Jammu and Kashmir and Uttar Pradesh in India.

1.7 Statement of the Problem

The research problem is stated as;

"Secondary School Principals’ and Teachers’ attitude towards ICT and its implementation in Uttar Pradesh (U.P) and Jammu and Kashmir (J&K)"

The implementation of Information and Communication Technology (ICT) in secondary schools of India is still at an early stage, and already faces several setbacks that may undermine the various initiatives undertaken by governments and the private sector to promote the use of Information and Communication Technology applications in schools. In fact, guidelines for proper ICT implementation in secondary schools exist but implementation cases were done haphazardly with no systematic approach. This study aims to understand the secondary school principals and teachers attitude towards Information and Communication Technology and its implementation in Uttar Pradesh and Jammu and Kashmir.

1.8 Significance of the Study

It was assumed that the schools selected for the study possessed at least the minimum of hardware and resources required. The study focuses on Secondary School Principals’ and Teachers’ attitude (positive or negative) towards ICT and the level of its implementation in Secondary schools of Jammu and Kashmir and Uttar Pradesh in India. The result from this study will be of value to Principals’ and teachers’ in Secondary schools of Uttar Pradesh and Jammu and Kashmir struggling with the challenge of ICT implementation. The significance of this study lies in the fact that the guidelines suggested can have a bearing on how policy-makers and decision-makers view principals and teachers attitude which is a prerequisite entity for the implementation of ICT. It could even receive a nationwide acceptance, with subsequent adoption, in secondary schools where the need for ICT implementation is recognized. If proper guidelines for ICT Implementation are suggested, then decision-makers will find it a valuable tool to overcome the setbacks they have so far encountered in strengthening the quality of education through innovative techniques like ICT. With no previous implementation process being based on research, this
study could help stakeholders in Secondary schools to clearly identify the areas of concern – many of which were ignored.

1.9 Definitions of operational terms

The Secondary education is the doorway for prosperity. It opens the world of employment to the youth of the country. Secondary education prepares the students for higher education.

"... () It is obvious that there can be no intelligent decision without acquaintance with facts. With the growing condensation of space and time, relations between countries and peoples are becoming continually closer. Modern democracy therefore demands that the people at large must have knowledge not only about their own country but also of the world in general. It is largely the function of secondary education to meet this demand of democracy. ..."

Humayun Kabir (1955)

➢ Secondary school

Secondary school which serves as a step towards preparation for higher and professional education has been described by ‘The International Webster’s Comprehensive Dictionary of English Language’ as,

“High school or preparatory school beyond the elementary or primary and below the college level”

According to ‘Wikipedia’, “Secondary School is a term used to describe an educational institution where the final stage of compulsory schooling, known as secondary education, takes place. It follows on from elementary to primary education”.

Thus, in schools where the education after primary or elementary education is being given are known as Secondary Schools. Secondary school stage incorporates the classes from 9th to 12th.

➢ Teacher

The term “teacher” has also been defined by ‘The Concise Dictionary of Education’ as “a person engaged by an educational institution to instruct others.”
Secondary school principal

A secondary school Principal is a person authorized to work as an administrator for providing guidance and direction to the teachers or students in a secondary school.

Secondary school teachers

A secondary school teacher is a person working in an official capacity for the purpose of guiding and directing the learning experience of students in a secondary school, whether public or private.

Attitude

An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related (Allport, 1935). Attitudes are acquired not innate. Attitudes are modifiable.

Aiken (2000) defined attitude as, “a learned predisposition to respond positively or negatively to a specific object, situation, institution, or person.”

Attitudes are literally mental postures, guides for conduct to which each new experience is referred before a response are made (Morgan, 1934, p.47).

Attitude = the specific mental disposition towards an incoming (or arising) experience, whereby that experience is modified, or, a condition of readiness for a certain type of activity (Dictionary of psychology, Warren, 1934).

An attitude is a complex of feeling, desires, fears, convictions, prejudices or other tendencies that have given a set of readiness to act to a person because of varied experiences (Chave, 1928).

An attitude is a tendency to act towards or against something in the environment which becomes thereby a positive or negative value (Bogardus 2002).

By attitude we understand a process of individual consciousness which determines real or possible activity of the individual counterpart of the social value; activity, in whatever form, is the bond between them (Thomas and Znaniecki, 1918).

Attitude is a mental disposition of the human individual to act for or against a definite object (Droba, 1993).
Information and Communication Technology

Blurton (1999) defined Information and Communication Technologies as a, "diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information."

Information and Communications Technologies are computer based tools used by the secondary school Principals and teachers in school functioning. Its purview covers computer hardware and software, the network, and other digital devices like video, audio, camera, and so on, which convert information (text, sound, motion, etc.) into digital form (Moursund & Bielefeldt, 1999).

Implementation

Surry and Ely (2001) defined ‘implementation’ as the process of introducing an innovation into an organization and fostering its use. In the present study, implementation of Information and Communication Technology means the application of Computers in the functioning of secondary schools. Successful implementation of Information and Communication Technology in the school system depends largely on Principals and teachers attitude towards the role of modern technologies in teaching and learning processes.

Attitude towards information and communication technology means – the sum total of the secondary school Principals and teachers’ evaluation reactions (positive or negative) as expressed through preferences or expressions of likes or dislikes for the various aspects of Information and Communication Technology. The measurement of attitude in this study is done by evaluating the secondary school Principals’ and teachers reaction (positive or negative) towards Information and Communication Technology. Naturally, a Principal or a teacher with positive attitudes towards Information and Communication Technologies would be familiar with its innovative tools and techniques and their application in the field of education while the one with negative attitude towards Information and Communication Technology would be alien to the innovative ICT tools. Since the secondary school Principals’ and teachers’ attitude towards Information and Communication Technology determines their evaluative reaction towards ICT and the implementation of ICT determines the extent of introducing ICT tools in education for administrative, teaching and learning purposes.
1.10 Objectives of the Study

The study is undertaken with the following objectives:

1. To determine the level of attitude of Secondary School Principals’ of Jammu and Kashmir towards ICT.

2. To identify the level of attitude of Secondary school principals’ of Uttar Pradesh towards ICT.

3. To explore the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals attitude towards ICT.

4. To explore the level of attitude of Secondary school teachers of Jammu and Kashmir towards ICT.

5. To ascertain the level of attitude of Secondary school teachers of Uttar Pradesh towards ICT.

6. To study the influence of gender, region and their interaction on secondary school teachers attitude towards ICT.

7. To study the level of implementation of ICT by the secondary school Principals’ of Jammu and Kashmir.

8. To verify the level of implementation of ICT by the secondary school Principals’ of Uttar Pradesh.

9. To study the influence of gender, region and their interaction on secondary school Principals level of implementation of ICT.

10. To examine the level of implementation of ICT by the secondary school teachers of Jammu and Kashmir.

11. To check the level of implementation of ICT by the secondary school teachers of Uttar Pradesh.

12. To study the influence of gender, region and their interaction on secondary school teachers level of implementation of ICT.

1.11 Research Hypothesis

Keeping the above research objectives in view the investigator has formulated the following null-hypothesis to be tested in the present study. For the sake of convenience the null-hypotheses have been classified into four sections; viz. section (A), section (B), section (C) and section (D) and a separate section (E) for the Research Question to be answered in the study.

**Section A**

*H₀₁*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Jammu Kashmir towards ICT.

*H₀₂*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school Principals of Uttar Pradesh towards ICT.

*H₀₃*: There is no significant difference and influence of interaction on attitude of secondary school Principals towards ICT according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (3a)**: There is no significant difference in secondary school Principals attitude towards ICT with respect to their gender (male and female).

**Hypothesis (3b)**: There is no significant difference in secondary school Principals attitude towards ICT with respect to the region (J&K and U.P).

**Hypothesis (3c)**: There is no significant influence of interaction between gender and region on secondary school Principals attitude towards ICT.

**Section B**

*H₀₄*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Jammu Kashmir towards ICT.

*H₀₅*: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Uttar Pradesh towards ICT.

*H₀₆*: There is no significant difference and influence of interaction on attitude of secondary school teachers towards ICT according to their gender (male and female) and region (J&K and U.P).
**Hypothesis (6a):** There is no significant difference in secondary school teachers' attitude towards ICT with respect to their gender (male and female).

**Hypothesis (6b):** There is no significant difference in secondary school teachers' attitude towards ICT with respect to the region (J&K and U.P).

**Hypothesis (6c):** There is no significant influence of interaction between gender and region on secondary school teachers' attitude towards ICT.

**Section C**

**Ho7:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the Principals of Jammu Kashmir.

**Ho8:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the principals of Uttar Pradesh.

**Ho9:** There is no significant difference and influence of interaction on implementation of ICT by the secondary school Principals according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (9a):** There is no significant difference in the implementation of ICT by the secondary school Principals according to their gender (male and female).

**Hypothesis (9b):** There is no significant difference in the implementation of ICT by the secondary school Principals with respect to the region (J&K and U.P).

**Hypothesis (9c):** There is no significant influence of interaction between gender and region on secondary school Principals implementation of ICT.

**Section D**

**Ho10:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Jammu Kashmir.

**Ho11:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Uttar Pradesh.

**Ho12:** There is no significant difference and influence of interaction on implementation of ICT by the secondary school teachers according to their gender (male and female) and region (J&K and U.P).
Hypothesis (12a): There is no significant difference in the implementation of ICT by the secondary school teachers according to their gender (male and female).

Hypothesis (12b): There is no significant difference in the implementation of ICT by the secondary school teachers with respect to the region (J&K and U.P).

Hypothesis (12c): There is no significant influence of interaction between gender and region on secondary school teachers’ implementation of ICT.

Section E

In order to understand the government initiatives and background of Information and Communication Technology Scheme in Schools of Jammu and Kashmir and Uttar Pradesh following research question has been formulated and will be analyzed through documentation technique.

Research question: What is the status of Information and Communication Technology scheme in secondary schools of Jammu and Kashmir and Uttar Pradesh?

1.12 Delimitation of the study

Delimitation of the study is enumerated as under:

India is a biggest democracy in the world. There are twenty nine states and seven Union Territories making a total of 36. The number of schools is very high in the country. It is not possible to study the schools of the whole nation in a single study. Thus the study was limited to secondary stage only. The number of secondary schools is very high in the whole country. It is not feasible to incorporate all secondary schools in a single study. So the investigator has set boundary and selected secondary schools of only two states: Jammu and Kashmir and Uttar Pradesh. There are twenty two districts in the state of Jammu and Kashmir and seventy five districts in the state of Uttar Pradesh. It is impracticable to include all the districts from both the states in a single investigation. So the study was confined to district Pulwama (south Kashmir of Kashmir Division) of Jammu and Kashmir and district Aligarh of Western Uttar Pradesh only. Since the number of Secondary schools and senior secondary schools in district Aligarh as per the information obtained from the website of UP Board (U.P.B) Allahabad, Council of Indian School Certificate Examination (CISCE) New Delhi, and Central Board of secondary Education (CBSE) New Delhi and AMU School Board, Aligarh Muslim University (AMU) is 411. Out of 411
institutions there are forty six (46) secondary schools in total which are affiliated to CBSE, New Delhi. The investigator has selected all these (46) secondary schools from district Aligarh, Uttar Pradesh.

The information received from the office of the Chief Education Officer the total number of Government Higher secondary schools in district Pulwama is thirty (30). The investigator has included all the thirty (30) government higher secondary schools in the present study. The findings could have been more convincing and accurate if a large size sample of secondary schools would have been taken from both the states. The study is laying emphasis on secondary schools only. Therefore, the result may not be generalized to Teachers and Principals of other levels of schooling. The extent to which the findings may be considered applicable to other situations will depend on the similarity between the population under study and the group under observation.

1.13 Organization of the study or layout of chapters

This study has been structured in five chapters.

Chapter 1 comprises of the introduction, significance of the study, Definitions of operational terms, Objectives of the study, Research hypotheses, Delimitation of the study and organization of the study.

Chapter 2 presents a detailed review of the literature related to the research problem, the variables undertaken in the study and critical appraisal.

Chapter 3 presents the research methodology applied in this study. It discusses the descriptive research design and gives details on the data collection methods and research tools that are applied and a strategy for statistical analysis of the data.

Chapter 4 presents analysis of the data and tabulated the research findings. It also presents the discussion of the analyzed data.

Chapter 5 comprises of summary, conclusion, implications, recommendations that can be implemented with respect to the findings and suggestions for future research.

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CHAPTER-2
REVIEW OF RELATED LITERATURE

2. 1 International Scenario
2. 2 National Scenario
2.3 Critical Appraisal
CHAPTER-2

REVIEW OF RELATED LITERATURE

A man who reviews the old so as to find out the new is qualified to teach others.

— Confucius

The review of related literature is always considered to be one of the most important chapters in every thesis and dissertation. It provides some insight into the strong points and limitations of the previous studies. The previous studies were analyzed by keeping their objectives, methodology and research findings under consideration so as to strengthen the rationale of the present study. The main purpose of this chapter is to provide a background of the research problem and justification for the research undertaken. In order to maintain prevalence in the field of research the investigators are subjected to the review of related literature. The review of related literature helps the investigator to develop a time frame within which a particular study can be completed.

"Review of Literature" is a phrase consisting of two words "review" and "literature". The word 'literature' means the knowledge of a particular area of investigation of any discipline which includes theoretical, practical and research studies. The term 'review' refers to organize the knowledge of the special area of research in such a way as to evolve an edifice of knowledge to show that this study would be an addition to this field (Singh 2006).

A literature review is a systematic, explicit and reproducible method for identifying, evaluating, and interpreting the existing body of recorded work produced by researchers, scholars, and practitioners (Fink, 1998).

Again literature review is a "critical analysis of a segment of a published body of knowledge through summary, classification, and comparison of prior research studies, reviews of literature, and theoretical articles" (University of Wisconsin Writing Center).

According to Cooper (1988) '... a literature review uses as its database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases reports are written documents. The types of scholarship may be
empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe, summarize, evaluate, clarify and/or integrate the content of primary reports.'

Best and Kahn views research review as;

"Since effective research is based upon past knowledge" and "capitalizing on the reviews of expert researches can be fruitful" in a number of ways, the review of related literature is a crucial aspect/ step in any research."

According to Bruce there are six elements of a literature review. These elements are; a list; a search; a survey; a vehicle for learning; a research facilitator; and a report.

![Diagram of literature review elements]

Fig. 2.1 Elements of Literature review (Bruce 1994)

The investigator has made an effort to study thoroughly almost all the studies conducted in both national and international scenario in order to strengthen the rationale of the present study. The review of these studies enables the investigator to understand the relationship between dependent and independent variables of the present study and to identify a research gap where the present study can be easily and suitably placed. For the sake of convenience the investigator has presented the review of related literature as under:
1. **International Scenario** (The research studies conducted abroad)

2. **National Scenario** (The research studies conducted in India)

1. **International Scenario**

   Eid Al harabi (2014) investigated successful implementation of ICT in education. This study focused on the issues educators may need to consider when pursuing effective implementation of ICT in education. The investigator made an intensive review of related literature about the successful use of ICT, articulating the barriers and the requirements to the effective use of ICT. The findings indicate that ICT implementation should begin with the identification of an educational problem and deciding what students, teachers or schools want to achieve, not with the provision of technology. Effective ICT implementation requires using ICTs as knowledge construction tools rather than instructional tools. Furthermore, ICT becomes significant when its use is linked to teachers' visions and levels of knowledge.

   Kaur and Chan (2014) investigated the knowledge level, attitude towards the use of ICT in teaching-learning and obstacles faced by the in-service teachers in secondary schools. The researcher conducted a survey involving all 50 teachers in a secondary school in the state of Penang. The findings of the study revealed that teachers were comfortable with the use of certain ICT applications such as spreadsheet, presentation software, Internet and e-mail. The respondents demonstrated a positive attitude towards using ICT as majority of them used ICT for teaching and
learning and felt that the connected classrooms can change the way students learn in classrooms. The study also proved that a connected classroom can be effective for students’ learning to happen. It was also found that the attitudes of teachers on use of ICT vary with their years of experience and level of knowledge on ICT.

Bolandifar et al. (2013) investigated the attitudes of Malaysian English language teachers toward integrating the Internet technology in English language classes. The investigator selected five Malaysian English language teachers through random sampling technique. A semi-structured interview was used as a research tool and interview was conducted to get in-depth information. The analysis of data gathered from interviewing with teachers revealed that Malaysian teachers showed positive attitudes toward Internet usage in general. Lack of Internet access and computer facilities, insufficient computer skills, and lack of time was reported as obstacles to integrate Internet in the classrooms. These findings suggested some implications for policy-makers to help teachers to integrate Internet technology in their classrooms.

Norma (2013) investigates the relationship between the leadership styles of public school principals in Lebanon and their attitudes and the level of use of technology for educational purposes in their schools. Data were collected by surveying school principals via two questionnaires. Moreover, one teacher from each participant public school completed a questionnaire pertaining to the level of use of technology in the school. Findings suggest the existence of positive correlation between the autocratic leadership styles of school principals and their negative attitudes towards the use of ICT for educational purposes. The result of the study also showed that positive correlation existing between principals’ attitudes towards the use of ICT for educational purposes and the level of its use by their teachers in schools.

Abdelaziz (2013) investigated the relationship between the age of teaching staff and their attitude toward ICT. In this study, Survey methodology was used and the data was collected through questionnaires. Random sampling technique was used while selecting the respondents (teaching staff) in Egyptian Higher Education Institutions. The population for this study was 500 full-time Faculty staff, and only 412 returned and completed questionnaires are considered as the study sample. The results showed that there is a moderate and positive relationship between the age of
participants and their attitude towards ICT. Thus, age is a significant factor while considering the attitude of teaching staff members in Egyptians Higher Education Institutions towards Information and Communication Technology. The result of this research has significant implications to Higher Education Institutions when they plan, develop, and adopt ICT.

Emmanuel and Joshua (2013) investigated the attitude dimensions of secondary school social studies teachers towards computer usage in Kogi State Nigeria. Qualification and gender influence on their use was examined. Participants were 427 (Male = 224; female = 203) social studies teachers. Sampling was purposive and random. The study adopted the survey design. Data were collected through a questionnaire and analyzed using mean and standard deviation to answer the research questions while t-test was used to test the hypotheses at .05 level of significance. The study revealed that Social studies teachers with higher qualification have higher negative attitude towards the use of computer than those with lower qualification. Male social studies teachers have higher negative attitude towards the use of computer than their female counterparts. However, no significant difference was established between male and female social studies teachers and use of computer.

Lazarus et al. (2013) investigated teachers’ and administrators’ perceptions on the importance of Information and Communications Technologies (ICT) in secondary school administration. In this study, the administrators are the principal, deputy principal and heads of departments. The investigator used a descriptive-comparative research design to obtain information on the current status of ICT. The t-test was used to establish whether there was any significant difference in perceptions while a Pearson product-moment correlation coefficient was used to find whether there was any significant relationship between educators’ perceptions of the importance and extent of ICT use in secondary school administration. Both teachers and administrators rated the use of ICT in secondary school administration as important. Teachers and administrators viewed the use of ICT in student administration as equally important. Administrators rated the importance of using ICT in supervision of instruction and in student administration more highly. The findings of the study showed that there was a significant difference between the perceptions of teachers and administrators on the importance of ICT use in the secondary school
administration: student administration, general administration and supervision of instruction.

Laaria (2013) investigated teachers’ skills that influenced the process of adoption and use of ICT in public secondary schools in Meru County. The study adopted a descriptive survey research design. 105 (30%) schools were sampled through stratified sampling from a target population of 350 for the study. 315 respondents were sampled through simple random sampling. 220 (69.8%) questionnaires were appropriately filled and returned. Data collected was analyzed by use of descriptive and inferential statistical techniques. The study findings established that there was limited supply of qualified ICT teachers in Kenya. More ICT teachers should be employed in public secondary schools and trained in ICT skills to make them effectively deliver ICT based curriculum. In-service courses should be designed that can enable teachers to acquire ICT skills. Continued professional development of teachers is central to successful implementation of ICT in schools. Generally, teachers had positive attitudes towards adoption and use of ICT in schools.

Tayo and Adedayo (2013) investigated secondary schools teachers’ perceived competence in the use of ICTs with respect to computer basics, use of the Internet, and their ability to use simple software’s. A research question and three hypotheses were raised for the descriptive survey study. The research tool used for the study was the ICT Competence Questionnaire (ICTCQ). Simple random sampling technique was used to select 300 public secondary school teachers in the four geo-political zones in Ogun State. Frequency count and percentages were used for the research question while chi-square was used in analyzing the hypotheses at 0.05 alpha levels. The findings indicated that most teachers in Ogun State secondary schools do not have the required competence in ICT. The findings also revealed that those teachers in the humanities have more competence in ICT than teachers in the sciences. The results also indicate that academic qualification of a teacher does not have any effect on teacher’s competence in ICT. The results also showed that teachers’ competence in the use of ICT is not influenced by their teaching experience. It is then evident that the present crop of teachers needs to be retrained to improve their competence in ICT usage. Consequently training of teachers in ICT through seminars and workshops organized by state government should be regulated. The government should increase the supply of computer system to schools and also make provisions for their
maintenance. Internet facilities should also be put in place for schools by the government and credit facilities can also be provided for teachers by the government to encourage individual teacher to have personal computer.

Yuan Yuan and Chun-Yi Lee (2012) investigated elementary school teachers' perceptions toward to the use of ICT. Magic Board, an interactive web-based environment which provides a set of virtual manipulative for elementary mathematics, is used as the case of ICT. After participating in Magic Board workshops, 250 elementary school teachers in Taiwan responded to a researcher developed questionnaire to get teachers' perceptions toward the use of Magic Board. The study revealed that teachers rated high scores on perceived teaching assistance, perceived learning assistance, and perceived competence of technology integration. The correlation among the three subscales indicates that teachers had a higher score on one scale correlated with higher scores on the other two scales. Findings show no gender difference on perceptions toward Magic Board. However, teachers who have data projectors in their classrooms rated higher scores on perceived teaching assistance and perceived competence of technology integration than those without data projectors in their classrooms.

Oner Uslu and Nilay (2012) investigated the impact of the Professional development program on Technology integration besides attitudes towards ICT in education of Turkish teachers. This study demonstrates the outcomes of one group pre-test and post-test design based on data, collected before, just after and six weeks after the Professional development programme. The results of the study revealed that, the Professional development programme had a positive effect on Technology integration continuing still at the sixth week while little or no change was detected on the teachers’ attitudes towards ICT in education.

Andre du Plessis and Paul Webb (2012) conducted a qualitative interpretive exploratory case study and investigated a sample of South African teachers' perceptions of the requirements for successful implementation of Information and Communication Technology Professional Teacher Development within disadvantaged South African township schools in the Port Elizabeth district in South Africa. The participating teachers' (N=30) perceptions and experience of Information and Communication Technology Professional Teacher Development were explored via
qualitative semi-structured interviews, an open-ended questionnaire, Internet user group responses, reflective journal writing and facilitator reflections. The findings indicate that they value three aspects, namely facilitator related aspects, training context aspects and school related aspects. These findings strengthen the Care, Competence, Relate, Hands-on, Ongoing, Assessment, Reflection, Read, Revise-replan, Feedback, Share, Support, Recognition and Resources framework offered as a heuristic for Information and Communication Technology related Professional Teacher Development and subsequent school and classroom implementation. The expectations of the teachers resonate with international expectations of Professional Teacher Development and underscore the magnitude of the task for those who aspire to meet the challenge they present.

Isman et al. (2012) investigated the Saudi Secondary school Teachers' Attitudes towards using Interactive Whiteboard in the classrooms. The research uses the Quasi-Experimental approach, with one group (100) teachers, and limited to the Secondary school Teachers that enrolled in the first semester of (2011/2012) academic year. The research uses Interactive Whiteboard Attitude Survey, observation skill card for using Interactive Whiteboard in the classrooms and structured interviews with students. The results indicated that there were appositive attitude towards using Interactive Whiteboard. But a few number of teachers used effectively the Interactive Whiteboard effectively in the classrooms. These results indicated that the teachers need a professional development program for effective using of Interactive Whiteboard effectively to help them in improving their Teaching skills and the students learning.

Amrit (2011) investigated the field of Information and Communication Technology (ICT) integration in education has indicated that teachers' attitudes towards ICT play a crucial role in the use of ICT by them. However, there is serious lack of qualitative studies to investigate the ICT related attitudes of the pre-service teachers, particularly science teachers. This qualitative study was conducted to explore the ICT use related attitudes of pre-service science teachers at the University of Adelaide. Specific aims were to identify the factors leading to these attitudes and to investigate the changes in their attitudes after teaching practice. The research was carried out in two phases i.e., pre- and post-teaching practice. Open-ended questionnaires were used to collect data from self-selected participants, followed by
in-depth one-to-one semi-structured interviews of purposefully selected participants in the second phase. The findings from data analysis, using comparative and open-coding techniques, indicated that overall attitudes of student-teachers were positive. But issues like lack of ICT facilities at schools and lack of ICT related knowledge and skills among student-teachers were emerged. It is recommended in the study that student-teachers should get appropriate training and opportunity to use ICT in educational contexts.

Sahin (2011) investigated the usage of ICT and the attitudes of high school English as Foreign Language teachers in Turkey towards Information and Communication Technology. Furthermore, this study focused on the relationship between computer attitudes and extension of ICT usage, computer attributes and personal characteristics. The data gathered through a questionnaire from in-service English as Foreign Language teachers (N=76) working at state schools were analyzed by using descriptive statistics and Pearson Correlations. The findings showed that the most widely used ICT tools are grade book, Internet, software for repetitive practice, processing texts, interactive exercises and PowerPoint presentations. It was also found that English as Foreign Language teachers hold positive attitudes towards the use of ICT for educational purposes: they regard computers as advantageous over traditional methods of instruction and suitable for their curriculum goals. However, the responses of the respondents indicate that insufficient class time and inadequate training opportunities are the major obstacles in the process of ICT integration.

Nurhan et al. (2011) investigated prospective science teachers’ attitudes towards computers in terms of gender, general academic achievement and grade level. This is a descriptive field survey. The study group of the research comprised of totally 226 students attending the Science Teaching Department of Education Faculty, Kisehir Ahi Evran University. "Attitude Scale towards Computers" and "Demographic Information Form" were used as data collection tools. In the analysis of the data, descriptive statistics, independent t-test, one-way ANOVA and Pearson correlation coefficient were used. At the end of the study, teachers’ attitudes towards computers were determined as in medium level. On the other hand, it was found out that prospective teachers’ points of attitudes towards computers differed significantly according to gender and grade level. In addition, it was determined that the teachers’ points of attitudes towards computers didn’t differ significantly according to general
academic achievement. It was revealed that there were high and medium-level positive relationships between prospective teachers' points of attitudes towards computers and gender, grade level and academic achievement.

**Ruqiyab (2011)** investigated how the 'level' of ICT uptake amongst teachers and the 'quality' of ICT use in classrooms can be promoted by challenging teachers' attitudes towards technology adoption. The issue of teachers 'technology confidence' and ICT lesson planning skills were tackled by providing training sessions that focused on encouraging them to use educational multimedia game resources for teaching and learning purposes. The results of this study revealed a positive shift in teachers' attitudes towards the received ICT training and positive attitudes towards the use of ICT in teaching. To encourage greater ICT use by teachers it is suggested that educational game playing workshops be considered as a form of sustainable in-service training.

**Mudasiru et al. (2011)** investigated the importance of ICT in empowering teachers and learners, and enhancing teaching and students' achievement has been highlighted in several studies. Similarly, the digital divide between the developed and developing nations had been of a serious concern to educators. The paucity of studies on ICT integration in the developing nations needs to be addressed so as to ensure total integration of ICT in the school curriculum. This study examined empirically student-teachers' competence and attitude towards information and communication technology. Gender influence on their competence and attitude were also examined. Participants were 382 student-teachers (181 males and 201 females) from the Faculty of Education, University of Ilorin, Nigeria. The data collected through a questionnaire were analyzed using percentages, means, and chi-square statistics. Findings revealed that majority of the student-teachers have positive attitude towards the use of ICT and they are competent in the use of few basic ICT tools. Overall, no significant difference was established between male and female student-teachers' attitudes and use of ICT. The implication is that the student-teachers lacked the necessary competence in the full integration of ICT in the curriculum. This underscores the need to improve the ICT contents of teacher education programs in universities in developing nations.
Samira (2011) investigated the appraisal of teacher attitudes towards computers that has gained importance following the widespread availability of microcomputers in schools all around the world. This study aims at investigating Egyptian teachers' attitudes towards computers in terms of gender and years of teaching experience. Attitudes of a sample of 118 public school teachers, 53 (45%) male and 65 (55%) female, were assessed using 'The Attitude Towards Computer Instrument' (ATCI), developed by Shaft et al (2004), which is a Likert type instrument with three factors of affective, cognitive, and behavioral. The gathered data were analyzed using an analysis of variance (ANOVA). Findings showed that the Egyptian public school teachers' attitudes towards computers are positive. There were no significant differences in terms of gender and teaching experience.

Michael Dartt. (2011) investigated the Impact of Teacher Attitudes on Technology use during Instruction. This collective, instrumental case study measured the impact of attitudes on the amount of time technology was used by three Algebra 2 teachers. The Theory of Planned Behavior (Ajzen, 1991) served as the theoretical framework. Data was collected through pre-observational surveys, classroom observations, and stimulated recall interviews. When common attitudes were discovered in participants, the amount of time that they used technology differed. Regarding the impact of attitudes on the amount of time spent using technology, results were mixed. In some instances attitudes had a profound influence, but in other circumstances they had none. There were cases where obstacles prevented the participants from using technology. Therefore, elements besides attitudes should be considered when determining why people neglect employing technology.

