CHAPTER - I

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Computer is one of the most useful gifts of science and technology. Today it is the most pervasive item in all spheres of life, starting from highly professional activities to that of day to day business transactions and in private homes. It has revolutionized the educational system not only by aiding multiplication of knowledge and information at very high speed but also by transmitting it at a much faster rate. Computer, along with the internet network, has made education a global phenomenon, facilitating its access to all nooks and corners of the world.

The growth of computers after World War II was very rapid and this development took place in five distinct phases known as computer generation –

- **First Generation**: The Thermonic Valves – 1950,
- **Second Generation**: Transistors – 1960,
- **Third Generation**: Integrated Circuits – 1965,
- **Fourth Generation**: Micro-processor Chips – 1975 and
- **Fifth Generation**: Large Scale Inference System – 1980.

The fourth generation of computers is hailed as the generation of micro-computers which make use of micro-processor chips. Since they have proved to be handy, cheap and readily available, micro-computers play an important role as tools in the process of computer education.
1.1 Computer education in the western countries

In western countries computer as a part of school education came to be recognised as early as 1967. The lead was taken by United Kingdom which was then rapidly followed by the developing countries. The importance of computer application in various levels of the secondary curriculum was acknowledged, but the availability of facilities to school was seen as the major limiting factor. At that time there was virtually no hands on experience available in schools, and the cost of mini computers for school use were such that shared use was often demanded. The arrival of the personal micro-computer in the 1980's and the sudden public realisation of the economic implication of the new technology led to a number of national initiatives. The designation of 1982 as Information Technology year followed a period in which secondary schools were offered opportunities to become involved in various pilot experiments to compete for hardware prizes and to develop teaching materials. The BBC computer literature project drew on market research to define its target audience and its efforts met with an enormous response.

The explosion of interest in the use of computer in school thus followed from a variety of pressures. The cost barriers were disappearing, making hands on experience at reasonable cost a possibility. The educational arguments for a sensible approach to the inclusion of computer in a range of subjects and learning situations were becoming widely accepted. The use of some costly system of
programmed learning gave way to comparatively cheaper microcomputer programmed learning modules. There was a growing view in society that the personal impact of computers would be so extensive that pupils had to be better prepared. The thrust of their arguments was mostly in view of the probable impact of information technology, rather than computing.

Thus, at present, due to increased awareness, computer study courses are rapidly becoming established as part of the curriculum in most secondary schools around the globe, even in the developing countries. It is an examination subject for the fourteen (14) and sixteen plus (16) level in many countries of the world. In the British Curriculum, computer studies has been taught as an examination subject at the sixteen plus (16) level for the last 20 years (Khan, H. Emdad, et. al., 1990).

1.2 Computer education in India

In India, till recently computers were used only for storage and processing of data. In 1955, the first computer HEC – 2M which was imported from UK was installed at the Indian Statistical Institute, Calcutta. In course of time, the first indigenously designed computer system was installed at Jadavpur University, Calcutta in 1964. During the 1982 Asian Games and 1983 Non-Alignment Meet held in New Delhi, Computers were successfully employed. Since then computers have been installed at many places in the country (Mishra, C. H. K., 1986).
In the schools of India computer education was introduced when the Government of India took a bold decision to take computers into the school class-room by launching in 1984 a pilot project appropriately named “CLASS” (Computer Literacy And Studies in Schools). This was a first step in promoting the use of micro-computers in the Indian Secondary Schools. Since then the micro-computer revolution has been rapidly gaining impetus through the “CLASS” project. No longer a novelty, micro-computer is becoming a familiar class-room tool in Indian schools.

In the first phase of the project 248 schools were selected all over the country for introducing computer literacy and studies in the year 1984-85. In the year 1985-86 another 501 schools were selected to extend computer literacy programme. In 1987-88 the programme was extended to about 2,000 secondary and higher secondary schools. Further, the programme of Action of the National Policy on Education, 1986 fixed the target of the extension of computer literacy programmes to cover all the higher secondary schools by 1991, secondary schools by 1995, and eventually the elementary schools in the long run. In the meantime 60 resource centres were established in selected technological institutions and universities to train school teachers and to provide logistic support to schools. During the period 1984-87 a total of 3,180 school teachers were trained at the resource centre. As many as 66 educational administrators, teachers, trainers and resource centre personnel were also sent to the UK to get acquainted with their project “Micro
electronics in school” and undergo training in software development and teaching methodology in computer literacy.

Thus the real boost in computer education in the schools of India came with the introduction of the pilot project called Computer Literacy And Studies in School (CLASS).

