Review of Literature

Chapter III
CHAPTER-III

REVIEW OF LITERATURE

3.1.0 INTRODUCTION

A review of related research is an essential aspect of a research study. It is very helpful for planning the study properly. Though such review is invariably time consuming, it is a wise investment. It is necessary to review the important literature related to the study in order to obtain pertinent information. A systematic review and analysis of the previous research work that has been completed and of writings of authorities in the area under study, provides a background for the development of the present study. It strengthens justification of the study, and gives direction to its progress. In the words of Walter, the literature in any field forms the foundation upon which all future works will be built. The author further observed that, if we fail by the review of literature, our work is likely to be shallow and vain, and will often duplicate work that has already been done better by someone else.

The review of the literature promotes a greater understanding. It also provides comparative data on the basis of which to evaluate and interpret the significance of one's findings. It also helps the investigator to acquire better knowledge of the methodology and procedures followed and create confidence in carrying out his/her research. Best (1977) has said, “man builds upon the accumulated and recorded knowledge of the past...a familiarity with the literature in any problems area helps the students to discover what is already known, what others have attempted to find out, what methods to attack have been promising and problems remain to be solved”.

It means those works or studies, which have been done, or the problems, which are directly related to the study proposed by the researcher. It is a pre requisite for every researcher to learn what others have done in the area of his/her interest for developing an insight into the problem under investigation. A careful review of related literature has done to bring a new dimension in his/her study.

Related literature, as an accumulation of post knowledge, allows the researcher to acquaint himself current knowledge in the proposed field or area of research, brings up-to-date knowledge on the work which others have done, enables the researcher to define the objectives of the study, helps to delimit the problem taken and facilitates to make it more clear and concise. A researcher can avoid unfruitful and unless problem areas and select those area in which positive findings are very likely to result so that his endeavours would be an addition to the knowledge and meaningful. It helps to avoid unintentional duplication of established findings. An understanding of the methods applied, statistical techniques and tools used in the previous studies and findings allows the researcher to adopt suitable techniques and methods to the current topic. Thus literature forms the foundation upon which all work can be built.

Review of related literature is an essential aspect of a research work. Related literature provides the basic ground to the researcher for his problem of research. It is of great help to the researcher and works as guide for him. Review or related literature serves as a pointer to the lacuna in the concerned piece of research work.

Indeed, a review or related literature provides the academic guidance to the researcher. According to C. V. Good (1959), “Survey of related literature helps us to know whether evidence already available to solve problem adequately without further investigation and thus may save duplication. It may contribute to general scholastic ability of investigator by providing ideas, theories and explanations, help in formulating the problem and may also suggest the appropriate method of research”.

Related literature what we understand is the similar or related studies made by previous research workers in the same filed. Related literature motivates the researchers for understanding the study in hand and lays a foundation for his entire investigation. It contributes a particular knowledge to the investigator and he notices the gaps in knowledge, thus, it helps his/her findings to identify areas where investigation of facts, concepts, theories and bibliographies etc. are needed.
It helps to avoid duplicacy and provides new knowledge to the research workers, where one can evaluate and interpret the significance of one's findings. Published literature is a fruitful source in which a researcher may stimulate the devised hypothesis of her/his own. The review of related literature is certainly helpful in acquainting the researcher with some current knowledge of the subject but in addition to it, the review of literature serves of the other purposes too. As the review of related literature enables the researcher to define and delimit of his field of research. Secondly, the investigator gets the up-to-date information about the area of his problem. This exercise makes the investigators alert and careful about the duplicacy of the work. Another important aspect is also covered by the review or related literature is that the researcher gets clear-cut understanding about the research methodology. He can find out the appropriate methodology of research relating to his problem and accordingly the researcher can select tools for the collection of data. In this way the review or related literature is an essential component for any of the investigator, which needs to be done seriously and honestly for launching of the research study. Researcher takes the advantages of the knowledge, which has accumulated in the past as a result of constant human endeavour. It can never be undertaken in isolation of the work that has already been done by taking in hand various problems of study, which are directly or indirectly related to a study proposed by a researcher. A careful review of the research journals, books, dissertations, thesis and other sources of information's on the problem to be investigated is one of the important steps in the planning of any research study. A review of the related literature must be done thoroughly for any well-planned research study. The review of the related literature gives the researcher an understanding of the research methodology, which refers to the way of conducting the study. It helps the researcher to know about the tools and instruments, which proved to be useful and promising in the completion of present study. The related literature is immensely effective in providing the insight in to statistical methods for computing the results of the study in hand. The review of literature indicates the list of various recommendations for having some studies in hand. In addition to it, the literature shows a large number of studies conducted in India and abroad for supporting the present study.

