CHAPTER 1: INTRODUCTION

1.1 GENERAL:

Computers made revolution in the early fifties of the twentieth century, owing to the advancement in science and technology. But, its impact was felt more in seventies in all parts of the world. It was due to the personal computers produced and sold at affordable prices. The second revolution began in eighties, when organizations shifted from personal computing to interconnected computing where multiple users were connected to various networks to do business and banking, to access databases, to shopping and other areas. And, in India, the computer hit the head only in early nineties in industries and was slowly introduced in the technical institutions. The computer was introduced as a course of study in all disciplines in polytechnics in 1991 in Kerala State. Owing to the high cost, the computers could not be provided in all the institutions for all the learners. However, the programming languages were taught without using the computers. The faster evolution of microprocessors and their utilization in personal computers became inexpensive, the institutions have started to procure them slowly through various funds for their need to a certain extent.

With the advancement of knowledge and technology, man started thinking and invented various gadgets for solving the problems in science and mathematics. In that development, he invented the computer, an electronic machine that reduced the burden of solving problems in mathematics. It performs all the work like human beings and many times faster and more accurate than the manual job as it was not having any diligence. Though computers were made initially for scientific purposes (i.e., for calculation and manipulation), they were utilized for word processing, creating databases and data base management systems and larger worksheets etc. For non-engineering operations, these areas have become much useful to the business people and has been introduced in commercial practices largely.

In engineering, the utilization of computers in the analysis and design of civil structures, mechanical components, electrical appliances was faster. And the computer aided design (CAD) and flexible manufacturing systems (FMS) made the greater impact in the real world for the society further. Thus, the computers, components of high technology have
entered in all fields of commerce, business, agriculture, engineering, medicine and others. The utilization of computers in communication made a new area called ‘Information Technology’ to process the information for storing, retrieval and processing in the required manner. Thus, the information superhighway spread its wings everywhere on the present society. The computer, once a sophisticated and costly ‘giant’, has become inexpensive and commonly used in all applications. Its performance is best and exceeded in all respects compared to all other advancements of science. Though the present-day computers are smaller in size, it is easy to operate, faster in processing the data and more reliable at all times.

1.2 SIGNIFICANCE / NEED OF THE PROBLEM

Being aware of the potential of computerization in raising the productivity, the Department of Electronics (DOE), an autonomous body under Government of India, has taken up certain projects of industries for modernization through computers as well as providing funds for educating the teachers and trainers to use the computer for all the instructional purposes.

The latest manufacturing and production processes have made the computer become inexpensive. In spite of such variety of information and its capability, the public is not very sure whether the educational authorities have made the education system impart this computer technology both in hardware and software, to the present generation of learners to utilize the computer for many applications.

Hence, an explorative study has been planned, through this research project, to identify the current status of the computer-based technician education programmes particularly in the State of Kerala. Since this technician education provides the manpower for manufacturing, assembling, testing, troubleshooting and maintenance of components and used for various production processes, it is essential to study the programmes at diploma and post-diploma level, their contribution to the utilization and industrial application.
1.3 PROBLEM STATEMENT :

The purposes of this study is to
- Study the status of computers based diploma and post-diploma programmes offered by technician education system in Kerala
- Analyze the training needs, develop programmes, planning the implementation of the programmes,
- Identify the necessary resources including communication facilities
- Evaluate the uses of computers in the administration of Institutes
- Identify the job opportunities career road map
- General problems and their remedies

These are further expanded as below:

- List the development of computer in hardware and software which have bearing in technician courses.
- Check the current status of use of computers in technician education.
- Assess the need of training and utilization of computers in teaching (both hardware and software) in the polytechnics.
- Outline the development made in the use of standard or tailor-made packages
- Analyze the infrastructure or resources available in each institute.
- Suggest the development in hardware and software, staff and the students
- Evaluate the use of computers in administration of technician education
- Evaluate the development of the computer assisted instructional packages in the polytechnics.
- Analyze the job/career description that are available for the technicians

To discuss and solve this problem, the application of computers in all systems and the educational aspects of computer are analyzed in the next section.
1.4 COMPUTER APPLICATION SPECTRUM IN TECHNICIAN EDUCATION SYSTEM

A: HARDWARE:

The advancement of technology has made the size of the computer small. In the early periods, even to perform a simple problem, its size was so big and occupying space of a big room because of the valve technology and other hardware. But, at present, it can be put on the palm and works fast and accurate in all respects owing to microprocessors and tiny memory chips. Initially, it started with main frame computer and magnetic tapes for storing, but now with the laptop machines having memory chips that accommodate millions of memory are very common.

