Chapter 5
Conclusions, Educational Implications and Suggestions for Further Research
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CHAPTER-V

CONCLUSIONS, EDUCATIONAL IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

5.1. CONCLUSIONS

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

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

i) Programmes Introduced for ICT Education to Bridge the Digital Divide in Schools of Punjab State.

Majority of the principals and ICT teachers from rural and urban schools were of the view that Computer Aided Learning (CAL) and Computer Literacy Programme (CLP) were the two programmes introduced in the schools for bridging the digital divide in the State of Punjab. 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 acquaintance of whole of the scheme and its implementation in its real spirit.

ii) Constitution of the Societies for Translating ICT Initiatives

Majority of the principals and ICT teachers from rural as well as urban schools are aware that Punjab ICT Education Society (PICTES) and Punjab EDUSAT Society are the societies constituted by the Government of Punjab for translating ICT initiatives into reality.

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.

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) Introduction of ICT Education in the Schools of Punjab State

In all the urban schools, ICT education was introduced in the year 2005 and in phases in rural schools in the year 2005 and 2006.

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) Agency Funding the Introduction of ICT Education

Majority of principals and ICT teachers from the rural as well as urban schools were of the view that funding for introduction of ICT education in the schools is provided by the State Government of Punjab.

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) Option for ICT Education as a Subject for all Enrolled Students.

The option for ICT education is only as compulsory subject for all enrolled students from grade 6th to 12th.

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.
5.1.2 ICT FACULTY

vi) Number of ICT Teachers Per School

Majority of the rural schools, two teachers are working as ICT teachers whereas in the case of majority of urban schools, three teachers are working as ICT teachers.

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) Mode of Appointment of ICT Teachers

All ICT teachers have been appointed on contractual mode in the rural and urban schools.

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) Remuneration for ICT Teachers

Majority of ICT teachers are getting Rs.10,000/- per month as remuneration.

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

ix) Qualifications Required for the Recruitment of ICT Teachers

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) Qualifications Possessed by ICT Teachers in the Schools

Majority of the ICT teachers working in rural as well as urban schools possess M.Sc.(IT)/ PGDCA/ M.Sc. (Computer science) and M.C.A. qualification.

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) Appointment of Qualified ICT Teachers and Acquiring Essential Qualifications During Service

Majority of ICT teachers appointed in the rural schools are having essential qualifications before their appointment whereas this is not the case in urban schools where ICT teachers are also recruited without requisite qualifications. All the ICT teachers who were appointed without requisite qualifications, acquired the qualification during the service.

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) Computer Education as the Main Teaching Subject

Majority of the principals and ICT teachers from the rural and urban schools were of the view that Computer Education is only the main teaching subject of ICT teachers.

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.
5.1.3 Training Programmes for ICT Teachers

xiii) Attending of Training Programme by ICT Teachers

Majority of the principals and ICT teachers from rural as well as urban schools were of the view that ICT teachers have attended training programmes during the past three years (2007, 2008 and 2009).

The document of Government of Punjab on ICT has specifically mentioned that it is mandatory for all the teachers 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) Nature of Training Attended by ICT Teachers

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) Organisations Providing Training to ICT Teachers

Majority of the principals and ICT teachers from rural as well as urban schools were of the view that Government In-Service Training Centres (GISTC) provided training to ICT teachers.

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 GISTCs. 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) Duration of Training of ICT Teachers

Majority of the ICT teachers from the rural schools attended training for two days and majority of the ICT teachers from urban schools attended training for 5 days.

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...
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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) Level of Training Attended by ICT Teachers

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

xviii) Reasons for Attending Training Programmes by ICT Teachers

The main thrusts of the attending the training programmes by the ICT teachers are professional growth, subject up gradation, career enhancement and to fulfil the requirement of the government for attending the programmes.

xix) Perceptions about Benefits of Training Programmes to ICT Teachers

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) Reasons for not Attending Training Programme by ICT Teachers

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.

5.1.4 Infrastructure

5.1.4.1 Availability of ICT Lab in the Schools

xxi) Availability of Separate ICT Lab in the Schools

Separate ICT labs have been established in each and every rural and urban school in the state of Punjab. Majority of the rural schools, there is only one ICT lab whereas in urban schools, this number is two.

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) Place for ICT Theory Classes

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) Types of Flooring in ICT Labs

In most of the rural and urban schools the ICT labs have PVC flooring followed by cement and tile flooring.

