CHAPTER - I

INTRODUCTION

1.0 INTRODUCTION

The impact of science and technology on human life has been phenomenal. It has changed the nation's economy and lifestyle of the people in the society at such a fast rate that man continuously struggles to catch it up. This change has affected millions of people. In this changing technological world, computer has occupied an important place. Computer is being used from the household management to the technological fields, almost in all the fields of life. Computers are handling not only financial and material accounting in industries, trade, banks, insurance companies, railways, post, but also widely used in universities, colleges and schools for preparing admission list, roll call, examination results, mark sheets etc. The society as a large is becoming increasingly aware of the ever-growing use of computers and it is also affecting the way of life of individuals, groups, and organizations. In a developing country like, India, it is essential to adopt these various emerging areas of technology to make people aware of their potentials, to make them informative and skilled and to educate them in newer technology, which can contribute towards personal as well as national development. Since long, the western countries have been using computers in the area of education. The educational use of computers in India is only dated back to the last part of eighties. It was a felt need to use computers in the schools that gave birth to the subject like, Computer Education. Though there is an increasing demand of Computer Education in school at different levels, the spread of computer is quite limited, only to a few schools in urban areas. Let us have a birds eye view in the historical development of Computer and Computer Education in India.

1.1 COMPUTER IN INDIA: A HISTORICAL PERSPECTIVE

India entered in the field of computers in the year 1954 when decision was taken to design first general purpose computer which was completed in the year 1956 by Tata Institute of Fundamental Research (TIFR), Bombay. Another attempt was made by the joint collaboration of Indian Statistical Institute (ISI), Kolkata, and

Jadavpur University (JU), Kolkata in the year 1963 to develop a computer which was named as ISIJU. The first indigenous mini computer was developed by Government owned ECIL (Electronic Corporation of India Ltd.), Hyderabad that was designed at Bhaba Atomic Research Centre (BARC), Bombay. Following the Government's decision, IBM Corporation withdrew itself from India in 1978. But by that time, however, there were a few private sector companies like, Wipro and Methodex which started assembling mini and personal computers.

The eighties saw the emergence of the higher level structured languages and faster adaptation to computerization by Indian Industries. This is perhaps the most significant trend seen in recent times and the most crucial for the development of the software industry in India. In pursuit of it, in November 1984, Government of India released new Computer Policy. It was an open and liberal invitation for collaboration, technology transfer and setting up of manufacturing facilities by the foreign firms. Many important foreign manufacturers except IBM had some tie-up with local vendors. The greatest impact of this open door policy was on the PC manufactures. With the easy availability of advanced technology systems due to liberal Government policy, software developers have also begun developing increasingly sophisticated packages both for the national and international markets. The 90's are the era of the Internet, Object Oriented Programming and Relational Database Management System i.e. the programming for stand alone machines to global networks across multiple network platforms. These developments in the field of computer are the credit of our education system. Due to the development of computer hardware (computers) and software (languages) and the ability of computers to be programmed, it is used in every sphere of life including teaching learning process. This leads to the inclusion of Computer Education in Indian schools.

1.2 BEGINNING OF COMPUTER EDUCATION IN INDIAN SCHOOLS

Education is preparation for the future and a nation's future prosperity depends on the quality of the present education of those who will become tomorrow's work force. Children, who are today in primary and secondary schools, will be the bearers of this computer-based industrial and social revolution in the country from

which no individual household, business or occupation would have been left untouched. As the patterns of employment are changing rapidly, today's children will need to be trained for jobs which such technological advances will generate. If these opportunities are to be accepted, an essential part of the spectrum of educational skills will be familiarity with the uses and applications of computers. With this in mind, Computer Education in schools was introduced during eighties. In this regard different five year plans, committees and commissions has recommended for Computer Education in schools. So, it is very essential to mention about these policies and programmes of different commissions and committees regarding Computer Education in school.

1.3 POLICIES AND PROGRAMMES ON COMPUTER EDUCATION IN INDIA

Computer Education in schools (hardware and software) started in India during eighties. Recognizing the importance of Computer Education, the Sixth Five Year Plan (1980-85) document stated that, 'the importance of educational technology has to be adequately provided for greater efficiency, effectiveness and wider reach of the educational programmes'.

The importance of Computer Education is also very well reflected in the report of the National Workshop on Computer Literacy Curriculum held at the National Council of Educational Research and Training (NCERT), New Delhi in 1984. It mentioned the following points.

(a) Computer Education should be introduced at senior secondary level and gradually be introduced at meddle and primary levels.
(b) Computer Education would be a part of the curriculum for every standard, irrespective of the area selected for specialization.
(c) Computer Education would familiarize students with computer as a versatile tool with immense application potential in all aspects of human development.

Later, the National Policy on Education (NPE) (1986) emphasized for the computer literacy. During the Seventh Five year Plan (1985-90), a huge sum of

Rs.700 cores was allotted for computer literacy and expansion of computer programmes at all levels of education. The following measures were suggested in this plan for expansion of various programmes of computer literacy.

(a) To expand existing or initiating new programs for computer manpower by 1995.
(b) Integration of Computer Education modules in professional and general education courses at first degree level and provision of computer facilities in these institutions.
(c) Introduction of effective computer science courses at higher secondary level.
(d) Extension of computer literacy programs for all higher secondary schools by 1995 and elementary schools in long term.

It can be noted here that the emphasis is given on computers, especially in the field of education due to the versatile facilities of computers. Keeping in mind the recommendation of NPE (1986), the following strategies and programmes were suggested by Programme of Action (POA) of NPE (1992).