B: SOFTWARE

As the computer has become miniaturized very much, in size, the hardware development was stopped to a certain extent, and went for the development of software programmes using this hardware. Thus, many larger programmes and packages were developed simultaneously along with the hardware development resulting into knowledge based systems that and behaves like human being. When compared to human, it is not having any diligence or any other problems but works/performes effectively at all times and at anybody's command or control. These hardware and software components find large applications in the society's requirements. Some of them are indicated and classified as shown:
In general, these applications provide the job avenues for the computer technicians.

1. Scientific system
2. Information system
3. Industrial System
4. Communication system
5. Knowledge-based system
6. Educational system

These are further classified as:

1. SCIENTIFIC SYSTEMS

<table>
<thead>
<tr>
<th>General</th>
<th>Specific</th>
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<tbody>
<tr>
<td>Engineering design</td>
<td>Aircraft Flight Dynamics of Missiles</td>
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<tr>
<td>Solving mathematical equations</td>
<td>Economic research</td>
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<tr>
<td>Weather predictions</td>
<td>Management games</td>
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<tr>
<td>Reactor design</td>
<td>Training Devices</td>
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<tr>
<td>Satellite orbital analysis &amp; predication</td>
<td>Simulation of earthquake dynamics</td>
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<tr>
<td>Crypto analysis</td>
<td>Transport simulations</td>
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<tr>
<td>Hydrological Analysis</td>
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</tbody>
</table>
II. INFORMATION SYSTEMS

Numerical

Accountancy, payroll
Inventory control
Billing & invoices
Sales analysis
Budget Control
Project monitoring
Management Information systems

Non-numerical

Language translation
Library & scientific data processing
Personal files
Database development & its use
Medical diagnosis

III. INDUSTRIAL SYSTEMS

Control

Industrial control of all types
Missile guidance system
Control of military operations
Traffic control
Manufacturing
Project management
CAD,CAM
Analysis and Design

Instrumentation

Monitoring of Lab.Equipment
Digital meters & gauges
Automatic setting system
Robotics

IV. COMMUNICATION SYSTEMS

Communication network systems
Message switching systems
Computer networks (LAN, WAN etc.)
Electronic Mailing ,Pagers, Cellular phones

V. KNOWLEDGE-BASED SYSTEMS

Interactive Type

Computer Aided System (CAD)
Computer Aided Instruction (CAI)
Computer Aided Manufacturing, (CAM)
Industrial Robotics
Word Processors and Office Automation
Pattern recognition & image processing

Intelligent Type

Problem Solving
Adaptive Type
Learning systems
Speech recognition systems
Expert systems
Artificial Intelligence
COMPUTER APPLICATION SPECTRUM IN TECHNICIAN EDUCATION SYSTEM:

Technician education system in India provides diploma and post-diploma programmes. In addition they conduct many courses which are needed for planning, design, commerce and business streams. The computer applications in technician education system is broadly classified in to six distinct systems.

Fig.1

1. Scientific System:

In scientific system the software are developed and used for scientific purposes. Engineering design applications pertain to architecture, civil, electrical, mechanical, electronics, textile, chemical, etc. are to be incorporated in the curriculum. In branches like civil engineering extensive packages have come in the design of structures (both RCC and Steel), estimation, project management, surveying, GIS, etc. Hence, to develop computer literate technicians, there is a need to update the curricula of various scientific based courses, but, the inclusion of the advancements are not up to the expectation.

2. Information System:

Most of the software packages are applicable for commerce and business diploma programmes. The diploma programmes in Library and Information Systems are to be very much oriented to adopt software in the information system. There is a tremendous development in medical transcription which can be included in the diploma in commerce programmes. For business management courses, M.I.S. is to be introduced.