Mojgan et al. (2010) investigated the extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a numbers of variables related to the use of Information and Communications Technology (ICT). Findings indicated that four factors played a role in explaining the level of computer use by principals. These factors included high level of computer access, strong perceptions of the attributes of ICT, high level of computer competence, as well as the high level of transformational leadership behaviors, all contributed significantly to the level of computer use by principals. All four constructs are equally important but have varying impacts on computer use.
Therefore, all four constructs should be viewed in an integrated manner in accordance to the conceptual model proposed in this study.

Papaoanou et al. (2010) explored the Cyprus primary school principals’ attitudes towards Information and Communication Technologies (ICT) as well as their perceptions about the factors that facilitate or inhibit ICT integration in primary schools in Cyprus. A mixed method approach was used to answer the research questions that guided this study. First, a survey was conducted among principals. Using a stratified random sampling 250 primary school principals from all over Cyprus (total population was 336) participated in this study. Data were collected through questionnaires, which were mailed to the principals. One hundred and thirty one questionnaires were received completed (response rate 52.4%). Then, a qualitative approach was followed. Eight principals were chosen to be interviewed based on specific criteria. The mixed method approach was chosen in order to safeguard the purpose of triangulation, complementarities, and expansion. Quantitative data were analyzed using the statistical pack-age SPSS and descriptive and inferential statistics were used to answer the research questions. The method of qualitative content analysis was used for the analysis of the qualitative data. Cyprus primary school principals, generally, hold positive attitudes towards ICT. However, a number of statistically significant differences were observed across gender, years of service, academic qualifications, access to a computer and the Internet at home, in-service training on ICT for teaching and learning purposes, existence of a computer in the principal’s office, computer experience, and the principals’ attitudes towards ICT. In addition, even though principals value the importance of ICT in the teaching and learning process as well as for the fulfillment of their managerial and administrative purposes, they still need more tailor-made in-service training and incentives in order to transfer their theoretical enthusiasm into practice. Moreover, principals are aware of a number of factors that can facilitate or inhibit ICT integration. These factors can be divided in two main categories: internal factors (inspiring and competent leadership, school-based in-service training on ICT, capable ICT coordinator, provision of incentives to the ICT coordinator, involvement of primary stakeholders in the integration process, collaboration with the district ICT advisory teacher, teachers’ competence and knowledge on ICT, acceptance of the innovation from the teachers) and external factors (centre-based in-service training on ICT, pupils’
background knowledge on ICT, technical support-maintenance of ICT, time available for principals to prepare the ICT integration, number of computers per class, support of the innovation from the Ministry of Education and Culture).

Afshari et al. (2010) investigated the extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a number of variables related to the use of information and communications technology (ICT). Findings indicated that four factors played a role in explaining the level of computer use by principals. These factors included high level of computer access, strong perceptions of the attributes of ICT, high level of computer competence, as well as the high level of transformational leadership behaviors, all contributed significantly to the level of computer use by principals. All four constructs are equally important but have varying impacts on computer use. Therefore, all four constructs should be viewed in an integrated manner in accordance to the conceptual model proposed in this study.

Cemil et al. (2010) determined teachers’ ICT integration stages according to CEO Forum’s standards and factors affecting their integration. Teachers are expected to use ICT in their teaching practice. Hence, it is crucial that their integration stages and factors affecting it are examined. A survey method was employed for this study. A sample of 200 teachers was selected randomly out of 460 teachers working in primary schools in Usak, Turkey. Researchers of this study developed an ICT integration questionnaire. Analysis of the data reveals that the teachers are in three different stages in ICT integration. A significant relationship is discovered between feelings of inadequacy in using ICT and exhibiting stage 1 behaviors. It is also clear that the ICT knowledge of teachers is the most important variable for the teachers who were at the third (the highest) stage of ICT integration. A model showing interrelations among factors influencing ICT integration behaviors were drawn for further studies to be tested.

Bulent et al. (2009) investigated the Integration of Information and Communication Technologies (ICT) into education has been an important concern in many countries. Recently, Turkish Ministry of Education has also done great efforts and major financial investments to implement ICT into teaching and learning environments. However, as in many developing countries, ICT tools are provided to
teachers without considering their attitudes toward ICT. The purpose of this study was to reveal Turkish primary science teachers' attitudes toward ICT in education and then explore the relationship between teachers' attitudes and factors which are related to teachers' personal characteristics (gender, age, computer ownership at home, and computer experience). In order to collect data, a self constructed tool (STATICTE) was developed by researchers and administered to 1071 science teachers almost uniformly distributed in 7 geographic regions of Turkey. In data analyses, descriptive statistics were used to describe and summarize the properties of the mass of data collected from the respondents. The results indicate that Turkish science teachers have positive attitudes toward ICT and although teachers' attitudes toward ICT do not differ regarding gender, it differs regarding age, computer ownership at home and computer experience.

Timothy (2008) examined the attitudes towards use of computers among pre-service teachers. A sample of 139 pre-service teachers was assessed for their computer attitudes using a Likert type questionnaire with four factors: affect (liking), perceived usefulness, perceived control, and behavioral intention to use the computer. The results of this study showed no gender or age differences among pre-service teachers on computer attitudes. However, there were significant differences for computer attitudes by the subject areas that pre-service teachers had been trained during their university education: Humanities, Sciences, Languages and General (Primary). Correlation analyses revealed significant associations between years of computer use and level of confidence, and computer attitudes.

Gulbahar and Guven (2008) explored the use of ICT tools in primary schools in the social studies subject area, by considering various variables which affect the success of the implementation of the use of these tools. A survey was completed by 326 teachers who teach fourth and fifth grade at primary level. The results showed that although teachers are willing to use ICT resources and are aware of the existing potential, they are facing problems in relation to accessibility to ICT resources and lack of in-service training opportunities.

Deniz (2007) investigated the computer experiences and computer attitudes of prospective class teachers. The research also investigated the differences between computer attitudes and computer experiences, computer competencies and the
influence of genders. Ninety prospective class teachers participated in the research. Computer Attitude Scale- Marmara (CAS-M), and a questionnaire, about their computer experiences, and opinions toward the use of computers in the classroom setting, were administrated. The major findings are as follows: (1) 62% of prospective class teachers have computer at home; (2) 50% of the computer owners have computers less than three years; (3) No significant differences were found between computer attitudes and gender; (4) Differences were found between general computer attitudes and computer liking attitudes of prospective class teachers based on their computer competencies in favor of more competent ones.

Abdulkafi (2004) explored the attitudes of high school English as Foreign Language (EFL) teachers in Syria toward ICT. In addition, the study investigated the relationship between computer attitudes and five independent variables: computer attributes, cultural perceptions, computer competence, computer access, and personal characteristics (including computer training background). The findings suggest that teachers have positive attitudes toward ICT in education. Teacher’s attitudes were predicted by computer attributes, cultural perceptions and computer competence. The results point to the importance of teacher’s vision of technology itself and the cultural conditions that surround its introduction into schools in shaping their attitudes toward technology and its subsequent diffusion in their educational practice.

Rhonda (2002) investigated the effects of technology integration education on the attitudes of teachers and students. Major findings regarding the effects of technology integration education on elementary school teachers are presented. A study of a K–5 treatment site versus two comparison schools over one academic year indicates that teachers progress one stage in a six-stage technology adoption model as a result of focused, needs-based technology integration education delivered throughout the school year. Needs-based technology integration education is shown to have a rapid, positive effect on teacher attitudes, such as computer anxiety, perceived importance of computers, and computer enjoyment. This type of education is shown to have a time lagged positive effect on the attitudes of students as well.
2. National Scenario

Principals and Teachers Attitude towards information and communication technology (ICT):

Prabhu (2013) investigated higher secondary school teachers’ attitude towards Information and Communication Technology. Random sampling technique has been used in the selection of the sample of as many as 166 higher secondary school teachers teaching in higher secondary schools situated in the Tiruvannamalai district of Tamilnadu, India. The attitude towards information and communication technology scale (ATICTS) constructed and validated by Vaiyapuri raja, P. et al., (2013) was used in the present investigation. Its intrinsic validity was found to be 0.79. The reliability of this scale was found to be 0.63. The mean and standard deviation for the entire sample and its sub-samples were computed for attitude towards information and communication technology score. The test of significance ("t" test) was used in order to find out the significance of the difference between the means of the attitude towards information and communication technology score and the SPSS 11.5 was used to compute the ATICT scores. The findings of the study showed that as much as 0.60% of teachers showed a highly favorable attitude towards information and communication technology, also 22.90% of them shows a favorable level of attitude towards information and communication technology and 76.50% of them shows a neutral level of attitude towards information and communication technology. The findings also revealed that there is a significant difference between the male and female higher secondary school teachers in respect of their attitude towards information and communication technology. Moreover the higher secondary school female teachers are found to be better than the higher secondary school male teachers in respect of their attitude toward information and communication technology. The results also indicated that there is no significant difference between the higher secondary school teachers working in the schools located in the urban areas and in the rural areas in respect of their attitude towards information and communication technology. It has also been seen that there is no significant difference between the higher secondary school teachers residing in the urban areas and in the rural areas in respect of their attitude towards information and communication technology.
The results also suggest that there is no significant difference between the higher secondary school teachers teaching arts subjects and science subjects in respect of their attitude towards information and communication technology. It has also been found that there is a significant difference between the higher secondary school teachers having the teaching experience up to 10 years and above 10 years in respect of their attitude towards information and communication technology. Moreover, higher secondary school teachers having the teaching experience up to 10 years are found to be better than the higher secondary school teachers having the teaching experience above 10 years in respect of their attitude toward information and communication technology. A significant difference has been found between the higher secondary school teachers having the age limit up to 30 years and above 30 years in respect of their attitude towards information and communication technology. Moreover, higher secondary school teachers having the age limit up to 30 years are found to be better than the higher secondary school teachers having the age limit above 30 years in respect of their attitude toward information and communication technology.

Anita and Smriti (2013) Investigated teachers’ attitude towards Information and Communication Technology; level of their competence in ICT skills; their experiences with ICT; and how best they use ICT in their current educational practice. Purposive Sampling technique was used by the investigator. The investigator has used three questionnaires for the collection of data namely; (1) “Faculty Attitudes toward Information Technology (FAIT)”, consisting of a total of 68 items on a five point Likert type scale, was administered on teachers to gather data on five separate factors namely: Enthusiasm/Enjoyment (F1); Anxiety (F2); Avoidance (F3); E-mail Use for Classroom Learning (F4) and Productivity Improvement (F5), (2) “Technology Competencies for All Educators”, consisting of 73 items on a four point Likert type scale, was administered on teachers to gather data on their proficiency in ten ICT skill categories and (3) “Technology Use Questionnaire”, consisting of 36 items on a five point Likert scale, was used as an instrument to elicit information from the teachers on how they use applications of ICT in planning their teaching and in their actual instructional practice.

This study was aimed to explore how the proficiency in ICT skills and attitude towards technology can help in ICT-pedagogy integration. The results reveal a strong
positive relationship between the possession of ICT skills by teachers, their attitude towards ICT and actual implementation of ICT in their classroom teaching.

Padmavathi (2013) investigated Secondary School Teachers’ Perceptions, Competency and Use of Computers. The investigator attempted to understand the use of Information and Communication Technology, particularly the use of computers among secondary school teachers for teaching and learning. The main focus of the study was to explicate teachers’ perceptions and competency in relation to actual use of computers in classroom teaching. The sample of the study was secondary school teachers working in the government and government aided schools in the union territory of Pondicherry. A Self-administered questionnaire was used for the collection of data from randomly selected 134 secondary school teachers. The questionnaire consists of information on socio-demographic profile; ownership, knowledge and training in computer; purpose of use of computer, teachers’ perception of computer technology for classroom transaction, computer competency and actual use of computer for teaching. The findings of the study revealed that Teachers’ perception towards use of computer was favorable. Age, gender, training in computers, teaching subject did not show significant difference in the teachers’ perception on use of computers. However, the actual use of computer by teachers seems to differ significantly by age, gender, computer ownership, teaching subject, teachers’ competency, and training. The findings also revealed that home access to computers; skill training and competency of teachers are the main determinants of integration of ICT in school education.

Shabnam, Jamsandekar and Nalavade (2012) investigated the relationship between teacher’s attitude towards ICT teaching, student engagement in the class and teaching time. The participants were the experienced teachers under the 30 to 40 age group of the computer science department of Smt.kasturbai Walchand College, Sangli. Results indicated significant relations between the teacher’s attitudes towards ICT teaching and teaching time on the course. Information society is mainly a consequence of continuing development in new technologies and requires people who use computer technologies. In this new era, educational systems seek to prepare teachers and students for the work force and computer literacy becomes vital in higher education. This is especially important for the Faculty of Computer Sciences. The purpose of this study is to examine the relationship between
1. Teacher’s attitude towards ICT teaching and Student engagement in the class.

2. Teacher’s attitude towards ICT teaching and teaching time required.

3. Teacher’s attitude towards ICT teaching time and Student engagement in the class.

Nishta (2012) investigated the teacher educators’ attitudes towards technology integration in classrooms. The investigator has selected 21 teacher educators who participated in the study from a teacher education college of North India. The researcher has used Teacher Educators’ Attitude towards ICT Scale having forty items for the collection of data. The results revealed that most of the teacher educators have positive attitudes towards ICT. The findings also reveal that no gender differences exist on attitudes towards ICT.

Rajasekar and Vaivyapuri (2007) investigated higher secondary school teacher’s computer knowledge and their attitude towards computer. Cluster sampling technique was used to select the sample of as many as 670 teachers working in higher secondary schools of Cuddalore district of Tamil Nadu, India. The investigator has used computer knowledge test (CKT) and attitude towards computer scale. The mean and standard deviations, percentage, t-test, Pearson’s product–moment ‘r’ were used for analysis of data. It was found that as much as 60-40% of the teachers had relatively favorable attitude towards computer and only 39.6% of them had relatively an unfavorable attitude towards computer. This trend was seen in respect of the subsamples too. There was no significant difference in attitude towards computer between male and female teachers, between the teachers working in the urban and rural schools, between the teachers working in government schools and private schools, and between the secondary grade teachers and postgraduate teachers. There was a significant difference in attitude towards computer between the secondary grade teachers and graduate teachers. Secondary grade teachers were better than graduate teachers in their favorableness of attitude towards computer. There was also a significant difference in attitude towards computer between graduate teachers and post graduate teachers. Postgraduate teachers were better than graduate teachers in their favorableness of attitude towards computer. There was a significant and positive relationship between the computer knowledge and the attitude towards computer of the higher secondary school teachers.
Mishra and Panda (2007) described the process of the development of an empirically based psychometrically sound instrument to measure faculty attitude towards e-learning. The 12-item attitude towards e-learning scale was developed showed a high probability of differentiating between positive and negative attitudes towards e-learning. However, the investigator suggested that the scale may be used alongside a 'social desirability scale' to reduce the limitations of attitude measurement.

Mishra and Panda (2007) studied the attitude of faculty members from IGNOU towards e-learning, and to identify barriers and motivators of e-learning adoption and use. Data for the study were obtained from the 150 full time faculty members of the IGNOU and the method used was survey technique. The findings suggested that extensive use of computers and email has a high level relationship with positive attitude towards e-learning. The most significant barriers perceived by the faculty included poor Internet access by 7 students and lack of training on e-learning, followed by institutional policy on and instructional design for e-Learning. The important motivators included personal interest to use technology, intellectual challenge, and sufficient provision for technology infrastructure.

Annaraja and Joseph (2006) studied the level of attitude towards ICT of teacher-trainees. Random sampling technique was used for selecting the sample of 13 male and 18 female teacher trainees from the teacher education centre of MG University, k Ottayam. Attitude towards ICT scale developed by the investigator was used as a tool to collect data. For analyzing the data t-test and chi-square test were used. The findings of the study were: a) it was found that 54% of male teacher trainees have high level of attitude towards ICT. b) 78% of female teacher trainee has high level of attitude towards ICT. c) There were no significant association between male and female teacher trainees' attitude towards ICT and (a) fathers' educational qualification (b) fathers occupation. (c) Mothers educational qualification (d) family income.

Kumar (1993) investigated the attitude of students and teachers towards educational television programmes and the impact of these programs on learning by the students. Historical and experimental method was used in research. Treatment was given with the help of 4 video cassette (20 minutes of each) developed by the center.
for educational technology, Lucknow. The sample was taken from 6 different primary schools of Lucknow city. Attitude towards educational television program scale and achievement test in Geography and social studies were used for data collection. The data were analyzed by computing percentages. The findings of the study were: 1) both the teachers and the students had favorable attitude towards educational television programs. 2) Students and teachers in general were satisfied with the technical aspect of program production such as clarity of sound and picture.

2.3 Critical Appraisal

A brief description of the proceeding studies leads to the conclusion that the studies conducted in the field of Principals and teachers attitude towards ICT and its implementation seems to be increasing, moving towards new areas and achieving new heights. A critical analysis of above mentioned studies give rise to certain substantive inquires which need to be highlighted and addressed for the sake of further research. Most of the studies whether conducted either in India or abroad support multiple results leading to phenomena where the need of further research becomes imperative.

The studies related to Principals and teachers attitude towards ICT, their perception towards ICT, integration, application or implementation of ICT, computer competence, computer experiences, level of competence in ICT skills and the like conducted in the International scenario reflected contrary or mixed inferences. Kaur and Chan (2014) investigated the knowledge level, attitude towards the use of ICT in teaching-learning and obstacles faced by the in-service teachers in secondary schools. The findings of the study revealed that teachers were comfortable with the use of certain ICT applications. The respondents demonstrated a positive attitude towards using ICT. The findings also revealed that a connected classroom can be effective for students' learning to happen. It was also found that the attitudes of teachers on use of ICT vary with their years of experience and level of knowledge on ICT. Bolandifar, et al (2013) investigated the attitudes of Malaysian English language teachers toward integrating the Internet technology in English language classes. The results revealed that Malaysian teachers showed positive attitudes toward Internet usage in general. Lack of Internet access and computer facilities, insufficient computer skills, and lack of time was reported as obstacles to integrate Internet in the classrooms. Norma (2013) investigates the relationship between the leadership styles of public school principals in Lebanon and their attitudes and the level of use of technology for
educational purposes in their schools. Findings suggest the existence of positive correlation between the autocratic leadership styles of school principals and their negative attitudes towards the use of ICT for educational purposes. The result of the study also showed that positive correlation existing between principals’ attitudes towards the use of ICT for educational purposes and the level of its use by their teachers in schools. Abdelaziz (2013) investigated the relationship between the age of teaching staff and their attitude toward ICT. The results showed that there is a moderate and positive relationship between the age of participants and their attitude towards ICT. Lazarus Makewa et al. (2013) investigated teachers’ and administrators’ perceptions on the importance of Information and Communications Technologies (ICT) in secondary school administration. The findings of the study showed that there was a significant difference between the perceptions of teachers and administrators on the importance of ICT use in the secondary school administration. Emmanuel Achor and Joshua Shaibu (2013) investigated the attitude dimensions of secondary school social studies teachers towards computer usage in Kogi State Nigeria. Qualification and Gender influence on their use was examined. The findings of the study revealed that Social studies teachers with higher qualification have higher negative attitude towards the use of computer than those with lower qualification. Male social studies teachers have higher negative attitude towards the use of computer than their female counterparts. However, no significant difference was established between male and female social studies teachers and use of computer. Yuan Yuan and Chun-Yi Lee (2012) investigated elementary school teachers’ perceptions toward the use of ICT. Findings showed no gender difference on perceptions toward the use of ICT. Oner Uslu and Nilay (2012) investigated the attitudes of Turkish teachers towards ICT in education. The results of the study revealed that the Turkish teachers had positive attitudes towards ICT in education. André du Plessis and Paul Webb (2012) conducted a qualitative interpretive exploratory case study and investigated a sample of South African teachers’ perceptions of the requirements for successful implementation of Information and Communication Technology (ICT). The findings indicate that they value three aspects, namely facilitator related aspects, training context aspects and school related aspects. Isman et al. (2012) investigated the Saudi Secondary school Teachers’ Attitudes towards using Interactive Whiteboard in the classrooms. The results indicated that there were appositive attitude towards using Interactive Whiteboard. Sahin (2011) investigated the usage of ICT and the attitudes
of high school EFL teachers in Turkey towards Information and Communication Technology. The findings showed that EFL teachers hold positive attitudes towards the use of ICT for educational purposes. The results also showed that insufficient class time and inadequate training opportunities are the major obstacles in the process of ICT integration. Nurhan et al. (2011) investigated prospective science teachers' attitudes towards computers. The findings of the study showed that teachers' had moderate attitudes towards computers. It was revealed that there were high and medium-level positive relationships between prospective teachers' points of attitudes towards computers and gender, grade level and academic achievement. Mudasiru et al. (2011) investigated the importance of ICT in empowering teachers and learners, and enhancing teaching and students' achievement has been highlighted in several studies. This study examined empirically student-teachers' competence and attitude towards information and communication technology. Findings revealed that majority of the student-teachers have positive attitude towards the use of ICT. No significant difference was established between male and female student-teachers' attitudes and use of ICT. Samira (2011) investigated Egyptian teachers' attitudes towards computers in terms of gender and years of teaching experience. Findings showed that the Egyptian public school teachers' held positive attitude towards ICT. There were no significant differences in terms of gender and teaching experience. Michael Datt. (2011) Investigated, "The Impact of Teacher Attitudes on Technology use during Instruction". The findings showed that common attitudes were discovered in participants however, the amount of time that they used technology differed. Regarding the impact of attitudes on the amount of time spent using technology, results were mixed. Papaloannou et al. (2010) explored the Cyprus primary school principals' attitudes towards Information and Communication Technologies (ICT) as well as their perceptions about the factors that facilitate or inhibit ICT integration in primary schools in Cyprus. The findings showed that Cyprus primary school principals, generally, hold positive attitudes towards ICT. However, a number of statistically significant differences were observed across gender, years of service, academic qualifications, access to a computer and the Internet at home, in-service training on ICT for teaching and learning purposes, existence of a computer in the principal's office, computer experience, and the principals' attitudes towards ICT. Bulent et.al (2009) investigated Turkish primary science teachers' attitudes toward ICT in education and then explores the relationship between teachers' attitudes and
factors which are related to teachers’ personal characteristics. The results indicate that Turkish science teachers have positive attitudes toward ICT. Timothy (2008) examined the attitudes towards use of computers among pre-service teachers. The results of this study showed no gender or age differences among pre-service teachers on computer attitudes. Deniz (2007) investigated the computer experiences and computer attitudes of prospective class teachers. The research also investigated the differences between computer attitudes and computer experiences, computer competencies and the influence of genders. The major findings showed that no significant differences were found between computer attitudes and gender however differences were found between general computer attitudes and computer liking attitudes of prospective class teachers. Abdulkafi (2004) explored the attitudes of high school English as Foreign Language (EFL) teachers in Syria toward ICT. The findings suggest that teachers have positive attitudes toward ICT in education.

Eid Al harabi (2014) investigated successful implementation of ICT in education. The findings indicate that ICT implementation should begin with the identification of an educational problem and deciding what students, teachers or schools want to achieve, not with the provision of technology. Effective ICT implementation requires using ICTs as knowledge construction tools rather than instructional tools. Furthermore, ICT becomes significant when its use is linked to teachers’ visions and levels of knowledge. Laaria (2013) investigated teachers’ skills that influenced the process of adoption and use of ICT in public secondary schools in Meru County. The findings of the study showed that there was limited supply of qualified ICT teachers in Kenya. More ICT teachers should be employed in public secondary schools and trained in ICT skills to make them effectively deliver ICT based curriculum. In-service courses should be designed that can enable teachers to acquire ICT skills. Continued professional development of teachers is central to successful implementation of ICT in schools. Generally, teachers had positive attitudes towards adoption and use of ICT in schools. Tayo and Adedayo (2013) investigated secondary schools teachers’ perceived competence in the use of ICT’s with respect to computer basics, use of the Internet, and their ability to use simple software’s. The findings of the study showed that most teachers in Ogun State secondary schools do not have the required competence in ICT. The findings also revealed that those teachers in the humanities have more competence in ICT than
teachers in the sciences. The results also indicate that academic qualification of a teacher does not have any effect on teacher’s competence in ICT. The results also showed that teachers’ competence in the use of ICT is not influenced by their teaching experience. It is then evident that the present crop of teachers needs to be retrained to improve their competence in ICT usage. Amrit (2011) investigated the field of Information and Communication Technology (ICT) integration in education has indicated that teachers’ attitudes towards ICT play a crucial role in the use of ICT by them. The findings indicated that overall attitudes of student-teachers were positive. Ruqiyabi (2011) investigated how the ‘level’ of ICT uptake amongst teachers and the ‘quality’ of ICT use in classrooms can be promoted by challenging teachers’ attitudes towards technology adoption. The results of this study revealed a positive shift in teachers’ attitudes towards the received ICT training and positive attitudes towards the use of ICT in teaching. Mojgan et al. (2010) investigated the extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a numbers of variables related to the use of information and communications technology (ICT). Findings indicated that four factors played a role in explaining the level of computer use by principals. These factors included high level of computer access, strong perceptions of the attributes of ICT, high level of computer competence, as well as the high level of transformational leadership behaviors, all contributed significantly to the level of computer use by principals. Afshari et al. (2010) investigated the extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a number of variables related to the use of information and communications technology (ICT). Findings indicated that four factors played a role in explaining the level of computer use by principals. These factors included high level of computer access, strong perceptions of the attributes of ICT, high level of computer competence, as well as the high level of transformational leadership behaviors, all contributed significantly to the level of computer use by principals. Cemil et.al (2010) determined teachers’ ICT integration stages according to CEO Forum’s standards and factors affecting their integration. Teachers are expected to use ICT in their teaching practice. A significant relationship is discovered between feelings of inadequacy in using ICT and exhibiting stage 1 behaviors. It is also clear that the ICT knowledge of teachers is the most important variable for the teachers who were at the highest stage of ICT integration. Gulbahar and Guven (2008) explored the use of ICT tools in primary schools in the
social studies subject area. The results showed that although teachers are willing to use ICT resources and are aware of the existing potential, they are facing problems in relation to accessibility to ICT resources and lack of in-service training opportunities. Rhonda (2002) investigated the effects of technology integration in education on the attitudes of teachers and students. The findings of the study showed that needs-based technology integration education is shown to have a rapid, positive effect on teacher attitudes.

The investigations conducted in the national scenario having any of the variables relevant to the present study manifested varied or mixed results. Prabhu (2013) investigated higher secondary school teachers’ attitude towards Information and Communication Technology. The findings of the study revealed that as much as 0.60% of teachers manifested a highly favorable attitude towards information and communication technology, also 22.90% of them shows a favorable level of attitude towards information and communication technology and 76.50% of them shows a neutral level of attitude towards information and communication technology. The findings also revealed that there is a significant difference between the male and female higher secondary school teachers in respect of their attitude towards information and communication technology. Moreover the higher secondary school female teachers are found to be better than the higher secondary school male teachers in respect of their attitude toward information and communication technology. The results also indicated that there is no significant difference between the higher secondary school teachers working in the schools located in the urban areas and in the rural areas in respect of their attitude towards information and communication technology. It has also been seen that there is no significant difference between the higher secondary school teachers residing in the urban areas and in the rural areas in respect of their attitude towards information and communication technology. The results also suggest that there is no significant difference between the higher secondary school teachers teaching arts subjects and science subjects in respect of their attitude towards information and communication technology. It has also been found that there is a significant difference between the higher secondary school teachers having the teaching experience up to 10 years and above 10 years in respect of their attitude towards information and communication technology. Moreover higher secondary school teachers having the teaching experience up to 10 years are
found to be better than the higher secondary school teachers having the teaching experience above 10 years in respect of their attitude toward information and communication technology. A significant difference has been found between the higher secondary school teachers having the age limit up to 30 years and above 30 years in respect of their attitude towards information and communication technology. Moreover higher secondary school teachers having the age limit up to 30 years are found to be better than the higher secondary school teachers having the age limit above 30 years in respect of their attitude toward information and communication technology. Anita and Smriti (2013) investigated teachers’ attitude towards Information and Communication Technology; level of their competence in ICT skills; their experiences with ICT; and how best they use ICT in their current educational practice. Purposive Sampling technique was used by the investigator. The investigator has used three questionnaires for the collection of data. The results reveal a strong positive relationship between the possession of ICT skills by teachers, their attitude towards ICT and actual implementation of ICT in their classroom teaching. Padmavathi (2013) investigated Secondary School Teachers’ Perceptions, Competency and Use of Computers. The findings of the study revealed that Teachers’ perception towards use of computer was favorable. Age, gender, training in computers, teaching subject did not show significant difference in the teachers’ perception on use of computers. However, the actual use of computer by teachers seems to differ significantly by age, gender, computer ownership, teaching subject, teachers’ competency, and training. The findings also revealed that home access to computers; skill training and competency of teachers are the main determinants of integration of ICT in school education.

According to Shabnam Mahat, Jamsandekar and Nalavade (2012) there is a significant relationship between the teacher’s attitudes towards ICT teaching and teaching time on the course. Information society is mainly a consequence of continuing development in new technologies and requires people who use computer technologies. In this new era, educational systems seek to prepare teachers and students for the work force and computer literacy becomes imperative. Rajasekar and Vaiyapuri (2007) investigated higher secondary school teacher’s computer knowledge and their attitude towards computer. It was found that as much as 60-40% of the teachers had relatively favorable attitude towards computer and only 39.6% of them
had relatively an unfavorable attitude towards computer. There was no significant
difference in attitude towards computer between male and female teachers, between
the teachers working in the urban and rural schools, between the teachers working in
government schools and private schools, and between the secondary grade teachers
and postgraduate teachers. There was a significant difference in attitude towards
computer between the secondary grade teachers and graduate teachers. Secondary
grade teachers were better than graduate teachers in their favorableness of attitude
towards computer. There was also a significant difference in attitude towards
computer between graduate teachers and post graduate teachers. Postgraduate teachers
were better than graduate teachers in their favorableness of attitude towards computer.
There was a significant and positive relationship between the computer knowledge
and the attitude towards computer of the higher secondary school teachers. Anmaraja
and Joseph (2006) studied the level of attitude towards ICT of teacher-trainees. The
findings of the study showed that 54% of male teacher trainees have high level of
attitude towards ICT, 78% of female teacher trainee have high level of attitude
towards ICT. There was no significant association between male and female teacher
trainees attitude towards ICT. Mishra and Panda (2007) studied the attitude of faculty
members from IGNOU towards e-learning, and to identify barriers and motivators of
e-learning adoption and use. The findings of the study suggested that extensive use of
computers and email has a high level relationship with positive attitude towards e-
learning. Kumar (1993) investigated the attitude of students and teachers towards
educational television programmes and the impact of these programs on learning by
the students. The findings of the study showed that both the teachers and the students
had favorable attitude towards educational television programs.

