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SUMMARY

6.1. INTRODUCTION:

Information and communication technology (ICT) is a new development which brings together the technology of micro electronics, computing and telecommunications. It is sometimes referred to as the science of information handling. It may be taken as a diverse set of technological resources needed to communicate and to create, disseminate, store and manage information. It is often described as the technology where computer and telecommunication devices are used for information gathering/acquisition, processing, storage, retrieval and dissemination to the relevant users. Dewal (2006) was of the view that Computer and information technology are developing with mind-boggling speed. Further, he was also of the opinion that in the 21st century no one can exclude or ignore the importance of Information and Communication Technology (ICT), Instructional Technology (IT) and Educational Technology (ET). Technology is of increasing importance in people’s everyday lives and its presence will most certainly increase in the coming years. No longer relegated to specialized workplace setting, information and communication technologies have become increasingly common in community setting, at school and at home. Whether looking up on a book on a computerized card catalogue at the public library, making a withdrawal from an automated teller machine, or accessing telephone message, everyday activities have been transformed by ICT. The use of information and communication technologies (ICT) in teaching and research by academics has arisen because of the number of information sources. The information revolution and the extraordinary increase in the spread of knowledge has given birth to a new era of knowledge and information which affects directly all spheres of life.

The emergence of new global economy has serious implications for the nature and purpose of educational institutes. As the half life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of instruction from teacher to student over a fixed period of time. Rather, school must promote “learning
to learn” i.e. the acquisition of knowledge and skills that make possible continuous learning over the lifetime.

Educational institutes must prepare the students for the future by teaching computer skills and make them technologically competent. Educational institutes must develop the ability in their students to use digital technology, communication tools and/or networks to define, access, manage, integrate, evaluate, create and communicate information ethically and legally in order to function in a knowledge society.

Blorton (1999) in first online version of the original contribution to UNESCO’s world communication and information report has written “although no comprehensive data on ICT in school worldwide exist, it is clear from many national examples that schools are also being equipped with ICT”. Use of ICT in education in India started as early as June 1923 with the broadcast by radio club of Mumbai. Since then many programmes like Gyan Darshan, Shiksha India (Dec. 2001), Vidya vahini, project T4, HEADSTART, Project Shiksha (2004), EDUSAT, Intel learn program, The Intel teach program, Mission 2007, NODLINET, National Knowledge Network (NKN) have been launched in India to make efforts to equip the citizens with ICT.

The National Policy on Education 1986, as modified in 1992, stressed the need to employ educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) paving the way for a more comprehensive centrally sponsored scheme – Information and Communication Technology @ Schools in 2004.

Revised scheme of information and Communication Technology (ICT) in schools was released on 21-02-2011 by Government of India, Ministry of Human Resource Development, Department of School Education and Literacy, New Delhi.

The four components of the revised scheme of ICT in schools are as under:

i) The partnership of State Government and Union Territories Administration’s for providing computer aided education to secondary and higher secondary Government and Government aided schools. Priority would be given to educationally backward blocks and areas with concentration.

ii) Establishment of smart schools which shall be technology demonstrators.
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iii) Teacher related interventions, such as provision for engagement of an exclusive teacher, capacity enhancement of all teachers in ICT and a scheme for national ICT award as a means of motivation.

iv) Development of e-content, mainly through Central Institute of Education Technology (CIET), six State Institutes of Education Technologies (SIETs) and 5 Regional Institutes of Education (RIEs).

Dewal (2006) was of the view that if unimaginatively used, ET and ICT can create a digital divide, which may result into a social divide. Educational planners have to take a note of that. Therefore, The state of Punjab in an endeavour to bridge the digital divide across the state rightly launched ICT Project in 2005. For overseeing the work of the project, Punjab ICT Education Society (PICTES) was also constituted. Two programmes in the field of ICT education, first as Computer Literacy Programme (CLP) and second as Computer Aided Learning (CAL) were introduced. In CAL, interactive multimedia CDs were developed for primary and upper primary classes to enhance teaching learning process so those students develop better understanding of hard spots in the course curriculum in a play way method. Under the Computer Literacy Programme, computer education based on NCERT and CBSE guidelines had been introduced for 6 to 12 classes in all government upper primary schools.