3. Industrial System:

In industrial system, most of the softwares are developed for manufacturing products. The diploma programmes in mechanical engineering, industrial engineering, production engineering, electronics etc. are to be updated to include relevant software applications.
Communication System:

In communication system, there are tremendous developments are taking place. The diploma programmes in electronics and communication engineering, electrical and electronics, electronics and control system, and computer engineering are to be updated to include software applications.

Knowledge-based System:

Knowledge based system software are highly utilized computer aided instruction, multimedia, learning packages. Online trading system, and online auction etc. are utilised in commerce and business. Hence, such software are to be included in the appropriate courses in the diploma programmes in commerce, business management.

Educational System:

The software in this system will be utilised for instructional system of the technician students. They will be highly useful for teacher training and continuing education.
VI. EDUCATIONAL SYSTEM

TEACHING

LEARNING (CAI, ON-LINE, WEB-BASED)

TRAINING (CBT, MULTI-MEDIA)

TRAINING AND EVALUATION

ADMINISTRATION

RESEARCH
( ANALYSIS & SYNTHESIS
STATISTICAL ANALYSIS
NUMERICAL ANALYSIS
SIMULATION
MODELLING )

5 EDUCATIONAL SYSTEM:

Eventhough this computer has made a dent in all fields of life, as discussed above, the is not sure that whether it has made much progress in the field of technician education.

The advancement of New Technology (NT) forced everyone in the society to use the personal computer irrespective of the field of work or study. This resulted in the requirement of computer education at various levels in various institutions and the computer education has to meet the following aspects, especially towards curriculum.

The discussion on the educational aspects, mainly on the curriculum in this study will provide the measures to be adopted in the infrastructure of the techniques, resources, methods and media to be used for instruction.
1.5.1 INFORMATION TECHNOLOGY IN TECHNICIAN EDUCATION:

The utilization of computers in communication made a new era of INFORMATION TECHNOLOGY to process the information for storing, retrieving and processing in the required format. The micro-electronics technology had made the equipment smaller in size, easy to operate, faster in processing and more reliable at all times. The use of this equipment resulted in the education of Information Technology, both in hardware and software. This IT education system also has all the components like teaching-learning, training, evaluating, administering, analyzing and researching as in other systems. So the IT education has to take care of the needs of the above job specification. This brings to the core issue – the Curriculum. So, an analysis in the changes and challenges of technician education curriculum will provide more understanding of the problems and their prospective solutions in the context of the following aspects in education:

i. educational questions,
ii. educational issues,
iii. educational consequences and
iv. educational practices

1.5.2 Educational aspects:

To meet the educational aspects of computer and information technology, the following components have to be discussed when implemented at various levels.

**Educational questions** - related to curricular issues for diploma and post-diploma programmes, educational administration, student records, library resources.

**Educational issues** - related to the concept of information, educating society

**Educational consequences** - related to planning the various programmes for study at different levels, staff development, instructional material preparation, hardware, software and courseware, placements and job opportunities.

**Educational Practices** - use of word-processing and other software packages for Information processing

These are further discussed in detail:
1.5.3 EDUCATIONAL QUESTIONS:

As the NT has opened a wider variety of jobs than the conventional technician education, some of the educational questions arising are: 1. Curricula, 2. Learning or infrastructure, 3. Industry-Institute-Interaction (I-I-I) concept. The discussion below on these may solve the educational questions arising out of the new technology.

Computer technician has become more important in any modern industry. So, the technician has to be given proper industrial and technical education as per the changes in higher education for effective progress. The incorporation of scientific and professional curriculum in higher education began after the world war II and the civil war all over the world. Herschbach, (1973) and Barlow (1967) state that scientific-technical development challenged the traditional classical curriculum and industrial education was a part of the attempt to include the intellectual tools of industrialism in the curriculum of the institute.

Globalization has brought the world-class technology practices and quality products in the Indian market. To achieve higher quality and services, the industry relies on the technician. Hence, the development of knowledge about fundamental concepts for the polytechnic students is essential. The existing curriculum stresses mostly on classroom learning and is lacking practical experience and developing problem-solving ability. The students are not exposed either to theory or practice to latest technology. The globalization and competitiveness poses great challenges to the industry and the challenges are complex in nature and changing fast. So, the curriculum of various programmes have to integrate the specialized skills required by the industry such that the teaching-learning process remains relevant at all times and should always be student-centered for employability.