After making extensive review of related literature, the investigator found that
studies on Information and Communication Technology had been conducted in both
India and abroad. These studies had taken different Information and Communication
Technology related aspects under consideration. Most of the studies have shown that
there is significant effect of secondary school Principals and teachers' attitude on the
implementation of Information and Communication Technology. In various studies it
was found that technological innovations play a great role for improving classroom
teaching and professional development of teachers. It is pertinent to mention that no
study has been conducted on secondary school Principals and teachers’ attitude
REFERENCES


## CHAPTER-3

**RESEARCH DESIGN AND METHODOLOGY**

3.1 Introduction
3.2 Research design and methods
3.3 Mixed mode research approach
3.4 Ethical measures
3.5 Variables under study
3.6 Sources of data
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3.8 Description of Data collection techniques
3.9 The pilot sample
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3.11 Administration of research tools
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3.13 Conclusion
CHAPTER-3
RESEARCH DESIGN AND METHODOLOGY

"When you do not know a thing, to allow that you do not know it - this is knowledge."
(Confucius, 551 BC - 479 BC)

3.1 Introduction

This chapter presents a detailed account of the strategy that was followed by the researcher in conducting the research. It covers the research design, research method, sampling and sampling techniques, description and construction of research tools, techniques and procedures for the collection and analysis of data.

3.2 Research Design and Methods

Research design is the conceptual framework within which the research is conducted by the researcher. A research design becomes the researcher’s systematic plan of action. It is a plan for collecting and analyzing data in an economic, efficient and relevant manner. According to Kerlinger,

"Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance."

Russel Lackoff views research design as,

"Design is the process of making decisions before a situation arises in which decision has to be carried out. It is a process of deliberate anticipation dictated towards bringing an unexpected situation under control."

Vimal Shah defines research design as,

"The design is the plan of study, and as such it is planned in every study, uncontrolled as well as controlled and subjective as well as objective."

Research design depicts the modus operandi for conducting a particular research study. This includes when, from whom, and under what conditions the data will be obtained (Mc Millan and Schumacher, 2001). When the research is conducted within the area of a definable mode of investigation, it becomes highly purposeful, meaningful and systematic. Thus, research design is the systematic way of investigation (Chikuya, 2007). The various research designs that can be employed for conducting the research are; case studies, historical designs, experimental designs,
and descriptive survey designs. However, the 'descriptive research design' was chosen by the investigator to carry out the current study on 'Secondary school Principals and teachers attitude towards ICT and its implementation in Jammu Kashmir and Uttar Pradesh' in India. Thus, descriptive survey method was employed as a method of research. The descriptive research design enables the researcher to describe or present picture of a phenomenon under investigation.

Basically there are three approaches to research, namely quantitative, qualitative and mixed mode research approaches. The investigator used the mixed mode research approaches in the current study.

![Diagram of Research Approaches]

**Fig. 3.1 Approaches of Research**

### 3.3 Mixed mode research approach

Mixed mode research method is an approach that combines quantitative and qualitative research methods in the same research study. Quantitative and qualitative methods are representing the *first and second methodological movements* respectively while as mixed mode research approach has been termed as the *third methodological movement* (Ridenour and Newman 2008; Teddlie and Tashakkori 2003, 2009). Quantitative and qualitative approaches to research are often understood as opposite to one another. The main difference between the quantitative and the qualitative approach to research is the relationship between cause and effect (Monyatsi 2002). In the quantitative approach, statistical data analysis can be used to show such relationships, but the information rich qualitative research approach provides explanatory data from the interview and observation schedules. Recently mixed mode
of research approach has received much attention in the social and behavioural sciences (Tashakkori and Creswell 2008). In mixed mode research approach, both quantitative and qualitative research approaches are used either independently (concurrently) or dependently (sequentially) to understand a phenomenon of interest. When used dependently the findings from one approach helps to draw out the inferences from the other. In the present study the investigator has followed a mixed mode research approach with a sequential strategy. This strategy helps the researcher to investigate the attitude of secondary school Principals and teachers first and then to understand the effect of the attitude on the implementation of ICT. The results from secondary school Principals and teachers attitude towards ICT helps to explore the status of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir.

Creswell and Clark (2007) advocated four major types of mixed method designs which are as;

(1) Triangulation which means merging qualitative and quantitative data to understand a research problem.

(2) Embedded means using either qualitative or quantitative data to answer a research question within a largely quantitative or qualitative study.

(3) Explanatory means use of qualitative data to help explain or elaborate quantitative results.

(4) Exploratory means (i.e., collect quantitative data to test and explain a relationship found in qualitative data). In the current study the researcher has followed triangulation design of mixed methods research approach. Proponents of mixed methods research appreciate the value of both quantitative and qualitative worldviews to develop a deep understanding of a phenomenon of interest.

Cresswell (1994) as quoted by Monyatsi (2002) suggests five benefits while combining qualitative and quantitative research approaches in a single study. These benefits are as under:

a) It helps to combine results.

b) It is complimentary as it may evolve different facts of a phenomenon.

c) It is developmental as the findings from one approach inform the other.
d) It facilitates contradictions and new perspectives to emerge.
e) Mixed methods add scope and breadth to a study.

Keeping the above mentioned benefits in view the investigator employs mixed mode research approach in the present study.

The current study investigates the 'Secondary school Principals' and Teachers' attitude towards Information and Communication Technology (ICT) and its implementation in Jammu and Kashmir and Uttar Pradesh.' In the present study the investigator employed two samples, the 'pilot sample' for the construction of tool and the 'main sample' for substantive inquiry.

The investigator employed 'Principals attitude towards ICT Scale’ and 'Teachers Attitude towards ICT Scale’ for measuring the secondary school Principals and teachers attitude towards ICT. While as the researcher employed 'Principals Implementation of ICT Scale’ and 'Teachers Implementation of ICT Scale’ for assessing the secondary school Principals and teachers level of implementation of ICT.

3.4 Ethical considerations

Ethics are usually considered to deal with beliefs about what is right or wrong, proper or improper, good or bad (McMillan and Schumacher 2001). In order to get the reliable and qualitative information from the respondents, the investigator must try to minimize the risk of participants/ subjects participating in a research study (Saunders et al. 2007). It is the responsibility of the investigator to ensure that ethical standards are adhered to. Therefore ethical measures were given due consideration throughout the study. The researchers of educational studies need to be more sensitive to ethical principles (Adam, 2005). Voluntary participation of the respondents, confidentiality and relationship with respondents was some ethical considerations that were taken care of while planning and conducting the present study. These measures were taken in order to ensure that the rights and welfare of the respondents would be protected and nobody will be harmed in any way during the process of the research.

Voluntary participation of the respondents is the pre-requisite for the success of the research. The respondents were fully informed about the purpose of the present study in advance before they fill in the scales. The researcher confirmed the
willingness of Secondary school Principals’ and Teachers’ to fill in the respective scales during the visit as they were the respondents in the present study and was given assurance of full confidentiality and anonymity. The investigator ensured confidentiality by managing to capture the confidence of respondents by revealing what the purpose of the investigation was that prompted them to divulge information that was needed for the research. The personal data gathered from the participants should be secured or concealed and made public behind a shield of anonymity (Christians, 2000). According to Maseko (2002), researchers are ethically obliged to possess a high level of competence and skill in undertaking a study. The investigator maintained a healthy rapport with the respondents of the targeted population and shared a high degree of trust throughout the investigation.

3.5 Variables under study

3.5.1 Independent Variables

- Secondary School Principals and Teachers Attitude

3.5.2 Dependent Variable

- Implementation of ICT

3.6 Sources of data

The investigator used primary as well as secondary sources of data in the current study. The primary sources of data were secondary school Principals and teachers who were the respondents from whom the reliable and adequate information was got through scales. The secondary sources of data constitute the documents like; DISE Reports, Indian statistics, census reports and the minutes, recommendations and reports of Project monitoring and evaluation group. Appropriate statistical treatments were used for the analysis of data.

3.7 Target Population

A population is any set of persons or objects that possesses at least one common characteristic (Busha and Harter, 1980). According to Monyatsi (2002), a population in research is a discrete group of units of analysis such as organizations or schools. That is why secondary schools were used for the selection of sample for the study rather than using all educational institutions. The target population for the present study was secondary school Principals and Teachers of Jammu Kashmir and Uttar Pradesh. However, the investigator has delimited the size of the target
population by including only secondary school Principals and teachers of District Pulwama of Jammu Kashmir and District Aligarh of Uttar Pradesh.

Pernia (2008) recognizes that the features of ICT are biased towards those who are already literate in a more traditional sense (have reading and writing skills) and are numerate (can understand and use numbers). Secondary school Principals and teachers, being literates, are therefore a suitable group for the present study investigating their attitude towards ICT and its implementation in Jammu Kashmir and Uttar Pradesh in India.

Fig. 3.2 Drawing of inferences about population from a Sample

3.7.1 Sampling

Limited time, lack of large amount of funds, and population scattered in a very wide geographical area often makes sampling necessary. Sample is a model or representation of the population under study. It is a unit that provides a practical and efficient means to collect data for the study. According to Manheim (1977), “a sample is a part of the population which is studied in order to make inferences about the whole population.” According to Saunders et al. (2007), sampling provides a valid alternative to a whole population because surveying an entire population may lead to budget constraints, time constraints and delay analysis of results. In defining ‘population’ from which the sample is taken, it is necessary to identify the ‘target population’ and ‘sampling frame’. The target population is one which includes all the units for which information is required. It should be noted that sampling frame is not a sample; rather it is the operational definition of the population that provides the basis for the sampling. The sampling frame in the present study is Principals and Teachers of secondary schools of Jammu Kashmir and Uttar Pradesh.
Sampling methods can be classified into probability and non-probability sampling (Panneerselvam, 2008). The different methods of data collection are shown in the figure (3.3) as under:

**Fig. 3.3**

**Data collection Methods**

- **Methods of data collection**
  - Census Method
  - Sampling Method

- **Probability Sampling**
  - Simple Random Sampling
  - Stratified Random Sampling
  - Systematic Sampling
  - Cluster sampling
  - Multistage sampling
  - Multiphase sampling

- **Non-Probability Sampling**
  - Convenience Sampling
  - Purposive Sampling
  - Quota Sampling
  - Snowball sampling
  - Volunteer sampling

The investigator employed probability sampling technique in the present study. The random sampling technique of probability sampling is considered to be the best and is preferred over other types of probability sampling. According to Gay (1987),

"Random sampling is the best single way to obtain representative sample. No technique, not even random sampling guarantees a representative sample, but the probability is higher for this procedure than for any other."

*(p.104)*
The investigator had selected all Principals of the selected secondary schools. However, after determining the actual number of secondary school teachers from the concerned departments, the secondary school teachers were selected through stratified random sample technique. The investigator selected a total of 76 Secondary Schools from the two states, thirty (30) from district Pulwama of Jammu Kashmir and forty six (46) from district Aligarh of Uttar Pradesh. However there were only thirty (30) government higher secondary schools in district Pulwama of Jammu and Kashmir and the investigator had selected all of them. Also the investigator selected all the (46) CBSE affiliated secondary schools from district Aligarh.

3.7.2 Deciding on a suitable sample size

The present study is confined to secondary stage only. That is why the researcher had selected only secondary schools. The number of secondary schools is very high in Uttar Pradesh and Jammu and Kashmir and it is not possible to select the whole population and that is why a small proportion (sample) from the target population has been selected from both the States. The larger the absolute size of a sample, the more closely its distribution will be to the normal distribution (Saunders et al., 2007). According to Paneerselvam (2008), the larger the size of the sample, the lower is likely the error in drawing generalization about the population.

The sample consisted of 30 higher secondary schools affiliated to Jammu and Kashmir Board of School Education from district Pulwama of Jammu and Kashmir and 46 Secondary schools affiliated to CBSE from district Aligarh of Uttar Pradesh making total of 76 secondary schools (see in Appendix- E). The initial sample consists of 631 respondents (76 secondary school Principals, 5 vice Principals and 550 secondary school teachers i.e. 300 from U.P and 250 from J&K). The investigator deleted some subjects due to the following reasons:

- Some respondents were outside the country.
- Respondents were busy in conducting exams.
- Some scales were incomplete as some respondents left some statements blank in one or more scales.
- Scales were returned totally blank.
- Few respondents were on either maternity or paternity leave.
- Some respondents have not returned the scales.
Finally after deleting some subjects, a sample of 529 was used in the current study from whom the relevant data was gathered by administering different research tools. The description of the sample is shown in the table 3.1 as under:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Target Group Selection</th>
<th>Sample Size Selected</th>
<th>Strategies for Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Secondary school Principals from district Pulwama (J&amp;K)</td>
<td>35</td>
<td>All</td>
</tr>
<tr>
<td>2.</td>
<td>Secondary school teachers from district Pulwama (J&amp;K)</td>
<td>236</td>
<td>Stratified Random sampling</td>
</tr>
<tr>
<td>3.</td>
<td>Secondary school Principals' from district Aligarh (Uttar Pradesh)</td>
<td>38</td>
<td>All</td>
</tr>
<tr>
<td>4.</td>
<td>Secondary school teachers from district Aligarh (Uttar Pradesh)</td>
<td>220</td>
<td>Stratified Random sampling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 529</td>
<td></td>
</tr>
</tbody>
</table>

3.8 Description of Data collection techniques

The data collection techniques are the research instruments used for the collection of data. The selection of research tool depends on the nature of research problem to be investigated and the research questions to be answered or the hypotheses to be tested. The research tools used in the present study are self constructed scales and document analysis. The investigator has used the following four scales for the collection of data:

1. A self constructed scale for measuring secondary school Principals attitude towards ICT.
2. A self constructed scale for measuring secondary school teachers’ attitude towards ICT.
3. A self constructed scale for assessing the level of implementation of ICT by the secondary school Principals.
4. A self constructed scale for assessing the level of implementation of ICT by the secondary school teachers.
The scale as a research tool is discussed in the section that follows;

3.8.1 Scale- A research tool

Scale is a measuring instrument consisting of a set of statements, symbols or numerals so designed that the statements, symbols or numerals can be assigned by rule to the individuals to whom the scale is applied. The individual manifests the information for which the scale has been designed to measure. Scale is used in two ways: to indicate a measuring instrument and to indicate the systematized numerals of the measuring instrument. We use it in both senses without bothering about a well defined difference (Kerlinger 2012).

The most commonly used techniques of data collection in education, social sciences and behavioural sciences research are interview, questionnaires, observation schedules, tests and scales. So, scales were used for the collection of data in the current study because they produce quantifiable data readily usable for statistical analysis. The scales when used in a research study produces standardized data which helps to increase the validity and reliability of results.

The present study focuses on secondary school Principals’ and teachers attitude towards ICT and its implementation in Uttar Pradesh and Jammu and Kashmir. The researchers employed four different scales to serve the purpose.

3.8.2 Development of Scales

The description of the development of scales used in the current study is as under;

1. Construction of ‘Principals Attitude towards ICT Scale’ and ‘Teachers Attitude towards ICT Scale’

The ‘Principals Attitude towards ICT Scale’ and ‘Teachers Attitude towards ICT Scale’ were developed on Likert Method, a method also known as ‘Method of Summated Ratings’. A summated rating scale is a set of statements to which the subjects respond with degrees of agreement or disagreement (Kerlinger 2012). The scales constructed according to Likert method uses five choices expressing different levels of agreement or disagreement. These two scales were designed to extract information from the subjects (secondary school Principals and teachers) on their attitude towards ICT with respect to the objectives of the study. The development of these scales involved the following steps:
- Preliminary Draft of the Scale
- Inquiry and evaluation of Statements
- Try-Out of the Scale
- Analysis of statements
- Final Draft of the Scales
- Scoring Procedures
- Validity and Reliability

1. Preliminary Draft of the Scale

The first step in the development of scales for measuring secondary school Principals and teachers' attitude towards ICT was the collection of statements for the preliminary drafts. For the collection of statements the investigator conducted extensive review of related literature, educational surveys, journals and scales used in different educational backgrounds (Al-Oteawi, 2002; Bannon, Marshall, and Fluegal, 1985; Bear, Richards, and Lancaster, 1987; Christensen & Knezek, 1996; Gardner, Discenza, and Dukes, 1993; Gressard and Loyd, 1986; Harrison and Rainer, 1992; Isleem, 2003; Jones and Clarke, 1994; Meier, 1988; Na, 1993; Robertson, Calder, Fung, Jones, and O.Shea, 1995; Sookmanan, 2002; Swadener and Hannafin, 1987) for the development of scales used for measuring secondary school Principals and teachers' attitude towards Information and Communication Technology and prepared separate and long lists of statements relevant for the determination of Principals and teachers' attitude towards ICT respectively. On the basis of this extensive review of related literature and scales used in different educational backgrounds, the investigator developed a preliminary draft of these scales. After preliminary scrutiny, editing of the statements and their pre-try-out and modification, the initial form of the scales comprised of (40) and (50) statements respectively on a five point rating scale were constructed.

2. Inquiry and evaluation of Statements

After the completion of the preliminary draft of 'Principals Attitude towards ICT Scale' and 'Teachers Attitude towards ICT Scale' in all respects, the investigator submitted them personally for open criticism and healthy suggestions to the experts, researchers and linguistic experts to improve the quality of the scales. These scales were evaluated by a panel of experts for face/ content/ expert validity. The panel included three content experts (Professors of Educational Technology), two bilingual
experts, one measurement expert, and four population experts (Secondary school principals and teachers). Most of the experts took much pain and were highly serious in the process of evaluation of each and every statement of these scales. They have made appreciable and worthy suggestions for the qualitative and quantitative improvement of the statements of these two scales. These suggestions include; reshaping of some statements, exclusion of some other statements, language upgradation and chronological and systematic arrangement of the statements. The feedback got from the panel of experts was used mainly to ensure that these scales measures the content areas of investigation and are culturally and technically appropriate for the context of the present study. After following the suggestions of the experts, the quality of these scales was improved and the revised version of these scales consisting (25) and (30) Likert type statements respectively were subjected for the tryout.

3. Try-Out of the Scale

The initial draft of the "Principals Attitude towards ICT Scale" consisted of (40) statements while as the initial draft of the "Teachers Attitude towards ICT Scale" consisted of (50) statements which were larger than the number of statements needed for the final scales. These two scales were subjected for the tryout on a small proportion of respondents who voluntarily participated from the target population (secondary school Principals and teachers). These scales were developed on a 5 point scale. The respondents (secondary school principals and teachers) were required to select their level of agreement or disagreement for each statement in the scales to indicate how they feel or react towards ICT. There was no right or wrong answer in the scales, however the response categories were; SD= strongly disagree, D= Disagree, UD= Undecided, A= Agree, SA= strongly agree.

4. Analysis of statements

With the help of SPSS Version 20, the total scores for (20) Principals and (100) teachers were arranged in a descending order. Twenty five percent (25%) of the high scores and twenty five percent (25%) of low scores were identified in both the scales and then, by doing "Paired samples T-test" for each of the statements, t-ratio was computed for the higher and the lower groups to find out the discriminating power of each statement. On the basis of the value of t-ratio, (15) statements of
'Principals attitude towards ICT scale' and (20) statements of 'Teachers attitude towards ICT Scale' were deleted as they were not significant even at (0.05) level of significance.

5. Final Draft of the Scales
The final draft of the scale for measuring secondary school principals' attitude towards ICT comprised of (25) statements. Distribution of positive and negative statements has been presented in table (3.2) below:

**Table 3.2**

<table>
<thead>
<tr>
<th>Statement Type</th>
<th>Statement Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>1,3,4,5,7,8,9,10,13,14,16,18,19,22,23,24=16</td>
</tr>
<tr>
<td>Negative</td>
<td>2,6,11,12,15,17,20,21,25= 9</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
</tr>
</tbody>
</table>

The final draft of the scale for measuring secondary school teachers' attitude towards ICT comprised of (30) statements. Distribution of positive and negative statements has been presented in table (3.3) below:

**Table 3.3**

<table>
<thead>
<tr>
<th>Statement Type</th>
<th>Number of statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>30</td>
</tr>
<tr>
<td>Negative</td>
<td>Nil</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

6. Scoring Procedures
The scoring procedures were same for both the scales in terms of the response categories. These two scales were developed on a 5-point Likert scale. Different values were assigned to different responses. These values were ranging from 1-5, where 5 (Strongly Agree) represents the maximum score of the scale and 1 (Strongly Disagree) represents the minimum score in respect of responses pertaining to positive statements. However, the values were reversed for the negative statements where
5(Strongly Disagree) represents the maximum score of the scale and 1(Strongly agree) represents the minimum score. The sum of these values gives the total score of attitude towards ICT for the respondent. The scale for measuring secondary school Principals’ attitude towards ICT consisted of (16) positive statements and (9) negative statements making a total of (25) statements as shown in the table (3.2). Thus there was polarity in the response category of “Principals Attitude towards ICT Scale”. While as the scale for assessing secondary school teachers attitude towards ICT consisted of all the (30) positive statements with no negative statement as shown in table (3.3) Thus, no polarity was found in the response category of “Teachers Attitude towards ICT Scale”. The polarity in the “Principals Attitude towards ICT Scale” will be used for subsequent statistical analysis.

7. Validity and Reliability

7.1 Validity

To establish validity of these two scales ‘Principals attitude towards ICT Scale’ and ‘Teachers attitude towards ICT Scale’, face or expert validity and construct validity was determined.

7.1.1 Face validity

In order to check the face validity of these two scales, the investigator submitted them to a panel of experts. The panel included three content experts (Professors of Educational Technology), two bilingual experts, one measurement expert, and four population experts (Secondary school principals and teachers).

7.1.2 Construct validity

To assess the construct validity of “Principals attitude towards ICT Scale” and “Teachers Attitude towards ICT Scale”, Pearson’s Product moment correlation technique was employed. The purpose of using Pearson Product moment correlation technique was to make these scales homogenous by evaluating consistency of each statement with the total scale and discarding the statements showing inconsistency. To this end, scores on each statement of the subjects were correlated with their total score. Based on the correlation between the statement scores and the total scores few statements from both the scales were deleted to finalize the final draft of these scales.
7.1.3 Pearson’s coefficient of correlation

The investigator calculated the relationship between each statement and the total score of ‘Principals Attitude towards ICT scale’ and the coefficient of correlation of all the statements were found significant. This indicates that all the statements are related to Principals attitude towards ICT and the scale has good construct validity. The researcher also calculated the relationship between each statement and the total score of ‘Teachers attitude towards ICT scale’ and the Pearson’s correlation coefficients were found significant as shown in the table (3.4). This indicates that the ‘Teachers attitude towards ICT scale’ has good construct validity.

Table 3.4
Showing correlation between each statement and Total Score of Teachers attitude towards ICT Scale

<table>
<thead>
<tr>
<th>Statement</th>
<th>‘r’ Values</th>
<th>Sig.</th>
<th>Statement</th>
<th>‘r’ Value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.430**</td>
<td>.001</td>
<td>16</td>
<td>.394**</td>
<td>.002</td>
</tr>
<tr>
<td>2</td>
<td>.031*</td>
<td>.000</td>
<td>17</td>
<td>.257**</td>
<td>.045</td>
</tr>
<tr>
<td>3</td>
<td>.412**</td>
<td>.001</td>
<td>18</td>
<td>.267**</td>
<td>.038</td>
</tr>
<tr>
<td>4</td>
<td>.390**</td>
<td>.002</td>
<td>19</td>
<td>.370**</td>
<td>.003</td>
</tr>
<tr>
<td>5</td>
<td>.513**</td>
<td>.000</td>
<td>20</td>
<td>.132*</td>
<td>.051</td>
</tr>
<tr>
<td>6</td>
<td>.307**</td>
<td>.016</td>
<td>21</td>
<td>.462**</td>
<td>.000</td>
</tr>
<tr>
<td>7</td>
<td>.572**</td>
<td>.000</td>
<td>22</td>
<td>.273*</td>
<td>.033</td>
</tr>
<tr>
<td>8</td>
<td>.343**</td>
<td>.007</td>
<td>23</td>
<td>.319**</td>
<td>.012</td>
</tr>
<tr>
<td>9</td>
<td>.348**</td>
<td>.006</td>
<td>24</td>
<td>.168*</td>
<td>.015</td>
</tr>
<tr>
<td>10</td>
<td>.300**</td>
<td>.019</td>
<td>25</td>
<td>.088*</td>
<td>.023</td>
</tr>
<tr>
<td>11</td>
<td>.227*</td>
<td>.048</td>
<td>26</td>
<td>.350**</td>
<td>.006</td>
</tr>
<tr>
<td>12</td>
<td>.364**</td>
<td>.004</td>
<td>27</td>
<td>.471**</td>
<td>.000</td>
</tr>
<tr>
<td>13</td>
<td>.535**</td>
<td>.000</td>
<td>28</td>
<td>.188*</td>
<td>.047</td>
</tr>
<tr>
<td>14</td>
<td>.544**</td>
<td>.000</td>
<td>29</td>
<td>.153*</td>
<td>.041</td>
</tr>
<tr>
<td>15</td>
<td>.423**</td>
<td>.001</td>
<td>30</td>
<td>.356*</td>
<td>.005</td>
</tr>
</tbody>
</table>

**Correlation is significant at 0.01 level
* Correlation is significant at 0.05 level

From the perusal of table (3.4), it can be interpreted that the correlation coefficient of all the statements were found significant. This indicates that all the
statements are related to Teachers attitude towards ICT and the scale has good construct validity.

7.2 Reliability

Reliability of the two scales "Principals attitude towards ICT Scale" and "Teachers Attitude towards ICT Scale" were assessed by using Cronbach's alpha. The Cronbach's alpha reliability coefficient for "Principals attitude towards ICT Scale" was equal to (0.71) and the Cronbach's alpha reliability coefficient for "Teachers Attitude towards ICT Scale" was found equal to (0.80). According to Garson (2008) an instrument is acceptable for research purposes when its reliability using Cronbach’s alpha is more than 0.70.

The Cronbach Alpha coefficient or the coefficient of reliability and Pearson’s correlation coefficient of two scales “Principals attitude towards ICT Scale” and “Teachers Attitude towards ICT Scale” is shown hereunder in the table that follows.

Table 3.5
Showing description of Attitude towards ICT scales

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the scale</th>
<th>No. of Statements</th>
<th>Reliability coefficient</th>
<th>Pearson’s correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Principals' Attitude Towards ICT Scale (PATICIT)</td>
<td>24</td>
<td>0.82</td>
<td>(.933, .944, .848, .868, etc.)**</td>
</tr>
<tr>
<td>2.</td>
<td>Teachers' Attitude Towards ICT Scale (TATICIT)</td>
<td>30</td>
<td>0.71</td>
<td>(.430, .412, .390, .513, etc.)**</td>
</tr>
</tbody>
</table>

** Correlation significant at 0.01 levels

2. Construction of 'Principals implementation of ICT Scale' and 'Teachers implementation of ICT Scale'

The 'Principals implementation of ICT scale' and 'Teachers implementation of ICT scale' was developed on Likert Methods. These scales were constructed in a way as to get information regarding the level of implementation of ICT from secondary school Principals and teachers. The development of these scales involved the following phases:
Preliminary Draft of the Scale
Try-Out of the Scale
Analysis of statements
Final Draft of the Scale
Scoring Procedures
Validity and Reliability

1. Preliminary Draft of the Scale

The statements for the preliminary draft of the two scales ‘Principal implementation of ICT scale’ and ‘Teachers implementation of ICT scale’ were prepared after reviewing available literature on the implementation of ICT and after consultation with two experts from Computer Science Department, two experts from Correspondence Education Department and two experts from English Department. After preparing the initial drafts of ‘Principal implementation of ICT scale’ and ‘Teachers implementation of ICT scale’ in all respects, these scales were subjected to screening and editing of the statements and for their pre-try-out and modification. The preliminary form of ‘Principal implementation of ICT scale’ consisted of (25) statements on a five point Likert type scales and the initial form of ‘Teachers implementation of ICT scale’ comprised of (30) statements on a three point respectively.

2. Try-Out of the Scale

The preliminary draft of ‘Principal implementation of ICT scale’ consisted of (25) statements and the initial draft of ‘Teachers implementation of ICT scale’ comprised of (30) statements which was higher than the number of statements required for the final draft of the scales. These two scales were applied for tryout on a small sample of (20) secondary school Principals and (100) secondary school teachers. The secondary school Principals were required to select their level of agreement for each statement to indicate how they feel to implement ICT on a 5-point Likert scale ranging from 1 to 5, where 5 (Strongly Agree) represents the maximum score of the scale and 1 (Strongly Disagree) represents the minimum score. The secondary school teachers were required to select their level of agreement for each statement to indicate how they experience to introduce ICT on a 3-point Likert scale ranging from 1 to 3, where 3 (Fully) represents the maximum score of the scale and 1 (No) represents the minimum score and the scoring will be done accordingly.
3. Analysis of the statements

The total scores of (20) secondary school Principals and (100) secondary school teachers will be arranged in a descending order with the help of SPSS version (20). Then after identifying (25%) of the high scores and (25%) of low scores of these two scales, t-ratio was computed for the higher and the lower groups to find out the discriminating power of each statement in both the scales with the help of “Paired T-test”. On the basis of the values of t-ratio, (7) statements of ‘Principals implementation of ICT Scale’ were deleted and (10) statements of ‘Teachers implementation of ICT Scale’ statements were discarded as they did not discriminate even at 0.05 level of confidence.