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) Furnishing of Windows of ICT Labs with Curtains

In hundred percent of the rural schools, windows of ICT labs are not furnished with curtains whereas in case of urban schools, these are furnished with curtains in a few schools.

xxv) Available Type of Board in the ICT Lab

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.

5.1.4.2 Availability of Furniture in the ICT Lab

xxvi) Number of Chairs Available for the Students in the ICT Labs

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) Availability of chairs for the students in the ICT Lab

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) Availability of Chairs for Students while Working in the ICT Lab

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) Perceptions about Seating of Students Comfortably while Working in ICT Lab and Measures to be Taken for Comfortable Seating of the Students

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) Availability and Number of Chairs for the ICT Teachers in the ICT Lab

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) Perceptions about Comfortable Seating for ICT Teachers and Measures for Comfortable Seating for the Teachers

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) Number of Computer Tables for Students in the ICT Labs

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) Size of the Computer Tables Available in the ICT Labs

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

xxxiv) Perceptions about Adequate Size of Table Top for Computer System

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) Availability of Computer Table for the Teacher in the ICT Labs

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

xxxvi) Number of Computer Tables for ICT Teachers in the ICT Labs

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.
5.1.4.3 Electric Infrastructure and Electric Supply

xxxvii) Availability of Switch Boards in ICT Lab

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) Number of Switch Boards Available in the Lab

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 in a few rural schools.

xxxix) Availability of Electric Source of Light in the ICT Lab

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) Availability of Fans and Air Conditioners in the ICT Labs

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) Availability of Regular Electric Supply during School Hours.

In majority of the urban school regular electric supply is available whereas in near about half of rural schools regular electric supply is not available during school hours. That majority of rural and all urban schools have UPS as power back up system. However, inverters are also available in a few of the rural schools. Many of the rural schools have power back up system of 2.0 KVA whereas half of the urban schools have power back up system of 0.5 KVA and the remaining half have power back up system of 1.0 KVA.

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) Duration of Supply of Backup System to ICT Lab

Majority of the rural schools whereas only half of the urban schools have power back up systems which can supply power to ICT labs for one hour and two three hours in the urban schools.

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.

5.1.4.4 Availability of Hardware

xliii) Number of Computer Systems Installed in the ICT Labs

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.

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.

xliv) Types of Systems Available in the ICT Labs

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.

xliv) Availability of Computer Monitors in the ICT Labs

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) Type and Number of Printers in the ICT Labs

Majority of the rural schools and near about hundred percent of urban schools have Laser printer (black) and Dot-matrix printers. However, coloured Laser printer is also available in some of the urban schools. Majority of the rural schools have one Laser printer (Black) and one Dot-matrix printer whereas all of the urban schools have one Laser printer (Black) and half of the urban schools have two Dot-matrix...
printers. However, the number of schools having coloured laser and inkjet printers is very small. Each school is having one number printer of each type available in the school.

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) Permission for Printout Facility

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) Reasons for Not Allowing Students to Take Print Out

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.

5.1.4.5 Operating System Available in the ICT Lab

i) Type of System Software Available in the ICT Labs

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) Type of Application Software Available in the ICT Lab

Majority of the rural as well as urban schools have MS Office 2003 Professional and Encarta encyclopaedia application software available in ICT labs. However, many of the rural as well as urban schools also have Window Server 2003 application software in ICT labs.

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.

5.1.4.6 Internet

i) Availability of Internet Service

Hundred percent of the rural and urban schools have the internet connectivity in the ICT labs.

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.

iii) Number of Systems Connected to the Internet

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, majority of the students from rural and urban schools were of the view that only one system is connected to the internet.

liii) Internet Service Provider and Availability of Regular Internet Connectivity

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.

iv) Permission to Students to Surf the Internet

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

lv) Permission to Students to Surf the Internet in the Absence of Teacher

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) Downloading Materials through the Internet

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.
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Ivii) Availability and Use of e-mail Account of the School

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.

5.1.4.7 Maintenance and Cleanliness of ICT Lab

Iviii) Time Taken for Replacement/Repair of Any System or Equipment in ICT Lab

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

Ixi) White Washing and Paints in the Labs

Majority of the rural as well as urban schools, ICT lab is white washed once in a year. Majority of the rural as well as urban schools, the almirah/cupboard, doors and windows of ICT lab are painted once in a year.

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) Cleanliness of ICT Labs

In majority of the rural and urban schools, the cleanliness of ICT lab is done daily.

5.1.5. Use of ICT Lab by Students and ICT Teachers

lix) Number of Students Working in ICT Lab at a Time

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

lxii) Number of Students Working on One Computer System at a Time

Majority of the rural as well as urban schools, two students work on one computer system together at a time.