1.5.3.1 Curricula of diploma and post-diploma programmes:

The planning and implementation of the Curriculum has to be oriented towards the NT and the new perspectives or the new understandings have to be taken care of. As the curriculum is the sumtotal of the experiences available to students at institutions, the impact of computers has to be considered with reference to the issue of power, responsibility and accountability. As the advancement in this technology is fast, due consideration has to be given for future education. Hence the teachers must continue to see their role as that of shaping and directing both the pace and direction of the revolution. This provides an opening to innovation.
As the civilized existing society is a result of longer experience and guidance of the teachers, this cannot be changed overnight because of the NT. There should not be any delay in introducing the computer in education because the education is a process of training in technical skills and employment related functionalism.

1.5.3.2. Learning:

Since the learning emphasizes the importance of feelings and emotions, their relationship between cognition and feeling, due care has to be given for this learning as the new technology involves the role of sensory experience. The use of computers in learning through CAI / CBT / MMLP proves this aspect.

Holpp and Wellins (1989) found in their study that as manufacturing changes, basic skills and technical skills need to be identified and altered to adopt to the modern manufacturing environment.

As to identify the curriculum content will be difficult, the curriculum development will be more appropriate and significant, if researchers broadly generalize the job skills into curriculum content. Barlow (1967) states that functional criteria and curriculum patterns emerged with increased clarity when attention was drawn to consideration of technical education as a body of knowledge rather than as a particular job.

Because of the extensive growth and change in industry, curriculum development for technician education needs should include input from practicing technicians and management personnel. Further, the translation of skills and abilities into curriculum is a process that requires a close functional relationship between industry and education.

1.5.3.3 Educational administration:

The computer removes the tasks that are carried out by hand earlier and performs routine administrative tasks such as time-scheduling of the classes, admission etc. efficiently and effectively and avoiding the time-consuming and complicated work. The following advantages are available due to this computer:

i. Simplification and speedy data processing in polytechnic administration.

ii. Use of statistical and logistic information as an aid to curriculum planning, analysis or curriculum management.
iii. 'Classroom management' involving the structuring and organization of resources, learning experiences and time within the classroom.

Examples are Library details: details of books, journals, films, CD-ROMs etc. in the library and their issues/receipts, reservation, procurement, search of any particular issue etc.

Student details, records and reports: Regarding the students bio-data, performances in their tests, assignments, examinations etc, preparation of question papers, curriculum details, revision etc.

1.5.4 EDUCATIONAL ISSUES:

Modern world generates very large information and the new technology allows this to be stored and retrieved in easy manner compared to earlier times. As a greater part of the task of education involves information, the New Technology provides the way for mental process, presentation abilities, processing the data, interpreting the analysis and evaluating them for better purpose.

The impact of New Technology on society as a whole and the implications for the present life are matter of consequence for education. No one can ignore this NT. Though there is an apprehension of under-employment or unemployment, the quality of life arising out of this NT is the best and results in more job avenues. The 'cash-less society' and 'paperless office' concepts result in tele-shopping, electronic commerce and banking, e-mail, CHAT etc. Thus, the pressure comes from all sides to accept this NT. This is an important purpose of education which prepares all the people to understand and accept or challenge them.

The society faces issues such as unemployment problem, commerce, marketing and trading, use of expert system, health monitoring, database on people, computer crimes and educational implications. Each has to be dealt in its own way with the previous knowledge acquired and to provide a better future for everyone. Even though the NT may result in certain problems, the society cannot ignore it because of its positive features that provides the way to get the rich information at the shortest time possible to the modern society.

As the society is to be educated, the changes of the technology must be taken to the society through exhibitions, seminars, quiz programmes, workshops and educational TV programmes.
Through these systems, it is possible to exploit the worldwide databanks. For educational purposes, the networks such as ERNET, INTERNET etc., can be utilized. This breaks the barrier between the regular schooling system and the outside world wither in employment or in academic activity.