4. Final Draft of the Scale

The final draft of ‘Principals implementation of ICT scale’ comprises of (18) statements and the ‘Teachers implementation of ICT scale’ consists of (20) statements.

5. Scoring Procedure

The ‘Principals implementation of ICT scale (PIICT)’ and ‘Teachers implementation of ICT scale (TIICT)’ were developed and used by the investigator for measuring the level of implementation of Information and Communication Technology by the secondary school Principals and teachers respectively. The ‘Principals implementation of ICT scale’ scale consists of (18) statements on five-point scale; strongly agree (5), agree (4), undecided (3), disagree (2), strongly disagree (1). The individual score is the sum of the scores of all the (18) statements. These scores were summed up to get an overall score for the individual in the scale.

The ‘Teachers implementation of ICT scale’ consists of (20) statements developed on three point scales fully (3), partially (2), and no (1). The individual score is the sum of the scores of all the (20) statements. These scores were summed up to get an overall score for the individual in the scale. Higher score indicates the high level of implementation of ICT.
6. Validity and Reliability of the Scales

6.1 Validity

To evaluate validity of these two scales ‘Principals implementation of ICT scale’ and ‘Teachers implementation of ICT scale’ face/ content or expert validity and construct validity was determined.

6.1.1 Face validity

In order to check the face validity of ‘Principals implementation of ICT scale’ and ‘Teachers implementation of ICT scale’, the investigator sought consultations of experts from different departments like department of Computer Science, Education, and English from the initial draft up to the final draft of the scales of implementation of ICT for the improvement of these research tools.

6.1.2 Construct validity

To assess the construct validity of ‘Principals implementation of ICT scale’ and ‘Teachers implementation of ICT scale’, Pearson Product moment correlation technique was employed. The purpose of using Pearson’s Product moment correlation technique was to make these scales (‘Principals implementation of ICT scale’ and ‘Teachers implementation of ICT scale’) homogenous by assessing the uniformity of each statement with the total scale and rejecting the statements showing inconsistency. To this end, scores on each statement of the subjects were correlated with their total score. Based on the correlation, between the individual statement scores and the total scores, few statements from both the scales were deleted to finalize the final draft of these scales.

6.1.3 Pearson’s coefficient of correlation

The investigator calculated the relationship between each statement and the total score of ‘Principals implementation of ICT scale’ and the coefficient of correlation of all the statements was found significant. This indicates that all the statements are related to Principals implementation of ICT and the scale has good construct validity. The researcher also calculated the relationship between each statement and the total score of ‘Teachers implementations of ICT scale’ and the Pearson’s correlation coefficients were also found significant as shown in table (3.6). This indicates that ‘Teachers implementations of ICT scale’ has good construct validity.
Table 3.6
Showing correlation between each statement and Total Score of Teachers
Implementation of ICT Scale

<table>
<thead>
<tr>
<th>Statements</th>
<th>'r' Values</th>
<th>Sig.</th>
<th>Statements</th>
<th>'r' Values</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.416**</td>
<td>.003</td>
<td>11</td>
<td>.444**</td>
<td>.001</td>
</tr>
<tr>
<td>2</td>
<td>.547**</td>
<td>.000</td>
<td>12</td>
<td>.584**</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>.541**</td>
<td>.000</td>
<td>13</td>
<td>.306**</td>
<td>.030</td>
</tr>
<tr>
<td>4</td>
<td>.594**</td>
<td>.000</td>
<td>14</td>
<td>.586**</td>
<td>.000</td>
</tr>
<tr>
<td>5</td>
<td>.479**</td>
<td>.000</td>
<td>15</td>
<td>.552**</td>
<td>.000</td>
</tr>
<tr>
<td>6</td>
<td>.668**</td>
<td>.000</td>
<td>16</td>
<td>.533**</td>
<td>.000</td>
</tr>
<tr>
<td>7</td>
<td>.560**</td>
<td>.000</td>
<td>17</td>
<td>.626**</td>
<td>.000</td>
</tr>
<tr>
<td>8</td>
<td>.688**</td>
<td>.000</td>
<td>18</td>
<td>.796**</td>
<td>.000</td>
</tr>
<tr>
<td>9</td>
<td>.559**</td>
<td>.000</td>
<td>19</td>
<td>.780**</td>
<td>.000</td>
</tr>
<tr>
<td>10</td>
<td>.688**</td>
<td>.000</td>
<td>20</td>
<td>.745**</td>
<td>.000</td>
</tr>
</tbody>
</table>

** Correlation coefficient significant at 0.01 level

From the perusal of table (3.6), it can be concluded that the correlation coefficient of all the statements were found significant. This indicates that all the statements are related to Teachers implementation of ICT and the scale has good construct validity.
6.2 Reliability

The reliability of 'Principals implementation of ICT scale' and 'Teachers implementation of ICT scale' was determined by employing Cronbach's alpha. The Cronbach's alpha reliability coefficient for 'Principals implementation of ICT scale' was equal to (0.79) and the reliability coefficient for 'Teachers implementation of ICT scale' was found to be equal to (0.89) respectively.

The Cronbach Alpha coefficient or the coefficient of reliability and Pearson's coefficient of correlation of the two scales 'Principals implementation of ICT scale' and 'Teachers implementation of ICT scale' is shown in the table (3.7) below:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the scale</th>
<th>No. of Statements</th>
<th>Reliability coefficient</th>
<th>Pearson's correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Principals’</td>
<td>18</td>
<td>0.79</td>
<td>.680*, .728**, .774**, .572*, etc.</td>
</tr>
<tr>
<td></td>
<td>Implementation of ICT Scale (PIICT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Teachers’</td>
<td>20</td>
<td>0.89</td>
<td>.416**, .547**, .541**, .594**, etc</td>
</tr>
<tr>
<td></td>
<td>Implementation of ICT Scale (TIICT)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Correlation coefficient significant at 0.01 level
*Correlation coefficient significant at 0.05 level

The Cronbach Alpha coefficient or the coefficient of reliability of different scales used in the present study is shown hereunder in the table that follows.
Table 3.8

Showing description of different scales

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the scale</th>
<th>No. Statements</th>
<th>Reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Principals’ Attitude Towards ICT Scale (PATICT)</td>
<td>25</td>
<td>0.82</td>
</tr>
<tr>
<td>2.</td>
<td>Teachers’ Attitude Towards ICT Scale (TATICT)</td>
<td>30</td>
<td>0.71</td>
</tr>
<tr>
<td>3.</td>
<td>Principals’ Implementation of ICT Scale (PIICT)</td>
<td>18</td>
<td>0.79</td>
</tr>
<tr>
<td>4.</td>
<td>Teachers’ Implementation of ICT Scale (TIICT)</td>
<td>20</td>
<td>0.89</td>
</tr>
</tbody>
</table>

3.8.3 Document analysis

Documentation was not the focus of this study. In order to gain a broad insight into the background of Information and Communication Technology scheme in schools and implementation of ICT in secondary schools of Jammu Kashmir and Uttar Pradesh the investigator analyzed documents emanating from different perspectives: (a) national governmental documents like Census 20011 and Indian statistics; (b) the DISE Reports; (c) National Policy on Information and Communication Technology (ICT) in School Education (Revised Draft 2011); (d) Reports from Department of School Education and Literacy Ministry of Human Resource Development Government of India; and (e) documents of Project Monitoring and Evaluation Group. These documents, called archival records (Nachmias and Nachmias, 1987) were obtained either online, or were hard copy documents obtained from government departments or from the Internet. These documents of the government of India on Information and Communication Technology in education were verified by the investigator to ascertain the rationale for the current study. These documents acted as information sources and were used to justify research aims and a means of triangulating data collected from scales.
3.9 The pilot sample

The most important phase in the development of research tool was the piloting stage. Bell (2005) stated that,

"all data gathering instruments should be piloted to test how long it takes recipients to complete them, to check that all questions are clear and to enable the researcher to remove any items that do not yield usable data" (p. 84).

In pilot study of the current study, twenty schools were randomly selected from the target population, ten from Jammu and Kashmir and ten from Uttar Pradesh. Secondary school Principals and teachers of these twenty schools were the respondents. They were requested to respond to the draft scales. The pilot sample helps in validation and standardization of the research tool by identifying possible ambiguities in both content and language. The tools so prepared can be used for the collection of main data from the main sample. It also helped the researcher to form an idea of the time required to complete the scale and to anticipate any problems likely to be encountered during the main data collection. Respondents were also asked to give suggestions or comments if any regarding the research tools. After analysis of the pilot responses to the scales, the research tools were reproduced for administration to the main sample. In this way the discrepancies if any were removed from the research tools.

3.10 Validity and Reliability

Silverman (2004) states: "validity and reliability are two important concepts to keep in mind when doing research, because in them the objectivity and credibility of research are at stake." Validity is more imperative and comprehensive than reliability, as it is harder to evaluate or measure (Ary et al., 2002). The validity and reliability is elaborated in the section that follows:

3.10.1 Validity

A major concern in research is the validity of the procedures or data gathering tools. According to Gay & Airasian (2000), validity is that quality of a data gathering instrument or procedure that enables it to measure what it is supposed to measure. The idea of validity rests on the extent to which research data and the methods for obtaining data are deemed accurate, honest and on target (Descombe, 2000). Validity
addresses the question of whether one is measuring suitable indicators of the concept, accuracy of the results and the extent to which an instrument measures what it was meant to measure (Dambudzo, 2005). Among various types of validity, the main ones are; face validity/ content validity and construct validity. The current study focused mainly on face/ content and construct validity as briefly explained in the sections that follow.

3.10.2 Face/ content validity

Face/ content validity are taken sometimes synonymously. Face validity is less systematic than content validity (Saunders et al., 2007). Content validity involves confidence that items comprising the measuring instrument are representative of the field which they intend to serve (Crowe, 2004). In the current study, the researcher used four research tools and each tool was designed in a way as to include the suitable statements necessary for measuring the secondary school Principals and teachers’ attitude towards ICT and the level of ICT implementation. In order to determine face/content validity, the researcher specified the domain of variables under investigation. Then the investigator handed over these tools to different experts so that the validity may be ensured. These experts included linguistic experts, measurement experts and subject experts. The experts verified face/ content validity of all the four scales one by one.

3.10.3 Construct validity

Validity which is nonfigurative, intangible and multifaceted is known as Construct validity. A research tool is said to possess construct validity to the degree that it confirms to predicted correlations with other speculative propositions. In order to check the construct validity of all the four research tools used in the current study, the investigator calculated correlation between the scores of each statement and the total score of the research tool. The correlation coefficient of all the research tools were found significant which indicated that all the tools related to different variables possessed good construct validity.

3.10.5 Reliability

According to McMillan and Wergin (2002) reliability refers to, “the degree of error that exists when obtaining a measure of a variable. No measure or instrument is perfect; each will contain some degree of error. The error can be because of
individual (general skills, attitudes, motivation) or because the way the instrument is designed and administered. Reliability is the estimate of the error in the assessment”. The two researchers studying a single setting may come up with different data and produce different findings (Saunders et al. 2007). Both studies can be reliable, but the reliability of one or both studies would be questioned if they yield incompatible results. Reliability therefore addresses the question: “Will two researchers independently studying the same setting or subject come up with same findings?” Reliability is essential to the effectiveness of any data gathering procedure. In support of this, Gay and Airasian (2000) noted that reliability is the degree of consistency that the instrument or procedure demonstrates.

The reliability was an important concern in the present study because reliability is a necessary condition for validity and consequently without reliability there can be no valid results (McMillan & Schumacher, 2001). An instrument for example, a scale or a questionnaire is said to be reliable to the extent that independent administrators of it or a comparable instrument, consistently yield similar results (Saunders et al., 2007). Thus, the more reliable the tools, the more reliable and dependable the results will be. There are several procedures for establishing reliability of the research tool such as Cronbachs’ Alpha technique, test re-test and split-half methods; the Cronbachs’ Alpha technique is the most commonly used in educational research. In the current study, the Cronbachs’ Alpha technique was employed.

3.11 Administration of research tools

The administration of research tool is one of the important steps in the research process. One cannot get the reliable results without administration of research tools. The research tools used in the present study were self-administering scales. The investigator sought permission from the concerned District Education Officer (DEO) or Chief Education Officer (CEO) who directed the secondary school Principals to cooperate and provide the necessary support and information to the investigator. Latter on the researcher got a list of secondary schools from the office of the District Education Officer or Chief Education Officer and after identifying the secondary schools the investigator visited these institutions by his own. While visiting these institutions the concerned Principals were contacted and the purpose of the research study was thoroughly explained to them. The respondents in the present
study were secondary school Principals and teachers. So all the Principals of selected secondary schools were contacted and the teachers were selected through random number tables. In order to get the right information the investigator explained the research tools briefly to the subjects and they were requested to go through the instructions carefully and ask the investigator if any difficulty was felt in understanding the instructions given in each scale. It was indicated in the scales that there is no right or wrong answer but the subjects had to represent their level of agreement or disagreement. The subjects were given full assurance that their responses will be kept confidential and the information they will reveal through their responses will be used for research purpose only.

3.12 Data Processing

Data processing was carried out for each of the scales. The processing was done for quantitative data using descriptive and inferential statistics. Responses from all the respondents to all the statements of all the scales were analyzed to facilitate coding processing and entered into the computer for further analysis. Keeping in view the objectives and hypothesis of the study and nature of data, the data-processing exercise started with the coding of all the responses obtained to facilitate easy analysis using the advanced Statistical software Package for Social Sciences (SPSS V.20). A comprehensive data sheet was prepared with proper coding of the dependent Variable (Implementation of ICT) and independent variable (secondary school Principals and teachers attitude) taking care of the requirements of the SPSS package. After the data was fed in the software worksheet, a master codebook was designed to ensure that all the scales were coded uniformly and crosschecked to find out and eradicate the mistakes.

The 'Principals attitude towards Information and Communication Technology scale (PATICT)' and 'Teachers attitude towards Information and Communication Technology scale (TATICT)' (Appendix A and Appendix C respectively) had (25) and (30) statements respectively in total for quantitative analysis; this analysis was done for assessing the secondary school Principals and teachers attitude towards ICT which partly described the nature of respondents. The scales 'Principals attitude towards Information and Communication Technology scale (PATICT)' and 'Teachers attitude towards Information and Communication Technology scale (TATICT)' were analyzed
as an index on a Likert scale as 1-strongly disagree, 2-disagree, 3-undecided, 4-agree, 5-strongly agree.

The ‘Principals implementation of Information and Communication Technology scale (PHICT)’ and ‘Teachers’ implementation of Information and Communication Technology scale (THICT)’ shown in (Appendix B and Appendix D respectively) set out to determine the level of implementation of ICT in secondary schools of Jammu and Kashmir and Uttar Pradesh in India consists of (18) and (20) statements respectively for analysis. The implementation of ICT by the Principals was analyzed as an index on a Likert scale as 1-strongly disagree, 2-disagree, 3-undecided, 4-agree, 5-strongly agree. The implementation of ICT by the teachers was analyzed as an index as follows: 3—fully, 2—partially, 1—no.

The percentage, mean, standard deviation, t-test (Paired sample t-test and One sample t-test), Pearson’s Product moment Correlation and 2x2 Factorial Design ANOVA were used to analyze the data. T-test is a statistical technique used to compare the differences between the means of two groups. All data was analyzed at a level of 95% or $\alpha = 0.05$ and degree of freedom depending on the particular case as was determined. The value $\alpha = 0.05$ has been chosen because the sample size is adopted from calculated figures based on 0.95 level of confidence. The statistical and documentation results are presented in the chapter that follows.

3.13 Conclusion

This chapter presented a detailed description of the research strategy developed and used in the present study. The chapter focused on the theoretical purpose and justification of the research approach followed, methodology chosen, ethical considerations, data gathering techniques and an explanation of the data processing method used. Techniques of sampling, validity and reliability were described and explained. The data analysis methods used for quantitative and qualitative data in the current study were explained.
REFERENCES


CHAPTER-4
STATISTICAL ANALYSIS OF DATA, INTERPRETATION AND DISCUSSION
4.1: Section: I Assessment of Secondary School Principals attitude towards ICT
4.2: Section: II Assessment of Secondary School teachers’ attitude towards ICT
4.3: Section: III Assessment of Secondary School Principals implementation of ICT
4.4: Section: IV Assessment of Secondary school teachers’ implementation of ICT
4.5: Section: V Assessment of government initiatives and background of Information and Communication Technology scheme in secondary schools
CHAPTER-4

STATISTICAL ANALYSIS OF DATA, INTERPRETATION AND DISCUSSION

"He uses statistics as a drunken man uses lamp-posts for support rather than illumination."

- Andrew Lang

This chapter presents the statistical analysis of data and discusses the research findings from the analysis of questionnaires/scales and documentation that were used as research tools in the study. The findings are presented, analyzed and interpreted as per the set hypotheses in the study. After collecting the data, it is subjected to analysis. Merriam (1998) indicates that: "the analysis usually results in the identification of recurring patterns that cut through the data or into the delineation of a process". When the data are collected, tabulated and analyzed it divulges certain facts and meanings which can be interpreted with respect to the objectives of the study. The investigator has to analyze and interpret the data as accurately as possible. "Analysis of the data means categorizing, ordering manipulating and summarizing of data to obtain answers to the research question" (Kerlinger, 1978). Data have no meaning unless analyzed and interpreted by employing suitable statistical techniques or by well defined qualitative analysis in order to arrive at certain reliable inferences. Data analysis is the "process of making sense and meaning from the data that constitute the findings of the study" (Merriam, 1998). The interpretation and discussion of the analyzed data have been presented in the following five sections:

Section: I Assessment of Secondary School Principals attitude towards ICT.

Section: II Assessment of Secondary school teachers' attitude towards ICT.

Section: III Assessment of Secondary School Principals implementation of ICT.

Section: IV Assessment of Secondary school teachers’ implementation of ICT.

Section: V Assessment of government initiatives and background of Information and Communication Technology scheme in secondary schools.
4.1-Section I

Assessment of Secondary School Principals attitude towards ICT

In order to assess secondary school Principals attitude towards ICT following objectives with respective hypothesis will be analyzed:

4.1 (a) To determine the level of attitude of Secondary School Principals’ of Jammu and Kashmir towards ICT.

4.1(b) To identify the level of attitude of Secondary school Principals’ of Uttar Pradesh towards ICT.

4.1(c) To explore the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals’ attitude towards ICT.

4.1 (a): To determine the level of attitude of Secondary School Principals’ of Jammu and Kashmir towards ICT.

In order to study the level of attitude of secondary school Principals of Jammu and Kashmir towards Information and Communication Technology the following null hypothesis was formulated:

Hypothesis 1: There is no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Jammu Kashmir towards ICT.

In order to know the attitude of secondary school Principals’ of Jammu and Kashmir towards Information and Communication Technology, one sample(sample mean and assumed mean =72) t-test was used.

Table 4.1
Result of t-test for one Sample

<table>
<thead>
<tr>
<th>Principals attitude towards ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>35</td>
<td>100.62</td>
<td>72</td>
<td>8.58</td>
<td>34</td>
<td>17.6</td>
<td>.000*</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level
Result given in Table no {4.1} revealed that the secondary school Principals' of Jammu and Kashmir expressed positive attitude towards Information and Communication Technology as the real mean (100.62) is higher than the assumed mean (72) and the t-value (17.6) is significant at (0.05) level. This substantiates rejection of null hypothesis, 'There is no significant difference between the assumed mean and the real mean of attitude of secondary school Principals of Jammu Kashmir towards Information and Communication Technology'.

4.1(b): To identify the level of attitude of secondary school principals of Uttar Pradesh towards Information and Communication Technology.

In order to study the above mentioned objective, following null hypothesis was formulated for pragmatic confirmation:

**Hypothesis No. 2:** There is no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Uttar Pradesh towards Information and Communication Technology.

To know the attitude of secondary school Principals' of Uttar Pradesh towards Information and Communication Technology, one sample t-test has been used.

**Table No 4.2**

Result of t-test for one sample

<table>
<thead>
<tr>
<th>Principals attitude towards ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.P</td>
<td>38</td>
<td>108.24</td>
<td>72</td>
<td>7.12</td>
<td>37</td>
<td>31.5</td>
<td>.00*</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result specified in table {4.2} disclosed that the secondary school Principals' of Uttar Pradesh exhibited more positive attitude towards Information and Communication Technology as the real mean (108.24) is higher than the assumed mean (72) and the t-value (31.6) is significant at (0.05) level. This substantiates rejection of null hypothesis, 'There is statistically no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Uttar Pradesh towards Information and Communication Technology'.
4.1(c) To explore the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals' attitude towards ICT.

In order to study the above mentioned objective, following null hypothesis with three sub-hypotheses has been formulated for empirical authentication and the related data to this objective is analyzed which is given in table 4.3.

**Hypothesis No.3** There is no significant difference and influence of interaction on attitude of secondary school Principals towards ICT according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (3a):** There is no significant difference in secondary school Principals attitude towards ICT with respect to their gender (male and female).

**Hypothesis (3b):** There is no significant difference in secondary school Principals attitude towards ICT with respect to the region (J&K and U.P).

**Hypothesis (3c):** There is no significant influence of interaction between gender and region on secondary school Principals attitude towards ICT.

In order to study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals' attitude towards ICT Two-way ANOVA was employed.

**Table 4.3**

**Summary of 2X2 (Gender and Region) Factorial Design ANOVA for Secondary School Principals Attitude towards ICT**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>259.43</td>
<td>1</td>
<td>259.43</td>
<td>4.38*</td>
<td>.040</td>
</tr>
<tr>
<td>Region</td>
<td>567.95</td>
<td>1</td>
<td>567.95</td>
<td>9.59*</td>
<td>.003</td>
</tr>
<tr>
<td>Gender * Region</td>
<td>77.71</td>
<td>1</td>
<td>77.71</td>
<td>1.31</td>
<td>.256</td>
</tr>
<tr>
<td>Error</td>
<td>4082.45</td>
<td>69</td>
<td>59.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>805494.00</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>5491.75</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

It is interpreted from the table {4.3} that F value for gender is (4.38), which is significant at 0.05 levels of significance. It means that the mean score of attitude
towards ICT of male and female secondary school Principals differs significantly. Hence, the null hypothesis (3a) *there is no significant difference in secondary school Principals attitude towards ICT with respect to their gender (male and female)* is rejected and it may, therefore be concluded that gender (Male and Female) influences the secondary school Principals attitude towards ICT.

The F value for region is (9.59), which is significant at 0.05 levels. It means that mean score of attitude towards ICT of secondary school Principals’ according to region (J&K and U.P) differs significantly. Hence, the null hypothesis (3b) *There is no significant difference in secondary school Principals attitude towards ICT with respect to the region (J&K and U.P)* is rejected and it may, therefore be concluded that region (J&K and U.P) influences the secondary school Principals attitude towards ICT.

The F value for interaction between gender and region is (1.31), which is not significant. It means that mean score of attitude towards ICT of male and female secondary school Principals belonging to two different regions (J&K and U.P) do not differ significantly. Hence, the null hypothesis (3c) *There is no significant influence of interaction between gender and region on secondary school Principals attitude towards ICT* is not rejected and it may, therefore be concluded that male and female secondary school Principals belonging to two different regions possessed same level of attitude towards ICT. Thus there are no differences among the four groups (male secondary school Principals of J&K, female secondary school Principals of J&K, male secondary school Principals of U.P and female secondary school Principals of U.P) in terms of their attitude towards ICT as shown in figure (4.1).
Fig 4.1
Influence of interaction between Gender and Region on Secondary school Principals Attitude toward s ICT

Thus, there existed a significant difference in the mean score of secondary school Principals attitude towards ICT in terms of gender and region. In order to find out which group of secondary school Principals is superior in attitude towards ICT with respect to gender (male and female) and region (J&K and U.P), descriptive analysis of data was used as presented in tables (4.4) and (4.5).

Table 4.4
Shows Mean Difference between Male and Female Respondents (secondary school Principals) According to their Attitude towards ICT

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>53</td>
<td>103.37</td>
<td>8.95</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>108.15</td>
<td>7.21</td>
</tr>
</tbody>
</table>
It is evident from table (4.4) and figure (4.2) that the mean value of male Principals is (103.37) where as for females it is (108.15) which indicates that females have more positive attitude towards ICT than males.

Fig. 4.2
Comparison of mean difference between male and female secondary school Principals according to their attitude towards ICT

Table 4.5
Shows Mean Difference between J&K and U.P Principals on their Attitude towards ICT

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>35</td>
<td>100.62</td>
<td>8.58</td>
</tr>
<tr>
<td>U.P</td>
<td>38</td>
<td>108.42</td>
<td>7.12</td>
</tr>
</tbody>
</table>
Fig. 4.3
Comparison of mean difference between J&K and U.P secondary school Principals according to their attitude towards ICT

It is clear from table {4.5} and fig. (4.3) that the mean value of J&K Principals is (100.62) whereas for U.P Principals it is (108.42). It means that secondary school Principals of U.P have more positive attitude towards ICT as compared to secondary school Principals of J&K.

4.2-Section: II
Assessment of Secondary school teachers' attitude towards ICT

In order to assess the secondary school teachers’ attitude towards ICT the following objectives with relevant hypotheses will be statistically analyzed:

4.2(a): To explore the level of attitude of Secondary school teachers of Jammu and Kashmir towards ICT.

4.2(b): To ascertain the level of attitude of Secondary school teachers of Uttar Pradesh towards ICT.

4.2(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers’ attitude towards ICT.
4.2(a): To explore the level of attitude of Secondary school teachers of Jammu and Kashmir towards ICT.

In order to study the above stated objective, following null hypothesis was formulated for practical verification:

**Hypothesis No. 4:** There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Jammu Kashmir towards Information and Communication Technology.

To identify the attitude of secondary school teachers’ of Jammu Kashmir towards Information and Communication Technology, one sample t-test has been used.

**Table No 4.6**

<table>
<thead>
<tr>
<th>Teachers attitude towards ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>236</td>
<td>95.04</td>
<td>90</td>
<td>6.83</td>
<td>235</td>
<td>11.33</td>
<td>.000*</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result stated in Table no {4.6} revealed that the secondary school teachers of Jammu and Kashmir have positive attitude towards Information and Communication Technology as the real mean (95.04) is higher than the assumed mean (90) and the t-value (11.33) is significant at (0.05) level. This authenticates rejection of null hypothesis, ‘There is statistically no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Jammu Kashmir towards Information and Communication Technology’.

4.4(b): To ascertain the level of attitude of Secondary school teachers of Uttar Pradesh towards Information and Communication Technology.

In order to study the above mentioned objective, following null hypothesis was formulated for empirical authentication:
Hypothesis No. 5: There is statistically no significant difference between the assumed mean and the real mean of attitude of secondary school teachers' of Uttar Pradesh towards Information and Communication Technology.

A one sample t-test was conducted to assess the attitude of secondary school teachers' of Uttar Pradesh towards Information and Communication Technology.

Table No 4.7
Result of t-test for one sample

<table>
<thead>
<tr>
<th>Teachers attitude towards ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.P</td>
<td>220</td>
<td>97.5955</td>
<td>90</td>
<td>7.93</td>
<td>219</td>
<td>14.2</td>
<td>.00*</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result indicated in Table no. (4.7) revealed that the teachers of Uttar Pradesh possess positive attitude towards Information and Communication Technology as the real mean (97.59) is higher than the assumed mean (90) and the t-value (14.2) is significant at (0.05) level. This confirms rejection of null hypothesis, 'There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers' of Uttar Pradesh towards Information and Communication Technology'.

4.2(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers' attitude towards ICT.

In order to study the above mentioned objective, following null hypothesis with three sub-hypotheses has been formulated for empirical verification and the related data to this objective is analyzed which is given in table (4.8).

Hypothesis No.6: There is no significant difference and influence of interaction on attitude of secondary school teachers towards ICT according to their gender (male and female) and region (J&K and U.P).

Hypothesis (6a): There is no significant difference in secondary school teachers' attitude towards ICT with respect to their gender (male and female).
Hypothesis (6b): There is no significant difference in secondary school teachers’ attitude towards ICT with respect to the region (J&K and U.P).

Hypothesis (6c): There is no significant influence of interaction between gender and region on secondary school teachers’ attitude towards ICT.

Two-way ANOVA was employed in order study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers’ attitude towards ICT.

Table 4.8
Summary of 2x2 (Gender and Region) Factorial Design ANOVA for Secondary School Teachers Attitude towards ICT

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>357.78</td>
<td>1</td>
<td>357.78</td>
<td>6.65*</td>
<td>.01</td>
</tr>
<tr>
<td>Region</td>
<td>87.72</td>
<td>1</td>
<td>87.72</td>
<td>1.63</td>
<td>.20</td>
</tr>
<tr>
<td>Gender * Region</td>
<td>4.48</td>
<td>1</td>
<td>4.48</td>
<td>.08</td>
<td>.77</td>
</tr>
<tr>
<td>Error</td>
<td>24306.50</td>
<td>452</td>
<td>53.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4252230.00</td>
<td>456</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected total</td>
<td>25507.18</td>
<td>455</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

From the perusal of table (4.8) it is clear that F value for gender is (6.65), which is significant at 0.05 levels of significance. It means that the mean score of attitude towards ICT of male and female secondary school teachers differs significantly. Hence, the null hypothesis (6a) ‘there is no significant difference in secondary school teachers’ attitude towards ICT with respect to their gender (male and female)’ is rejected and it may, therefore be concluded that gender (Male and Female) influences the secondary school teachers attitude towards ICT.