(a) The CLASS project would be expanded subject to resource availability.
(b) The coverage of 2000 senior secondary schools was envisaged in the Eight Five-Year Plan.
(c) The management system for implementation of CLASS project would be strengthened and made more effective
(d) Computer applications with adequate facilities of computers in schools would be encouraged on operational basis at secondary and higher secondary levels.

In the history of Computer Education in India CLASS project, central government had played a significant role in spreading the computer literacy programme in schools.

1.3.1 CLASS Project: Beginning of an IT Era

With due emphasis on Computer Education, the Department of Electronics, Government of India (GOI), in close cooperation with the Department of Education,

Ministry of Human Resource and Development (MHRD), GOI launched a pilot project in 150 schools. After this, National Council of Educational Research and Training (NCERT), New Delhi, took up the executive responsibility and Indian Institute of Technology (IIT), New Delhi provided initial inputs for the implementation of CLASS (Computer Literacy And School Studies) project in terms of designing teachers' and students' training program. CMC (Computer Maintenance Corporation) Limited took the responsibility to install and maintain the computers of the project. For this project 42 regional resource centres had taken up the responsibility for implementing the project. The CLASS project introduced Computer Education in schools in a phased manner with the following objectives:

1. To provide student with broad understanding of computer and their use.
2. To familiarize students with the range of computer applications in all walk of human activity and the computer's potentials as a controlling and information-processing tool.
3. To introduce Computer Education at the secondary and higher secondary level at the outset, to be followed by the computer literacy at middle and primary school levels.
4. To make Computer Education a part of the school curriculum, and for every student, irrespective of eventual branching into science, humanities and commerce.
5. To enable students to become familiar with the computers and it's potential as a versatile tool with application in all aspects of human endeavour.

Microcomputers were selected for this project because of their low cost and availability of the suitable software packages for school children such as, word processor, data based systems and computer based learning packages. The most crucial element of the program was the generation of an adequate number of trained teachers for running the Computer Education program 750 teachers (3 each from 250 schools) were trained through the intensive training courses conducted by the resource centres during June-July 1984. For the actual implementation of Computer Education in schools after the training of the teachers, a Computer Education curriculum was prepared. The curriculum which was followed for Computer Education was divided

into three phases. The first phase was designed to prepare the students to be able to make use of the existing educational programmes. The second phase was designed to provide training in BASIC languages and the third phase was meant for vocational training of the students with special aptitude for computers.

Indeed, the CLASS project was initially introduced as a pilot project during the year 1984-85. A total of 12,000 microcomputers were distributed to Secondary and Senior Secondary Schools through State Governments. The project was subsequently adopted as a Centrally Sponsored Plan Scheme during Seventh Five Year Plan (1993-98). During the Eight Five Year Plan the scheme was widened to provide financial grants to institutions which were provided BBC Microcomputers and also coverage of new Government Aided Secondary and Senior Secondary Schools. Assistance included annual maintenance grant for BBC micros, and purchase as well as maintenance of equipment for new schools. 2598 schools having BBC Micros were covered under the CLASS during the eight five year plan for providing instructors, maintenance of hardware, consumables and textbooks for students and training of teachers in schools. In addition to it, 2371 new schools were covered with new hardware and services which included Rs. 1.0 Lakhs for hardware configuration and Rs. 1.30 Lakhs per annum for recurring cost and Rs. 0.80 Lakhs per annum was kept as the recurring cost for schools which had already been covered under the BBC Micros scheme.

The scheme began with the identification of the National Institute of Computer (NIC) as the nodal agency for finalizing the contract for the supply of hardware. The use and supply of software were restricted. The coverage of the programme was confined to Senior Secondary Schools and the students of class XI and XII underwent rigid Computer Course Modules.

Based on the feedbacks and suggestions from the states, guidelines for the implementation were modified from time-to-time. In May 1996 the states were given flexibilities to procure hardware directly, develop and introduce the software operating system and extend Computer Education to classes other than class XI and XII. In a subsequent exercise to review various Centrally Sponsored Schemes, and in

the wake of Prime Minister's IT Initiatives, it was decided to revise the CLASS project so as to address the new vision and long term objectives of the nation.

1.3.2 The Revised CLASS Project

The Government of India has started an improved CLASS project called 'CLASS 2000' covering secondary, and higher secondary education. It is planned to impart Computer based education in 100 Smart Schools, Computer Aided Education in 1000 schools and general computer literacy in 10,000 schools. Recently the Government of India had launched revised scheme of CLASS 2002 with the vision to create awareness among school students about the computer and its usage in teaching-learning process and in modern world so that they make full benefit of information and communication technology (ICT) in their daily life and in education at every level. The long term objective of CLASS 2002 is mentioned in the following words, 'Recognizing that some of the state government and private schools have taken initiatives to introduce Computer Education in schools, the project is intended to accelerate the pace of introduction of Information Technology (IT) in schools and create models of school Computer Education so as to achieve the goals of universalisation of computer literacy among school passed outs within five years'.

Realizing the long term objectives of CLASS 2002 and reviewing various Centrally Sponsored Schemes in the wake of Prime Minister's IT initiatives, it was decided to stop old scheme in 1996-97 and the revised scheme has been operationalize and funding started from 2001-02. The following are the main features of the revised CLASS Scheme 2002

(i) Each State/UT would be requested to formulate a Computer Education Plan (CEP). The CEP would indicate the steps already taken by the State Government/UTs and the assistance which they now require.

(ii) The department of Secondary and Higher Secondary education would set up a Project Monitoring and Evaluation Group (PMEG) at the national level which would consider the CEPs. Funds would be allocated on the recommendations of the PMEG.