The main objectives of the ICT Project were to:-

1. Provide Compulsory ICT Education for all 13.5 lac students.
2. Train in-service subject teachers to use ICT tools.
3. Create job opportunities for students and computer teachers.
4. Setup modern labs with latest IT infrastructure where students get the best of IT training.
5. Develop student and teacher competence as per NCERT and CBSE guidelines, develop preference writing competency in combination languages such as C++ under CLP, under CAL provide interaction multimedia CDs to the students in primary and upper primary classes to make learning a joyful experience.
6. To create awareness, develop attitude and skill among students for ICT Education.
7. To increase the enrolment and check out the dropout rate.
At present, Information & Communication Technology (ICT) Education Project has been started with the aim to impart computer education to all students of class VI to XII. In Punjab, the Project is being managed by the two societies namely ‘Punjab ICT Education Society’ (PICTES) for computer literacy and Punjab EDUSAT Society for development and transmission of e-content. Now, The ICT Project consists of four components in Punjab i.e. Computer Literacy; Computer Aided Learning; Teacher Training; and EDUSAT based lessons.

6.2. SIGNIFICANCE OF THE STUDY:

Keeping in view, the benefits of ICT for the learners, the Punjab Government launched ICT education project in the State in 2005 in a phased manner to translate the ICT initiatives into reality. The project is being run under Punjab ICT education society. But how far the project has been successful in providing ICT Education to the students in the Government schools of Punjab is a matter of deep concern which needs to be studied and evaluated. In the present study, a small effort has been made on the part of the investigator to evaluate the provisions made under ICT education project in the schools of Punjab State so as to provide a clear and comprehensive picture of the ICT education there.

6.3. STATEMENT OF THE PROBLEM

“ICT in the schools of Punjab State: An Evaluative Study”

6.4 OBJECTIVES OF THE STUDY:-

1. To evaluate provision of the infrastructure for ICT education (furniture, hardware, electric infrastructure, electric supply).

2. To evaluate provision of ICT faculty recruited for ICT education.

3. To evaluate provision of training for ICT faculty for ICT education.

4. To evaluate maintenance and cleanliness of ICT labs for ICT education.

5. To evaluate software availability in ICT labs for ICT education.

6. To evaluate LAN and internet connectivity in ICT labs for ICT education.

7. To evaluate the provisions for teaching material for ICT education.

8. To evaluate the curriculum transaction for ICT education.
9. To evaluate the evaluation process being adopted in the ICT education.
10. To evaluate provisions of financial resources for ICT Education.
11. To evaluate the Computer aided learning programme for ICT education.
12. To evaluate the strengths of the ICT education programme.
13. To evaluate/find the weaknesses of the ICT education programme.

6.5 DELIMITATIONS OF THE STUDY:-

The present study was delimited in the following aspects:-

i) The study was delimited to Government rural and Government Urban schools of selected 05 districts of Punjab only.

ii) The study was restricted to the principals from the selected schools only.

iii) The study was confined to the students from classes VI to XII only.

iv) The study was delimited to the teachers recruited for ICT education from the selected schools only.

6.6 OPERATIONAL DEFINITION OF THE TERMS USED:-

➤ **ICT**: ICT refers to information and communication technologies for imparting computer education.

➤ **Evaluation**: - Evaluation means to work out the value of a (a quantitative expression), to find a numerical expression for, to “reckon up”, ascertain the amount of, to express in terms of something already known.

➤ **Study**: - A study denotes a critical inquiry, analysis and interpretation as presented in the chapter III dealing with method and procedure.

6.7 RESEARCH METHOD:

In the light of objectives of the study, the Descriptive Survey Method of research was used as it was most appropriate and suitable for the present study. This method enabled the investigator to obtain detailed and relevant information concerning the status of ICT in the schools of Punjab and thus to draw valid conclusions from the facts so discovered. Thus in the present study, descriptive survey method enabled the researcher to fulfil the objective of the study to analyse, interpret and evaluate ICT in schools of Punjab.
6.8 SAMPLE:

The present study "ICT in the schools of Punjab State: An Evaluative Study" was carried out to evaluate ICT in the schools of Punjab State. ICT Education in high or senior secondary schools of Punjab State is being provided by Punjab ICT Education Society. Therefore the students from class 6th to 12th from schools of Punjab state government constituted the population of the study. Out of 22 districts of Punjab, 5 districts were selected at random for the sample. From each of the selected districts, 5 schools (high schools or senior secondary ) comprising of 3 schools from rural areas and 2 school from urban area at random to make it to a total of 25 schools including 10 high schools and 15 senior secondary schools overall were selected. From each of the selected senior secondary schools from each class, 5 students were selected at random and from each of the selected high schools from each class, 7 students were selected at random. Thus the sample comprised of 35 students from each school. The principal of each of the selected schools was selected for the study making it to a total of 25 principals. From each of the selected schools, two ICT teachers were selected for the study making it to total of 50 ICT teachers.