Here, in this chapter, an attempt has been made to present a review of the relevant and representative studies and the observations on the different fields of TE conducted for the last few decades. While reviewing the studies, focus has been given to the TE in NER. Care has also been taken to maintain as far possible the chronological order of the studies.

Hundreds of studies in TE completed in universities and research institutes since the beginning of educational research in Indian universities. But, hardly a few research studies have been conducted on TE in India in general, and NER in particular. The present study is the first of its kind in this NER. The investigator feels that there is the dearth of related literature, especially with regard to this part of NER and reports with reference to the problem of the present study. But in spite of such a condition, an effort has been made to avail at least some research reports relating to the present study.

Review of related literature is an important aspect of any research work. The present study has been undertaken to study the status of TE in NER with Special Reference to Information Services. Therefore, in this chapter, an attempt has been made to review some of the existing literature related to this area of study. This is important because it helps the researchers to acquaint himself/ herself with the available knowledge in this particular area of study and to find out what is already known, what others have attempted to find out, what methods of attack have been promising or disappointing and what problems remain to be solved. It shows whether the evidence already available solves the problem adequately further investigation. After going through a number of related literature from different research journals, books, theses and other study materials, the researchers found that, although a number of studies were conducted on TE in general, only a few were taken up to find out the status of TE in NER.

Taking into consideration the stated objectives in mind, a careful review of some related literature was done by the investigator which consists of review of research journals, books, dissertations, thesis, periodicals, and volumes of survey reports edited by M B Buch (1974, 1979, 1987 and 1992), India Yearbooks of Education, and Encyclopedia of Educational Research. There is no dearth of related literature attempting to define and describe TE. A number of journals, books, dissertations, theses, yearbook of educational research, encyclopedia of educational research,
websites and other sources of information are used for collecting information regarding a study related to present topic. The different aspect of TE were obtained from the researchers already done by scholars both in India and abroad. The materials collected are categorized as under.

1. Studies Conducted in India
2. Studies Conducted on TE in Abroad
3. Studies Conducted on TE in NE Region
4. Studies Conducted on Library & Information Services in the Technical Institutes in India & specially NE Region

3.1.1 STUDIES CONDUCTED IN ABROAD

Mishra, Arun K (1994) in his research report entitled “The Development of Technical and Vocational Education in India—A Case Study in Quality Improvement. Case Studies on Technical and Vocational Education in Asia and the Pacific” pointed out that education has a place of high priority on India’s development agenda. The technical/vocational education (TVE) system is multi-sectoral with each ministry responsible for labour force development in that sector. The TVE programs in the formal education system are either state delivered or financed. The higher secondary vocational education program is the emerging mode for skill training for formal and unorganized sectors and aims to the educational requirements for self-employment. Technician education is primarily the responsibility of the polytechnic; the Ministry of Labour looks after craft worker and apprenticeship training. Educational policy formulation is a complex exercise, carried out at many levels by all concerned agencies. India has passed less educational legislation than many other countries. Steps being taken to improve TVE include a major World Bank-financed scheme that addresses the present weakness. TVE problems are identified by public officials, voluntary organizations, mass media, and education. Future directions of improvement are as follows: introduction of first degree-level vocational courses; internet resource generation through the vocational program outreach studies in schools; creating and expanding the open learning system for greater flexibility in delivery and for wider outreach, and effective linkage with industry and the world of work; and entrepreneurial orientation to TVE; and articulation between TVE and general education.

Ho, Moon-Tim (1999) conducted a survey on the development of “Prevocational and Secondary Technical Education of Hong Kong for the year 1997”.

Barr, Nicholas (2002), in his report on “Funding Higher Education: Policies for Access and Quality” put forward a strategy for achieving two objectives in higher education improved access and increased quality. He pointed out that If graduates pay an interest rate equal to the government’s cost of borrowing (not the bank overdraft rate), repayments increase from about 50% of total borrowing to about 85% (the remaining 15% shortfall being mainly due to low lifetime earnings), largely eliminating the fiscal impediment to expanding loans. The move is politically less difficult than it sounds. Interest rates are currently low, so that a move to the government’s cost of borrowing involves only a small increase to the rate that graduates pay. Second, a graduate’s monthly repayments depend only on his/her income; thus an increase in interest rates has no effect on monthly repayments, instead affecting the duration of the loan – making it clear that repayments are simply a form of targeted income tax. He stressed that by removing interest subsidies is the single essential key to solving current funding problems. The considerable resources thereby released underwrite the strategy for quality and access. The strategy has three mutually reinforcing elements: flexible fees, a wide-ranging loan system and active measures to promote access. Flexible fees are necessary to reflect diversity, to arrest quality decline and to assist some redistribution of teaching budget towards institutions with more remedial teaching. Specifically, fees should be increased initially to £2000, but with institutions free to charge less. All fees should be fully covered by a loan entitlement. There are two impediments to access - financial poverty and information poverty. The strategy outlined to address both. He suggested:

1. Grants and scholarships for students from poor backgrounds.
2. Extra personal and academic support when students from poor backgrounds reach the university.
3. Raising the aspirations of school children.
4. More resources earlier in the system, including financial support for 16-19 year olds.
Psacharopoulos, George and Patrinos, Harry Anthony (2002) in Policy Research Working Paper on “Returns to Investment in Education: A Further Update” reviewed and presented the latest estimates and patterns as found in the literature at the turn of the century on returns to investment in education and establishing related patterns.

Kondo, Amiri (2003), in his paper on “Issues and Challenges Associated with TE Assessment and Certification For The Labour Market: The Tanzania Experience” argued that the commitment of the Government of Tanzania to provide TE, underpin the development of human resources with high level of skills required to improve the quality of its people’s life and alleviate poverty. TE and training is, therefore, not only seen as a vehicle for socio-economic development of the country but also as a strategy for successful development of the manpower requirement for the labour market. With the ongoing liberalization of Tanzania’s economy and increased globalization of trade, employment opportunities in the public sector have considerably shrunk, thus forcing the large number of new entrants into the labour market to look for employment in the private and informal sectors. Since the scope for employment in the formal sector has become constricted, it has become necessary to establish an efficient and effective TE and training system to ensure the availability of technical personnel with adequate knowledge, skills and understanding capable of becoming entrepreneurs and generating employment. To realize this strategic objective, it is necessary to make sure that technical institutions have sound assessment procedures to ensure the provision of an established qualification(s) to the required standards in relation to manpower profile requirements. By doing so, Examining Bodies will help to select the training programmes and institutions capable of carrying out the required training for labour market demands. It will also promote the development of qualification equivalences, harmonization, and eventual validation of certificates acquired by learners and to elevate training institutions to a level where they can successfully meet the challenges of the future. This paper discusses about issues and challenges associated with assessment and certification of TE and training in Tanzania, and the role of the National Council for Technical Education (NACTE), in establishing the relevant assessment and certification procedures in order to nurture technical personnel with necessary knowledge and skills (required by the labour market) to ensure socio-economic development and sustainable national development.

Uysal, Yeşim Yüksel (2003) conducted a “Survey on the System of Education at the Middle East Technical University Department of Architecture, 1956-1980”. This thesis explores the system of architectural education in the Middle East Technical University Department of Architecture between 1956 and 1980. The formation and the transformation of the system of architectural education in the school are investigated with references to the evolution of the social, political, economic and architectural context of Turkey in the period and the systems of architectural education applied in the country.

Whitley, Peter J (2004) conducted a study on “The leadership of entrepreneurialism in technical and further education colleges”. He found that the provision of vocational education and training is largely provided by the Technical and Further Education (TAFE) colleges and institutes, which have been established throughout Australia. All of these colleges and institutes are the responsibility of the respective State governments and are generally considered by those governments as strategic instruments of government particularly in regard to the preparation of people for employment and addressing deficiencies within the workforce. The resulting research has found that TAFE leaders are working in an environment that has a multiplicity of expectations and demands that challenge the leadership of TAFE. The research finds that many of the TAFE leaders strive to act entrepreneurially whilst attempting to manage an environment that is constrained by its policy frameworks, industrial relations requirements, funding arrangements and national and state compliance frameworks.


Preston, Lesley Florence (2005) conducted a study on “Reflections on South Tech and Secondary Technical Education 1960-90”.