(iii) The State governments would have to contribute a minimum of 25% of the funds required for the scheme. The scheme also provides for contribution of 25% of funds from the Member of Parliament Local Area Development (MPLAD) scheme for Members of Parliament in addition or as an alternative to the State government contribution.

(iv) The assistance of the Government of India would be for the following items and up to the limits indicated against each item:

- PC/Printer/CRT not exceeding Rs. 60, 000 per set.
- Software/Curriculum/CDs not exceeding Rs. 25,000 per schools per annum.
- Furniture (one time) not exceeding Rs.10, 000 per schools.
- Computer stationary not exceeding Rs. 20,000 per school per annum.
- Maintenance – 50% of the cost of the annual maintenance contract (after the period of warranty is over)
- Internet connectivity, not exceeding Rs. 5,000 per annum per school.
- Teacher's training – not exceeding Rs. 10,000 per school per year (for teachers teaching in such schools for which the grants are agreed to be given).
- An amount of Rs. 1 crore would be kept aside for the Department of Secondary Education & Higher Education for the development of software, teaching tools, designing training models, evaluation, monitoring and other contingent expenditure.
- Only such schools which have Computer Education as an elective subject at the secondary stage would be eligible for the grants under the scheme. However, the scheme could be implanted in English/Hindi or the regional language.
- The CEPs received from the State/UTs will be examined by a Project Monitoring and Evaluation Group consisting of the following:

    a) Secretary, Department of Secondary Education and Higher Education as the Chairman
    b) Joint Secretary (Secondary Education), DSEHE: Member.

c) A representative of the Department of Information Technology: Members.

d) Financial Advisor, MHRD Members.

e) Two Technical Experts nominated by the Chairperson of the PMEG Members.

- Kendriya Vidyalaya/Navodaya Vidyalaya would be converting one of their schools into SMART school with a grant of Rs. 25 Lakhs per school.
- Kendriya Vidyalaya/Navodaya Vidyalaya would be given funds @ Rs. 15, 000 per neibhourhood school to impart computer literacy, to not more than 10 neibhourhood schools to cover Rs. 10, 000 per such schools over three years.

(v) The CEP of States/UT would be implemented. During financial year 2001-02 a provision of Rs. 74,000 crore has been earmarked for this purpose.

Thus, it can be concluded that over the last two decades the NPE (1986), revised NPE (1992) and POA (1990) and (1992) have highlighted not only the importance of computers in education but also have suggested different strategies to implement the recommendations at different school levels. Even Ramamurthy Committee Report (1990) also laid emphasis on making computers education an integral part of school timetable. Thus, it is beyond doubt that computers and information technology are going to play a very crucial role in education system in India in this 21st century. The National Curriculum Framework for School Education (2000) has mentioned the integration of Information and Communication Technologies into schooling in the following lines, "the process of education can no longer ignore the social and psychological impact of the technology that structures information and possibilities that global information sharing opens up. Furthermore that these technologies affect the way people think and learn has been widely recognized." It has also mentioned that "Integration of Information and Communication Technology (ICT) into schools, therefore, has a strong pedagogical rationale and is natural sequence in the evolution of the schooling process. It is only with new skills and perceptions that the teacher can assume her new role as a facilitator of learning and implement and maintain innovations in the classroom. This calls for a new definition of pre-service courses and effective training and orientation programmes for those who are already in the job. The new course should help teachers to acquire skills of using information

technology as well as making the best use of computer technology in curriculum transaction."

Recently, The National Curriculum Framework (draft) (2005) also mentioned that "The tremendous effectiveness of the computer and computing technology in shaping modern society has created the need for an educated public that can utilize such technology most effectively for the betterment of society and humankind. There is therefore a growing realization of the need to have place for these domains of knowledge in the school curriculum".

From this analysis of the suggestions and recommendations of committees and commissions and the implementation part of it, it could be said that attempt had been made by the central government in eighties and nineties for the development of Computer Education and computer literacy in Indian schools. On the guidelines of central schemes, government of different states prepared and implemented programmes for the spread of Computer Education at state education. In the following paragraphs, mentions have been made about the initiatives taken by the Government of Gujarat to spread Computer Education in schools.

1.4 COMPUTER EDUCATION IN GUJARAT

Realizing the need and importance of computer, the central and state governments are emphasizing on the implementation of Computer Education at school and college levels Some state governments have started working in this direction. Computer was first introduced at the school level in Scindia School, Goa in 1982. In the subsequent years, gradually it was introduced in many other private schools of the country. During 1990 and 1995 many private and private aided schools in Gujarat introduced Computer Education in secondary and higher secondary schools as an additional subject. After realizing its importance the Gujarat government took the step in 1998 to introduce Computer Education as a subject at secondary school level. Gujarat Secondary Education Board (1998) circular1197/C.M/6T6/sited that GSEB has recognized Computer Education as a subject for 8th to 10th standard in 1998-99 and prescribed a course outline for 8th to 10th standard. A detailed syllabus for 8th standard has been prescribed and implemented on experimental basis. But it

has recognized computer course as a SUPW subject and not as a compulsory course. GSEB introduced the syllabus for Computer Education with the following major objectives.

1) To introduce students to modern usage of computer including careers other then computing.
2) To ensure that students can use the course as a jumping off point to go to more advanced courses in computing.
3) To encourage logical thinking among students.
4) To ensure that student who has not previous exposure to computers does not find it difficult to grasp the course.
5) To ensure that students who already have some exposure to computing do not find it too boring or easy.
6) To teach students storage, management and presentation of information, and
7) To encourage the use of computers as a tool in learning process.