At present the Indian government has taken many steps in this direction. It has constituted a high level task force for maximising the innovative yield of this revolution. The key initiatives proposed by the task force include launching of three schemes namely – (a) Vidyarthi Computer Scheme, (b) Shikshak Computer Scheme and (c) School Computer Schemes. This is to enhance computer access in every school. Moreover, the Boards of Secondary Education throughout the country have been designated as nodal agencies for implementation of computer literacy and computer education. Many state governments, realising the importance of computer education, are trying to gain supremacy in this area, for example – Tamil Nadu government has decided that within 10 years the whole state should be qualified in computer literacy. It means that all schools, colleges, universities should be provided with computer education. To achieve this aim 43,000 teachers were trained in computer education. In Rajasthan also, the introduction of computer literacy in 6,000 schools has been contemplated with a span of five years (Dr. Vyas, P. C., 2000).
Thus it is seen that in future computer will be a powerful new teaching tool for the teacher to make a departure from the monotonous world of black boards and chalk. The teacher will be able to hold the students interest, and the students will also benefit largely. They will be able to explore information at their own pace, through audio and video means as well as from text animation. A simple example is that of dissection of a frog or rat, most commonly carried out in the early stages of learning biological science. Instead of dissecting a semi-conscious animal, the students now have the facility on a computer with voice-over detailing every aspect.

Computer technology revolution will ultimately result in the setting up of Cyber Schools dominated largely by networks of computer and the internet. Here, the learning environment will be supportive rather than competitive and the teacher will be a navigator. It is heartening to note that government of India have resolved to open Cyber Schools under “Operation Knowledge” of the computer technology task force (Arya, B. L., 2000).

The computer literacy and education programme of the state government is likely to bring about a revolution in the field of school education. The students taking computer education as a subject of study at school level today will form the core competency group of tomorrow and lead India to the pinnacle of the computer technology world. The students of the future will help India make rapid advances in the competing world and will lay the foundation of a knowledge based society.
1.3 Computer education in Assam

As part of the all India CLASS project (Computer Literacy and Studies in School) Assam also introduced the same in a few higher secondary schools in 1984. Altogether 90 schools came under this project during 1984 to 1990.

However, this initial project could not accomplish the desired goal not only in Assam, but all over the country. As such it had to be abandoned. The reasons attributed to its ineffective implementation were insufficient funds, inadequate training, low motivation of the teachers, extra curricular status outside school hours, its adhoc nature, neglect of instructional inputs as most of the secondary schools did not have sufficient physical facilities. On the other hand, the drop-out rate was very high. It was only from 15th January 1995 the project commenced with a reviewed strategy in 93 schools in the state. This scheme too could not make much headway due to a number of constraints.

Meanwhile, another scheme of computer education at plus two stage was sponsored by the government of India as part of the vocational stream with effect from 1987- 88 session in Assam.

This scheme envisaged 2 years of learning (class XI and XII) including practical to make students competent in the vocation, so that students become competent to take up any job, but because of the lack of infrastructure and proper trained teachers, this programme failed to get proper response. Also, students do not feel
attracted to this programme as facilities of competency based training are made available by the private institution for such training is much shorter than the time prescribed at the plus two state).

However, at the secondary level computer education received immense response from the privately run secondary schools, where the programme started around 1987, whereas the government secondary schools did not take any initiative in this regard. In Assam the private schools imparting computer education take the help of the implementing agency for imparting computer literacy programme. They are all private sector companies. In some schools the private sector company supply hardware, consumables, text books and deploy also computer instructors. These instructors are qualified persons who take up the training programme with full responsibilities. These private companies implement computer literacy programme as turn-key projects and they supply everything to the school against agreement. Minimum period of the contract is three years. After the expiry of the contract, the computers and all other materials used for computer teaching automatically become the property of the school. In some schools they employ the teachers and the management of the school to procure hardware from the selected vendors.

In the meantime the North Eastern Council (NEC) has observed that the students of the North East are not adequately exposed to the basics of computer in the school level. It was expected that such an exposure at the school level would prevent the students from getting
a sudden shock at a later stage in life where computer shall be used everywhere. Based on their observations, the North Eastern Council had launched a project on computer education in schools with the following basic objectives (Project report on computer education in the school of North Eastern region, 1996).

1. To provide basic computer infrastructure in some selected schools in the seven states to be selected by the state government.

2. To introduce a standard curriculum in the schools in consultation with the State School Boards.

3. To train at least two teachers in a school in computer inclusively for the purpose.

4. To acquire licensed software necessary at the school level and make arrangement for the maintenance of the system.

The project of the North Eastern Council towards introducing computer education in the schools of Assam is launched in a phased manner. At the first phase of the project, the North Eastern Council has identified the following five schools for providing facilities for starting computer education in Assam.