The table further reveals that the value of F (1.63) for region (J&K and U.P) is not significant at 0.05 level of confidence. It means that mean score of attitude towards ICT of secondary school teachers’ according to region (J&K and U.P) do not differ significantly. Hence, the null hypothesis (6b) ‘There is no significant difference in secondary school teachers’ attitude towards ICT with respect to the region (J&K and
is not rejected and it may, therefore be concluded that region (J&K and U.P) do not influence the secondary school teachers' attitude towards ICT.

The F value for interaction between gender and region is (0.083), which is not significant. It means that mean score of attitude towards ICT of male and female secondary school teachers belonging to two different regions do not differ significantly. Hence, the null hypothesis (6c) 'There is no significant influence of interaction between gender and region on secondary school teachers' attitude towards ICT' is not rejected and it may, therefore be concluded that male and female secondary school teachers belonging to two different regions possessed same level of attitude towards ICT. Thus there are no differences among the four groups (male secondary school teachers of J&K, female secondary school teachers of J&K, male secondary school teachers of U.P and female secondary school teachers of U.P) in terms of their attitude towards ICT as shown in fig.4.4

Fig 4.4: Influence of interaction between Gender and Region on Secondary school Teachers Attitude towards ICT
Thus, there existed a significant difference in the mean score of secondary school teachers’ attitude towards ICT in terms of gender. In order to find out which group of secondary school teachers’ is superior in attitude towards ICT with respect to gender (male and female) descriptive analysis of data was used presented in table (4.9).

### Table 4.9

**Shows Mean Difference between Male and Female Respondents According to their Attitude towards ICT**

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>284</td>
<td>95.06</td>
<td>6.46</td>
</tr>
<tr>
<td>Female</td>
<td>172</td>
<td>98.27</td>
<td>8.57</td>
</tr>
</tbody>
</table>

**Fig.4.5 Comparison of mean difference between male and female respondents according to their attitude towards ICT**

It is clear from table (4.9) and fig. (4.5) that the mean value for male secondary school teachers is (95.06) where as for female secondary school teachers it is (98.27), which indicates that female secondary school teachers possess more positive attitude towards ICT than male secondary school teachers.
**4.3-Section: III**

**Assessment of Secondary School Principals implementation of ICT**

For the assessment of implementation of ICT by Secondary School Principals following objectives with respective hypotheses will be subjected to statistical analyses:

4.3 (a): To study the level of implementation of ICT by the secondary school Principals' of Jammu and Kashmir.

4.3(b): To verify the level of implementation of ICT by the secondary school Principals' of Uttar Pradesh.

4.3(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals level of implementation of ICT.

4.3 (a): To study the level of implementation of ICT by the secondary school Principals’ of Jammu and Kashmir.

In order to study the above quoted objective, following null hypothesis was formulated for pragmatic verification:

*Hypothesis No. 7: There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the Principals of Jammu Kashmir.*

To find out the implementation of Information and Communication Technology by the Principals' of Jammu Kashmir, one sample t-test was conducted.

**Table No 4.10**

**Result of t-test for one sample**

<table>
<thead>
<tr>
<th>Principals implementation of ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>3, 5</td>
<td>70.00</td>
<td>54</td>
<td>10.26</td>
<td>34</td>
<td>9.21</td>
<td>.000*</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level*
The results shown in Table 4.10 made it clear that the t-value (9.21) is significant at (0.05) level, which authenticates rejection of null hypothesis, "There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the Principals of Jammu Kashmir". The results also revealed that the level of implementation of Information and Communication Technology by the Principals of Jammu and Kashmir in their day to day work is considerably high as the real mean (70.00) is higher than the assumed mean (54).

4.3(b): To verify the level of implementation of Information and Communication Technology by the principals' of Uttar Pradesh.

In order to study the above quoted objective, following null hypothesis was formulated for pragmatic verification:

Hypothesis No. 8: There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the principals of Uttar Pradesh.

To check the level of implementation of Information and Communication Technology by the Principals of Uttar Pradesh, one sample t-test was used.

**Table No 4.11**

Result of t-test for one sample

<table>
<thead>
<tr>
<th>Principals implementation of ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.P</td>
<td>38</td>
<td>82.26</td>
<td>54</td>
<td>5.63</td>
<td>37</td>
<td>30.9</td>
<td>00*</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result stipulated in Table 4.11 unveiled that the level of implementation of Information and Communication Technology by the Principals’ of Uttar Pradesh in their routine work is significantly high as the real mean (82.26) is higher than the assumed mean (54) and the t-value (30.9) is significant at (0.05) level. This substantiates rejection of null hypothesis, "There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the Principals of Uttar Pradesh".
4.3(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals level of implementation of ICT.

In order to study the above quoted objective, following null hypothesis with three subsequent sub-hypotheses has been formulated for pragmatic verification and the related data to this objective is analyzed which is given in table (4.12).

**Hypothesis No.9** There is no significant difference and influence of interaction on implementation of ICT by the secondary school Principals according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (9a):** There is no significant difference in the implementation of ICT by the secondary school Principals according to their gender (male and female).

**Hypothesis (9b):** There is no significant difference in the implementation of ICT by the secondary school Principals with respect to the region (J&K and U.P).

**Hypothesis (9c):** There is no significant influence of interaction between gender and region on secondary school Principals implementation of ICT.

In order to study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals implementation of ICT Two-way ANOVA was employed.

**Table 4.12**

Summary of 2X2 (Gender and Region) Factorial Design ANOVA for Secondary School Principals implementation of ICT

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>134.786</td>
<td>1</td>
<td>134.786</td>
<td>2.02</td>
<td>.16</td>
</tr>
<tr>
<td>Region</td>
<td>2082.95</td>
<td>1</td>
<td>2082.95</td>
<td>31.23*</td>
<td>.00</td>
</tr>
<tr>
<td>Gender * Region</td>
<td>9.570</td>
<td>1</td>
<td>9.57</td>
<td>.14</td>
<td>.70</td>
</tr>
<tr>
<td>Error</td>
<td>4601.65</td>
<td>69</td>
<td>66.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>433414.00</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>7499.26</td>
<td>72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level
It is clear from the perusal of table {4.12} that F value for gender is (2.02), which is not significant at 0.05 levels of significance. It means that the mean score of implementation of ICT of secondary school Principals with respect to their gender do not differ significantly. Hence, the null hypothesis (9a) ‘there is no significant difference in the implementation of ICT by the secondary school Principals according to their gender (male and female)’ is not rejected and it may, therefore be concluded that gender (Male and Female) do not influence the secondary school Principals level of implementation of ICT.

The table further reveals that the value of F (31.23) for region (J&K and U.P) is significant at 0.05 level of confidence. It means that mean score of implementation of ICT by the secondary school Principals according to region (J&K and U.P) differs significantly. Hence, the null hypothesis (9b) ‘there is no significant difference in the implementation of ICT by the secondary school Principals with respect to the region (J&K and U.P)’ is rejected and it may, therefore be concluded that region (J&K and U.P) influences the secondary school Principals level of implementation of ICT.

The F value for interaction between gender and region is (0.14), which is not significant. It means that mean score of implementation of ICT of male and female secondary school Principals belonging to two different regions do not differ significantly. Hence, the null hypothesis (9c) ‘there is no significant influence of interaction between gender and region on secondary school Principals implementation of ICT’ is not rejected and it may, therefore be concluded that male and female secondary school Principals belonging to two different regions possessed same level of implementation of ICT. Thus there are no differences among the four groups (male secondary school Principals of J&K, female secondary school Principals of J&K, male secondary school Principals of U.P and female secondary school Principals of U.P) in terms of their level of implementation of ICT as shown in fig.4.6.
Thus, there existed a significant difference in the mean score of secondary school Principals’ implementation of ICT in terms of region. In order to find out which group of secondary school Principals’ is superior in the level of implementation of ICT with respect to region (J&K and U.P) descriptive analysis of data was used which is presented in table (4.13).
Table 4.13
Shows Mean Difference between secondary school Principals of J&K and U.P on their level of implementation of ICT

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>35</td>
<td>70.00</td>
<td>10.26</td>
</tr>
<tr>
<td>U.P</td>
<td>38</td>
<td>82.26</td>
<td>5.63</td>
</tr>
</tbody>
</table>

Fig. 4.7 Comparison of mean difference between J&K and U.P Principals according to their level of implementation of ICT

It is evident from the perusal of table (4.13) and fig. (4.7) that the mean value of J&K secondary school Principals is (70.00) where as for U.P secondary school Principals it is (82.26). It indicates that the level of implementation of ICT by secondary school Principals of U.P is considerably high as compared to the secondary schools Principals of J&K.
4.4-Section: IV

Assessment of Secondary school teachers’ implementation of ICT

For the assessment of secondary school teachers’ implementation of ICT the following objectives with respective hypotheses will be analyzed statistically:

4.4(a): To examine the level of implementation of Information and Communication Technology by the teachers of Jammu and Kashmir.

4.4(b): To check the level of implementation of Information and Communication Technology by the teachers of Uttar Pradesh.

4.4(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers’ level of implementation of ICT.

4.4(a): To examine the level of implementation of Information and Communication Technology by the teachers of Jammu and Kashmir.

In order to study the above quoted objective, following null hypothesis has been formulated for pragmatic verification:

_Hypothesis No. 10: There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the secondary school teachers of Jammu Kashmir._

To know the level of implementation of Information and Communication Technology by the secondary school teachers of Jammu Kashmir, one sample t-test was conducted.

**Table No 4.14**

<table>
<thead>
<tr>
<th>Teachers implementation of ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>236</td>
<td>26.68</td>
<td>40</td>
<td>6.8</td>
<td>235</td>
<td>30.05</td>
<td>.000*</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result given in Table {4.14} revealed that the level of implementation of Information and Communication Technology by the secondary school teachers of Jammu and Kashmir in their daily work is noticeably less as the real mean (26.68) is
less than the assumed mean (40) and the t-value (30.05) is significant at (0.05) level. This proves rejection of null hypothesis, ‘There is statistically no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the secondary school teachers of Jammu Kashmir’.

4.4(b) To check the level of implementation of Information and Communication Technology by the teachers of Uttar Pradesh.

In order to study the above quoted objective, following null hypothesis was formulated for pragmatic verification:

**Hypothesis No. 11:** There is statistically no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the secondary school teachers of Uttar Pradesh.

One sample t-test was used to assess the level of implementation of Information and Communication Technology by the secondary school teachers of Uttar Pradesh.

**Table No 4.15**

<table>
<thead>
<tr>
<th>Teachers implementation of ICT</th>
<th>State</th>
<th>N</th>
<th>Real mean</th>
<th>Assumed mean</th>
<th>SD</th>
<th>Df</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.P</td>
<td>220</td>
<td>30.99</td>
<td>40</td>
<td>7.31</td>
<td>219</td>
<td>18.26</td>
<td>.000*</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

Result shown in table {4.15} revealed that the level of implementation of Information and Communication Technology by the secondary school teachers of Uttar Pradesh in their routine work is drastically less as the real mean (30.99) is less than the assumed mean (40) and the t-value (18.26) is significant at (0.05) level. This proves rejection of null hypothesis, ‘There is no significant difference between the assumed mean and the real mean of implementation of Information and Communication Technology by the secondary school teachers of Uttar Pradesh’.
4.4(c): To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers’ level of implementation of ICT.

In order to study the above quoted objective, following null hypothesis with three subsequent sub-hypotheses has been formulated for pragmatic verification and the related data to this objective is analyzed which is given in table (4.16).

Hypothesis No. 12: There is no significant difference and influence of interaction on the implementation of ICT by the secondary school teachers according to their gender (male and female) and region (J&K and U.P).

Hypothesis (12a): There is no significant difference in the implementation of ICT by the secondary school teachers according to their gender (male and female).

Hypothesis (12b): There is no significant difference in the implementation of ICT by the secondary school teachers with respect to the region (J&K and U.P).

Hypothesis (12c): There is no significant influence of interaction between gender and region on secondary school teachers’ implementation of ICT.

In order to study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers implementation of ICT Two-way ANOVA was employed.

Table 4.16
Summary of 2X2 (Gender and Region) Factorial Design ANOVA for Secondary School Teachers implementation of ICT

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>31.44</td>
<td>1</td>
<td>31.44</td>
<td>.63</td>
<td>.42</td>
</tr>
<tr>
<td>Region</td>
<td>1044.78</td>
<td>1</td>
<td>1044.78</td>
<td>21.08*</td>
<td>.00</td>
</tr>
<tr>
<td>Gender * Region</td>
<td>101.55</td>
<td>1</td>
<td>101.55</td>
<td>2.04</td>
<td>.15</td>
</tr>
<tr>
<td>Error</td>
<td>22401.87</td>
<td>452</td>
<td>49.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>401976.00</td>
<td>456</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>24718.42</td>
<td>455</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level
It can be clearly interpreted from the perusal of table {4.16} that F value for gender is (0.63), which is not significant at 0.05 levels of significance. It means that the mean score of implementation of ICT of male and female secondary school teachers do not differ significantly. Hence, the null hypothesis (12a) ‘there is no significant difference in the implementation of ICT by the secondary school teachers according to their gender (male and female)’ is not rejected and it may, therefore be concluded that gender (Male and Female) do not influence the secondary school teachers level of implementation of ICT.

The table further reveals that the value of F (21.08) for region (J&K and U.P) is significant at 0.05 level of confidence. It means that mean score of implementation of ICT of secondary school teachers according to region (J&K and U.P) differs significantly. Hence, the null hypothesis (12b) ‘there is no significant difference in the implementation of ICT by the secondary school teachers with respect to the region (J&K and U.P)’ is rejected and it may, therefore be concluded that region (J&K and U.P) influences the secondary school teachers’ level of implementation of ICT.

The F value for interaction between gender and region is (2.04), which is not significant. It means that mean score of implementation of ICT of male and female secondary school teachers belonging to two different regions do not differ significantly. Hence, the null hypothesis (12c) ‘there is no significant influence of interaction between gender and region on secondary school teachers’ implementation of ICT’ is not rejected and it may, therefore be concluded that male and female secondary school teachers belonging to two different regions possessed same level of implementation of ICT. Thus there are no differences among the four groups (male secondary school teachers of J&K, female secondary school teachers of J&K, male secondary school teachers of U.P and female secondary school teachers of U.P) in terms of their level of implementation of ICT as shown in fig.4.8.
Fig 4.8
Influence of interaction between Gender and Region on Secondary school Teachers Implementation of ICT

Estimated Marginal Means of Secondary school teachers implementation of ICT

region
- Jammu and Kashmir
- U.P.

Thus, there existed a significant difference in the mean score of secondary school teachers’ implementation of ICT in terms of region. In order to find out which group of secondary school teachers’ is superior in the level of implementation of ICT with respect to region (J&K and U.P) descriptive analysis of data was used which is presented in table (4.17)
Table 4.17
Shows Mean Difference between J&K and U.P Secondary School Teachers on their level of implementation of ICT

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>236</td>
<td>26.68</td>
<td>6.80</td>
</tr>
<tr>
<td>U.P</td>
<td>220</td>
<td>30.99</td>
<td>7.31</td>
</tr>
</tbody>
</table>

Fig.4.9 Comparison of mean difference between J&K and U.P teachers according to their level of implementation of ICT

It is evident from the perusal of table (4.17) and fig. (4.9) that the mean value for J&K secondary school teachers is (26.68) where as for U.P secondary school teachers it is (30.99). It indicates that the level of implementation of ICT by the secondary school teachers of U.P is notably high as compared to secondary school teachers of J&K.
4.5 DISCUSSION OF SECTION I, II, III AND IV

Section: I Assessment of Secondary School Principals attitude towards ICT
Section: II Assessment of Secondary school teachers’ attitude towards ICT
Section: III Assessment of Secondary School Principals implementation of ICT
Section: IV Assessment of Secondary school teachers’ implementation of ICT

Information Communication Technology is an imperative element in the education scenario. The quality of education is often related to the use of ICT in teaching and learning. ICT is one of the important innovations for modern development. As McCain and Jukes (2001) states, “if the education system is to survive and to rise to the challenges faced within the 21st century, the system must take on the qualities of a learning organization and the teacher must take on the qualities of new millennium learners.” According to Dr. Craig Barrett, Chairman of Intel Corporation, “All the educational technology in classrooms today is worth nothing if teachers don’t know how to use it effectively. Computers are not magic, teachers are.”

The implementation of Information and Communication Technology in education has been a challenge for the overall educational system and all countries of the world are striving for the integration of Information and Communication Technology in education and to manage it according to the rising needs and demands of the 21st century. There is an increasing concern to study secondary school Principals and teachers’ attitude towards ICT and its implementation as the assimilation of ICT in education depends largely on the attitude of school administrators and teachers. In the available literature, researches have described level of secondary school Principals and teachers’ attitude towards ICT.

The principle findings of the study revealed that the secondary school Principals and teachers expressed positive attitude towards ICT. Several reports are substantiating our results that, secondary school Principals and teachers exhibit positive attitude towards Information and Communication Technology (Bolandifar et al. 2013, Abdelaziz 2013, Emmanuel and Joshua 2013, Lazarus et al. 2013, Prabhu (2013, Padmavathi 2013, Yuan and Chun-Yi Lee 2012, André du Plessis and Paul Webb 2012, Isman et al. 2012, Sahin 2011, Rajasekar and Vaiyapuri 2007). The results clearly depicted that the secondary school Principals and teachers of Uttar
Pradesh possessed considerably positive attitude towards ICT than the Principals and teachers of Jammu and Kashmir.

The results also indicated that gender (Male and Female) affects secondary school Principals and teachers' attitude towards ICT and revealed that female secondary school Principals and teachers possessed significantly more positive attitude towards ICT than male secondary school Principals and teachers. No differences were found among the four groups of secondary school Principals (male Principals of J&K, female Principals of J&K, male Principals of U.P and female Principals of U.P) and four groups of secondary school teachers (male teachers of J&K, female teachers of J&K, male teachers of U.P and female teachers of U.P) teachers in terms of their attitude towards ICT. Samira (2011) conducted a study on Egyptian teachers' attitude towards computers with respect to gender and years of teaching experience. The results indicated that the Egyptian public school teachers held positive attitude towards ICT. But no significant differences with respect to gender and teaching experiences were found.

The implementation of Information and Communication Technology in education helps to provide innovative information to the students and assists to inculcate innovative and technological skills in them to cater their needs. UNESCO 2002 made it clear that, "Educational systems around the world are under increasing pressure to use the new Information and Communication Technologies (ICT's) to teach students the knowledge and skills they need in the 21st century" (UNESCO 2002). Educational institutions should be highly computerized, and all teachers should be able to use the technology to enhance their working methods (Key Data on Information and Communication Technology in Schools in Europe, 2004). In connection to this, Principals have been allocated with an extra responsibility and accountability of not only working with the technology but to introduce the technology as a part of pedagogy to improve teaching and learning through it (Gurr, 2000).

The findings also indicated that the level of implementation of ICT by secondary school Principals was considerably high and the level of implementation of ICT by secondary school teachers was considerably low. However, a trustworthy difference was seen between the Principals of Uttar Pradesh and the Principals of
Jammu Kashmir in respect of the level of implementation of Information and Communication Technology. The level of implementation of ICT by secondary school Principals of Uttar Pradesh was high as compared to the secondary school Principals of Jammu and Kashmir.

A reliable difference was also seen between secondary school teachers of Jammu and Kashmir and secondary school teachers of Uttar Pradesh in respect of their level of implementation of information and communication technology. The level of implementation of ICT by secondary school teachers of Uttar Pradesh was significantly high as compared to than secondary school teachers of Jammu and Kashmir.

It was revealed that gender (Male and Female) of secondary school Principals and teachers do not affect the implementation of ICT. However, contradictory results were seen so far as sex of secondary school Principals and teachers are concerned. The level of implementation of ICT by male secondary schools Principals was high as compared to female secondary school Principals. While as the level of implementation of ICT by female secondary school teachers was noticeably high as compared to male secondary school teacher. No differences were found among the four groups of secondary school Principals (male Principals of J&K, female Principals of J&K, male Principals of U.P and female Principals of U.P) and four groups of secondary school teachers (male teachers of J&K, female teachers of J&K, male teachers of U.P and female teachers of U.P) in terms of their implementation of ICT.

The research reports which corroborates our findings that secondary school Principals are using Information and Communication Technology in their daily work in the school (Laaria 2013, Tayo and Adedayo 2013, Anita and Smriti 2013, Ruqiyyabi 2011).

The Principals and teachers of secondary schools manifested positive attitude towards ICT. It may be due to the fact that they are well aware of the new innovations science has contributed like various ICT tools that can be used in the field of education for enhancing the excellence and overall quality of education. The expression of positive attitude by the Principals and teachers of secondary schools also indicates their keenness, determination and inclination towards ICT. The
secondary school Principals and teachers of Uttar Pradesh expressed considerably more positive attitude towards ICT than the Principals and teachers of Jammu and Kashmir. Probably the reason behind this may be the fact that the secondary school Principals and teachers of Uttar Pradesh are more exposed towards the novel innovations like ICT than the secondary school Principals and teachers of Jammu and Kashmir.

The results also indicated that there was no influence of interaction between gender and region on secondary school Principals and teachers’ attitude towards ICT. It was also found that there was no influence of interaction between gender and region on secondary school Principals and teachers’ implementation of ICT. This is probably because the conditions prevailing in the secondary schools of both the states were same, the initiatives taken by the government of India regarding the implementation of ICT in secondary schools were also same and the medium and mode of instruction also resembled.

The results also showed that the female secondary school Principals and teachers manifested more positive attitude towards ICT than male secondary school Principals and teachers. The difference between the attitude of male and female secondary school Principals and teachers towards ICT is probably because female were manifesting more expertise and were having repertoire of technological skills than male in spite of the fact that same facilities and avenues were available for both the sexes. The female were more inclined to use the innovative techniques and tactics in education. They were more serious than their counterparts in performing their duties. The seriousness, commitment and dedication were the attributes the females were endowed with and males were expressing the deficiency of the same.

It was found that the secondary schools Principals were using different ICT tools in the administrative matters. The reason behind this may be the facts that for effective administration one cannot move away from the innovative techniques and cannot work and shoulder responsibilities without using different ICT gadgets. The level of implementation of ICT by male secondary schools Principals was higher than the female secondary school Principals. The reason behind this may be the fact that female secondary school Principals were lacking in technological competence and were having more domestic liabilities like caring and rearing of children and
managing household needs. In India when a female is married, she is not married to one but she is married with a whole family meaning to say that she has to fulfill the demands of all the family members per contra to this male is always is always married to one. The findings also indicated that the level of implementation of ICT of secondary school teachers was considerably less. Lack of time, lack of ICT training, lack of technological know-how, and burden of the completion of syllabus may be the reason that hampers them from implementing ICT tools in education. This may also be due to the fact that technologically inefficient teachers were being recruited. Without Technological competence of teachers’ excellence will remain far away from the domain of education and quality of education cannot be enhanced.

Results showed a reliable difference between secondary school teachers of Jammu and Kashmir and secondary school teachers of Uttar Pradesh in respect of their level of implementation of information and communication technology. It was found that the level of implementation of ICT by secondary school teachers of Uttar Pradesh was high as compared to the secondary school teachers of Jammu and Kashmir. This may due to the fact that secondary school teachers of Uttar Pradesh manifested highly positive attitude towards ICT than secondary school teachers of Jammu and Kashmir. Another reason may be the lack of exposure the secondary school teachers of Jammu and Kashmir were endowed with. The results indicated that the levels of implementation of ICT by female secondary school teachers were found drastically high as compared to male secondary school teachers. Probably this may be due to the fact that female secondary school teachers were exercising more positive attitude towards ICT than their male counterparts.

4.6- Section: V

Assessment of government initiatives and background of Information and Communication Technology scheme in secondary schools

In this section following objective will be analyzed through documentation technique:

4.5 To highlight the government initiatives and background of Information and Communication Technology scheme in secondary schools of Jammu and Kashmir and Uttar Pradesh.

In order to understand the government initiatives and background of Information and Communication Technology Scheme in secondary schools of Jammu
and Kashmir and Uttar Pradesh following research question has been formulated and analyzed through documentation technique.

The corresponding Research question for the above mention research objective will be as;

Research question: What is the status of Information and Communication Technology scheme in secondary schools of Jammu and Kashmir and Uttar Pradesh?

The government of India has taken several initiatives which are targeted at secondary stage. Information and Communication Technology in schools is one of the projects aimed and implemented at secondary stage in all the states and Union Territories of India. The Information and Communication Technology Scheme in schools was launched on 15th December, 2004 to promote computer education in Government and Government aided Secondary and Senior Secondary schools in India. The ICT Scheme in schools is expected to bring innovation in teaching-learning process. The guideline of the revised Information and Communication Technology (ICT) Scheme in schools has been circulated to States and Union Territories in July 2010. The revised scheme of Information and Communication Technology in schools intended to increase Internet access to all Government and Government aided secondary and higher secondary schools. It also aimed at strengthening the teacher capacities, proposed to provide broadband connectivity and development of e-content.

Information and Communication Technology scheme in schools intended to support computer enabling learning and usage of ICT in educationally backward blocks and in areas where there is concentration of social casts, schedule tribes, minority or other weaker sections of the society. Article 46 of Indian constitution also envisages to promote the educational and economic interests of social casts, social tribes and other weaker sections of the society and to protect them from social injustice and exploitation. Education Commission 1964-66 also maintains the promotion of Education among SCs, STs and OBCs as is observed in Chapter VI, "One of the important social objectives of education is to equalize opportunity, enabling the backward or under-privileged classes and individuals to use education as a lever for the improvement of their condition. Every society that values social justice and is anxious to improve the lot of common man and cultivate all available talent must ensure progressive equality of opportunity to all sections of the
population. This is the only guarantee for the building up of an egalitarian and human society in which the exploitation of the weak will be minimized." It is really very sad that we have not paid attention to the words of wisdom of the Education Commission (1964-66).

The present study proposed to investigate secondary school Principals’ and teachers attitude towards ICT and its implementation in Uttar Pradesh and Jammu and Kashmir so it was confined to these two states only. In the state of Uttar Pradesh the total number of blocks is 830. Out of 830 the number of educationally backward blocks is 680 and Non- Educationally Backward blocks are 150. While as in the state of Jammu and Kashmir the total number of blocks is 215 with 97 Educationally Backward blocks and 118 Non- Educationally Backward Blocks.

Table 4.18

<table>
<thead>
<tr>
<th>State</th>
<th>Total Number of Blocks</th>
<th>Number of Educationally Backward blocks</th>
<th>Non- Educationally Backward Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uttar Pradesh</td>
<td>830</td>
<td>680</td>
<td>150</td>
</tr>
<tr>
<td>Jammu and Kashmir</td>
<td>215</td>
<td>97</td>
<td>118</td>
</tr>
</tbody>
</table>

Source: Ministry of Human Resource Development Government of India

It is clear from the perusal of table (4.18) that the number of Educationally Backward Blocks is more in the state of Uttar Pradesh than Jammu and Kashmir. Thus more efforts are to be utilized to promote computer enabling learning and usage of ICT in Uttar Pradesh than Jammu and Kashmir.

Implementation of Information and Communication Technology scheme- An Evaluation

The evaluation of implementation of Information and Communication Technology scheme is being monitored at the national level by Project Monitoring and Evaluation Group (PMEG). The States have also been advised to evaluate the scheme through external organizations like Indian Institute of Technologies (IITs), Indian Institute of Information Technologies (IIITs) and National Institute of
Technologies (NITs) etc. Information and Communication Technology scheme in schools has given the approval of the establishment of 63 Smart schools in the country during the year 2011-12. The coverage of secondary schools under Information and Communication Technology implementation scheme in India from 2007-08 to 2011-12 is shown in the table below.

Table 4.19

<table>
<thead>
<tr>
<th>Year</th>
<th>Coverage of secondary schools under ICT implementation scheme</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>22833</td>
<td>20000</td>
</tr>
<tr>
<td>2008-09</td>
<td>26350</td>
<td>18000</td>
</tr>
<tr>
<td>2009-10</td>
<td>9556</td>
<td>15000</td>
</tr>
<tr>
<td>2010-11</td>
<td>20000</td>
<td>19482</td>
</tr>
<tr>
<td>2011-12</td>
<td>20000</td>
<td>14062</td>
</tr>
</tbody>
</table>

Source: Department of School Education and Literacy Ministry of Human Resource Development Government of India.

Figure 4.10

Year wise coverage and target of Secondary schools under ICT scheme in India

It is clear from the perusal of table (4.19) and figure (4.10) that during the year 2007-08, the number of secondary schools to be covered under the scheme of Information and Communication Technology was 20,000 and the number of secondary school covered under the same Scheme was 22,833 which indicates that
coverage of secondary school under ICT Scheme exceeds the target to be achieved. In the year 2008-09, the target was only 18,000 secondary schools and 26,350 secondary schools were covered under the scheme of Information and Communication Technology which clearly shows that the number of secondary schools covered under the scheme of Information and Communication Technology was considerably high as compared to the target to be achieved during the year 2008-09.

During the year 2009-10, the number of secondary schools to be covered under the scheme of Information and Communication Technology was 15,000 and the number of secondary school covered under the same Scheme was 9,556 which shows that the coverage of secondary schools under the scheme of Information and Communication Technology is considerably less as compared to the target set to be achieved during the year 2009-10.

In the year 2010-11, the target was only 19,482 secondary schools and 20,000 secondary schools were covered under the scheme of Information and Communication Technology which clearly shows that coverage exceeds the target to be achieved during the year 2010-11.

During the year 2011-12, the number of secondary schools to be covered under the scheme of Information and Communication Technology was 14,062 and the number of secondary school covered under the same Scheme was 20,000 which shows that the coverage of secondary schools under the scheme of Information and Communication Technology is significantly high as compared to the target set to be achieved during the year 2011-12.