To introduce Computer Education as a subject in secondary classes for the session June 2002 the GSEB, Gandhinagar has prescribed certain rules. The rules are as follows. These rules are translated from circular, Sr.No./ SHSEB/ Research/ Co.Edu./ 2002-26250 of GSEB, Gandhinagar. (For original Gujarati version please refer Appendix VII).

1) If the school wants to introduce the course for the session 2002-03, they can get the training from GSEB recognized computer agency and take permission for standard 9th and 10th.
2) Permission will be given keeping in mind that there are 10-15 computers in the school so that two student's can work for theory and practical in one computer.
3) 10 computers are must if number of students in the school is less than 60.
4) To start this subject in the school, maximum fees of Rs. 50/- can be taken from each student.
5) School can not charge any other fees from student for the purpose of Computer Education as mentioned in serial no. 4.

6) The students of the school, which has taken the permission up to 10th standard from session June 2002 only can opt the board examination of 10th March 2003 and can keep it as an optional subject.
7) The school which has once paid the registration fees they need not to pay Rs. 1500/- for getting permission again for standard 10th from the Board.
8) The students of the school which has got the permission to appear the examination of standard 10th March 2001-02, those schools don't need to get the permission again for Secondary School Certificate (S.S.C) examination of March 2003.

1.4.1 Terms and Conditions of Gujarat Government for Providing Computer Education

After the implementation of Computer Education, lots of developments have taken place in the field of Computer Education at secondary school level with respect to the number of schools getting grants from the government for introducing Computer Education. For this the GSEB has prescribed certain terms and conditions for providing Computer Education in schools. Those are as follows. These terms and conditions are translated from GSEB circular no. SEB-2001-1281-7 dt. 17/05/2002. (For Gujarati version refer Appendix- VIII).

According to the circular dated 3/11/1998 of Education Department, Computer Education has been introduced in Standard 8th as an optional subject from June 1998. As far present State Government planning, the government will help up to Rs. 3 Lakhs or 50% of the expenditure for purchasing computers for the non-granted schools and the school of Tribal Area (where more than 50% students are tribal).

According to the Letter No D.O.N F. 11/10/2000-S.C.H.-5-(PT-1), Letter No IT/36/2001/4009-C and Letter No. ITP/36/2002-C-302 dated 4/2/2002of Secondary and Higher Education Department, MHRD, GOI, New Delhi, had planned to provide computers in Secondary and Higher Secondary Schools under Computer Literacy and School Studies scheme. Considering this, modifications have been made in the present plan of Government of Gujarat, Gandhinagar and permission is given for providing computer to the schools on the basis of following terms and conditions.

1) This scheme will be known as CLASS and the implementation of this scheme will be done by the Commissioner of the school and Mid Day Meal, Gandhinagar.
2) According to this scheme, the granted secondary and higher secondary schools of state government have to maintain limit of Rs. 6.70 Lakhs per school for computers and other related materials.
3) According to this scheme 75% of the amount will be given from the grants of central government and remaining 25% amount should paid by the respective schools.
4) For government secondary and higher secondary schools 75% expenditure will be given from the grants of central government and remaining 25% expenditure will be given by state government from its own grants.
5) For the secondary and higher secondary schools of tribal area where more than 50% students are tribal, 75% of the expenditure will be given from the grants of central government and remaining 25% should be given by the state government from its own grants.
6) The responsibility of implementing this scheme is of Commissioner of the Schools. The schools who wants to take benefits from this scheme, the Commissioner should invites the application, scrutinize it and select the school. The Commissioner should select those schools which have standard 8th to 12th, its own building, good S.S.C. results, and facility of computer room, financial sufficiency and having permission for computer subject from Gujarat Secondary Board of Education.
7) According to this scheme, the limit of expenditure on computers and other material have been decided by the Government of India, its specification, configuration and purchasing should be done according to the rules and regulation of the state government. In this regard the Secretary will form a committee in place of President of school management. The Commissioner of Schools will be its Secretary. While Deputy Secretary (Secondary Education), Financial Advisor, members of G.I.L. and member of I.T. department will be the member of this

committee. The Commissioner of the school will handle all the activities of this committee as a member secretary.

8) Secretary and appointed committee will organize training program for teachers keeping in mind the rules of the present I.T. institutions who are providing training. All the power to organize the training program for teachers will rest on the committee.

9) According to this program each school will be provided maximum 10 sets of computers, printer and other necessary material. Which school should be provided how many set will be decided by the Commissioner while selecting the school keeping in mind the number of student and other facilities. Except this, grants will be provided for other necessary material keeping in mind the expenditure decided by Government of India for which the Commissioner should invite application from those schools.

10) According to this programme, purchasing of hardware and other material will be done keeping in mind I.T. norms, rules and regulation by G.I.L. and as per the rules the payment will be paid to G I.L. from the grants. For this whole procedure G.I.L. should seek the permission from the committee formed by the Secretary.

11) According to this programme the schools getting necessary materials have to deposit 25% amount as decided by the government. This amount should be deposited in the joint account of District Education Officer (DEO). After purchasing specified number of computer sets, furniture and internet the DEO will pay the limited grants as decided by the Government of India to the respective schools.

12) The remaining amount will be paid by the respective schools through draft to the supplying agencies decided by the government.

13) This scheme will be continued till the Central Governments CLASS scheme provides assistance.

14) No expenditure for new appointment and purchasing of vehicle will be done from Central assisted CLASS scheme.