6.9 TOOLS USED:

Keeping in view, the nature and objectives of the study, the following tools were developed by the researcher herself.

(1) Questionnaire for principals.
(2) Questionnaire for teachers.
(3) Questionnaire for students.
(4) Observation schedule.

6.10. PROCEDURE OF DATA COLLECTION:

The principals of each of the 25 schools were contacted to seek permission to collect data. The principals, selected ICT teachers and 35 sample/students of each of these schools were explained the purpose and usefulness of the study by investigator. They were motivated for filling in complete information to the best of their knowledge. The investigator used to explain all the instructions to the students in case
they faced any difficulty while answering the questions. The researcher, while visiting
the selected schools, filled the observation schedule, by observing ICT labs.

6.11. DATA ANALYSIS TECHNIQUE

The frequencies and percentages were used for analysing the data.

6.12 CONCLUSIONS

On the basis of analysis and interpretation of data following conclusions can
be laid down:

6.12.1 The Programmes Introduced for ICT Education in the Schools of Punjab
State

To bridge the digital divide across the state, the Government of Punjab
introduced its own programme computer literacy programme in April 2005 and the
second programme as Computer Aided Learning (CAL) on behalf of Sarva Shiksha
Abhiyan Society Punjab.

The findings of the present study indicate that both the principals and ICT
teachers who are the real implementer of the scheme in the schools are aware with the
programmes introduced by the State of Punjab. This helps in the acquisatance of
whole of the scheme and its implementation in its real spirit

i) The state of Punjab constituted a society in the name of Punjab ICT Education
Society (PICTES) to translate its initiatives in reality. PICTES has been
specified to implement the scheme to achieve the objectives of ICT scheme in
the state.

The awareness of the principals and ICT teachers with the authorized society
helps in getting feedback about the implementation of scheme, its various
strengths and weaknesses. It also makes a rapport between school authorities
and PICTES functionaries.

ii) The findings of the present study reveal that the school functionaries are aware
with the authorized society by the Government of Punjab. It leads to provide
proper feedback about the implementation of the scheme in the schools.

iii) The findings are indicative of the fact that ICT scheme started in urban
schools in the year 2005 and in rural areas in 2006 in phases. There are about
5433 upper primary schools in which this scheme was to be implemented.
Hence, it was done in phases. The findings of the present study support the claim of the Government of Punjab about the year of implementation of the scheme in rural as well as urban schools. This awareness prepared the teachers for implementing the scheme in the schools for making arrangements to implement the scheme.

iv) The findings of the present study reveal that the school functionaries are aware with the fact that Government of Punjab is funding this scheme in the state of Punjab. This will help the functionaries to communicate with the appropriate authority in case of any requisition for the implementation of the scheme.

v) Introducing ICT education as a compulsory subject helps in making all the students ICT literate and does not leave them to ignore the subject. The finding of the present study indicates that ICT education has been made a compulsory subject in all schools from grade 6th to 12th. Making of ICT education as a compulsory subject of study by the State of Punjab is in consonance with the findings of the present study. Due to this all the students will become ICT literate as per the targets of the State of Punjab.

6.12.2 ICT Faculty

vi) By appointing minimum number of two teachers, the Government of Punjab has fulfilled its commitment of providing ICT teachers in the schools. The appointments depend upon the number of students in the light of this, three teachers have been appointed in urban schools where the number of students in large in comparison to rural schools. This is also supported by the findings of the present study as it has been found that two and three ICT teachers are working in rural and urban areas respectively.

vii) The document of Government of Punjab as ICT education Project of Government of Punjab has specified that recruitment of ICT teachers will be on contract basis only. This is also supported by the finding of the present study as all ICT teachers working in the schools have been found to be working on contractual basis.

viii) The Government of Punjab decided to pay a fixed remuneration of Rs. 7000/- P.M. to reach ICT teacher. However, it has been found that each ICT teacher is getting a fixed remuneration of Rs.10,000/- P.M. This might have happened
they faced any difficulty while answering the questions. The researcher, while visiting the selected schools, filled the observation schedule, by observing ICT labs.