The Project Monitoring and Evaluation Group approved schools in two parts during the year 2007-08. In its part first, the schools were approved to the state of Uttar Pradesh and no school had been granted to the state of Jammu and Kashmir in this part. The number of schools sanctioned by Project Monitoring and Evaluation Group to the state of Uttar Pradesh is shown in the table as under.
Table 4.20

Number of schools and amount approved by Project Monitoring and Evaluation Group

Part I (2007-2008)

<table>
<thead>
<tr>
<th>State</th>
<th>Provision made in State Budget (Rs. In Lakh)</th>
<th>Schools and Amount approved by PM &amp; EG under Boot Model (A)</th>
<th>Fund Released (Rs. In Lakh)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>School</td>
<td>Amount</td>
</tr>
<tr>
<td>U. P</td>
<td>6700.00</td>
<td>2500</td>
<td>5000.00</td>
</tr>
</tbody>
</table>

Source: Compiled from the statistics released by: Lok Sabha Unstarred Question No. 1365, dated on 26.11.2007.

The Project Monitoring and Evaluation Group in its part second (2007-08) sanctioned funds and approved schools under the scheme of Information and Communication Technology in schools to the state of Jammu and Kashmir. The number of Schools and amount approved by Project Monitoring and Evaluation Group under scheme of Information and Communication Technology in Schools to the state of Jammu and Kashmir is shown in the table below:

Table 4.21

Number of Schools and amount approved by Project Monitoring and Evaluation Group

Part II (2007-2008)

<table>
<thead>
<tr>
<th>State</th>
<th>Schools and Amount approved by PM &amp; EG under Out Right Purchase Model (B)</th>
<th>Fund Released</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School</td>
<td>Amount 1340.00</td>
</tr>
<tr>
<td>J&amp;K</td>
<td>200</td>
<td>1340.00</td>
</tr>
</tbody>
</table>

Source: Compiled from the statistics released by: Lok Sabha Unstarred Question No. 1365, dated on 26.11.2007.

The information given in the tables (4.20) and (4.21) above clearly indicates that the state of U.P has made budgetary provisions for opening of schools under the scheme of Information and Communication Technology scheme in schools whereas
the state of Jammu and Kashmir has not made any such provisions. The state of U.P has made a budgetary provision of rupees 6700.00 lakh during the year 2007-08 for the establishment of 2500 schools while the state of J&K has not made such budgetary provisions for the establishment of 200 schools sanctioned under Information and Communication Technology scheme in schools and has not even bothered to attend the meetings held by Project Monitoring and Evaluation group for the successful implementation of ICT scheme in schools. This clearly depicts the lack of interest of the government of Jammu and Kashmir to implement the scheme of Information and Communication Technology in schools.

The Information and Communication Technology scheme is currently being introduced in all states and Union territories of India in government and government-aided secondary schools. The scheme also aims to set up Smart schools in Kendriya Vidyalayas and Navodaya Vidyalayas which are pace setting institutions of government of India to act as “Technology Demonstrators” and to lead in propagating ICT skills among students of neighboring schools. Funds were released to the state of Uttar Pradesh and Jammu and Kashmir under the scheme of Information and Communication Technology in school. The details of funds released under ICT Scheme in the schools during 2006-07, 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12 is shown in the table:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U. P</td>
<td>3115.47</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>3984.82581</td>
<td>6268.174</td>
</tr>
<tr>
<td>2</td>
<td>J&amp;K</td>
<td>570.06</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Source: Ministry of Human Resource Development govt. of India

It is clear from the information given in table (4.22) that during the financial year 2007-08 Rs. 570.06 lakhs were released to the state of Jammu and Kashmir while as an amount of Rs. 3115.47 lakhs were released to the state of Uttar Pradesh and again an amount of Rs. 3984.82581 lakhs were released during the year 2010-11 and during the financial year 2011-12 up to Feb.2012 an extra amount of Rs. 6268.174 was released to the state of Uttar Pradesh under ICT scheme in schools. No doubt the
educationally backward blocks is more in Uttar Pradesh than Jammu and Kashmir but ignoring the latter all along from 2007-08 onwards clearly indicates the biased attitude towards the state of Jammu and Kashmir. Funds were released thrice to the state of Uttar Pradesh and a meager amount of Rs. 570.06 lakhs were released to the state of Jammu and Kashmir from 2007-08 to February 2012. Thus from the perusal of the information given in the table it is clear that lack of financial can be one of the reasons responsible for poor or no implementation of Information and Communication Technology scheme in the state of Jammu and Kashmir.

Financial assistance is given to the states of India under Centrally Sponsored Scheme of 'Information and Communication Technology in Schools'. The financial assistance released and utilized under the Scheme of 'Information and Communication Technology in Schools of Uttar Pradesh and Jammu and Kashmir from 2009-10 to 2012-13 is shown in the table as under:

Table 4.23
Financial assistance released and utilized under Centrally Sponsored scheme of 'Information and Communication Technology in schools' from 2009-10 to 2012-2013

(Rs. In Lakh)

<table>
<thead>
<tr>
<th>States</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Release</td>
<td>Utilize</td>
<td>Release</td>
<td>Utilize</td>
</tr>
<tr>
<td></td>
<td>-d</td>
<td>-d</td>
<td>-d</td>
<td>-d</td>
</tr>
<tr>
<td>U.P</td>
<td>0.00</td>
<td>0.00</td>
<td>3984.82</td>
<td>3984.8</td>
</tr>
<tr>
<td>J&amp; K</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Source: Lok Sabha Unstarred Question No. 28737 dated 13.03.2013

It is clear from the information given in the table (4.23) that no amount has been released or utilized by either of the states during the year 2009-10. During the year 2010-11 an amount of Rs 3984.82 lakhs were released and the same amount were utilized by the state of Uttar Pradesh under Centrally Sponsored scheme of 'Information and Communication Technology in schools'. On the other hand, the central government has not released even a paisa to the state of Jammu and Kashmir.
under Centrally Sponsored scheme of 'Information and Communication Technology in schools' during the year 2010-11. Again in the year 2011-12 an amount of Rs 6268.17 lakhs were released to the state of Uttar Pradesh in which only an amount of Rs 4267.07 lakhs were utilized while as during the same year the state of Jammu and Kashmir was once again ignored. During the financial year 2012-13 an amount of Rs 4302.72 lakhs were released to the state of U.P and the actual figure of the utilized amount is still not available. Contrary to this, the state of Jammu and Kashmir was again ignored during the year 2012-13 as no financial assistance was released to the state. This clearly depicts that the state of Jammu and Kashmir is lagging behind in implementing the innovations and innovative schemes like ICT scheme in the education system due to lack of financial assistance given to the states and union territories by the government of India. Lack of funds once again can be counted as the reason accountable for poor implementation of ICT scheme in schools. Jammu and Kashmir possess a special status under Article 370 but lacks the eminence which is expected to have been achieved by the state of Jammu and Kashmir in the 21st Century.

The Information and Communication Technology scheme in schools approved schools to the states and union territories of India. The number of such schools sanctioned to the state of Uttar Pradesh and Jammu and Kashmir under the Centrally Sponsored Scheme of Information and Communication Technology as on 31.03.2009 is presented in the table that follows;

<table>
<thead>
<tr>
<th>States</th>
<th>School Sanctioned for coverage</th>
<th>Mode of Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uttar Pradesh</td>
<td>1500</td>
<td>Boot Model</td>
</tr>
<tr>
<td>Jammu and Kashmir</td>
<td>200</td>
<td>Outrage Purchase</td>
</tr>
</tbody>
</table>

Source: Ministry of Human Resource Development, Govt. of India.

It can be depicted from the information given in table (4.24) that 1500 schools were sanctioned for coverage under Boot Model mode of implementation to the state
of Uttar Pradesh and only 200 schools were sanctioned for coverage under Out Purchase mode of implementation of Centrally Sponsored Scheme of Information and Communication Technology (ICT) in schools. In fact, the number of schools sanctioned to the state of Jammu and Kashmir is considerably less but at the ground level not a single school exists yet out of these 200 schools.

The centrally sponsored scheme of Information and Communication Technology (ICT) in schools has approved several schools including Smart schools to the states of Uttar Pradesh and Jammu and Kashmir right from 2004-2005 to 2012-2013. The details are shown in the table that follows.

Table 4.25
Number of schools approved (including Smart schools) under centrally sponsored scheme of Information and Communication Technology from 2004-2005 to 2012-2013

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.P</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>2500</td>
<td>1500</td>
<td>-</td>
<td>1500</td>
<td>1608</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>J&amp; K</td>
<td>-</td>
<td>140</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>200</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Rajya Sabha Unstarred Question No. 3189, dated on 04.05.2012 and Lok Sabha Unstarred Question No. 2737, dated on 13.03.2013.

The information given in table (4.25) clearly indicates that during the year 2006-07 200 schools were approved to the state of U.P. In the year 2007-08 2500 schools were approved to the state of U.P. Again during the year 2010-11 1500 schools were sanctioned to the state of U.P. During the year 2011-12 1608 schools were approved to the state of U.P. Five smart schools have also been approved to the state of U.P under centrally sponsored scheme of Information and Communication Technology. While as only during the years 2005-06 and 2009-10 140 and 200 schools respectively were approved to the state of Jammu and Kashmir and no smart school has been approved to the state of J&K under centrally sponsored scheme of Information and Communication Technology. This again indicates the prejudiced treatment to the state of J&K. Thus it can be said that less or no number of schools
approved to the state of J&K can be another reason responsible for poor or no implementation of ICT scheme in the state. Smart schools for smart learners or digital learners is need of the hour but unfortunately no such school has been approved so far under centrally sponsored scheme of Information and Communication Technology to the state of J&K. This again indicates callous treatment to the state of J&K by the government of India which can be the reason responsible for lack of awareness about ICT and its use in education among teachers. However it is a matter of great concern to find out the causes responsible for poor or no response of Ministry of Human Resource Development towards proper implementation of ICT Scheme in secondary schools of Jammu and Kashmir.

Department of School Education and Literacy, Ministry of Human Resource Development Government of India informed through a letter dated 20th January 2014 with number as: F.No. 11-35/2007-Sch-5 to the Secretary Education Jammu and Kashmir that 200 schools sanctioned under Centrally Sponsored Scheme of ICT in Schools in 2008-09 stands cancelled with refunding of unspent balance of Rupees 603 lakh lying with the state as the government of the state is facing problems in implementing the scheme. The state government agreed to pay back the unspent amount.

Several agencies are working for the strengthening of educational system in the country. National University of Educational Planning and Administration (NUEPA) is also concerned with the intensification of educational management information system. It devises the State Report Cards of Secondary Education in India. The State Report Cards of Secondary Education 2012-13 is based on the data received from as many as 228 thousand schools spread over 662 districts across 35 States and Union Territories. The investigator has used the State Secondary Education Report Cards 2012-13 to demonstrate the percentage secondary schools with computer, electricity, Internet facility and Information and Communication Technology Laboratory in Jammu and Kashmir and Uttar Pradesh.

The percentage of all secondary and higher secondary schools with computer in Jammu and Kashmir and Uttar Pradesh is shown in the table that follows:
Table 4.26
Percentage of schools with computer at secondary school level in J&K and U.P

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage of secondary schools with computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jammu and Kashmir</td>
<td>57.30%</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>26.73%</td>
</tr>
</tbody>
</table>


It is clear from the information given in table (4.26) and from the Fig. 4.11 that the percentage of all secondary and higher secondary schools with computer is more in Jammu and Kashmir than Uttar Pradesh. In Jammu and Kashmir it is 57.30% while as Uttar Pradesh it is only 26.73%.

Fig. 4.11
Comparison between the percentage of Secondary schools with computer in Jammu and Kashmir and Uttar Pradesh

Table 4.27
Percentage of secondary schools with electricity in Jammu and Kashmir and Uttar Pradesh

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage of secondary schools with electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jammu and Kashmir</td>
<td>70.02%</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>78.14%</td>
</tr>
</tbody>
</table>

Fig. 4.12
Comparison between the percentage of secondary schools with Electricity in Jammu and Kashmir and Uttar Pradesh

The information in the table (4.27) and figure (4.12) revealed that the percentage of schools with electricity facility is more in the state of Uttar Pradesh than Jammu and Kashmir. In U.P it is 78.14% while as in the state of Jammu and Kashmir it is only 70.02%.

Table 4.28
Percentage of secondary schools with Internet facility in Jammu and Kashmir and Uttar Pradesh

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage of secondary schools with Internet facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jammu and Kashmir</td>
<td>42.72%</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>19.49%</td>
</tr>
</tbody>
</table>

Fig. 4.13
Comparison between the percentage of secondary schools with Internet facility in Jammu and Kashmir and Uttar Pradesh

The information in the table (4.28) and figure (4.13) revealed that the percentage of schools with Internet facility is more in the state of Jammu and Kashmir than Uttar Pradesh. In J&K it is 42.72% while as in the state of U.P it is only 19.49%.

Table 4.29
Percentage of secondary schools with ICT laboratory in Jammu and Kashmir and Uttar Pradesh

<table>
<thead>
<tr>
<th>State</th>
<th>Percentage of secondary schools with ICT lab.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jammu and Kashmir</td>
<td>13.46%</td>
</tr>
<tr>
<td>Kashmir</td>
<td></td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>25.53%</td>
</tr>
</tbody>
</table>

Comparison between the percentage of secondary schools with ICT laboratory in Jammu and Kashmir and Uttar Pradesh

From the perusal of table (4.29) and figure (4.14) it is clear that the percentage of schools with ICT Laboratories is more in the state of Uttar Pradesh than Jammu and Kashmir. In U.P it is 25.53% while as in the state of J&K it is only 13.46%.

Thus it can be concluded from the information gathered from *State Report Cards of Secondary Education* that the percentage of secondary schools with computer and Internet facility in Uttar Pradesh is significantly less than Jammu and Kashmir. But on the other hand, it was found after the analysis of quantitative data gathered by employing different research scales given in section (I) that the secondary school Principals of Uttar Pradesh expressed considerably more positive attitude towards ICT than the secondary school Principals of Jammu and Kashmir.

It was also found that the percentage of secondary schools with electricity facility and ICT laboratory facility is more in Uttar Pradesh than Jammu and Kashmir. Results in section III and IV revealed that the level of implementation of ICT by the secondary school Principals and teachers of Uttar Pradesh is considerably high as compared to the secondary school Principals and teachers of Jammu and Kashmir.
Thus it may be concluded that the Principals of Uttar Pradesh exhibited noticeably more positive attitude than the Principals of Jammu and Kashmir and the reason may be the fact that the secondary schools with computer facility are more functional in Uttar Pradesh than Jammu and Kashmir as was seen by the investigator himself while visiting these institutions for the collection of data. But conversely, in Jammu and Kashmir the percentage of secondary schools with computer and Internet facility is more in Jammu and Kashmir than Uttar Pradesh as per State Report Cards of Secondary Education 2012-13. It was found that the level of implementation of ICT by the secondary school Principals and teachers is considerably less in Jammu and Kashmir than Uttar Pradesh. This may probably due to the fact that secondary schools of Jammu and Kashmir are with computer facility but defunct. The investigator while visiting different higher secondary schools of district Pulwama of Jammu and Kashmir for the collection of data met with the Principals who claimed that we have computer facilities but totally obsolete and the Internet was found nowhere in the higher secondary schools of District Pulwama of Jammu and Kashmir. The percentage of secondary schools with ICT laboratory is also less in Jammu and Kashmir than Uttar Pradesh as per State Report Cards of Secondary Education. These may be the probable reasons responsible for secondary school Principals of Jammu and Kashmir who expressed considerably less positive attitude towards ICT than the secondary school Principals Uttar Pradesh.

4.7 DISCUSSION

Section V

Assessment of government initiatives and background of Information and Communication Technology scheme in secondary schools

The National Policy on Information and Communication Technology in School Education aims at creating an ICT-knowledgeable society, providing free access to ICT enabled tools and resources to teachers and students and motivate the sections of the society strengthening the school education process through appropriate utilization of ICT (revised National Policy on Information and Communication Technology in School Education, 2012).

The quality of education can be improved by integrating innovative techniques in education. Funds were released, provisions were made in state budgets, and schools
were opened, infrastructure was developed, training was provided, satellites were launched, policies were framed, meetings were held, minutes were framed and schemes were devised for the successful implementation of Information and Communication Technology scheme in the country. However, the progress of the scheme varies differently between various states and union territories. The present investigation, in this backdrop, is an endeavor to study secondary school Principals and teachers' attitude towards ICT and its implementation in Jammu and Kashmir and Uttar Pradesh. The Indian statistics revealed that the two states vary in terms of literacy rate. The literacy rate of Jammu and Kashmir is 68.74 while as literacy rate of Uttar Pradesh is 69.72 which is more than the literacy rate of Jammu and Kashmir. Funds were released and properly utilized by the government of Uttar Pradesh. However, the state government of Jammu and Kashmir failed to utilize funds sanctioned under centrally sponsored scheme of Information and Communication Technology in schools. A letter was dispatched on 20th January 2014 with number as: F.No. 11-35/2007-Sch-5 to the Secretary Education Jammu and Kashmir by Department of School Education and Literacy, Ministry of Human Resource Development Government of India with the information that 200 schools sanctioned under Centrally Sponsored Scheme of ICT in Schools in 2008-09 stands cancelled with refunding of unspent balance of Rupees 603 lakh lying with the state and the state government agreed to pay back the unspent amount as soon as possible. Per contra to this the government of Uttar Pradesh spent a huge amount of funds under the scheme of Information and Communication Technology in schools. Thus the state government of Uttar Pradesh is committed, motivation oriented and serious in implementing the innovations in education sector. While as the state government of Jammu and Kashmir showed callousness, lack of motivation and commitment, inability to utilize funds approved and released under the scheme of Information and Communication Technology and the value of innovative techniques, tactics and innovations which can bring laurels to the whole education system in the state.

It is clear from the letter dispatched on 20th January 2014 by the Department of School Education and Literacy, Ministry of Human Resource Development government of India that the government of Jammu and Kashmir is not competent, determinant and capable enough to utilize the funds released under the scheme of ICT in schools. Now it is impressed up on the Ministry of Human Resource Development,
government of India that the government of Jammu and Kashmir must be made accountable for poor or non-utilization of funds released for the development of education system in the state.
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CHAPTER 5
SUMMARY, FINDINGS, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

5.1 Summary
5.2 Objectives of the study
5.3 Hypotheses
5.4 Methodology
5.5 Major findings
5.6 Conclusions
5.7 Implications
5.8 Recommendations
5.9 Suggestions for Further Research
CHAPTER 5
SUMMARY, FINDINGS, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND SUGGESTIONS

*Schools must move from being educational centres to becoming knowledge and skill centres.*

— A P J Abdul Kalam

The development of the entire education system depends largely on the expansion of Secondary education. It forms the inter connectivity to the higher education system. The generation of secondary education is the result of the increasing demand for highly skilled labour force in the economy of the world. Secondary education develops abilities like; formal reasoning, abstract problem solving skills and critical thinking in secondary graduates which enables them to compete in the global economy. Secondary education promotes the development of a skilled and knowledgeable citizenry with access not only to the national but also to the global economy (Lewin and Caillods, 2001). The University Education Commission Report (1950, reprinted in 1983, p.55) envisaged that, ‘Secondary Education is the real weak spot in our entire educational machinery’. In order to keep pace with the global economy, the need of the hour is to enhance the quality of secondary education, improve the technological endeavor, effective leadership and effectiveness of teachers. Quality of secondary education can be enhanced by engaging knowledgeable, technologically efficient and highly professional teachers. The traditional modes must be replaced with innovative tactics and the innovations be utilized effectively. Teachers need to acquaint themselves with latest innovations, techniques and tactics and equip themselves with innovative skills so as to impart and inculcate the same in their students. New technology will “*overthrow the traditional structure of school, the idea of curriculum, the separation of children by age and practically everything that the education establishment will preserve to the bitter end*” (Papert 1998).

Over the last few decades, many studies have indicated that individuals’ beliefs, attitudes and intentions would affect their technology use (Kriek & Stols, 2010; Taylor & Todd, 1995; Venkatesh, Morris, & Davis, 2003). The present study, in this background, has been designed to investigate the secondary school Principals’
and teachers' attitude towards Information and Communication Technology. This study was also expected to explore the implementation of Information and Communication Technology in Uttar Pradesh and Jammu and Kashmir.

This chapter deals with the findings, implications, recommendations and suggestions for further research that has emerged out of the analysis and interpretation of data presented in the preceding chapter.

5.1 Summary

The main purpose of the current study was to investigate the secondary school Principals and teachers' attitude towards Information and Communication Technology and its implementation in Uttar Pradesh and Jammu and Kashmir. To this end, the chalk out of the present chapter comprises of objectives, hypotheses, methodology and findings that are explained as under:

5.2 Objectives

The study is undertaken with the following objectives:

1. To determine the level of attitude of Secondary School Principals' of Jammu and Kashmir towards ICT.

2. To identify the level of attitude of Secondary school principals' of Uttar Pradesh towards ICT.

3. To explore the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals attitude towards ICT.

4. To explore the level of attitude of Secondary school teachers of Jammu and Kashmir towards ICT.

5. To ascertain the level of attitude of Secondary school teachers of Uttar Pradesh towards ICT.

6. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers attitude towards ICT.

7. To study the level of implementation of ICT by the secondary school Principals' of Jammu and Kashmir.
8. To verify the level of implementation of ICT by the secondary school Principals’ of Uttar Pradesh.

9. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school Principals level of implementation of ICT.

10. To examine the level of implementation of ICT by the secondary school teachers of Jammu and Kashmir.

11. To check the level of implementation of ICT by the secondary school teachers of Uttar Pradesh.

12. To study the influence of gender (male and female), region (J&K and U.P) and their interaction on secondary school teachers level of implementation of ICT.


5.3 Hypothesis

Keeping the above research objectives in view the investigator has formulated the following null- hypothesis. For the sake of convenience the null- hypotheses have been classified into four sections; viz. section A, section B, section C and section D and a separate section i.e., (E) for the Research Question.

**Section A**

**H01:** There is no significant difference between the assumed mean and the real mean of attitude of secondary school principals of Jammu Kashmir towards ICT.

**H02:** There is no significant difference between the assumed mean and the real mean of attitude of secondary school Principals of Uttar Pradesh towards ICT.

**H03:** There is no significant difference and influence of interaction on attitude of secondary school Principals towards ICT according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (3a):** There is no significant difference in secondary school Principals attitude towards ICT with respect to their gender (male and female).
Hypothesis (3b): There is no significant difference in secondary school Principals attitude towards ICT with respect to the region (J&K and U.P).

Hypothesis (3c): There is no significant influence of interaction between gender and region on secondary school Principals attitude towards ICT.

Section B

Ho4: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Jammu Kashmir towards ICT.

Ho5: There is no significant difference between the assumed mean and the real mean of attitude of secondary school teachers’ of Uttar Pradesh towards ICT.

Ho6: There is no significant difference and influence of interaction on attitude of secondary school teachers towards ICT according to their gender (male and female) and region (J&K and U.P).

Hypothesis (6a): There is no significant difference in secondary school teachers’ attitude towards ICT with respect to their gender (male and female).

Hypothesis (6b): There is no significant difference in secondary school teachers’ attitude towards ICT with respect to the region (J&K and U.P).

Hypothesis (6c): There is no significant influence of interaction between gender and region on secondary school teachers’ attitude towards ICT.

Section C

Ho7: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the Principals of Jammu Kashmir.

Ho8: There is no significant difference between the assumed mean and the real mean of implementation of ICT by the principals of Uttar Pradesh.

Ho9: There is no significant difference and influence of interaction on implementation of ICT by the secondary school Principals according to their gender (male and female) and region (J&K and U.P).

Hypothesis (9a): There is no significant difference in the implementation of ICT by the secondary school Principals according to their gender (male and female).
**Hypothesis (9b):** There is no significant difference in the implementation of ICT by the secondary school Principals with respect to the region (J&K and U.P).

**Hypothesis (9c):** There is no significant influence of interaction between gender and region on secondary school Principals implementation of ICT.

**Section D**

**Ho10:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Jammu Kashmir.

**Ho11:** There is no significant difference between the assumed mean and the real mean of implementation of ICT by the secondary school teachers of Uttar Pradesh.

**Ho12:** There is no significant difference and influence of interaction on implementation of ICT by the secondary school teachers according to their gender (male and female) and region (J&K and U.P).

**Hypothesis (12a):** There is no significant difference in the implementation of ICT by the secondary school teachers according to their gender (male and female).

**Hypothesis (12b):** There is no significant difference in the implementation of ICT by the secondary school teachers with respect to the region (J&K and U.P).

**Hypothesis (12c):** There is no significant influence of interaction between gender and region on secondary school teachers' implementation of ICT.

**Section E**

In order to understand the government initiatives and background of Information and Communication Technology Scheme in Schools of Jammu and Kashmir and Uttar Pradesh following research question has been formulated.

**Research question:** What is the status of Information and Communication Technology scheme in secondary schools of Jammu and Kashmir and Uttar Pradesh?

**5.4 Methodology**

The methods and procedures followed in the present study have been described in detail in the preceding chapter with number (3). A sample of 529
secondary school teachers' and Principals' were taken from 68 secondary schools through different sampling techniques.

Besides document analysis, the investigator has constructed four research tools after considering the purpose of the present research study. Two tools were meant for measuring the attitude of secondary school Principals' and teachers towards Information and Communication Technology and next two tools were constructed for estimating the implementation of Information and Communication Technology by secondary school Principals and teachers. These tools were then standardized and their reliability and validity were established.

These standardized tools were then administered on the sample. The data gathered were subjected to appropriate statistical treatments such as, t-test, mean, Standard deviation, 2X2 Factorial Design ANOVA, Pearson's coefficient of correlation and Alpha Cronbach test. The analysis and interpretation of data with necessary tables were presented in a detailed manner in Chapter 4.

5.5 Major Findings

The major inferences drawn from the analysis of data are presented in the sections that follow;

◆ Findings based on Secondary school Principals attitude towards Information and Communication Technology

Section- I

(1) The results revealed that there is a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school Principals of Jammu Kashmir. As the real mean (100.62) is significantly more than the assumed mean (72) and the t-value (17.6) is significant at (0.05) level (significance value is .00). Therefore secondary school principals of Jammu Kashmir manifested positive attitude towards ICT.

(2) The result indicated that there is a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school principals of Uttar Pradesh. As the real mean (108.24) is considerably more than the assumed mean (72) and the t-value (31.6) was significant at (0.05) level. So the secondary school principals of Uttar Pradesh exhibited positive attitude towards ICT.
(3) It was observed that the F value (4.38) for gender was significant at 0.05 levels. It means that the mean score of attitude towards ICT of male and female secondary school Principals differs significantly. Thus the results revealed that gender influenced the secondary school Principals attitude towards ICT. The mean score value of attitude towards ICT for male secondary school Principals is (103.37) where as for female secondary school Principals it is (108.15) which shows that female secondary school Principals were found more positive in their attitude towards ICT than male secondary school Principals.

The F value for region is (9.59), which was significant at 0.05 levels. It means that mean score of attitude towards ICT of secondary school Principals’ according to region (J&K and U.P) differs significantly. The mean score of attitude towards ICT of secondary school Principals of Uttar Pradesh (108.42) is higher than the mean score of attitude towards ICT of secondary school Principals of Jammu and Kashmir (100.62). So, secondary schools Principal of Uttar Pradesh were found more positive in their attitude towards ICT than the secondary school Principals of Jammu and Kashmir.

◆ Findings based on Secondary school teachers’ attitude towards Information and Communication Technology

Section- II

(4) The findings indicated a significant difference between the real mean and the assumed mean of scores of attitude towards ICT of secondary school teachers of Jammu Kashmir. As the real mean (95.05) is higher than the assumed mean (90) and the t-value (11.33) was significant at (0.05) level (significance value was .00). It means that secondary school teachers of Jammu Kashmir reflected noticeably positive attitude towards ICT.

(5) The results showed a significant difference between the assumed mean and the real mean of scores of attitude towards ICT of secondary school teachers of Uttar Pradesh. As the real mean (97.59) is higher than the assumed mean (90) and the t-value (14.2) was significant at (0.05) level indicating that secondary school teachers of Uttar Pradesh exhibited positive attitude towards ICT.
(6) It was observed in the results that the F value (6.65) for gender was significant at 0.05 levels. It means that the mean score of attitude towards ICT of male and female secondary school teachers differs significantly. Thus the results revealed that gender influenced secondary school teachers’ attitude towards ICT. The mean score of attitude towards ICT for male secondary school teachers is (95.06) where as for female secondary school teachers it is (98.27), which indicated that female secondary school teachers manifested obviously more positive attitude towards ICT than male secondary school teachers.

The value of F (1.63) for region (J&K and U.P) was not significant at 0.05 level of confidence. It means that mean score of attitude towards ICT of secondary school teachers’ according to region (J&K and U.P) do not differ significantly.

❖ Findings based on Implementation of Information and Communication Technology by the Principals of secondary schools

Section- III

(7) The result indicated that there is a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school Principals of Jammu Kashmir. As the real mean (70.00) is more than the assumed mean (54.00) and the t-value (9.21) was significant at (0.05) level. So, secondary schools Principals of Jammu Kashmir have shown noticeable high level of implementation of ICT.

(8) The findings revealed a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school principals of Uttar Pradesh. The real mean (82.26) is higher than the assumed mean (54) and the t-value (30.9) was significant at (0.05) level. It shows that the level of implementation of ICT by secondary school Principals of U.P is obviously high.

(9) The results explored that the F value (2.02) for gender was not significant at 0.05 levels. It means that the mean score of implementation of ICT of male and female secondary school Principals do not differ significantly. Thus the results revealed that gender do not influence the level of implementation of ICT of the secondary school Principals. It was also found that the mean score of implementation of ICT of
secondary school Principals of Uttar Pradesh (82.26) is higher than the mean score of implementation of ICT of secondary school Principals of Jammu and Kashmir (70.00). So, secondary school Principals of Uttar Pradesh exhibited clearly high level of implementation of ICT than the secondary school Principals of Jammu and Kashmir.