15) Implementation of this programme, letter related to expenditure, related information etc., should be submitted to the Commissioner of Schools. The responsibility of obtaining 75% expenditure from the Government

of India within stipulated time for this programme is of Commissioner of Schools

16) Under this scheme the responsibility of maintenance of purchased computers and other related materials lies on the schools and for this no extra grants will be provided. Before providing the grants, the declaration should be taken from the schools that the school will not do any kind of non-educational use, selling and exchange of the purchased computers and other related materials. If the school is closed down then the computers and other related material should be sent back to the government in working condition.

17) The state government programme should be stopped effectively and immediately.

18) Under this scheme the arrangement of the budget for current year as the part of state government and as the part of central government granted scheme should be done by Commissioner and by the respective school as soon as possible.

19) According to the conditions of the circular, the stamp paper must be signed on MoU by the school.

1.4.2 Specification of Gujarat Government Regarding the Computer Training of Secondary Teachers

The GSBE has prescribed certain specification regarding the training of the teachers for Computer Education. In this regard the GSEB has specified the name of certain institutions (Refer Appendix IX). The specifications regarding the training are as follows. All these specifications are translated from GSEB circular no SHSEB Research/Co.Edu. dt. 22/07/2003. (For original Gujarati version refer Appendix -X).

1) Any registered granted or non-granted secondary school can apply for subject registration in prescribed form and have to pay Rs. 1500/- as subject registration fees.
2) The school should get the training for respective standard from the training institute and have to get the certificate. On the basis of that and the rule

mentioned in sr. no.3 (circular no. 696/03 dt. 6/7 June, 2003) schools will be given permission.

3) The applicant school for this subject must need to have at least 10 computers in computer laboratory and on the basis of two students on one computer (four student including theory and practical) 15 computers per 60 students in the school.
4) After applying for the registration for standard 8th, 9th and 10th the teacher can get training for one standard or more than one from different institution and can get the permission. The teacher of respective school can get the training for respective standard or the teacher who has completed computer training has to obtain the certificate from the institution and send to the research department of board.
5) The school can get freedom from training if any teacher of the school has qualification for this subject.
6) The school has to arrange themselves for training by paying Rs. 1200/- as training required expenditure.
7) For the permission of this subject the schools have to send Rs. 1500/- through demand draft.
8) To keep this subject for standard 10th board examination, the schools have to obtain permission from board after completing the training of standard 8th, 9th and 10th.

Thus, it can be concluded that after the implementation of Computer Education in 1998, a lots of development have taken place in the field of Computer Education at secondary school level with respect to specification for introducing Computer Education in school as a subject, for getting grants from the state government and training of teachers. Though through these schemes of Government some teachers are trained in computer fundamental and courseware, no efforts were made in training teachers related to the pedagogy of computer teaching. Even after more than half decade of introducing Computer Education, it has still remained as an optional subject (SUPW) and not a compulsory.

1.5 PRESENT STATUS OF COMPUTER EDUCATION IN SCHOOLS

Though Computer Education is not introduced as a compulsory subject in school education, it is being considered as one of the emerging subject for the future school education. Due to the lack of resources, it is not considered as a subject in every school. It is being considered as a subject of SUPW in the schools offering Computer Education. More and more emphasis is being given on this subject to be introduced in school education and State governments are trying to introduce this subject with the help of community. Due to the demand of this subject many schools in urban area, Central schools, Navodaya Vidyalayas have started offering it for each and every standard. In future, it may be considered as one of the compulsory subject for school education, which needs proper Computer Education teachers. The status of Computer Education is presented here in four segments including the Use of Computers in Schools, Computer Education courseware, Computer Education teaching learning process, and Computer Education Teachers which are as follows.

1.5.1 Use of Computers in Schools

Computer is used in schools in two ways, first computer as a tutor i.e. computer as a tool to teach other subjects and second computer as a tutee i.e. to teach Computer Education as a subject.

1.5.1.1 Computer as Tutor

In tutor applications the computer acts as a tutor by performing a teaching role. In fact, the students are tutored by the computer. These types of applications are often referred by several different labels such as, Computer-Based Instruction (CBT), Computer-Assisted Instruction (CAI), or Computer-Assisted Learning (CAL). Tutor application includes the specific applications like, drill-and-practice application, tutorial applications, simulations, animations, problem-solving applications, and games. One or more specific applications can be incorporated in the CBI, CAI or in CAL according to the learning outcome of the topic. The use of computer as a tutor in

schools is very less. Now with the availability of software CDS related to different school subjects, this application of computer is increasing mainly in urban areas.

1.5.1.2 Computer as Tutee

In tutee applications the computer act as a tutee, or as a student, and the user becomes the teacher. The user had to teach the computer to do some task. To do this, the user has to learn how to communicate with the computer in a language that the computer understands. In essence, the user must learn how to write a set of commands that tell the computer how to accomplish a particular task or solve a problem. Before students can program the computer to solve a problem, they must first understand how to solve the problem themselves. This requires the development and use of thinking skills and problem solving skill using computer languages and packages. Thus, the computer as tutee will constitute a new and fundamental intellectual resource. Tutee application require students to solve problem themselves before they can teach the computer how to do it. To realize this use of computer, there is a need for the Computer Education that helps learners to master different packages and languages. Here various packages and languages are taught in the schools. The packages like, Word processor, Data Base Management Packages (dBASE, Foxpro, Sibase), LOTUS 1-2-3, MS-Office etc. and the languages like, BASIC, LOGO, C, Pascal etc. are taught in the schools.

1.5.2 Computer Education Courseware

There is no fixed pattern of courseware offered for school Computer Education. It differs in school boards and from state to state. Varied dimensions of Computer Education are covered in the school syllabus. Those are (a) Fundamentals of Computers (b) Computer Hardware (c) Computer Software (d) Networking and (e)Multimedia Education and their combinations.