1.5.5 EDUCATIONAL CONSEQUENCES:

The purpose of polytechnic education is to pass on information through necessary skills and consequently transmitting information into knowledge, understanding, scholarship, wisdom and innovative thoughts. As the forms of storage of information have changed dramatically, it is to be determined that how much effect developments will have within the formal educational system. The analysis of the following components might focus some of the aspects and consequences arising out of this NT.

i. Computer curriculum model
ii. Staff development
iii. Infrastructure facilities
iv. Industry-institute-interaction cells
v. Instructional materials with methods and media
vi. Placement and opportunities in NT

The Educational Literature (Marland, 1981) mentions full of relevant phrases like study skills, library skills, resource-based learning, media skills, the use of reference books, project skills and so on. But the recent advances made the concept seem central. The range, size, quality, speed of information have changed now and the cost and consequent availability which are crucial in determining how much effect these developments will have within the formal educational system.

The first response to all this has to place more emphasis on 'Information skills' that include collecting, accessing, evaluating, storing, retrieving, manipulating, communicating, using, presenting etc. The educational importance lies in the information skills as the

- ability to find a way through the maze of information sources
- ability to make sensible decisions (about what to access and how to do so) efficiently, economically and speedily
- ability to bring together information from the various sources (ISDN)
1.5.5.1 Computer Curriculum Model / Process:

A uniform complaint from industry and end-users seems to be that the content and training methods of many of the courses are out-dated or even not relevant to present day needs. The change of curriculum can be done only after five years makes further problem as the IT changes many fold and the pass-outs are again out-dated.

By analyzing the existing curriculum and on the basis of deficiencies, a new curriculum process is suggested to improve the technician skills and employability directly. Polytechnics should provide knowledge to students about IT with focus on accessing, managing and processing information, problem solving and learning to learn skills. Linkage with other polytechnics and industries is also necessary to give the students a feel of the world of work. For IT curriculum, the focus should be to sharpen their skills in IT tools. As the IT is introduced at school level now, polytechnics curriculum should be updated as per the technological advancement.

As IT creates an impact on the methods of working, the curricula should have multi-skilled, multi-disciplinary technical workforce with the knowledge of computer application such as tele-working, tele-shopping and paperless money system using electronic data interchange, e-commerce, enterprise resource planning (ERP) and Internet. The curriculum should help in life-long learning and in facing the future challenges.

In imparting some of the information skills, the education should not be replaced by training alone which is more orientated towards task achievement. Tom Stonier (1983) makes the distinction as follows:

"Training provides skills, whereas education provides meta-skills. Meta-skills are a sort of super-skills that allow one to acquire other skills more easily. Meta-skills allow one to obtain needed information and assimilate it readily even though the information is outside one's own experience. The more educated one becomes the more versatile one."

1.5.5.2 Staff development:

The changes in the curriculum need the teachers to be updated through refresher courses. Even though the staff are mostly graduates in Computer Science / Engineering, they would not have studied the new languages or software packages of recent origin. Teacher training must be made mandatory to refresh their knowledge, otherwise they will be obsolete in knowledge and skill. With the information super highway, the new methods of teaching
and training should be adopted by the staff because of the characteristics of the computer such as speed, accuracy, diligence etc.

The training to faculty should be

1. to use the potentials of IT in students learning
2. to work in a collaborative and co-operative environment.
3. to give insights to provide a practical orientation to the use of IT to students

The instructional materials in the form of CAI/CBT/ MMLP notes and books have to be prepared for the teachers and learners as the hardware technology changes often. Because of the globalization in industries, the training programmes on ISO 9000 and TQM (Total Quality Management ) have to be planned for the employees / workers in industries. Also they can be trained for their updating knowledge in the technology in academic institutions during their leisure hours.

The personnel in hospitals, newspapers, stock exchanges etc. should also be trained in the new technology and the training must be made mandatory for everyone.

1.5.5.3 Infrastructure facilities :

Facility for information technology must be provided while implementing the new curriculum, otherwise the commercial set-up of human force may take over and exploit the situation over the genuine requirement. In case of paucity of funds, the institute can generate funds through continuing education programmes, parent-teacher association funds, industry sponsorship and other means. Also, shift system can be introduced for wider utility of the existing facilities. Sharing of computers and other facilities from nearby industries, firms or other social organizations at a nominal cost is also another alternative.

1.5.5.4 Industry-Institute Interaction :

Each state should establish Industry-Institute Interaction Cells (I-I-I cells) exclusively for IT to monitor the changes in the workforce, due to NT and to support the modifications in the educational goals, to keep abreast of changes in technology.