(1) Dispur Vidyalaya, Dispur, Guwahati
(2) Government Boy’s Higher Secondary School, Jorhat
(3) Don Bosco High School, Guwahati
(4) Barpeta Government H. S. School, Barpeta
(5) Blue Bird English Medium School, Guwahati
Each of the selected schools has been provided with computer by the North Eastern Council besides training a teacher for teaching the subject. Experts of the North Eastern Council have also prepared a syllabus which was forwarded to the Board of Secondary Education, Assam (SEBA) for consideration. The Board of Secondary Education had sought the help of Indian Institute of Technology (IIT), Guwahati to get the syllabus examined and reviewed. Thus, a fresh thrust has been given to computer education at the school level at the behest of the Board of Secondary Education, with North Eastern Council guided curriculum, syllabus and infrastructure.

1.4 Computer and the Board of Secondary Education, Assam

The matter of introducing computer education as a curricular subject was discussed at great length in several meetings of the Board and it was finally decided to introduce the subject from the academic session of 1996 as an activity under work experience for class VI, VII and VIII and as an elective subject in class IX and X. Meanwhile the Board formulated a set of norms for according permission to the school desirous of starting computer education in schools. The following norms were set for according permission to schools to offer computer education. It was mandatory for the schools applying for permission to introduce computer in their curriculum to fulfil certain norms in terms of the kind of machines required, rooms and other infrastructural facilities, teachers qualification etc.
1.4.1 Type of machine

486 PC AT
4/8 MB RAM
1.44 MB 3 ½” FDD – 1 No.
540/630 MBI HDD – 1 No.
With monochrome monitor with standard IBM Key Board.
Printer – 9 pin Dot Matrix Printer, preferably EPSON.

1.4.2 Process for maintenance

The school should have provision for Annual Maintenance Contact (AMC) on yearly basis after the warranty period is over.

1.4.3 Number of machines

(a) Computer: For hands on experience on the computer, not more than 3 students should be allowed to work on a machine at a time. Depending upon the number of students in a class opting for computer education, the school should procure the number of computers on the above basis, subject to a minimum of 5 computers. A school should not be accorded permission for imparting computer education if it has fewer than 5 computers.

(b) Printer: The school must acquire at least one dot matrix printer.
1.4.4 Room and other infrastructure

(a) A room of 20 feet X 15 feet should be adequate as a computer room. The room should have electric connection with proper earthing. It is advisable to have a separate earthing for the electrical connection of the computers. If possible the light and fan connection of the room should be in a different phase. 5 CVT (Constant Voltage Transformer) of 8.5 KVA rating one each for the 5 computer should be provided.

(b) The room should not be directly exposed to excessive sunlight. It should be free from dampness and dust as far as possible.

(c) Shoes should not be allowed into the computer room and as such a shoe rack should be provided at the entrance of the computer room.

(d) A steel almirah and a book shelf should be provided.

(e) The computer room should not be used as a lecture room. For lecture classes a separate room should be used, as dust particles from chalk etc. might damage the computers.
1.4.5 Teacher’s qualifications

(a) Direct recruitment: Teachers directly recruited should be graduates with at least 1 year diploma in computer application (DCA) from a recognized institution like, Gauhati University or Institute of Advance Studies etc. Care should be taken not to recruit people trained in private institutions of doubtful reputation.

(b) In service training: Young, intelligent, enthusiastic graduate existing teachers may also be trained by a reputable institution like Institute of Advance Studies, in computer for a period of not less than six months.

(c) Software package: The school should also acquire the following software packages like –

(i) Word processor like - Word Star
(ii) Database system like - dBase - IV or more recent versions.
(iii) Spread sheets like - Lotus 1-2-3 etc.
(iv) Education CBL (Computer based learning) packages.

1.4.6 Teaching time

As per work experience for class VI - VIII and the elective subjects in classes IX and X.
Besides the above mentioned set of norms, the Board has also recommended text books on computer education. The Board while framing the syllabus for computer education for class VI and X has laid stress on teacher training so that individual teachers could develop their own style of presentation within the guidelines given in the syllabus.

In a bid to make the students familiar with the world of computers, the syllabus had also stressed the need in the initial stage for handling of the computers than on lectures e.g. by games, simple drawings, simple use as word processor for writing brief messages, simple examples with which a class VI student is familiar may be considered. It also laid stress on teachers’ use of his/her own creativity.