1.5.2.1 Fundamentals of Computers

It is the basic theory part of the Computer Education course in schools These components of Computer Education help students to understand about the origin of

computer and it major uses. This dimension includes the contents like, the origin of computer, different generations of computers and computer languages, system design of computer, different uses of computers, flow chart etc. This component helps to make the students aware about the world of computers.

1.5.2.2 Hardware

The hardware component has a very little importance in the school syllabus. Introduction about the hardware is the prime focus of this course. It is mainly meant to identify different hardware/ parts of computers and its importance. It includes monitor (CRT (Cathod Ray Tube)), Keyboard, CPU (Central Processing Unit), Printer, RAM (Random Access Memory), ROM (Read Only Memory), Floppy Drives, Floppies, Hard Disks, Motherboard, different Processors, CDs, CD Drive, Mouse etc. The importance for hardware is quite less in the school Computer Education course. It is considered as one of the importance course at the higher education from the point of job opportunities.

1.5.2.3 Software

Software component is the major and important part of Computer Education courseware. Here various packages and languages are taught to the students. With the learning of software, students are trained to prepare programmes for different purposes. This component covers nearly 60% to 70% of the total courseware of the Computer Education at schools. The software includes different platforms like, DOS (Disk Operating System), Windows and Unix; packages and languages like, Word-Star (version 4 to 7), Excel, MS- Office, dBASE, Foxpro, Logo, BASIC, C+ +, Graphics, Flash etc.

1.5.2.4 Networking

Interconnection between two or more computers in order to communicate with each other is called networking. The interconnection medium could be copper wire, laser microwave or communication satellite. There are different types of Local Area Networking (LAN) like, Broadband, token bus, token ring, fiber optics etc. and

Wide Area Networking (WAN). Networking is introduced in the higher levels of Computer Education. With the increasing demand of Internet, networking component of Computer Education is also gaining more and more popularity among learners.

1.5.2.5 Multimedia

Multimedia usually means the integration of two or more communications media that can be controlled or manipulated by the user via a computer (Galbreath, 1992). Mc Cuthy (cited in Schroeder, 1992) the integration of text, audio, graphics, still image and a moving picture into a single computer controlled system is multimedia. It is comparatively a new concept in the Computer Education but it is getting more and more popular due to its versatile uses.

1.5.3 Computer Education Teaching Learning Process

In schools, teaching of Computer Education is not according to the psychological and pedagogical principles of learning. Even Computer Education curriculum is not compatible to the schools and the computer teachers are not qualified In many schools computers are either unutilized or underutilized. Even there is no exact stage of introducing Computer Education in schools.

Computer Education is a new field introduced in the school curriculum as a subject. As a new field, there is lack of research regarding the nature of computer learning and also no theories have been developed and tried out with respect to nature and the way computer learning takes place. The nature of computer learning may have similarity with other subjects but no proper diagnosis has been made so far. In schools, Computer Education is taught to the students in different ways. They learn it in one or another form may be through trial and error procedure or through imitation. Some teachers emphasize only on practical where as, some emphasize on both theory and practical. But the way Computer Education is taught to the students is not properly systematized Due to this students are facing problems in the way of Computer Education learning. It may be due to the unsystematic method of teaching, or lack of models of learning computer

1.5.4 Computer Education Teachers

The qualities of Computer Education teachers in our schools are not up to the mark. As Computer Education is not a recognized compulsory subject in school education, there is no recognized post of Computer Education teachers in schools due to which Computer Education teachers are under paid. Due to this, interested and qualified computer personnel do not opt for the profession of Computer Education teachers in the schools. According to the experts views, computer teachers from primary standard (I-V) should be preferably lady teachers with minimum diploma in computer software or computer application; and for secondary and higher secondary standards, they should be trained graduate with diploma/degree in computer application and/or some experiences. But unfortunately very large portions of the Computer Education teachers at secondary level (80%) are untrained (Biswal and Das, 2000).

1.6 TRAINING OF COMPUTER TEACHERS

In almost all the teacher training colleges of Gujarat Computer Education is offered either as optional or compulsory subject. In these teachers training institution trainees learn about the basic applications of computers in education. But they are not trained how to teach computer as a subject. These types of programmes are available at the M.S. University, Vadodara i.e. it offers Computer Education as a special field and ICT as a compulsory subject, and IGNOU in-service B.Ed. where it is considered as a special field. Though there are pre-service training programmes in DAVV, Indore in the nomenclature of Bachelor of Computer Education (B.C.Ed.) and Master in Computer Education (M.C.Ed.), those are not recognized equivalent to B.Ed. and M.Ed. courses respectively by the NCTE Even these courses are not recognized by UGC Though the nature of the subject Computer Education is quite different from other school subjects and it needs special training about the methodology of teaching. Though methods of teaching computer is considered in the B.Ed. syllabus of Gujatrat University, Ahmedabad and Kutch University, Bhuj as a method course, no students is opting it. It because of the fact that there is no permanent post for computer

teachers in schools or may be due to the lack of trained Computer Education teacher educator. But for the development of Computer Education at school level, there is need of proper Computer Education teachers and teacher training programme in Computer Education. There is a need to provide Computer Education as a method of teaching for pre-service teachers and special training programme for in-service teachers.

Though IGNOU is offering Computer Education as an Optional subject in its in-service B.Ed. programme, no or very less emphasis is given in this subject about the pedagogical aspect of Computer Education teaching and learning. More application part is covered in this training programme. Most of the teachers those are teaching Computer Education in the schools are untrained teachers and hence need to know the pedagogical aspects of general teaching learning including psychology of learning, methods, models, approaches of teaching, lesson planning, technique of class room management etc. They need comprehensive in-service training may be of short duration which can help them to teach Computer Education effectively to the students. In the proposed study an attempt has been made to develop a teacher training programme for existing Computer Education teachers to teach Computer Education at secondary school level and to see its effectiveness.