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i) The state of Punjab constituted a society in the name of Punjab ICT Education Society (PICTES) to translate its initiatives in reality. PICTES has been specified to implement the scheme to achieve the objectives of ICT scheme in the state. The awareness of the principals and ICT teachers with the authorized society helps in getting feedback about the implementation of scheme, its various strengths and weaknesses. It also makes a rapport between school authorities and PICTES functionaries.

ii) The findings of the present study reveal that the school functionaries are aware with the authorized society by the Government of Punjab. It leads to provide proper feedback about the implementation of the scheme in the schools.

iii) The findings are indicative of the fact that ICT scheme started in urban schools in the year 2005 and in rural areas in 2006 in phases. There are about 5433 upper primary schools in which this scheme was to be implemented.
Hence, it was done in phases. The findings of the present study support the claim of the Government of Punjab about the year of implementation of the scheme in rural as well as urban schools. This awareness prepared the teachers for implementing the scheme in the schools for making arrangements to implement the scheme.

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viii) The Government of Punjab decided to pay a fixed remuneration of Rs. 7000/- P.M. to reach ICT teacher. However, it has been found that each ICT teacher is getting a fixed remuneration of Rs.10,000/- P.M. This might have happened
due to constant resentments and demands of the ICT teachers from time to time.

ix) Majority of the principals and ICT teachers from the urban schools opined B.Sc.(IT) /B.C.A. /B. Tech /3 year Degree in Computer Engineering/ B.Sc.(Computer Science) is the qualification required for the recruitment of ICT teachers. However, a little more than half of the principals and ICT teachers from rural schools were of the opinion that M.Sc.(IT)/ PGDCA/ M.Sc.(Computer Science) and M.C.A. is the qualification required for the recruitment of ICT teachers.

x) The qualifications prescribed for the post of ICT teacher are BCA or its equivalent. The findings of the present study reveal that all the ICT teachers possess qualifications which are higher than the prescribed qualification. This is a good step of the state of Punjab as the teachers with higher qualifications can yield more than the teachers with lower qualifications.

xi) The Government of Punjab recruited some of the teachers in the urban schools without requisite qualifications as found in the present study. The statement of the State of Punjab that, it had appointed well qualified MCA/BCA as ICT teachers is not supported by the findings of the present study. However, all teachers acquired the requisite qualification to fulfil the conditions of their appointment.

xii) The education authorities of Punjab have specified teaching of computer education by the ICT teachers only which is supported by the findings of the present study. It is a very healthy sign as ICT teachers would devote full time to train the students in the use of ICT.

xiii) The document of Government of Punjab on ICT has specifically mentioned that it is mandatory for all the teacher to undergo ICT in-service training. This objective has been fulfilled as all teachers have undergone specified teacher training from the year 2007 onwards.

xiv) Majority of ICT teachers working in rural as well as urban schools attended Computer training. However, Project-making, Seminar and General teaching method training were also attended by a few of the ICT teachers working in the rural and urban schools.
xv) As specified by the Government of Punjab, in-service training would be organized in convenient batches at SCERTs or such other training institutions as the state government finds suitable. The Government of Punjab has identified all DIETs where training would be impacted by Microsoft. These have been termed as GSITCs. These institutions provide in-service training which is also established by the findings of the present study. The findings of the present study support the objective of the State of Punjab as all the teachers have been provided ICT training in authorized training centres.

xvi) The document of the Government of ICT education has specified a training of 10 days (8 hours a day). But it has been found in the present study that training was provided for five days to teachers of urban schools and two days to rural schools, only which is beyond the specified duration of training. From this it seems that the training centres have only done the formality of training only as two days training in case of rural schools is not adequate as ten day material cannot be transacted in two days.

xvii) The level of training attended by the ICT teachers is in the order of intermediate, basic and advanced.

xviii) The main thrusts of the attending the training programmes by the ICT teachers are professional growth, subject upgradation, career enhancement and to fulfill the requirement of the government for attending the programmes.

xix) The benefits of training programme to ICT teachers as perceived by principals and ICT teachers working in rural and urban schools are: learning updated computer skills, peer learning, knowledge of latest technology and improvement in teaching methodology.

xx) In hundred percent of the rural and urban schools, the reason for ICT teachers for not attending training programme is that ICT teachers themselves are not interested and nomination of ICT teachers for training was not done.
6.12.3 Infrastructure

xxi) PICTES established one lab in each school and bigger schools have been provided with two labs. The findings of the present support this claim of the State of Punjab as it has been found that one or two ICT labs had been established in each school.

xxii) In majority of the schools, classroom is used for teaching ICT theory. In some rural as well as urban schools, ICT lab is used by ICT teachers to teach theory of ICT education. However, in some of the schools, ICT teachers use both classrooms and ICT lab for imparting instruction in ICT theory.

xxiii) The flooring of the ICT lab has been done as per the policy document of ICT education as in most of the schools it was found that the labs had PVC flooring.