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.
lxiii) Use of ICT for Number of Days per Week by Teachers and Students.

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.

lxiv) Purpose of Using ICT Labs

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.

lxv) Abilities to be Developed in Students by Teaching ICT Education

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.

5.1.6 Study Materials for ICT Education

lxvi) Text Book for ICT Education and its Uses

In majority of the rural as well as urban schools, ICT text books are available with the students. In majority of the rural and urban schools, ICT textbooks are provided to the students by school authorities. The use of ICT textbook by the students are in the order of getting understanding/ detailed knowledge of the syllabus, knowing content of learning and self-study.

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.
lxvii) Note Book for ICT Education

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.

lxviii) Work Book for ICT Education

In majority of the rural as well urban schools, ICT workbooks are not available with the students. However, majority of the ICT teachers only from rural schools opined that ICT workbooks are available with the students. In majority of the rural as well urban schools, workbooks are provided to the students by the parents. In none of the rural as well urban schools, the students are charged any money for the workbook as per principals and ICT teachers. However, in many of the rural schools, the students are charged money for the workbook as per the views of the students. Majority of the principals in the rural as well as urban schools and ICT teachers in the rural schools are of the opinion that ICT workbook is used for writing, making notes, solving exercises and to know the class work done. In case of urban schools, half of the principals favour its use for practical work and the remaining half for writing/ making notes/ to know class work done and for solving exercises.

The Government of Punjab has made a provision of providing free ICT workbooks 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.
5.1.7 Curriculum Transaction

**lxix) Periods Assigned for ICT Education**

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.

The Government of Punjab ha prescribed two practical and two theory classes per week. The above finding supports the time schedule given by the state of Punjab as the classes are being held as per this time schedule.

**lxx) Regularity in Holding ICT Classes**

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.

5.1.8 Evaluation of Performance of students In ICT Education

**lxxi) Prevalence of Evaluation of Performance of Students in ICT Education**

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

**lxxii) Evaluation Procedure for Evaluation of Performance in ICT**

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.

**lxxiii) Type of Question Paper for Evaluation of Performance in Theory of ICT Subject**

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.
Ixxiv) Conduct of Examination for 8th, 10th and 12th Classes by Punjab School Education Board (P.S.E.B.) in ICT subject

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.

Ixxv) Session End Examination for ICT Subject in the School for Non-board Classes (6th, 7th, 9th, 11th).

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.

5.1.9 Financial Resources

Ixxiii) Payment of ICT Teachers’ Salary

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.

5.1.10 Computer Aided Learning

Ixxiv) Introduction of Computer Aided Learning (CAL) Programme

In large majority of the rural as well as urban schools, CAL programme has been introduced. In large majority of the rural as well as urban schools, CAL programme has been introduced for classes VI, VII and VIII.

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.

Ixxv) Methods of Teaching under CAL Program.

For imparting instruction under CAL programme, the preference of the methods followed by the teachers is in the order of lecture method, activity method, play way method and use of CDs.

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) Use of Computer in Different Subjects for Various Purposes

The use of computer by the ICT teachers in the subject of mathematics is made in the order of: teaching and learning, making projects, power point presentations, creating interest and quizzes. The use of computer in science and social science is made in the order of: making projects, teaching and learning, power point presentations and to create interest. The use of computer by the ICT teachers in English language in rural schools is made in the order of:- teaching and learning, making projects, power point presentations and typing whereas the order of use in the urban schools is making projects, power point presentations, teaching and learning and typing.

The use of computer made by the ICT teachers in Punjabi language is in the order of: typing, teaching and learning, power point presentations and to make projects.

Ixxix) Frequency of Use of Computer Under CAL Program to Teach Different Subject

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.
lxxx) Number of CDs Available Under CAL Programme

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.

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.

lxxxi) Agency which had Developed CDs for CAL Programme

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

lxxxii) Uses of Multimedia and Microsoft CDs

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.

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

lxxxiii) ICT Education as per Expectations of Punjab Government

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

lxxxiv) Aspects Covered under ICT Education in the Schools.

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.
Suggestions for better ICT Education in Schools

The students in some schools suggested to have more spacious labs, better infrastructure including more computers, more chairs, carpets, white-washing the labs, permission to use facilities provided like internet and printers and better ICT education.

5.2 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.

4. 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.

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

6. 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.

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

8. 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.

9. 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.

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

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

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

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

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

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

5.3. 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.