Regarding the I-I-I cells, they are not formed in the polytechnics in spite of the world bank assistance scheme. This is again due to shortage of funds in the polytechnics. So, the industrial visits, guest lectures from the staff are limited and are implemented only in limited polytechnics.
These I-I-I cells can arrange

i. guest lectures on technological advancement, industrial practices and quality control.

ii. involvement of industry in curriculum, evaluation, projects and instructional aids

iii. to provide in-plant training for teachers and students

iv. to support in career and guidance activities for students.

v. to cooperate in seminars through professional bodies

vi. to support the modifications in the educational goals to keep abreast of changes in technology.

1.5.5.5 Instructional Materials with Media and Methods:

Studies on CAI reveal that students found computer classes interesting, freedom to handle computers and self initiative in learning. However, trained teachers were not available to organize the computer classes. Mostly, the teachers were not sure about the strategy of integrating the computer classes with subject teaching programmes.

Studies on multimedia have proved effectiveness with regard to achievement of instructional objectives. Mastery level of learning was witnessed with 75 to 80 percent basis. System-design-based learning packages were found to be more effective than casually prepared learning materials, judicious combination of methods and media were found to be effective in achieving designed results. Keeping in view of specific learning objectives, different alternative multimedia packages were found possessing different levels of effectiveness.

Most of the media studies have proved the effectiveness of print based media, mechanical media and electronic media superior to or equally effective traditional methods/media based instruction. They have indicated the utility of multimedia approaches from the point of view of self-instructional activities. Because of these positive effectiveness, the instruction can be extended or used to distance education programmes also instead of restricting to classroom situation. This will cater to the needs of a larger population of learners.
1.5.5.6 Placements and Opportunities:

From the newspapers and magazines advertisements calling for the various jobs, it can be understood that the computer education provides the following placements of various levels in production, companies, sales, installation, research, servicing etc. depending upon the qualification and experience which were not earlier available.

Regarding the manpower, there is a heavy demand in all areas such as installation, marketing, service and support the telecom works. It is estimated that there will be demand for 1 million engineers and technicians on the service area. Today, about 60 million computers are networked worldwide for communication, for information exchange over long distances, for sharing computer resources and for easy access to information by a host of users.

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<tr>
<th>DRIVER</th>
<th>SOFTWARE</th>
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<tbody>
<tr>
<td>Hardware</td>
<td>Software</td>
</tr>
<tr>
<td>a) Technician level:</td>
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<tr>
<td>TRAINEE TECHNICIAN</td>
<td>PROGRAM TRAINEE</td>
</tr>
<tr>
<td>DRAFTSMAN(CAD)</td>
<td>SECRETARIES</td>
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<tr>
<td>ASSEMBLERS</td>
<td>DATA ENTRY OPERATOR</td>
</tr>
<tr>
<td>PRODUCTION TECHNICIAN</td>
<td>WORD PROCESSOR / DTP OPERATORS</td>
</tr>
<tr>
<td>PRODUCTION SUPERVISOR</td>
<td>PROGRAMMERS AT VARIOUS LEVELS</td>
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<tr>
<td>SERVICING TECHNICIAN</td>
<td>RESEARCH ASSISTANTS</td>
</tr>
<tr>
<td>DRAFTSMAN (CAD/CAM)</td>
<td>RESEARCH ANALYZERS</td>
</tr>
<tr>
<td>LAYOUT OFFICERS (PLANNING)</td>
<td>WEB-BASED TECHNICIAN</td>
</tr>
<tr>
<td>INSTALLATION OF COMPUTERS &amp; EQUIPMENT</td>
<td>LIBRARIANS</td>
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<tr>
<td>CAD/CAM MAINTENANCE</td>
<td>CAD/CAM OPERATORS</td>
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<tr>
<td>NETWORK TECHNICIAN</td>
<td>JUNIOR PROGRAMMERS</td>
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<td></td>
<td>SALES AND MARKETING PERSONNEL</td>
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</table>
FMS OPERATOR
BANKING AND ACCOUNTING
PERSONNEL