xxiv) The Government of Punjab made a provision of installing nine computer systems in each ICT lab and more than this in bigger schools. The present study also found that 11-20 computer systems in rural schools and 21-30 computer systems in urban schools had been installed in the ICT labs. This is indicative of the fact that State of Punjab has done a lot in the field of ICT Education by providing sufficient and adequate number of computer systems in each ICT lab.

xxv) In hundred percent of the rural as well as urban schools, marker boards are available in the ICT labs of the schools. In one of the schools, both chalk board and marker board are available.

xxvi) Majority of the rural schools have 21 to 30 chairs available for the students in ICT labs whereas majority of the urban schools have 41 to 50 chairs for the students in ICT labs.

xxvii) A little more than half of the rural schools and a small majority of urban schools have chairs available for the students in ICT labs that are adjustable.

xxviii) In majority of the rural and urban schools, chairs for students are invariably available for them in the ICT lab while they work there.

xxix) Majority of the principals, ICT teachers and students from rural and urban schools opined that available chairs in the ICT lab are comfortable for the
students. Majority of the ICT teachers from the rural schools suggested to get the chairs repaired or replaced whereas majority of the principals from rural as well as urban schools suggested to provide adjustable chairs in the ICT lab.

**xxx)** In large majority of the rural as well as urban schools, the chairs are available for ICT teachers in the ICT labs. In majority of rural schools, one chair is available for ICT teacher in the ICT lab whereas in majority of urban schools, two chairs are available for ICT teachers in the ICT lab.

**xxxi)** Majority of ICT teachers from rural as well as urban schools were of the view that chairs available for the ICT teachers in the ICT labs are comfortable for seating of ICT teachers. Majority of the ICT teachers from rural schools and half of the ICT teachers from urban schools suggested for making the provision of revolving and adjustable chairs whereas half of the ICT teachers only from urban schools also suggested for providing more chairs in the ICT labs.

**xxxii)** Majority of the rural schools have 11 to 20 computer tables whereas majority of urban schools have 21 to 30 computer tables available for the students in ICT labs in schools.

**xxxiii)** In majority of rural and urban schools, available computer tables are of more than standard size.

**xxxiv)** Majority of principals, ICT teachers and students from rural as well as urban schools perceived that in the ICT labs, size of computer table top available is adequate for keeping the computer system on it.

**xxxv)** Majority of the rural as well as urban schools have computer tables available for ICT teachers in the ICT labs.

**xxxvi)** Majority of the rural schools and a little more than half of the urban schools have one computer table available for ICT teachers. However, a few of the rural schools and a little less than half of the urban schools also have two computer tables for ICT teachers in the ICT labs.

**xxxvii)** All the rural as well as urban schools have availability of separate switch boards to connect the computer system to power supply in ICT labs.
xxxviii) Majority of the rural schools have 11 to 20 switch boards available in each ICT lab whereas majority of the urban schools have 21 to 30 switch boards available in each ICT lab. However, 1 to 10 switch boards are also available in only a few rural schools.

xxxix) Majority of the rural as well as urban schools, tube light as well as CFL are the electric source of light in ICT labs. However, in a few of the schools, ordinary electric bulb is also available as the electric source of light.

xl) All the rural schools and urban schools have fans available in ICT labs in the schools whereas air conditioners are not available in any of the schools.

xli) The document of ICT education project of Government of Punjab Stated that UPS of 2 KVA and 3 KVA are to be provided to the schools. As found in the present study UPS are available in all the urban schools and in any of the urban schools. The inverters were replacing the lack of UPS in rural schools. This indicates that the Government of Punjab has provided UPS for regular supply of power in the ICT labs for continuous work by the students.

xlii) The provision of one hour backup with battery bank of the Government of Punjab was found to be justified as all the ICT labs in the schools were having a backup of one to two hours.

xliii) Majority of the rural schools have 11 to 20 computer systems installed in the ICT labs whereas majority of the urban schools have 21 to 30 computer systems installed in ICT labs.

xliv) In majority of urban schools, Pentium-IV systems are available in the ICT labs whereas majority of rural schools have Pentium-III systems available in the ICT lab. However, AMD and Celeron systems are also available only in a few of the rural schools.

xlvi) Majority of rural schools have monochrome computer monitors as compared to majority of urban schools which have colour 14” computer monitors available in ICT lab.

xlvi) The document of the Government of Punjab on ICT education made a provision of providing one Dot-Matrix printer in each ICT lab. However, it
has been found in the present study that Government of Punjab has provided Laser printers in place of Dot-Matrix printers which shows the concern of the Government about providing latest technology to the students of the state.