Practical classes under “Topic 1 (b) Computer games”, and under “Topic 6 Introduction to Logo” should be taken up from the beginning parallely with the other lectures. The teacher need not follow the sequence of the topic in a rigid manner.

Games may continue in class VII under topic 9, with more practical classes, simple game programmes can be given and students themselves may key in the games and play. Tentatively twelve practical classes are indicated.
As the seriousness of theories increases, tutorial classes can play an important role. In class VIII, this is indicated by the topic 12 added tentatively. Similar tutorials can be added to class IX and X also.

The Board of Secondary Education has also recommended text books on computer education and developed three text books in Assamese for classes VI-VIII.

The book already brought out, Basikot Computer Programming by Dr. H. K. Das (A. B. Publication) is recommended as text book for class IX. The English version of this book Computer Programming in Basic is recommended in classes IX to X in English Medium Schools.

As a first step, the Board of Secondary Education Assam accorded permission to introduce computer education in the schools, where North Eastern Council had already provided the infrastructure, with effect from the academic session of 1996. Meanwhile about another 10 more schools in the state obtained permission from the Board to start computer science so that students could appear High School Leaving Certificate examination in 1999-2000. The 10 schools that received permission were as follows –

(1) St. Mary’s English High School, Guwahati
(2) St. Mary’s English High School, Maligaon
(3) South Point English High School, Guwahati
(4) Ankur Seminary English High School, Guwahati
(5) Town High School, Silchar
(6) Sowmar Vidyapeeth High School, Digboi
Thus, when a developing country like India, where the majority of the elementary schools are deprived of chalk and board facilities, decides to go for computer education in the schools, there are many aspects to be looked into. The greater availability of computers in schools and the introduction of computer literacy courses do not necessarily provide a guarantee that, ultimately students will be computer literate. For such a course to be truly functional, a number of other related conditions shall have to be fulfilled. Not only the proper infrastructure in term of adequate number of computers and space for item, acceptance by management teachers and students are also crucial factors. Therefore a holistic understanding of all such factors is needed for deriving the best out of the computer education.

To achieve the aims, research is needed on the social, psychological, organizational, and management factors, involved in introducing computers in the existing school system.

The present study discusses the various issues and factors involved in introducing computer education in the secondary schools of Assam, highlighting the students' and teachers' view points on the introduction of the new course and students' academic performance in computer science. A comparison between the English medium
and Assamese medium students, infrastructural facilities of the schools, teachers' attitude towards computer education have been analysed, and information on acquisition and funding for computer resources, qualification of teachers etc. have also been outlined in detail.

Initially, the objective of the present study was to evolve a comparison between the computer education imparted in government and private schools. However, it was found after actually visiting the government schools which were granted infrastructure facilities by the North Eastern Council (NEC), that very few students of these government schools were willing to take up the course on computer education. Even if the willingness of the students was there, the lack of maintenance, the inadequately trained teachers and other related drawbacks prevented the students from taking up the computer course. As such no student was found enrolled in computer course in these schools. Hence, the investigation in the present work has necessarily been restricted to carrying out a study on the private secondary schools following the syllabus laid down by the Board of Secondary Education, Assam (SEBA), provided they have obtained permission from SEBA to take up computer education as an elective subject for the High School Leaving Certificate (H.S.L.C.) Examination.
1.5 Need of the present study

It is a universal truth that it is basically through education that a nation can be shaped for future advancements. Since computer education has become an important component of the overall system of education and information today, it is imperative that an in-depth understanding of the nature of computer education being provided in our secondary schools should be acquired. So far, no such study has been conducted in Assam.

The introduction of computer education in the schools of Assam is still in its infancy. It has been observed by the North Eastern Council that the secondary students of Assam are not adequately exposed to the basis of computer education at the school level (Project Report of North Eastern Council on Computer Education, 1996). It should be emphasized that an exposure to computers at the school level will prevent the students from receiving a shock or being filled with awe, at a later stage in life, when the computer shall be used everywhere. Therefore, it was thought worthwhile to undertake a study in the area of computer education in secondary schools particularly in the state of Assam.

1.6 Fixation of the topic

The topic of the present study has been fixed as “Computer Education in the Secondary Schools of Assam”.
1.7 Delimitation of the study

The present study has been confined only to the schools following Board of Secondary Education, Assam (SEBA) syllabus having been granted permission by the same within the territorial limit of Assam.

From the survey it was found that in some schools the course was not yet taught upto class X. Only those schools that offered the course upto class X were considered, and they formed the population of schools for the study.

Since at present the Board of Secondary Education, Assam (SEBA) conducts the final examination in computer education for class X, only such schools were considered for collecting data.