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The report entitled “Participation in Formal Technical and Vocational Education and Training Programmes Worldwide: An Initial Statistical Study”, developed by UNESCO Institute for Statistics (2006) intended as a first step in addressing this gap in knowledge and as an initial exploration of how TVET data might best be used. As for any new research, the preparation of this report has been a learning experience. It is part of ongoing efforts by UNESCO to strengthen its capacity, and the capacity of its Member States, for the collection and analysis of TVET data. The report is to be read primarily as an initial survey of the available data. It is not a comprehensive description of what is actually going on “out there”. Indeed, the report stresses the gaps in data, the reliance on estimates and the shortcomings of applying conventional educational indicators in the TVET arena. This report is therefore a modest first step in using statistics on access to formal TVET and exploring their potential to better inform policy at national and international levels. As the survey points out, data on non-formal and informal TVET are not readily available. Indeed, participation in these activities is difficult to quantify in the normal ways. What does exist for many countries are data on enrolments in public general and vocational education programmes, disaggregated by ISCED level, age and gender. Whilst recognizing that enrolment in formal TVET programmes is only a small percentage of overall participation in TVET (especially in developing countries), the scope of this survey is limited to formal TVET. At the outset, the challenges of global monitoring in the field of TVET are discussed. There is not only an absence of data in many countries, but the boundaries between TVET and general education differ from place to place. Statistical indicators developed for general education assume a far closer correspondence between age and education than exists in TVET, which not only takes place prior to entry to the labour market but includes deferred initial training, updating, upgrading and retraining. This therefore presents the long-term methodological challenge of developing new indicators that encompass public and private formal, non-formal and informal TVET. The report offers a statistical overview of formal TVET enrolments across ISCED levels from a global perspective and some regional patterns emerging from the data are discussed. Enrolments in TVET at the secondary and post-secondary levels are also discussed using Vocational Gross Enrolment Ratios (VGER). The most valuable part of the report is the presentation of the statistical tables. These tables provide the clearest picture yet of what national-level data currently exist to describe access to formal TVET programmes by level, age and gender. Despite the shortcomings in the coverage, reliability and comparability of these data, this report is nevertheless one of the most comprehensive statistical analyses to date of enrolment in formal TVET in the world. This report demonstrates how taking a statistical perspective towards TVET can provide helpful descriptions and analysis. It has also shown how data collection and analysis can reveal complexities which point to the need for more attention to methodological work and the development of more appropriate indicators for TVET. Indeed, the conclusions of the report give a clear indication of what needs to be done. Whilst statistics are important, they may not reveal significant differences between countries in the way that TVET is organized and managed. Relationships between variables can often be better understood when statistics are complemented with qualitative narratives that can put “flesh on the bones” by illuminating historical, cultural and contextual factors. As this report shows, the use of statistical data can reveal some of the distinctive features of TVET. It also shows how TVET statistics can be approached in a critical way, which can assist in the development of more relevant and appropriate indicators and analytical tools. It is hoped that this report will stimulate dialogue with UNEVOC centers on the potential and limitations of statistics in TVET. Support from UNEVOC centers can help to improve the supply and coverage of statistical data, both geographically and in terms of levels and types of TVET. They also have a key role to play in improving the quality, reliability and comparability of TVET data. UNEVOC centers can also help to ensure that TVET is included in national and international reports on education. By looking at TVET from a research perspective, UNEVOC centers have much to offer this emerging field of enquiry (unesdoc.unesco.org/images/0014/001496/149652e.pdf).

Not only is the report’s focus limited to formal TVET, it is also restricted to issues of access and participation in it. The survey does not comment upon such factors as the quality of TVET, the internal efficiency of providers, the relevance of programmes and the contribution that TVET makes to individuals, or indeed what it contributes to wider development objectives. These dimensions are clearly important and suggest a rewarding future agenda for TVET research. Participation in Formal TVET Programmes Worldwide: An Initial Statistical Study Quality, for
example, is now recognised as an integral part of Education for All, and the 2004 Bonn Declaration on “Learning for Work, Citizenship and Sustainability” notably states that TVET can “help improve the quality of life for all and help achieve sustainable development”. As the lead agency for the United Nations Decade for Education for Sustainable Development, UNESCO has a crucial role to play, through its Institutes and Centres, in strengthening the capacity of Member States to analyse the relationship between TVET and sustainable development. Monitoring progress towards Dakar EFA Goal 3 is also an important challenge that will require concentrated efforts and coordination between relevant authorities in coming years. At the heart of the monitoring challenge appears to be the emphasis on outcomes rather than inputs within definitions of TVET. This underlies the need for more appropriate qualitative and quantitative indicators that recognise contextual differences on one hand while enabling international comparisons on the other. As the so-called “knowledge economy” gives rise to new occupations, especially in service industries, a more integrated approach to education, training and employment is emerging in many countries. With increased convergence between TVET and general education and growing attention to “skills development” and “lifelong learning”, TVET itself is changing. Indeed, with the shift in focus from teaching to learning, education and training are becoming inseparable. In the medium to long term, it will be necessary to ensure that indicators in both TVET and general education keep pace with such developments, while permitting meaningful comparisons to be made over both time and space. This initial survey makes an important contribution.