xlvii) In majority of rural schools, the students are allowed to take printouts. However, in half of the urban schools only, the students are allowed to take printouts. In more of urban than rural schools, students are allowed to take printouts.

xlviii) Lack of stationary, defective printers, and inefficiency of the students for taking out printouts emerged as the main reasons for not permitting the students to take print outs. The ICT teachers are permitted to take printouts in majority of rural as well as urban schools.

i) Majority of the rural as well as urban schools, windows XP professional as the operating system is available whereas in some of the rural as well as urban schools, Windows 2003 is also available.

l) In the document of ICT education project of Government of Punjab, it has been stated that provision of the MS Office-2003 Professional, Visual Studio. NET 2003, Windows XP Professional, Encarta Encyclopaedia and Windows Server (2003) will be made available in the ICT labs. However, the above said softwares were not available in the ICT labs of the schools, selected for the study. Majority of the schools had MS Office-2003 and Encarta Encyclopaedia, and many Window Server-2003 alongwith these softwares and only a few schools had visual studio. Net 2003 alongwith other specified software. This indicates that after procurement of different softwares from Microsoft, there has not been proper allotment of software for each school.

li) The commitment of Government of Punjab to connect all computers in a lab through the LAN and provisions of internet holds good as all the computers were found connected through LAN and availability of internet connection in the ICT lab.

lii) In near about one-third of the rural schools and more than half of the urban schools, more than 10 systems are connected to the internet. However,
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majority of the students from rural and urban schools were of the view that only one system is connected to the internet.

liii) BSNL (Bharat Sanchar Nigam Limited) is the only internet service provider in all the schools. Majority of schools have regular internet connectivity. However, regular internet connectivity is more in the schools of urban areas as compared to the schools of rural areas.

liv) In hundred percent of the rural and urban schools, the students are allowed to surf the internet in the schools.

lv) In majority of the rural and urban schools, students are not allowed to go for surfing the internet in the absence of ICT teachers.

lvi) Majority of the ICT teachers and principals from rural and urban schools and majority of the students from urban schools are of the opinion that the students are not allowed to download pornographic material. However, majority of those students from rural schools are of the opinion that they are not allowed to download websites related to music, games and movies.

lvii) Majority of the rural as well as urban schools have created their own e-mail accounts. In majority of the rural and urban schools, principals and ICT teachers surf the e-mail account of the school. The students are permitted to login to school e-mail account in about fifty percent of rural as well as urban schools.

lviii) In near about half of the rural and urban schools, the non-functional systems or equipments are repaired or replaced within 2-3 days.

lix) The document of ICT education project of Government of Punjab stated that for maintenance of computer labs, white washing and painting of labs will be done regularly. The present study has also found that white washed and painted once in a year. It shows that ICT labs are being maintained properly.

lx) In majority of the rural and urban schools, the cleanliness of ICT lab is done daily.
6.12.4. Use of ICT Lab by Students and ICT Teachers

1xi) Majority of the rural as well as urban schools, 21 to 30 students work in ICT labs at a time.

1xii) The Government of Punjab has committed to provide computer system in the ratio of one computer system for two students. It has provided computer systems in this ratio in the schools and the same has also been found in the present study that two students work on one computer system at one time.

1xiii) Majority of the rural schools, the students are using ICT labs for 2 days per week and in majority of the urban schools, the students are using ICT lab for six days per week as per the views of the principals and teachers. However, as per views of the students of both rural and urban schools, ICT lab is used by them for 4 days per week. Majority of the rural as well as urban schools, ICT teachers are using ICT lab for six working days in a week.

1xiv) In majority of the rural as well as urban schools, ICT labs are used mainly for regular instruction and training for developing computer skills, developing the ability to use basic computer application programme and for maintaining school records. However, in a few of the rural as well as urban schools, these are also used for playing games and watching movies on computers.

1xv) To provide computer literacy/ knowledge of basic computer operations, to teach internet surfing, training in typing in English and Punjabi, to provide knowledge of hardware, software and taking printouts, to prepare power point presentation/ own CD making, learning syllabus / material, bringing students at par with students of private schools and Central Board of Secondary Education schools and doing project work emerged as the abilities to be developed through ICT Education in both the rural and urban schools.
6.12.5 Study Materials for ICT Education

ixvi) The document of ICT education project of Government of Punjab stated that text books of ICT education are to be developed by IGNOU based on NCERT and CBSE guidelines. The above finding also indicates that all the students were having ICT related study material and Government had been successful in providing material to the students.

ixvii) In majority of the rural as well as urban schools, ICT note book is available with students. The ICT notebooks are provided to the students by the parents. The advantages of ICT notebooks for the students in the urban schools are in the order of:

- Helpful in learning by providing learning material for revision in examination.
- Make notes/ permanent record for class work/ additional information/writing important points.
- Writing question answer, exercise and home work.