1.7 RESEARCH QUESTIONS

The researcher does not come across any studies related to the process of computer learning at any level, or research related to any type of training programme related to Computer Education teaching learning. The researcher took the proposed study with the following research questions, some of which may be answered during this proposed study.

1) What is the nature of Computer Education learning at secondary school level? Whether Computer Education learning follows a special pattern? If so, what are the components of Computer Education learning at secondary school level?

2) Whether Computer Education learning at secondary school level has resemblance with any type of learning like, language learning, Social Science learning, Science/ Mathematics learning? Whether Computer Education learning at secondary school level has the ingredients of all the types of learning like, language, Social Science, Science and Mathematics learning?

3) Whether any model of teaching like, the Information Process Teaching Models, be suitable for teaching Computer Education at secondary school level?

4) Whether Computer Education teaching at secondary school level is done according to the needs of the Computer Education contents?

5) Whether Computer Education teaching at secondary school level is done according to the learning needs of the students?

6) Do the Computer Education teachers need any type of special training?

7) Whether giving special training to the Computer Education Teachers will enhance the Computer Education achievement of secondary school students?

1.8 RATIONALE OF THE STUDY

Twenty first century is characterized as the century of development in science and technology. In this science and technological world, computer has occupied an important place. Recognizing this importance, the Sixth Five Year Plan (1980-85) stated that "the importance of educational technology has to be adequately provided for greater efficiency, effectiveness and wider reach of the educational programmes". Over the last two decades the **NPE (1986)**, revised **NPE (1992)** and **POA (1990)** and **(1992)** have highlighted not only the importance of computers in education but also have suggested different strategies to implement the recommendations at different school levels. **Ramamurthy Committee Report (1990)** laid emphasis on making Computer Education an integral part of school timetable. The **National Curriculum**

Framework for School Education (2000) and (2005) has also mentioned the integration of information and communication technologies into schooling.

Realizing the importance of computer, the center and state governments are emphasizing on the implementation of Computer Education at school level and some state started working in this direction. The research conducted by (Clements, 1987; Clements & Gullo, 1984; Clements & Nastasi, 1988; Keller, 1990; Decorte, 1996) on LOGO programming environment shows that the LOGO programming fosters higher order thinking skills, develop creativity, and produces other desirable out comes. The **National Curriculum Framework 2005** also mentioned that "Providing children more direct access to multi-media equipment and Information and Communication Technology (ICT), and allowing them to mix and make their own productions and to present their own experiences could provide them with new opportunities to explore their own creative imaginations". Computer Education is being imparted in the schools without knowing the nature and the ways its learning takes place. The learning nature of the subject can decide the ways and means of teaching the subject. Though Computer Education is being taught using different approaches, it is essential to know the approaches that can be suited best for the subject. There is a need to provide suitable approach for the Computer Education teaching learning that needs the analysis and study of the system of Computer Education teaching learning process on the basis of which special training programmes for computer teacher could be designed. There is also a need to standardize different methods and approaches of computer teaching and learning that needs the experimentation of training programmes of varied nature. The testing of training programmes for Computer Education teachers can also help to develop special methods of teaching Computer Education that can be a part of pre-service teacher education programmes.

The Gujarat State government has introduced Computer Education as a subject from 1998 at secondary stage. To provide Computer Education a status of a special discipline, there is drastic need to formulate appropriate teaching learning processes in terms of approaches, models and theories those can be used properly in an appropriate way. There is also a need to prepare proper teachers to teach Computer Education at different levels of learning. Bradford (1999) mentioned the lack of computer, computer laboratories, lack of training and knowledge of how to use software are the

major barriers to integrate computer technology into the teaching and learning process. Biswal and Das (2000), Chandrakar (2002), and Gohil (2005) suggested for the training need of computer teachers as they were found untrained. Research on Computer Education: Past, Present and Future by Jeffery (2000) highlighted the necessity of teacher training to use high quality instructional programme and technology to its full potential. There is much needed research work in this area as Computer Education has been implemented in schools across different states. A proper structurized and rationalized courseware and teaching learning process and teachers' training programme can accelerate the pace of Computer Education learning at school level. It can help to strengthen the subject as a special discipline. There is a need to prepare disciplinarian approach to the subject. As computer and its related education occupied the status of a professional course in general stream and technical stream at higher education stage, there is an increasing demand of introducing Computer Education at secondary and higher secondary stages. As a transit period between school education and higher education, the need of Computer Education at this stage is felt important. Though secondary stage is considered as the starting stage for Computer Education by many schools, the proper teaching learning should be started at this stage which needs a proper training programme for computer teachers teaching at secondary stage.