(b) Engineer level:
FMS DESIGNER
CAD/CAM DESIGNERS
NETWORK ENGINEERS
INSTALLATION ENGINEERS

PROJECT LEADERS
TEAM LEADERS
SYSTEM ANALYST
SYSTEM ADMINISTRATOR
EDP MANAGER
PROJECT MANAGERS
MANAGING DIRECTORS

1.5.6 EDUCATIONAL PRACTICES:

The present paper-and-pencil use of collecting information, tabulating, classifying, processing etc. may be dispensed because of new technology. This new technology provides faster and accurate information processing with the help of software packages. They are easy to handle and create various types of reports for analysis, inferences, decision making and presentation. The new technology changed the practices favourably to everybody. The utility packages like word processor, database, spreadsheet which are content-free are introduced by this computer. These are some of the tools to learn and think in a better way in the educational processes and secretarial practice in a speedy and presentable way. This gives a professional touch for effective business line for career development.

For example, DTP (Desk Top Publishing) and the word processor give the freedom to write to one’s imagination by the clarity and neatness of the medium, possibility for quick and skillful editing and inter-group communication. As the word processor gives easy processing of drafting the reports/letters, it saves the wastage of stationery and a better presentation. Similar is the case with database and spreadsheet. It improves the students’ skill in ‘collecting’ and ‘organizing’ the data, interpreting the data, ‘decision making’ processing any amount of data in a shorter duration. These result in aiding the processes in education. And the development in communication area make it possible to groups of students, who are physically separated by states or countries, to communicate with each other either through e-mail, paging, networks or tele-conferencing through satellites.
1.5.6.1 Suggestion for Curriculum preparation:

Because of the latest trends in the Information Technology and the job avenues, the curriculum should be framed to incorporate the specialized / specific areas in communication and industries-based on the following:

- Curriculum should be revised / updated once in two years to incorporate the trends.
- Information technology should be a common subject for all the learners.
- Compartment of branches / departments (such as Mechanical, Electronics and Electrical) should be removed and integration of departments should be made such as Mechatronics.
- Theory and practice of IT should be 40 : 60 or 50 : 50 in the curriculum.
- Learners should be aware of the current trends in their branch of study.
- The teaching methods can be tried with the available computer-based or multi-media packages.
- Emphasizing the use of multi media learning packages (MMLP).
- Learners-controlled instructions must be available for the excellence in learning.
- Students should be made to realize the human superiority over automotive mechanism.
- Networking among institution should be provided.
- On-line instructions can be tried after the completion of the networking in the Kerala State.
- Exclusive channel (such as GYAN DARSHAN) timings for classroom communication and interaction in TV may be included for more effective learning.
- Ensuring excellence in information service through communication, network facilities.
- CD-ROMs on specific titles for all the subjects are to be developed by the teachers and all libraries should be equipped with them.
- All the teachers of Electronics, Computer and Information technology should undergo the refresher courses and they should be made mandatory.

- Teaching Staff must be updated/trained in information technology to meet the curriculum changes and challenges.

Thus one could see the computer in education resulting in various educational issues, questions related to curriculum practices to be adopted through various software packages and the consequences on education to attain various skills and related job opportunities under one simple concept arising out of the New Technology.

Hence the study of computer technician education programme in Kerala has the following objectives and hypotheses:

1.6 OBJECTIVES:

1. To critically review the various IT technician curricula of Kerala state.

2. To assess the needs of the computer industries.

3. To evaluate the input and the process adopted in IT technician programmes in Kerala state.

4. To generate a developing model for computer technician education programme.

5. To develop a dynamic model for curriculum implementation.

6. To develop an integrated model for the staff development programme in computer education in Kerala.

7. To integrate work and education in technician development programme.

To achieve these objectives, the following hypotheses are formulated to steer clear of the direction of this project.

1.7 Hypotheses:

1. The curriculum structure and courses offered based on the needs of the technicians who will be employed in the IT industries in Kerala.

2. There is a mechanism for assessing needs of the technician who will be employed in computer industry in Kerala state.
3. The instructional system adopted by the faculty based on the needs of the students.

4. The competencies developed in the technicians based on the detailed study of the job potential identified by the curriculum developers.

5. Specific instructional materials and instructional aids for the technicians.

6. The staff development needs met by the training agencies programmes offered by the state or the centre.

7. A specific mechanism for periodical review and revision of curriculum which incorporates the state needs.