The advantages of ICT notebooks for the students in the rural schools are in the order of:

- Make notes/ permanent record for class work/ additional information/writing important points.
- Helpful in learning by providing learning material for revision in examination.
- Writing question answer, exercise and home work.

ixviii) The Government of Punjab has made a provision of providing free ICT work books to the students. However, it has been found that the students have to pay for the work book which is a point of concern in view of the policy of the Government.
6.12.6 Curriculum Transaction

lxix) Two periods per week each for theory and practical work are allotted in the time-table of class 6th to 12th in all the schools.

lxx) Majority of the schools, ICT theory classes are always held regularly. However, some of the students did not support the view that ICT classes are held regularly in the schools. In large majority of the rural as well as urban schools, ICT practical classes are always held regularly. However, in urban schools, ICT practical classes are sometimes held regularly as per views of the students.

6.12.7 Evaluation of Performance of Students in ICT Education

lxxi) In hundred percent of the rural as well as urban schools, evaluation of performance of the students in ICT education is carried out.

lxxii) For evaluating the performance of students in ICT education, the evaluation procedures followed are in the order of written, oral and practical examinations. Internal assessment and classroom performance, discipline and behaviour in classroom are also other ways and techniques for evaluating ICT performance.

lxxii) In majority of the rural schools, the question paper set for measuring the performance of students consists of both objective and subjective type items whereas in case of majority of urban schools, the question paper consists of subjective type items only.

lxxiii) Punjab State School Education Board conducts examination for the evaluation of the achievement of the students in ICT subject for board classes i.e. 8th, 10th and 12th.

lxxiv) In majority of the rural as well as urban schools, session end examination is conducted by the school itself for measuring the achievement of the students in the ICT subject for classes 6th, 7th, 9th and 11th.
6.12.8 Financial Resources

Ixxv) Government of Punjab is paying salary to ICT teachers and bearing the expenses on account of electricity bill, stationery, refilling/replacement of printer cartridges, telephone/internet charges and expenses on account of procuring CDs and DVDs for ICT labs.

6.12.9 Computer Aided Learning

Ixxvi) As per the findings of the present study, Government of Punjab through PICTES is performing the responsibility of CAL programme on behalf of Sarva Shiksha Abhiyan (SSA) Authority of Punjab.

Ixxvii) The use of play way method in Computer Aided Learning (CAL) was specified in the document of Government of Punjab. However, the study found the preference of ICT teachers for lecture method over the play way method. This shows that ICT teachers are not following the guidelines of the State Government which is a matter of the methods to be followed for CAL and concern for ICT education in the state.

Ixxviii) The document of Government of Punjab stated about the provision of 25 educational multimedia CDs. Thus it can be said that Punjab Government is trying to enhance the learning of students by presenting it through Microsoft CDs and multimedia CDs. However, the findings as given above indicate that 11-20 CDs are available in the ICT labs of the rural schools which is less than the prescribed number of multimedia CDs. Government has not been successful in providing requisite number of CDs in rural schools.

Ixxix) Interpreted that the schools, where CAL programme is introduced, the computers are always being used for imparting instruction in ICT. That the schools where CAL programme is introduced, in majority of the rural schools and half of the urban schools, the computer is sometimes used for teaching mathematics. The schools where CAL programme is introduced, in majority of the rural and urban schools the computers are sometimes used in imparting instruction in science. That in the schools where CAL programme is introduced, in majority of the rural and urban schools,
computer is often used for teaching social science as per views of ICT teachers and it is used sometimes as per views of principals. That the schools, where CAL programme has been introduced, in majority of the rural as well as urban schools, the computer is sometimes used for imparting instructions in English. In majority of the rural schools, where CAL programme has been introduced, the computer is sometimes used in teaching Punjabi and in case of urban schools, the use of computer is rarely used for teaching Punjabi.

Ixxx) In half of the rural schools, 11 to 20 CDs and in majority of urban schools more than 30 CDs are available in the schools under CAL programme.

Ixxxi) In majority of rural as well as urban schools, the CDs which are available, had been developed by Azim-Premji foundation.

Ixxxii) The multimedia CDs in schools under CAL Programme are being used to create interest in learning, for learning through visualisation and animation, for explanation of subject learning material in an effective manner, to easily understand subject matter and improve knowledge. The Microsoft CDs in schools under CAL Programme are used for understanding the concepts easily and getting knowledge, to install windows and making the students download software, to present Microsoft text, to teach subject matter and to provide good material to the students.