Most of the teachers those are teaching Computer Education in the schools are untrained teachers and hence need to know the pedagogical aspects of general teaching learning including psychology of learning, methods, models approaches of teaching, lesson planning, technique of class room management etc. They need comprehensive in-service training may be of short duration which can help them to teach Computer Education effectively to the students. It is an attempt in this direction in the present study to study the process of Computer Education courseware and the teaching-learning process and to design, develop and implement a suitable training programme for teachers to strengthen the subject learning at secondary level. Though few universities and teacher training institutions are lunching programmes to prepare Computer Education teachers in pre-service mode, very less effective programmes are available for in-service counter parts. Even the teachers those are working as the Computer Education teachers are quite experienced and only programmes of short duration on pedagogy of Computer teaching can help them a lot in molding their

teaching style. Hence the programme prepared by the researcher is of short duration including the important needed teaching pedagogy related to Computer Education teaching. Though Computer Education in schools started as a formal course from the standard VIII, the researchers had taken the teaching learning of standard VIII the present study which would help the teachers get initial knowledge about the teaching learning pedagogy and that may help to transfer learning for higher classes and better implementation of the learned training. Any training programme may help teachers to shape their behaviour in terms of their teaching in the form of approach, method, skills etc. used, but it should have some effect on the learning of the students. Change in the teacher's teaching behaviour without any betterment in the learning behaviour of the students is meaning less and has no use. To know the betterment in the learning behaviour of the students in Computer Education due to the training of students provided by the researcher, the change in achievement of the students in Computer Education was considered in the present study. Hence the present study, details of which are presented in the form of the statement, objectives and methodology.

1.9 STATEMENT OF THE PROBLEM

Designing, Developing and Implementation of a Teacher Training Programme to Teach Computer Education at Secondary School Level.

1.10 OBJECTIVES OF THE STUDY

The present study was designed with the following objectives.

1. To study the Computer Education teaching-learning process at secondary school level.
2. To design a teacher training programme to teach Computer Education at secondary school level.
3. To develop a teacher training programme to teach Computer Education at secondary school level.
4. To implement the developed Computer Education training programme.

5. To study the effectiveness of the developed teacher training programme in terms of teachers' reaction.
6. To study the effectiveness of the developed teacher training programme in terms of teachers' teaching behaviour.
7. To study the effectiveness of the developed teacher training programme in terms of students' achievement in Computer Education.

1.11 HYPOTHESIS

The following null hypotheses are formulated for the present study.

1. There will be no significant difference between the mean Computer Education overall achievement scores of students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

2. There will be no significant difference between the mean Computer Education theory achievement scores of students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

3. There will be no significant difference between the mean Computer Education practical achievement scores of students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

4. There will be no significant difference between the mean Computer Education overall achievement scores of English medium students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

5. There will be no significant difference between the mean Computer Education theory achievement scores of English medium students' taught by the teachers

with and without training programme while taking the pre-test score of the students as co-variate

6. There will be no significant difference between the mean Computer Education practical achievement scores of English medium students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

7. There will be no significant difference between the mean Computer Education overall achievement scores of Gujarati medium students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

8. There will be no significant difference between the mean Computer Education theory achievement scores of Gujarati medium students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

9. There will be no significant difference between the mean Computer Education practical achievement scores of Gujarati medium students' taught by the teachers with and without training programme while taking the pre-test score of the students as co-variate.

1.12 OPERATIONAL DEFINITION OF THE TERMS

Computer Education: It refers to the education related to computer provided by secondary schools including the components like, fundamental of computers, computer software (operating systems, packages and languages) (both application & programming) and hardware. It includes both theory and practical.

Computer Education at Secondary School Level: It refers to the Computer Education that Gujarat State Education Board has recognized as a subject for 8th, 9th

and 10th standard in 1998-99 and prescribed a course outline for the same as per the GSEB (1998) circular 1197/C.M/6T6.

Computer Education Teaching Learning Process: It refers to the transaction of teaching Computer Education at secondary schools by the Computer Education teachers and the process of learning Computer Education by secondary school students.

Achievements in Computer Education: It refers to the score secured by the students in theory and practical Computer Education achievement tests prepared by the researcher. The sum of both the test scores will be the overall achievement in Computer Education.

Teacher Training Programme: It is a short duration training programme for in-service Computer Education teachers that will be designed and developed by the researcher.

Reaction of Teachers: It is the reaction of teachers in a five point scale towards the developed training programme and its implementation prepared by the researcher.

Teachers Behaviour: It refers to teachers' teaching behaviour in terms of the use methods, approaches, use of lesson planning, use of teaching skills etc, during the transaction of Computer Education teaching learning

1.13 LIMITATION AND DELIMITATION OF THE STUDY

Following limitations and delimitations were considered while carrying out the present study.

1. The study is delimited to Computer Education teaching-learning process at standard VIII of English and Gujarati medium schools.

2. The study is limited to the Computer Education syllabus prescribed by the Gujarat State Board of School Textbooks for standard VIII.

1.14 ORGANISATION OF CHAPTERS

The present study is reported in eight chapters. The detailed organization of the chapters is given as follow.

Chapter I: This chapter deals about the introduction of the present study, policy initiatives on Computer Education, rationale, statement of the problem, objectives, hypothesis, operational definition of the terms, limitation and delimitation of the study and the scheme of the chapterization.

Chapter II: This chapter provides the overview of the review of related research work done in the area of Computer Education.

Chapter III: This chapter deals with the methodological procedures used in this present study This chapter includes the major points like, population, sample, tools for data collection, procedure of data collection and data analysis techniques used in the present study.

Chapter IV: This chapter deals with the development and implementation of the developed training programme. This chapter includes analysis of textbook, conclusion of pre-training theory and practical class observation, development of the training programme, session wise implementation of the training programme, and reaction of the teachers towards the training programme.

Chapter V: This chapter deals with the analysis and interpretation of pre-training and post-training observation data of both theory and practical classes respectively.

Chapter – VI: This chapter deals with the analysis and interpretation of data related to the achievement of students, testing of hypothesis in overall, theory and practical of Computer Education.

Chapter – VII: This chapter deals with the major findings of the study and discussion.

Chapter – VIII: This chapter deals with the summary and conclusion including introduction, rationale, objectives, methodology, major findings, implication of this study, suggestions for further research and conclusion. This chapter is followed by bibliography and appendices.