- Findings based on Implementation of Information and Communication Technology by the teachers of secondary schools

Section- IV

(10) The findings revealed a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school teachers of Jammu Kashmir. As the real mean (26.68) is less than the assumed mean (40.00) and the t-value (30.05) was significant at (0.05) level. It indicates that the teachers of Jammu and Kashmir show considerably low level of implementation ICT.

(11) The inferences indicated a significant difference between the assumed mean and the real mean of scores of implementation of ICT of secondary school teachers of Uttar Pradesh. The real mean (30.99) is less than the assumed mean (40.00) and the t-value (18.26) was significant at (0.05) level. It shows that the secondary school teachers of Uttar Pradesh have exhibited significantly low level of implementation of ICT.

(12) The findings exposed that the F value (0.63) for gender was not significant at 0.05 levels. It means that the mean score of implementation of ICT of male and female secondary school teachers do not differ significantly. Thus the results revealed that gender do not influence the level of implementation of ICT of the secondary school teachers.

The value of F (21.08) for region (J&K and U.P) was significant at 0.05 level of confidence. It means that mean score of implementation of ICT of secondary school teachers according to region (J&K and U.P) differs significantly. It was found that the mean score of implementation of ICT of secondary school teachers of Uttar Pradesh (30.99) is more than the mean score of implementation of ICT of secondary school teachers of Jammu and Kashmir (26.68). So, secondary school teachers of
Uttar Pradesh exhibited considerably high level of implementation of ICT than the secondary school teachers of Jammu and Kashmir.

- Findings based on the Background of Information and Communication Technology scheme in schools

Section- V

The major findings drawn from the documentation analysis are given below:

(1) The results revealed that in Uttar Pradesh out of 830 blocks the number of educationally backward blocks is 680 (81.92%) and non-educationally backward blocks are only 150 (18.07%). While as in Jammu and Kashmir the total number of blocks is 215 with 97 (45.11%) educationally backward blocks and 118 (54.88%) non-educationally backward blocks. Thus, the percentage of educationally backward blocks is more in Uttar Pradesh than Jammu and Kashmir.

(2) It was found that number of schools approved by Project Monitoring and Evaluation Group for Uttar Pradesh was 2500 during the year (2007-08) while as the number of schools approved by Project Monitoring and Evaluation Group for Jammu and Kashmir was only 200 during the same year. Thus more schools have been approved for Uttar Pradesh than Jammu and Kashmir.

(3) It was found that Information and Communication Technology scheme in schools had given the approval of the establishment of 63 Smart schools in the country during the year 2011-12. Out of 63 smart schools, 5 (7.93%) schools were set up in Uttar Pradesh and no such school had been established in the state of Jammu and Kashmir.

(4) The results clearly indicated that during the year (2007-08) the government of Uttar Pradesh has made a budgetary provision of Rs. 6700.00 lakh for the establishment of 2500 schools in the state and no such provision was made by the government of Jammu and Kashmir for the establishment of 200 schools.

(5) The results clearly pointed out that Project Monitoring and Evaluation group held several meetings with the representatives of states and Union territories for the successful implementation of ICT scheme in schools. The Uttar Pradesh government sends its representatives for attending these meetings while the government of Jammu and Kashmir had not sent its representative for attending the meetings. This clearly
indicated poor or no response towards the implementation of ICT scheme in the secondary schools of Jammu and Kashmir than Uttar Pradesh.

(6) The results of the study revealed that more funds were released under the scheme of ICT in schools for the state of Uttar Pradesh than Jammu and Kashmir which clearly depicted that the state of Jammu and Kashmir is lagging behind in implementing the innovations and innovative schemes like ICT scheme in the education system due to lack of financial assistance given to the states and union territories by the government of India.

(7) The findings of the study revealed that Department of School Education and Literacy, Ministry of Human Resource Development Government of India informed Secretary Education Jammu and Kashmir through a letter that 200 schools sanctioned under Centrally Sponsored Scheme of ICT in Schools in 2008-09 stands cancelled with refunding of unspent balance of Rupees 603 lakh lying with the state and the government of the state agreed without any interference.

(8) The results of the study indicated that the percentage of secondary schools with computer in Jammu and Kashmir is 57.30% while as in Uttar Pradesh it is only 26.73%.

(9) The findings revealed that 78.14% secondary schools in Uttar Pradesh are with electricity facility while in case of Jammu and Kashmir only 70.02% secondary schools are having the electricity facility.

(10) The results showed that 42.72% secondary schools in Jammu and Kashmir are having Internet facility whereas 19.49% secondary schools in Uttar Pradesh were found with Internet facility.

(11) The results revealed that 25.53% secondary schools of Uttar Pradesh were with ICT laboratory facility whereas it was found that only 13.46% secondary schools are having ICT laboratory facility in the state of Jammu and Kashmir.

5.6 Conclusion

Total sample used in the study was 529. Out of 529 respondents, 236 teachers and 35 Principals were taken from Jammu and Kashmir and 38 Principals and 220 teachers were taken from Uttar Pradesh. Responses of the respondents (secondary
school Principals and teachers) were collected in order to assess their attitude towards ICT and its implementation. In conclusion, the findings of the study indicated that secondary school Principals and teachers possess positive attitude towards ICT. However it was revealed that the secondary school Principals of Uttar Pradesh manifested considerably more positive attitude towards ICT than the secondary school Principals of Jammu and Kashmir. It was also indicated that the secondary school teachers of Uttar Pradesh expressed noticeably more positive attitude towards ICT than the secondary school teachers of Jammu and Kashmir. The findings also revealed that the level of implementation of ICT by the secondary school Principals and teachers of Uttar Pradesh is significantly higher than the level of implementation of ICT by the secondary school Principals and teachers of Jammu and Kashmir. Research tools were constructed, Standardized and then used for the collection of data. The data so collected were subjected to appropriate statistical treatments.

Several documents like DISE Reports, ICT policy document, Indian statistics, Census reports and the minutes of the meetings, recommendations and reports of Project Monitoring and Evaluation Group were analyzed to understand the initiatives taken by government of India to introduce Information and Communication Technology in education. These documents were also used to understand the status of ICT in secondary schools of Uttar Pradesh and Jammu and Kashmir. These documents were analyzed through documentation technique. In finale, the findings of the study revealed that the government of India has taken several initiatives to integrate ICT in education in the whole country. Funds were sanctioned, released and utilized, schools were approved to introduce ICT in education but the government of different state and Union Territories were varying in implementing the ICT scheme in schools.

5.7 Implications

The governments, non-government organizations, educationists and policy makers all over the world are very much anxious to promote, propagate and introduce ICT in education at different levels of schooling. The findings of the present study, in this backdrop, may have direct bearing on educational system and have some valuable educational implications especially on Principals and teachers at secondary level of
education in the Indian scenario. Some educational implications of the current study are as under:

1. Secondary school Principals and teachers cannot make significant contribution to the development of education system without the acquisition of ICT knowledge and ICT skills. This implies that there should be greater efforts by the government and non-government organizations in promoting ICT awareness and inculcating ICT skills among secondary school Principals and teachers.

2. Work load, lack of awareness in ICT and lack of ICT training avenues, technological expertise and the like hindered the implementation of ICT in education. These hindrances must be wiped out so as to develop technological proficiency among secondary school Principals and teachers for effective implementation of ICT in education.

3. Use of ICT in education can bring laurels in the whole system of education. Secondary school Principals and teachers can play a significant role in enhancing the quality of education if they are competent, committed and determined to use ICT in education.

5.8 Recommendations

The government, school administrators and teachers have shown different reactions towards Information and Communication Technology and have different roles to implement it in education. They have different responsibilities and have different contributions to the successful implementation of ICT in teaching and learning. Based on the findings of the research and extensive review of the literature, the investigator gave the following recommendations for the government, school administrators and teachers.

❖ Government Level

1. The government of India is providing grants for schools to purchase computer facilities, Internet Services, and network facilities and impart training to the teachers. But there is no such policy which aims at improving the attitude of teachers’ towards Information and Communication Technology. For effective and efficient implementation, the attitude of teachers towards ICT and using ICT in their teaching are significant. The government only establishes targets
to be chased by the teachers. No one bothers about the keenness of teachers in the implementation. Teachers’ attitude is the prerequisite for the implementation of ICT. Therefore, the policy makers are advocated to consider the teachers attitude related to the innovative technology. Without teachers support, effective implementation of ICT in education is not possible and it is exercise in futile to spend money for providing ICT facilities to the schools.

2. The Ministry of Education in India has invested a great deal of funds to facilitate the integration of ICT in schools. Teachers are required to think and to plan how ICT can be integrated in teaching effectively. It is recommended that the government should recruit more teachers and clerical staff in order to lessen teachers’ duties (teaching and non teaching duties) in the school thereby increasing the quality of teaching.

3. In order to monitor and provide guidance to schools so that the implementation of Information and Communication Technology in education is carried on in right direction. It is therefore recommended to devise an evaluation system which will provide guidance to the schools regarding the implementation of ICT. No doubt at the national level the Information and Communication Technology scheme in schools is being monitored by the Project Monitoring and Evaluation Group but there is a dearth of an evaluation system at the school level.

❖ School Level

1. There is a need to educate secondary school Principals about ICT. They are recommended to understand the importance of ICT in education through an awareness campaign.

2. Principals’ vision, mission and leadership play a momentous role in effective integration of ICT in schools. They are recommended to frame a comprehensive policy to be followed in the school and which will ensure effective integration of ICT in education

3. Principals should become knowledgeable about the integration of ICT in teaching and learning. They are required to be trained in basic computer courses and pedagogical use of ICT. Training should be imparted to them.
The training courses should be appropriate and should meet the needs of the schools.

4. The use of ICT has basically changed the education industry. Innovative educational and instructional technologies are now replacing traditional instructional methods. Principals are recommended to encourage teachers to attend computer courses provided by external organization.

5. Psychological support is imperative for the successful implementation of ICT. School administrators should encourage and provide continuous support to teachers in order keep them abreast with innovative technology and their utilization in teaching.

6. School administrators should do their best in providing computer facility and Internet access to each and every teacher so as to promote ICT usage by them in the overall functioning of the school.

**Teacher Level**

1. The position of ICT at secondary stage is not satisfactory. Some schools were found with defunct ICT labs. The government is suggested that the issue of implementing ICT must be tackled adequately. The Government is also recommended to provide ICT training to the teachers or engage ICT trained teachers, develop ICT infrastructure in the schools, open smart schools and utilize funds released by the Ministry of Human Resource Development government of India for the implementation of ICT in schools.

2. Secondary school teachers with good ideas and attitude towards ICT need to be supported and encouraged continuously in order to increase ICT use for educational purposes.

3. Teachers should understand the importance of Information and Communication Technology as it is an aid to teaching. Teachers should use innovative techniques, follow innovative tactics and employ relevant technology in achieving the educational goals.

4. Teachers should update and equip themselves to meet the new challenges in the 21st century. They should open their minds to accept new approaches in teaching. Teachers should evaluate their own ICT ability and are required to attend training courses providing to develop ICT skills, inculcate technological spirit and improve their teaching.
5. Mutual understanding and joint support is a prerequisite entity for the effective implementation of ICT in education. Teachers should psychologically and technically support each other to maintain a mutual tone for the successful implementation of ICT.

5.9 Suggestions for Further Research

Based on the findings, conclusions and implications that have been previously explained, some important suggestions can be directed towards other researchers. The suggestions are as follows:

1. The present study is a small scale study and bounded on secondary schools of district Aligarh of U.P and on secondary schools of district Pulwama of Jammu and Kashmir only. The findings of the study cannot be generalized to all Indian secondary schools. Hence the researcher suggests that a broad research should be done on secondary schools of other states.

2. The investigator has targeted the secondary school Principals and teachers only in the current study. The scope of the research population can be broadened if the future researchers will target the education officers at block level, district level and at the state level in the Ministry of Education.

3. The investigator considered only the attitude of secondary school Principals and teachers towards ICT. There can be a number of factors like qualification, ICT training, availability of ICT gadgets and many more which could influence the implementation of ICT in education.

4. It is pertinent to accept that implementation of ICT is a continuous process and long-term strategy is required for effective implementation of ICT in education. The present study only investigated the implementation of ICT by secondary school Principals and teachers. The implementation of ICT in education indirectly depends on the responses of secondary school Principals and teachers in two different questionnaires. Results could have been more acceptable if they would have been practically exposed to different ICT gadgets in order to know the actual level of implementation of ICT by the secondary school Principals and teachers. Thus future researchers are intended to investigate the implementation of ICT by directly exposing the secondary school Principals and teachers to different ICT tools.
5. Future Researchers who intends to investigate the implementation of ICT in India are suggested to consider an evaluation of ICT Policy for effective assimilation of ICT in education.

6. Future researchers are suggested to design the course material on ICT training for secondary school Principals and teachers which is very significant in the Indian scenario.

7. The present study is a small scale study delimited to secondary schools only. The findings cannot be generalized to all levels of schooling. Hence the investigator suggests that future researches should be done on different levels of schooling like elementary level, higher level, etc. Future research can also be extended to the Principals and teachers of colleges.

8. Dissimilarity in the implementation of ICT in education from state to state is one of the important results found in this investigation. Further research about the causes of the difference between the states in the implementation of ICT in education and the strategies to wipe out the differences is recommended by the investigator.

The present study was an endeavor to investigate secondary school Principals and teachers 'attitude towards ICT' and 'implementation of ICT' in the secondary schools. Against this background, 'attitude' is an important factor that influences the implementation of ICT and can lead to the implementation of any of the innovations like ICT. Thus it is need of the hour that the Government, educationists, Policy makers and the others who are directly or indirectly associated with the quality improvement of education and integration of different innovations and innovative techniques in education must carry on to investigate the factors; sociological or cultural, psychological or personal, physical or infrastructural or the like that effects the implementation of ICT in education at secondary level.
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APPENDICES

A- Principals' Attitude towards Information and Communication Technology Scale (PATICT)

B- Principals' Implementation of Information and Communication Technology Scale (PIICT)

C- Teachers' Attitude towards Information and Communication Technology Scale (TATICT)

D- Teachers' Implementation of Information and Communication Technology Scale (TIICT)

E- List of Secondary School of district Pulwama (South Kashmir) of Jammu and Kashmir used for The collection of data

F- List of Secondary School of district Aligarh (Western U.P) of Uttar Pradesh used for the Collection of data

G- Paper Published
APPENDICES

Appendix -A

Principals' Attitude towards Information and Communication Technology Scale (PATICT)

Name of the school .................................................................

1. What is your gender?
   Male [ ] Female [ ]

General Instructions: The purpose of this questionnaire is to examine secondary school Principals' attitudes toward Information and Communication Technology (ICT). There are twenty five statements and make sure to respond to every statement by making a tick mark against the statement in the box that represents your level of agreement or disagreement with it. Your response will be kept confidential and will be used for research purpose only. There is no right or wrong answer, in the option SD= strongly disagree, D= Disagree, UD= Undecided, A= Agree, SA= strongly agree.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Statements</th>
<th>SD</th>
<th>D</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Knowing how to use computers is a worthwhile skill.</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Learning about computers is a waste of time*.</td>
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<tr>
<td>3.</td>
<td>I believe it is very important for me to learn how to use a computer.</td>
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<tr>
<td>4.</td>
<td>Computers can be a useful instructional aid in almost all subject areas.</td>
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<tr>
<td>5.</td>
<td>Computers are changing the world too rapidly.</td>
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<td>6.</td>
<td>If I had a computer at my disposal, I would try to get rid of it*.</td>
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<tr>
<td>7.</td>
<td>I can learn many things when I use a computer.</td>
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<td>8.</td>
<td>Computers can improve education.</td>
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<tr>
<td>9.</td>
<td>The challenge of learning about computers is exciting.</td>
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<tr>
<td>10.</td>
<td>Having a computer at home is very important for me.</td>
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<tr>
<td>11.</td>
<td>Learning about computers is boring to me. *</td>
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<tr>
<td>12.</td>
<td>I will probably never learn to use a computer. *</td>
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<tr>
<td>13.</td>
<td>I like learning on a computer.</td>
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<td>14.</td>
<td>Computer usually saves me some time and effort.</td>
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<tr>
<td>15.</td>
<td>Working with a computer makes me feel tense and uncomfortable. *</td>
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<tr>
<td>16.</td>
<td>I enjoy learning how computers are used in our daily lives.</td>
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<tr>
<td>17.</td>
<td>I am afraid that if I begin to use computers I will become dependent upon them. *</td>
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<tr>
<td>18.</td>
<td>I would work harder if I could use computers more often.</td>
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<tr>
<td>19.</td>
<td>I believe that I am a better Principal with technology.</td>
<td></td>
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<tr>
<td>20.</td>
<td>Computers are difficult to use. *</td>
<td></td>
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<tr>
<td>21.</td>
<td>I avoid using computers whenever I can. *</td>
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<tr>
<td>22.</td>
<td>I think that computers are very easy to use.</td>
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<tr>
<td>23.</td>
<td>I feel comfortable while working with a computer.</td>
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<tr>
<td>24.</td>
<td>I like reading about computers.</td>
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<tr>
<td>25.</td>
<td>Computers have the potential to control our lives. *</td>
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</tbody>
</table>
Appendix -B

Principals’ Implementation of Information and Communication Technology Scale (PIICT)

Name of the school .............................................................

1. What is your gender?
   Male [ ]    Female [ ]

General Instructions: The purpose of this questionnaire is to examine secondary school Principals’ implementation of Information and Communication Technology (ICT). There are eighteen statements and make sure to respond to every statement by making a tick mark against the statement in the box that represents your level of agreement or disagreement with it. Your response will be kept confidential and will be used for research purpose only. There is no right or wrong answer. The various options are: Strongly disagree, Disagree, Undecided, Agree and strongly agree.

ICT KNOWLEDGE

Indicate the degree of your agreement with the following statements:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>ICT skill</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I can start and shut down a computer</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>I can use an Internet /e-mail</td>
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<tr>
<td>3.</td>
<td>I can use word processing</td>
<td></td>
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<tr>
<td>4.</td>
<td>I can use databases</td>
<td></td>
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<tr>
<td>5.</td>
<td>I can use PowerPoint</td>
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</tbody>
</table>

ICT APPLICATION USED IN SCHOOL FUNCTIONS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>School timetable</td>
</tr>
<tr>
<td>7.</td>
<td>Students’ progress reports</td>
</tr>
<tr>
<td>8.</td>
<td>Financial transactions</td>
</tr>
<tr>
<td>9.</td>
<td>Library catalogue</td>
</tr>
<tr>
<td>10.</td>
<td>Staff personal information records</td>
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</tr>
<tr>
<td>11.</td>
<td>Students' admission details</td>
</tr>
<tr>
<td>12.</td>
<td>Staff responsibilities records</td>
</tr>
<tr>
<td>13.</td>
<td>Communication with school Staff</td>
</tr>
<tr>
<td>14.</td>
<td>Maintain correspondence with education offices</td>
</tr>
</tbody>
</table>

**CHALLENGES FACING ICT IMPLEMENTATION**

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.</td>
<td>Financial constraints</td>
<td></td>
<td></td>
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<tr>
<td>16.</td>
<td>Lack of ICT learning centers</td>
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<tr>
<td>17.</td>
<td>Lack of ICT infrastructure</td>
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<tr>
<td>18.</td>
<td>Lack of interest in ICT</td>
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</table>
Appendix -C

Teachers’ Attitude towards Information and Communication Technology Scale (TATICT)

Name of the school .................................................................

1. What is your gender?
   Male [ ] Female [ ]

**General Instructions:** The purpose of this questionnaire is to examine secondary school teacher’s attitudes toward Information and Communication Technology (ICT). The questionnaire consists of thirty statements covering all domains of attitude (cognitive, affective and behavioral). Please indicate your reaction to each statement by making a tick mark against the one in the box that represents your level of agreement or disagreement with it. Make sure to respond to every statement. Your response will be kept confidential and will be used for research purpose only. There is no right or wrong answer. In the option SD= strongly disagree, D= Disagree, UD= Undecided, A= Agree, SA= strongly agree.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Statement</th>
<th>Strongly disagree SA</th>
<th>Disagree D</th>
<th>Undecided UD</th>
<th>Agree A</th>
<th>Strongly agree SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Using computers is enjoyable.</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>Computers make me feel uncomfortable.</td>
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<tr>
<td>3.</td>
<td>I dislike using computers in teaching.</td>
<td></td>
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<tr>
<td>4.</td>
<td>Computers save time and effort in class.</td>
<td></td>
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<tr>
<td>5.</td>
<td>Schools would be a better place without computers.</td>
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<td>6.</td>
<td>Students must use computers in all the subjects.</td>
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<tr>
<td>7</td>
<td>Learning about computers is a waste of time.</td>
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<tr>
<td>8</td>
<td>Computers are a fast and efficient means of getting information.</td>
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<tr>
<td>9</td>
<td>I do not think I would ever need a computer in my classroom.</td>
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<td>10</td>
<td>Computers can enhance students learning.</td>
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<tr>
<td>11</td>
<td>I would rather do things by hand than with a computer.</td>
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<tr>
<td>12</td>
<td>If I had the money, I would buy a computer.</td>
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<tr>
<td>13</td>
<td>I would like to learn more about computers.</td>
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<tr>
<td>14</td>
<td>Computers will improve Education.</td>
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<tr>
<td>15</td>
<td>Teaching with computers offers real advantages over traditional methods of instruction.</td>
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<tr>
<td>16</td>
<td>Computer technology cannot improve the quality of students learning.</td>
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<tr>
<td>17</td>
<td>Using computer technology in the classroom would make the subject matter more interesting.</td>
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<td>18</td>
<td>Computers have no place in Schools.</td>
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<td>19</td>
<td>Class time is too limited for Computer use.</td>
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<td></td>
<td>20. It would be difficult for me to learn to use the computer in Teaching.</td>
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<td></td>
<td>21. I have no difficulty in understanding the basic functions of computers.</td>
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<td></td>
<td>22. Computers complicate my task in the classroom.</td>
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<td></td>
<td>23. Everyone can easily learn to operate a computer.</td>
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<td></td>
<td>24. I have seen computers at work.</td>
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<td>25. Computers have proved to be the effective tools for learning.</td>
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<td></td>
<td>26. I have never seen computers being used as an educational tool.</td>
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<td></td>
<td>27. Computers will not make any difference in our classrooms, schools, or lives.</td>
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<td></td>
<td>28. Students prefer ‘learning from teachers’ to ‘learning from computers’.</td>
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<tr>
<td></td>
<td>29. People who are skilled in computers have privileges not available to others.</td>
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<td></td>
<td>30. Computers should be a priority in education.</td>
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</tbody>
</table>
Appendix -D

Teachers’ Implementation of Information and Communication Technology Scale (TIICT)

Name of the school .................................................................

1. What is your gender?
   Male [ ]   Female [ ]

General Instructions: This questionnaire has 20 statements designed to measure secondary school teachers Implementation of ICT. Below are given the names of some ICT tools along with three alternative responses i.e. (Fully used, partially used and Not used). You are requested to put a tick mark against response category of each statement.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>STATEMENTS</th>
<th>RESPONSES</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FULLY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PARTIALLY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
</tr>
<tr>
<td>1.</td>
<td>Computers are used in the school.</td>
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</tr>
<tr>
<td>2.</td>
<td>I make use of Computer for instructional practices in the school.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Internet is used in the school.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>I make use of internet in the school.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>I use Internet while planning the lesson.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>LCD Projector is used in the school</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>I use Projector while delivering the lesson in the classroom.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I use ppt. while discussing the subject matter in the classroom.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Educational software is available in the school.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>I use educational software while teaching the students through ICT.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>There is access to digital library in the school.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I use digital library resources to get new information.</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I use computer to maintain the record of student’s performance.</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Audio-Conference is used in the school.</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I use Audio-Conference in the school.</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Video-Conference is used in the school.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>I use Video-Conference in the school.</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>There is Online-teaching in the school.</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>I use online teaching in the school.</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>I used to instruct the student through smart classes.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix- E

List of Secondary School of district Pulwama (South Kashmir) of Jammu and Kashmir used for the collection of data

<table>
<thead>
<tr>
<th>S. No.</th>
<th>School Name</th>
<th>Village Name</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Govt. Higher Secondary School Noorpura</td>
<td>Noorpura</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>3</td>
<td>Govt. Higher Secondary School Pinglena</td>
<td>Pinglena</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>4</td>
<td>Govt. Higher Secondary School Kakapora</td>
<td>Kakapora</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>5</td>
<td>Govt. Higher Secondary School Ratnipora</td>
<td>Ratnipora</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>7</td>
<td>Govt. Higher Secondary School Satoora</td>
<td>Satoora</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>8</td>
<td>Govt. Higher Secondary School Loragam</td>
<td>Loragam</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>9</td>
<td>Govt. Higher Secondary School Ladhu</td>
<td>Ladhu</td>
<td>Up. Pr. Secondary and Higher Sec</td>
</tr>
<tr>
<td>10</td>
<td>Govt. Higher Secondary School Lethpora</td>
<td>Lethpora</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>11</td>
<td>Govt. Boys Higher Secondary School Samboora</td>
<td>Samboora</td>
<td>Up. Pr. Secondary and Higher Sec</td>
</tr>
<tr>
<td>15</td>
<td>Govt. Boys Higher Secondary School Khrew</td>
<td>Ward 1</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>16</td>
<td>Govt. Higher Secondary school Hawl</td>
<td>Hawl</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>17</td>
<td>Govt. Boys Higher Secondary School Koil</td>
<td>Koil</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>No</td>
<td>School Details</td>
<td>Ward</td>
<td>Education Level</td>
</tr>
<tr>
<td>----</td>
<td>------------------------------------</td>
<td>-------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Govt. Boys Higher Secondary School Pulwama</td>
<td>No9</td>
<td>Higher Secondary only</td>
</tr>
<tr>
<td>21</td>
<td>Govt. Higher Secondary School Rajpora</td>
<td>Rajpora</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>22</td>
<td>Govt. Boys Higher Secondary School Rohmu</td>
<td>Rohmu</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>23</td>
<td>Govt. Boys Higher Secondary School Aribal</td>
<td>Aribal</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>26</td>
<td>Boys Hr. Sec. School Panzgam</td>
<td>Panzgam</td>
<td>Secondary with Higher Secondary</td>
</tr>
<tr>
<td>28</td>
<td>Govt. Boys Higher Secondary School Wasoora</td>
<td>Wasoora</td>
<td>Secondary with Higher Secondary</td>
</tr>
</tbody>
</table>
Appendix- F

List of Secondary School of district Aligarh (Western U.P) of Uttar Pradesh used for the collection of data

<table>
<thead>
<tr>
<th>S. No.</th>
<th>School Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AL-barakaat Public School</td>
<td>Anoopshahr Road Aligarh Up</td>
</tr>
<tr>
<td>2</td>
<td>Aligarh Modern School</td>
<td>Behind Hadi Hasan Hall Dhoerra Aligarh</td>
</tr>
<tr>
<td>3</td>
<td>Aligarh Public School</td>
<td>Nishat Kothi Civil Lines University Road Aligarh</td>
</tr>
<tr>
<td>4</td>
<td>Ayesha Tarin Modern Public School</td>
<td>Anoopshahr Road Aligarh Uttar Pradesh</td>
</tr>
<tr>
<td>5</td>
<td>Babuji Convent School Jattari</td>
<td>Village-fajilpur Kalan, Post-jattari, Aligarh</td>
</tr>
<tr>
<td>6</td>
<td>Blackdale Public School</td>
<td>Village Maheshpur P.O. Aligarh</td>
</tr>
<tr>
<td>7</td>
<td>Blue Bird Higher Secondary School</td>
<td>Banna Devi Bhattacharya Bhavan G. T. Road Aligarh</td>
</tr>
<tr>
<td>8</td>
<td>Brilliant Public School</td>
<td>Shankar Vihar, Quarsi, Ramghat Road</td>
</tr>
<tr>
<td>9</td>
<td>C.B. Gupta Saraswati Vidyapeeth, Singharpur</td>
<td>C. B. Gupta Saraswati Vidyapeeth, Singharpur Mathura Road, Aligarh</td>
</tr>
<tr>
<td>10</td>
<td>City Convent School</td>
<td>Atrauli, Aligarh</td>
</tr>
<tr>
<td>11</td>
<td>Colonel's Brightland Public School</td>
<td>Cill Lakawali P.O, Kalal Kheria, Agra Uttar Pr</td>
</tr>
<tr>
<td>12</td>
<td>Delhi Public School</td>
<td>Aligarh Uttar Pradesh</td>
</tr>
<tr>
<td>13</td>
<td>Dharam Samaj Bal Mandir</td>
<td>Sudhama Puri, Aligarh, Uttar Pradesh</td>
</tr>
<tr>
<td>14</td>
<td>Engineers Colony Senior Secondary School</td>
<td>Quarsi By Pass Road Aligarh</td>
</tr>
<tr>
<td>15</td>
<td>G D Public School</td>
<td>Khair Road Aligarh</td>
</tr>
<tr>
<td>16</td>
<td>Gagan Public School</td>
<td>Khair Bypass, Aligarh</td>
</tr>
<tr>
<td>17</td>
<td>Green Valley Convent Public</td>
<td>Atrauli Road, Chharra Aligarh</td>
</tr>
<tr>
<td>No.</td>
<td>School</td>
<td>Address</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>18</td>
<td>Gurukul Public School</td>
<td>Somna Road Khair Aligarh</td>
</tr>
<tr>
<td>19</td>
<td>Hare Krishna Public School</td>
<td>Village Bhankri Tehsil Kol G. T. Road Aligarh</td>
</tr>
<tr>
<td>20</td>
<td>Hem Vidya Niketan</td>
<td>Village-chaman Nagaria</td>
</tr>
<tr>
<td>21</td>
<td>Heritage International School</td>
<td>Talanagri Ramghat Road Aligarh</td>
</tr>
<tr>
<td>22</td>
<td>Ingraham Institute ENG-Med School</td>
<td>G. T. Road Banna Devi Aligarh</td>
</tr>
<tr>
<td>23</td>
<td>Ingraham Institute English School</td>
<td>Kasimpur Aligarh</td>
</tr>
<tr>
<td>24</td>
<td>Iqra Public School</td>
<td>Sayed Nagar Iqra Colony Aligarh</td>
</tr>
<tr>
<td>25</td>
<td>Jagran Public School Aligarh</td>
<td>Agrawal and Associates, Chartered Accountant, Aligarh</td>
</tr>
<tr>
<td>26</td>
<td>Jawahar Navodaya Vidyalaya</td>
<td>Sujanpur Khair Aligarh</td>
</tr>
<tr>
<td>27</td>
<td>Kendriya Vidyalaya</td>
<td>Ramghat Road, Devsaini, Aligarh</td>
</tr>
<tr>
<td>28</td>
<td>Ketan Covent School</td>
<td>Opposit Iti Gate, Iti Road Aligarh</td>
</tr>
<tr>
<td>29</td>
<td>Krishna International School</td>
<td>Krishna Nagar, Opposite Relience Petrol Pump Aligarh</td>
</tr>
<tr>
<td>30</td>
<td>L B K Public School</td>
<td>Kajroth, Hathras Road,Aligarh</td>
</tr>
<tr>
<td>31</td>
<td>Mothers Touch School</td>
<td>City Office, Near Hdfc Bank Aligarh</td>
</tr>
<tr>
<td>32</td>
<td>Neehar Meera</td>
<td>National High School Aligarh</td>
</tr>
<tr>
<td>33</td>
<td>Our Lady of Fatima Higher Secondary School</td>
<td>Ramghat Road Aligarh</td>
</tr>
<tr>
<td>34</td>
<td>Raghbir Bal Mandir</td>
<td>Ramghat Road, Aligarh</td>
</tr>
<tr>
<td>35</td>
<td>Radiant Stars English School</td>
<td>Khair Road Aligarh</td>
</tr>
<tr>
<td>36</td>
<td>Range Hills Public School</td>
<td>Dhanipur, G. T. Road Aligarh</td>
</tr>
<tr>
<td></td>
<td>School Name</td>
<td>Address</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>37</td>
<td>Sant Sar Public School</td>
<td>Bhankarikhas Delhi G. T. Road Aligarh</td>
</tr>
<tr>
<td>38</td>
<td>Saraswati Vidya Mandir</td>
<td>Keshav Nagar Gonda Mor Kher Marg Aligarh</td>
</tr>
<tr>
<td>39</td>
<td>Shantiniketan World School</td>
<td>Panch Sheel Colony, Near Jint, Aligarh</td>
</tr>
<tr>
<td>40</td>
<td>Shree Ji Public School</td>
<td>Aligarh-palwal Road</td>
</tr>
<tr>
<td>41</td>
<td>St. Fidelis School</td>
<td>Tali Nagari Aligarh</td>
</tr>
<tr>
<td>42</td>
<td>St. Johns School</td>
<td>Atrauli District Aligarh</td>
</tr>
<tr>
<td>43</td>
<td>Three Dots Sewamarg Public School</td>
<td>Ramghat Road, Aligarh</td>
</tr>
<tr>
<td>44</td>
<td>Wisdom Public School</td>
<td>Quarsi, Ramghat Road Aligarh</td>
</tr>
<tr>
<td>45</td>
<td>Woodbine Floret Public School</td>
<td>Anoopshahr Road Aligarh</td>
</tr>
<tr>
<td>46</td>
<td>Zakir Husain Model Senior School</td>
<td>Civil Lines Dodhpur Aligarh</td>
</tr>
</tbody>
</table>
ASSESSMENT OF INITIATIVES AND UNDERSTANDING THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION IN INDIA

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ABSTRACT

India has been undertaking many projects to integrate Information and Communication Technology (ICT) in the teaching-learning processes in educational institutions. This research study sheds light on the role of ICT tools in education and various initiatives, measures that were taken by the government of India for the integration of Information and Communication Technology (ICT) in education. The results revealed that although government had taken several initiatives for the integration of ICT in school education but in spite of these initiatives and schemes, several challenges are there which are posing a threat in the integration of ICT in school education. Teachers are willing to use ICT resources and are aware of the existing potential; they are facing problems in relation to accessibility to ICT resources and lack of in-service training opportunities and ICT skills.