6.12.10 Perceptions of Principals, ICT Teachers and Students about ICT in Schools

Ixxxiii) ICT education is being imparted in the schools as per aims and objectives of the Government of Punjab.

Ixxxiv) ICT Education in the schools is performing well mainly in the aspects of teaching computers to all students, providing knowledge about working on computers including surfing internet and using e-mail, imparting knowledge and effective teaching. Some other aspects covered under ICT education emerged are providing computers to students, clarifying concepts, using online communication for contacts, motivating the students for education.
The students in some schools suggested to have more spacious labs, better infrastructure including more computers, more chairs, carpets, washing the labs, permission to use facilities provided like internet and printers and better ICT education.

6.13 EDUCATIONAL IMPLICATIONS OF THE STUDY

The government of India at national level and the government of Punjab at state level had made various efforts to provide ICT education to the students in schools of Punjab state. The efforts include the provision of programmes introduced for ICT education in the schools of Punjab state to all students. This effort of the government is successful as computer literacy and computer aided learning is being provided to all students at secondary level schools. On the basis of the results, the study can have following implications for schools:

1. PICTES is performing well to bridge the digital divide in the schools of Punjab State. Such societies may be encouraged to take up more initiatives in the state as well as outside the state also. Funding in the ICT Education had become the responsibility of the State Government alone. In addition to its own scheme i.e. ICT education @ school scheme, the Government of India should also provide funds to the state owned scheme so that they are not deprived of funds and make the students ICT literate.

2. The disparity in the number of ICT teachers employed in the rural as well as urban schools which exists at present should be removed. ICT teachers should also be appointed in the rural schools as per the strength of the students.

3. Government In-service training centres are organising training programmes for ICT teachers. Some private agencies like Microsoft may be given the opportunity to impart training to ICT teachers in rural as well as urban schools to faster the process.

All of the ICT teachers have been appointed on contractual basis. Their regular appointment can be helpful to provide make the ICT teachers satisfied with job and may provide better ICT education. ICT teachers from the rural and urban schools should be encouraged to attend advanced level training programmes of longer duration than 2-5 days. ICT teachers
themselves should be interested to attend training programmes. All the teachers irrespective of any affiliations should be nominated for attending the training from time to time.

4 The broken furniture should be replaced/ repaired and the ICT labs should be provided with adequate and adjustable furniture.

5 Adequate number of computer systems should be provided in the ICT labs so that each student may have time to work on the computer. The monitors of acceptable size of the screen should be provided and there should not be any disparity between rural and urban schools.

6 All the students should be allowed to take a hard copy of the study material. The government must provide adequate funds for the same.

7 An attempt should be made to supply uninterrupted electric supply to the schools or systems with more backup should be supplied to each school. Other measures of power from the conventional sources like sun and wind may be used for power supply. Supply of electricity in rural schools is not found to be as regular as urban schools, though urban schools are also not having regular supply always. Therefore, it is suggested that the schools should have generators to meet with power-cuts.

8 For the immediate repair or replacement of the system, stringent measures must be taken and strict action should be taken against the agency for violating the clauses of agreement.

9 Provision of ICT training to majority of the ICT teachers revealed in the study would strengthen provision of ICT education.

10 Latest softwares should be supplied in the ICT labs so that the students may have the experience of working with them.

11 Provisions must be made for regular internet connectivity in the labs. In case of low signals systems must be provided for increasing the speed.

12 Free of cost study materials and workbooks should be provided to the children by the government.

13 Regular classes should be held in ICT education in the schools. If possible more periods may be allotted for ICT education.

14 Continuous and comprehensive system of evaluation should be adopted for evaluating the learning out comes in ICT education.
15 The teachers should prefer play way method for imparting ICT education so that the students may feel interest in ICT.

6.14. SUGGESTION FOR FURTHER RESEARCH

i) The study was limited to schools of Punjab state only. It can be extended to other states also.

ii) The study can include all the districts of Punjab.

iii) The study can be extended to find the status of ICT in higher education institutes.

iv) The study can be extended to compare centre government schools including schools in union territories, Kendriya Vidyalays and Navodaya Vidyalays.

v) The study can be conducted to compare the status of ICT in state government schools and private schools.

vi) The study can be extended to find the extent to which computer skills have been developed among the students.

vii) The study can be conducted in the B. Ed and degree colleges of Punjab and other states to find the status of ICT in higher education.