Keywords: Information and Communication Technology, Initiatives, education, Indian national policy, technology integration.
INTRODUCTION:

India is the seventh largest and second most populous country in the world. It is bordered by Pakistan, the People's Republic of China, Nepal, Bhutan, Bangladesh, and Myanmar. Administratively India is divided into 28 States and 7 Union Territories, with more than 618 districts. There are 21 official languages. The population of India according to census 2011 is 1.21 billion. The Indian economy has been growing at a steady growth @ 7-9%. Services sector contributes 54% of GDP, industry and agriculture contributes 29% and 17%, respectively. However, more than 60% of the population is dependent on agriculture and 23% of the people still live below the poverty line.

BACKGROUND:

The education being the concurrent subject in India is administered by the Ministry of Human Resource Development at the centre and the different Departments of Education at the state level. The Government of India provides the overall policy framework, financial support and guidelines to ensure a national standard of education. India has maintained its position in the ICT development index, ranking 118th in 2007 (International Telecommunication Union –Measuring the Information Society, 2009).

The integration of ICT into education has been assumed as the potential of the new technological tools to revolutionize an outmoded educational system (Albrini, 2006). The importance of using ICT for improving education has been emphasized for over a decade in India. The National Knowledge Network has been launched based on the recommendation of the National Knowledge Commission (KNC), with the collaborative effort of the Ministry of Human Resource Development (MHRD), Department of IT and Department of Telecom to harness the capacity of ICT in delivering educational services.

INITIATIVES:

- EDUSAT—Education Satellite
- ICT @ Schools Scheme
- Rajiv Gandhi Project for EDUSAT Supported Elementary Education
- Gyan Darshan and Gyan Vani
- National Knowledge Network
- Azim Premji Foundation's Computer-Aided Learning Program

EDUSAT—EDUCATION SATELLITE:

EDUSAT (Education Satellite), launched on September 20, 2004, is the first Indian satellite for serving the educational sector was launched by Indian Space Research Organization (ISRO). It was launched primarily to serve the need for an interactive satellite to enhance the distance education system in the country. Many projects like the “Virtual Classroom Technology on EDUSAT for Rural Schools” (VICTERS) program have been initiated to impart education through the satellite. EDUSAT services commenced on March 7, 2005 with the inauguration of EDUSAT based Primary Education Project in Chamarajanagar District under taken by ISRO jointly with the Karnataka State Government. Under this project, 885 satellites receive terminals for primary schools have been set up in predominantly tribal areas. EDUSAT is primarily meant for providing connectivity to school, college and higher levels of education and also to support non-formal education including developmental communication.

Fig.1: EDUSAT — Education Satellite
Many initiatives were taken by the Government of India to integrate ICT at all levels of education. Some of the major initiatives are hereunder:

**ICT @ SCHOOLS SCHEME:**

The Government of India has launched ICT @ Schools scheme in 2004 with a view to provide opportunities to students to develop their ICT skills and to make use of ICT in the teaching learning process. The scheme is currently being implemented in all states and union territories of India in government and government-aided secondary and higher secondary schools. The scheme also aims to set up SMART schools in Kendriya Vidyalayas and Navodaya Vidyalayas. The government of India has released funds for the scheme from 2005 to 2008, which amounted to about INR 3.2 Billion. Budget allocation for ICT @ School scheme during the year 2013-14 was 315.00 crores. The State Government of Kerala has introduced “IT @ School” project for providing training to the teachers, providing high-speed net connectivity to schools, and for implementing learning management solutions.

The ICT in Schools Scheme is expected to bring innovation in teaching learning process. The guideline of the revised ICT in Schools Scheme has been circulated to States and Union Territories in July 2010. The revised ICT scheme proposed to increase outreach to all Government and Government aided secondary and higher secondary schools, strengthen teacher capacity, provision of broadband connectivity and e-content development.

**OBJECTIVES OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN SCHOOLS SCHEME:**

- Joint venture with State Government/UTs for providing computer aided education to Secondary and Higher Secondary Government and Government aided schools.
- Establishment of Smart Schools.
- Teachers related interventions, such as a scheme for national ICT award for teachers, provision for recruitment of elite teachers and capacity building of all teachers in ICT.

Development of a E-content, mainly through Central Institute of Education Technologies (CIET), six State Institutes of Education Technologies (SIETs) and 5 Regional Institute of Education (RIEs), and also through outsourcing.

**EVALUATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IMPLEMENTATION SCHEME:**

The evaluation of the progress of Information and Communication Technology (ICT) scheme is done at the state level by a separate unit created for the purpose. At the national level, the implementation of the scheme is being monitored by Project Monitoring and Evaluation Group (PMEG). Third party evaluation of the scheme has been taken up by the States and Union territories. The States have also been advised to evaluate the scheme through external organizations like Indian Institute of Technologies (IITs), Indian Institute of Information Technologies (IIITs) and National Institute of Technologies (NITs) etc. Information and Communication Technology (ICT) scheme has given the approval of the establishment of 63 Smart schools during the year 2011-12.

The table shows year wise coverage of ICT implementation scheme in India.

<table>
<thead>
<tr>
<th>Year</th>
<th>Coverage of secondary and senior secondary schools under ICT implementation scheme</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>22833</td>
<td>20000</td>
</tr>
<tr>
<td>2008-09</td>
<td>26389</td>
<td>18000</td>
</tr>
<tr>
<td>2009-10</td>
<td>9556</td>
<td>15000</td>
</tr>
<tr>
<td>2010-11</td>
<td>20000</td>
<td>19482</td>
</tr>
<tr>
<td>2011-12</td>
<td>20000</td>
<td>14062</td>
</tr>
</tbody>
</table>

Source: Department of School Education and Literacy Ministry of Human Resource Development Government
of India New Delhi.

**RAJIV GANDHI PROJECT FOR EDUSAT SUPPORTED ELEMENTARY EDUCATION:**

The Rajiv Gandhi Project for EDUSAT Supported Elementary Education (RGPEEE) is another initiative aimed at harnessing the benefits of EDUSAT; it is a collaborative project of Indira Gandhi National Open University (IGNOU), Ministry of Human Resource Development (MHRD), and ISRO. The project promotes the use of EDUSAT in enabling teachers to incorporate ICT in elementary education. It is operational in Madhya Pradesh, Chattisgarh, Uttar Pradesh, and Bihar.

**GYAN DARSHAN AND GYAN VANI:**

DD-Gyan Darshan is an educational television channel telecasting different educational programmes has been set up by the national telecaster Doordarshan and IGNOU. Gyan Vani is an educational FM radio channel broadcasting different educational programmes contributed by various educational institutions, NGOs, and national level institutions such as IGNOU, NCERT, UGC, IITs, and open universities.

**NATIONAL KNOWLEDGE NETWORK:**

The National Mission on Education through ICT was launched in 2009. It aims to use ICTs for enhancing the teaching learning experience of learners. A high-speed digital broadband network, the National Knowledge Network, is envisaged for interconnecting the country’s major research and educational institutions, colleges, and universities.

**AZIM PREMJI FOUNDATION’S COMPUTER-AIDED LEARNING PROGRAM:**

Azim Premji Foundation is an NGO which works in the area of elementary education in rural areas. In 2002, it initiated the Computer-Aided Learning program (CALP) to harness the potential of computer technology for education. The foundation has set up Computer-Aided Learning Centers (CALC) to improve academic learning levels, attract out of school children, provide child centric education to retain students, and reduce absenteeism of teachers and students. The government has taken the responsibility to provides computers and required hardware to schools to establish these centers. The program has covered approximately 16,000 schools across 14 states in the country.

**SARVA SHIKSHA ABHIYAN:**

SSA is a flagship programme of the Government of India developing, and strengthening the formal primary and upper primary school systems. The SSA program is largely funded by the Government of India but is also supported by the World Bank, Department for International Development, and the European Community (EC) with the World Bank being the largest contributor. The provisions of Right to Education Act 2009 (RTE) are implemented through SSA. Government has approved an expenditure of Rupees 2, 31,233 crore for implementation of the combined RTE Act and SSA for the five year plan of 2010-11 to 2014-15.

The SSA encourages states to use ICT and the satellite EDUSAT (Education Satellite) to provide distance education within states to supplement school education. Almost all the states in the country are implementing ICT @ Schools. In addition to central sponsored ICT initiatives, different state governments had taken different ICT-related initiatives in educational institutions.

Some examples of education initiatives using ICT in different states are:

- The government of Delhi had taken an ICT-related initiative viz, “Chalta-Phirta Mobile Bus”. It is a bus fitted with a television screen and equipped with computers, multimedia facilities, a book library, blackboard and toys and is to go around the slum clusters of New Delhi where children do not have access to education. Each bus will have two teachers specially trained to educate children through books, computers, exhibits, films etc. It was determined that if the children cannot get the school, the school will be brought to them. It is called Chalta Firta School. These schools are out to empower the children in the slums of India to start going to school.
The government of Chhattisgarh started another initiative namely "Eklaya computer-aided self-learning". This initiative aimed to provide fully vigorous multimedia software based on textbooks of classes 6 to 8, which has been loaded on touch screen computers and kept in the school corridors for easy access by children.

Education and Technology Services Limited (ETS) is in the process of implementing IT solutions for SSA Bihar. It will also setup and maintain Computer Labs in 200 schools. Each lab will have computers, printers, UPS, generators, and computer teachers.

NAVODAYA VIDYALAYA SAMITI:

Navodaya Vidyalaya Samiti (NVS) is an autonomous organization under the Ministry of Human Resource Development, Department of Secondary & Higher Education Government of India. Its significance lies in providing quality education to the rural population who has been deprived of quality education. Navodaya Vidyalaya Samiti has integrated a number of ICT facilities in each of the schools spread across the country. All schools are equipped with computer labs for students in class 6 and above. The computer-student ratio on an average is 1:12 across all schools. In addition to computer labs most schools have one "SMART" class, which is equipped with LCD televisions, projectors, Internet, and other multimedia facilities.

KENDRIYA VIDYALAYA SANGATHAN:

Kendriya Vidyalaya Sangathan (KVS) is also an autonomous organization of the Ministry of Human Resource Development. Its aim is to cater to the educational needs of the children of transferable Central Government Employees including Defense Personnel and Para-Military forces by providing common programme of education. Almost 97% of all KVs have a computer lab along with at least one ICT teacher. All computer labs have Internet access either via broadband or VSAT.
CHALLENGES FOR ICT ADAPTATION IN EDUCATION IN INDIA:

India faces a number of challenges for the adoption of ICT in the education sector. Some of these challenges are discussed hereunder as:

- **Low Literacy Level**
- **Technophobia**
- **Monitoring and Evaluation**
- **Institutional division**

**Low Literacy Level**: The literacy rate in India is not satisfactory. It has been seen that even the literates are not competent enough to use ICT. The standards of education can be raised by increasing the number of digital literates.

**Technophobia**: Technophobia is another threat and hurdle to the adaptation of ICT in education in India. Steps are to be taken to overcome the technophobia and to increase digital literacy levels among students and teachers. Increasing awareness about the use of ICT in education by the teachers and students for improving teaching and learning processes will develop positive attitude among them which is a prerequisite for the adaptation of ICT in education.

**Monitoring and Evaluation**: The ICT applications like computer can be easily installed in the school. However, there should be an auditing system or a system of evaluation to check whether teachers and students are really using such applications.

**Guidelines for the Construction of Subject Matter**: No clear guidelines are available for the construction of the content in ICT. Deciding quality content is a common constraint for schools looking to use ICT in teaching and learning processes.

**Institutional Division**: Different institutions follow different rules and regulations. The content to be taught in the school also varies from school to school. Thus, decisions regarding the curriculum, infrastructure, and other related factors are taken up by different planners and policy makers at different levels. There is a wide gap between different schools. There is a need to overcome the gap so that all the institutions can be brought under the same umbrella.

DEVELOPMENT OF ICT INFRASTRUCTURE IN SCHOOLS AS PER ELEVENTH FIVE YEAR PLAN (2007-12):

ICT plays an important role in the delivery of educational services across the world. Development of infrastructure is the prerequisite for the implementation and integration of ICT in the schools. Eleventh Five Year Plan envisaged that ICT infrastructure will be established at government and government-aided secondary and senior secondary schools. There are about 1.4 lakh such schools out of which 1.08 lakh are government and government-aided schools. About 80000 schools were proposed to be connected on Internet through wireless broadband mode and the remaining 280000 schools will be provided Internet connectivity through broadband. UPS with battery backups and solar power panels for uninterrupted power supply will also be provided as per requirements.

An estimated amount of Rs 5000 crore was proposed to be provided during the Eleventh Plan for providing ICT infrastructure in schools. Under this programme, each school will be provided with ICT infrastructure consisting of a networked computer lab with at least ten computers, a server, a printer connected on Local Area Network and broadband Internet connectivity of 2 Mbps. Every school will also have a technology classroom, with audio visual equipment for enhancing the learning. Training of teachers in the use of computers and teaching through computers will be another important component of this initiative. This scheme of ICT in schools will be implemented in partnership with the States and private providers. This will be a sub-Mission of the National Mission of ICT of MHRD.

The National Policy on Education 1986, as modified in 1992, stressed the importance of educational technology for the improvement of quality education. The policy statement advocated two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS). The National Curriculum Framework 2005 highlighted the importance of ICT in school education. ICT has shaped and influenced the domain of education and thus it is imperative to take all possible measures for the integration and implementation of ICT in school education for quality improvement in the country. The use of ICT for the...
overall development of education can be built only through a sound policy. The initiative of ICT Policy in School Education is inspired by the tremendous potential of ICT for enhancing and improving quality of education.

The ICT Policy in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all-round socioeconomic development of the nation and global competitiveness.

CONCLUSION:

India as a developing country has taken several measures, initiatives and framed policies for the integration of ICT in school education. More is needed to frame and implement for the successful integration of ICT in education in India. The involvement of researchers, policy planners, stakeholders and administrators should be involved for the successful implementation and integration of ICT in school education. The involvement of Government, Private and public agencies is imperative for funding of the integration of ICT in school education. The integration of ICT in education has a great potential to enhance teaching and learning process but it requires a proper planning and careful execution on part of the government both central and state. The challenges which have been faced in the integration and implementation of different initiatives and schemes of ICT should be addressed.

REFERENCES:

A STUDY OF SECONDARY SCHOOL TEACHER’S ATTITUDE TOWARDS INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN JAMMU AND KASHMIR

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ABSTRACT
The study set out to examine the secondary school teacher’s attitudes towards information and communication technology in Jammu and Kashmir. A total of 130 secondary school teachers from district Pulwama of Jammu and Kashmir State participated in this study. The data were collected through a 30-item self made questionnaire developed by the investigator for measuring secondary school teacher’s attitude towards ICT. The results of the study revealed that most of the secondary school teachers have positive attitude towards ICT. The findings also show that no gender differences exist on attitudes of secondary school teacher’s towards ICT in Jammu and Kashmir. However further analysis shows that there is no significant difference between the teachers’ attitude towards ICT with respect to experience.

Keywords: Secondary school teacher, Attitude towards ICT, Information and communication technology

INTRODUCTION
Today’s society has undergone through several massive changes from the agrarian age to the industrial age and now the information age (Reigeluth 1995). These drastic changes have certainly affect today’s education systems at various levels (Goktas and Yildirim, 2003). The need to incorporate Information and Communication Technologes (ICT) into education is now inescapable (Goktas and Yildirim, 2003). The main reasons behind these changes are the increased amount of information and the reliance on Internet use (Aldojan, 2007; Kuo, 2005). The整个 world tends to apply the new information and communication technology (ICT) into their schools as a movement to improve their educational systems (O’Neil & Perez, 2002). Applying information and communication technology in schools will no doubt assist the delivery of highly qualified educational programs (National Center for Education Statistics [NCES], 2000). New technology has eliminated some barriers that help educators communicating together much more than before (O’Neil & Perez, 2002; Pasquerilla, 2008), and has forced school leaders to adopt new technology into their school administration. Information and communication Technology plays an important role in teaching and learning processes. It is shaping the future of education. The use of Information and Communication Technology (ICT) in teaching and learning can enhance curriculum delivery, and concurrently improve the quality of education, provided that there is appropriate attention to pedagogy (Louw et al., 2008; Bytheway et al., 2010). However, in developing countries where the repercussions of poverty, unemployment, and a lack of resources are widespread, the large-scale and sustainable integration of ICTs in schools is yet to be realized, particularly in those institutions that are under-resourced. Research has indicated that, despite the provision of infrastructure, ICT adoption is not necessarily a viable outcome (Bytheway et al., 2010). Numerous factors influence the introduction of ICTs in educational environments: personal and professional cognition and efficacy, a lack of knowledge...
and skills, and unfavorable socio-economic dynamics (Fanni et al., 2010; Van Zyl & Rega, 2011). The role of educators is pivotal in the integration of ICT in education, as is the case with most educational innovation. (Demitriadis et al 2003).

REVIEW OF RELATED LITERATURE
Rajasekar and Vaijapuri (2007) investigated higher secondary school teacher’s computer knowledge and their attitude towards computer. It was found that teachers had relatively favorable attitude towards computer. There was no significant difference in attitude towards computer between male and female teachers. Chen and Chang (2006) indicate that attitudes, skills, and practice are interrelated variables. Their results also suggest that aspects of teacher technology competence vary according to number of teaching years, home computer access, and length of in-service training. Isman et al. (2012) investigated the Saudi Secondary school Teachers’ Attitudes towards using Interactive Whiteboard in the classrooms. The results indicated that there was a positive attitude towards using Interactive Whiteboard. Myers & Halpin (2002), Yildirim (2000), and Tco (2008) believe that attitudes towards computers and trust in using them in education are two major predictors for teachers’ future use of technology in classrooms. (Sadik, 2006) investigated that more experienced teachers showed more positive attitudes towards computers. Cavas et al. (2010) investigated Turkish primary science teachers’ attitudes towards ICT in education and revealed that they have positive attitudes towards ICT; no gender differences have been traced in their attitudes towards ICT. According to Sutherland Rosamund, the use of ICT in schools was sporadic and 'disappointing' in the UK and overseas. Many teachers feared that computers would interfere with 'genuine' or 'book-based learning, particularly in the humanities and creative subjects and use ICT only for administration and routine tasks. However the use and availability of computer in the average classroom has dramatically increased over the last thirty years or so. The main use of different tools of ICT like computer in the classroom is word-processing or a drill and practice method of instruction. Nowadays efforts are being made to use different tools of ICT for instructional practices in the modern classrooms and for professional development of teachers. The present study aims to find out secondary school teachers’ attitude towards ICT based on their gender and teaching experience.

OBJECTIVES OF THE STUDY
The study has the following objectives:

➢ To study the attitude of Secondary school teacher’s towards ICT.
➢ To study the attitude of Secondary school teacher’s towards ICT in relation to their Gender.
➢ To study the attitude of Secondary school teacher’s towards ICT in relation to their teaching experience.

HYPOTHESES
➢ Secondary school teachers do not have positive attitude towards ICT.
➢ There is no significant difference in the attitude of secondary school teacher’s towards ICT in relation to their gender.
➢ There is no significant difference in the attitude of secondary school teacher’s towards ICT in relation to their experience.

METHODOLOGY
The investigator has used descriptive survey method in the present study. This method enables the investigator to obtain general results about the sample and to go to the real life situations for the collection of data from a small sample in a short period of time. Researchers suggest that it is convenient to
carry out a survey study when the researcher has time and resource problems (Cohen et al. 2000). The description of the variables of the present study is as under:

➢ Independent variables; gender, teaching experience and
➢ Dependent variables; attitude towards information and communication technology.

SAMPLE
The investigator has used purposive sampling technique while selecting secondary schools. However, the researcher has selected the teachers through randomly technique. The participants in this study are 130 secondary school teachers of district Pulwama of Jammu and Kashmir state. According to gender variable, 58 (45%) male and 72 (55%) female teachers participated in this study. In terms of teaching experience variable, 29 teachers have less than 10 years (22.3%), 24 have more than 10 years (18.4%), 32 have more than 15 years (24.6%), and 45 have more than 20 years (34.6%).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>58</td>
<td>44.61</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
<td>55.38</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching experience</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10 yrs</td>
<td>29</td>
<td>22.3</td>
</tr>
<tr>
<td>11-15 yrs</td>
<td>24</td>
<td>18.4</td>
</tr>
<tr>
<td>16-20 yrs</td>
<td>32</td>
<td>24.6</td>
</tr>
<tr>
<td>20+ yrs</td>
<td>45</td>
<td>34.6</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100.0</td>
</tr>
</tbody>
</table>

TOOL
The investigator has used a self made questionnaire for the collection of data in the present study. The questionnaire consists of two parts. The first part provides information about the respondents' demographic background like gender and teaching experience. The second part of the questionnaire is designed to assess the attitude of secondary school teachers' towards information and communication technology (ICT). The questionnaire consisted of 30 statements. The respondents in the present were secondary school teachers. The investigator has visited different secondary schools personally while gathering the information from the respondents. The teachers were required to select their level of agreement for each statement to indicate how they feel towards ICT on a 5-point Likert scale ranging from 1 to 5. Reliability of the questionnaire was assessed by using Cronbach's alpha. The Cronbach's alpha reliability coefficient for the scale was = 0.80.

DATA ANALYSIS
The respondents in the present study were secondary school teachers' of district Pulwama of Jammu and Kashmir state. The responses of the respondents to the questionnaire were statistically analyzed according to gender and teaching experience variables. In the present study the investigator had used both descriptive and inferential statics. The mean (x) and standard division (SD) scores were computed. Some parametric techniques like t-test; one-way ANOVA were used in the present study. These tests were used to test the significance of the differences at 0.5
levels. SPSS software was used for different statistical techniques that were employed in the present study.

**FINDINGS**

Results of the study showed that all the respondents responded to all the items of the scale and there is no missing data were found in the research tool. The mean score of 15.46 was obtained. This mean score suggests that the respondents had positive attitude towards ICT.

<table>
<thead>
<tr>
<th>Table III Mean Scores and Standard Deviations</th>
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<tbody>
<tr>
<td>Attitude towards ICT</td>
</tr>
<tr>
<td>-----------------------</td>
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</tbody>
</table>

In order to determine any gender differences in the attitude scores among secondary school teachers, an independent t-test was conducted. The scores of independent t-test can be seen in Table IV.

<table>
<thead>
<tr>
<th>Table IV Gender Differences in Computer Attitudes</th>
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<tbody>
<tr>
<td>Scale</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Attitude towards ICT</td>
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<td></td>
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</tbody>
</table>

The independent t-test scores show no significant gender differences at .05 levels of significance. This clearly indicates that there is no significant gender difference among the secondary school teachers’ in their attitude towards ICT. Based on scores, male teachers have a relatively higher (32.03) attitude towards ICT than females (31.32).

To investigate the relationship between teachers’ attitude towards ICT and years of teaching experience, scores for years of teaching experience were categorized into four levels: from 1 to 10, from 11 to 15, from 16-19, and from 20+ years of teaching experience. The ANOVA tests were used to analyze the differences among the four groups and their computer attitude.

The findings showed that teachers’ attitude towards ICT were affected by their teaching experience. It can be concluded that in terms of teaching experience, there is no significant difference between the teachers’ attitude towards ICT.

<table>
<thead>
<tr>
<th>Table V Descriptive Statistics on Teaching Experience</th>
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<tbody>
<tr>
<td>From 1 to 10 Years N=29</td>
</tr>
<tr>
<td>From 11 to 15 Years N=24</td>
</tr>
<tr>
<td>From 16 to 19 Years N=32</td>
</tr>
<tr>
<td>From 20+ Years N=45</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>-------</td>
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<tr>
<td>Attitude towards ICT</td>
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</table>

<table>
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<tr>
<th>Table VI Summary of One-way ANOVA</th>
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<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Between group</td>
</tr>
<tr>
<td>Within group</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

**DISCUSSION**

From the results of the study it is clear that secondary school teachers showed a positive attitude towards ICT. This study found no significant differences in the attitude of secondary school teachers towards ICT with
respect to their gender. This finding does not support past research which suggested significant differences in computer attitudes by gender (e.g. Margolis & Fisher, 2002; Markauskaite, 2006). Next finding of this study revealed that on the bases of teaching experience there is no significant difference between the teachers' attitude towards ICT. The study points out to the fact that almost all of the secondary school teachers were willing to use different tools of ICT in their practices efficiently and effectively as understood by their positive attitude towards ICT. Having a positive attitude towards ICT is a good thing for any institution and would be helpful in attaining effective implementation of ICT in the institutions.

LIMITATIONS
As only 130 secondary school teachers of district Pulwama of J&K were involved in the study, the findings could not be generalized to the overall population of secondary school teachers in the state of J&K. Further, the study was restricted to the use of ICT at secondary school level, and had not taken into consideration differences encountered at different levels of schooling like elementary level etc. Hence the perception about the attitude of secondary school teachers towards ICT in one state might not be the same as that of another state in the same country. So the investigator suggests more and more research on attitude of secondary school teachers towards ICT by taking different aspects under consideration.

CONCLUSION
Innovative educational and instructional technologies are now replacing traditional methods of teaching. These new technologies are doing much more than simply delivering regular lectures. Taking a discipline based approach; this study investigated the secondary school teachers' attitude towards ICT. The results reveal that almost all the participants hold positive attitudes towards ICT. The study has provided data on secondary school teachers' use of ICT in teaching and learning, related to their gender, years of teaching experience. The results also showed that male teachers have access to computers more than the female teachers. However, the study revealed that there was no difference in the innovative use of ICT between female teachers and male teachers. The present study acts as a clear evidence for the government that teachers held a positive attitude towards ICT and the need of the hour is to frame policies, schemes and initiatives are to be taken for the successful integration of ICT in school education.

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http://etd.ohiolink.edu/view.cgi?ace_num=ohiou1176926973