Thabede, Reginald Thamsanqa (2007) & Bunnell, David Paul (2009) studied on the “Development of vocational and TE in South Africa up to 1990” and “The Development of Postsecondary TE in Georgia” respectively.

3.1.2 STUDIES CONDUCTED IN INDIA

Other studies pertaining to TE in the national levels have implications for the present study. Prof. N. Sidheswar and Prof. N. Rama (1965), Prof. B. P. Sarkar (1965), Prof. J. P. Joshipara (1965), Prof. S. K. Dutta (1965), Huge Warren (1967), Prof. S. A. Balu, Prof. G. S. Chandran (1994) and Dr. Swaminandhan (1995) studied TE in India. Balaraman and Kalyan Krishnan (1985) while referring to the Ministry of Education sponsored faculty study on perceived goals and goal orientations in engineering education have compared the views of the engineering college faculty (out of a stratified random sample of 2000 faculty members) with the Delphi study on “identification of future goals of basic engineering education” conducted in 1977 by a study group in IIT Madras. The Delphi was conducted with 109 India experts drawn from public and private sector industries, R&D organizations and engineering education institutions, to bring about a consensus on the primary question- What should be the goals and priorities of basic engineering education during 90’s. As a result, 40 most significant goals were identified.

TE in India since 1970: A Select Annotated Bibliography by Husain, Shujat (1986) provides a detailed list of publications & conducted in India from 1970 to 1986. Ratna, K B, Adithan, M, Puri, V P and Gill, H K (1988) conducted an independent study entitled “Case Studies of the Technician Education System in States C and D (Northern Regional)” to investigate the planning processes and methodology adopted by the Directorate concerned with technician education in respect of various aspects concerning the technician education system. The Objectives of the study are (i) To study the planning process and methodology adopted by the State Directorates in respect of various aspects of the technician education system thereby bringing out its strengths and weaknesses in the states, (ii) to create a awareness amongst the senior planners and administrators of the need to adopt a scientific approach in the state level planning and management of the technician education system, and (iii) to highlight the problems faced. The key Findings are: (i) The State Directorates have become aware that they should not be merely administrative bodies but bodies involved in professional management of the technician education system in the States. (ii) The Directorate wished to strengthen themselves to undertake major
activities like monitoring, preparing development plans, inspection, evaluation, computerization, curriculum development and manpower planning.

Srinavasan, R (1988) carried out an independent study on “Self-Perception of Technical Teachers” to address the problem of self-perception of technical teachers. The objectives of the study are to analyse the relationship between age, experience, occupational status and self-perception as perceived by the polytechnic teachers. He found that (i) There was no significant difference in the self-rating between the two groups of teachers. On the whole, the self-rating of the second batch of teachers was found to be more consistent as it showed a lesser variation. (ii) Twenty teachers (ten each in the two batches) rated themselves below their respective groups mean scores. (iii) The chi-square test results revealed no significant relationship between age and their self-perception. (iv) No significant relationship existed between their years of experience and their self-perception. (v) In terms of their occupational status, there was no significant relationship between the lecturers and the demonstrators.

Pillai, S S and Srinivasan, R (1988) carried out an independent study on “A Study on The Occupational Experiences of Women Technicians. The objectives were: To study the different aspects of women technicians work environment including the nature of the technicians’ job and the contributions made by them, their attitude towards their designated position, the average amount of emoluments received, their relationship with colleagues, and the difficulties, if any, encountered by them in fulfilling their job requirements. The major findings were: (i) The women technicians working as the faculty in polytechnics found their work interesting (ii) More than 50% of the respondents did not face any difficulties in carrying out their duties. However, they felt that they were made to strain too much both in their work places and at home (iii) In terms of earnings those employed as faculty members seemed to be the privileges group compared to others (iv) All of them expresses that they had a friendly and normal relationship, with their colleagues and superiors. (v) The positive aspects of their job as perceived by them were a) relevance of polytechnic education to their on-the-job performance; (b) ability to adapt the job expectations; (c) security of service, and (d) quest for seeking fresh and new knowledge to do their duties in a better manner (vi) The distressing factors which came in the way of their doing their best were identified as (a) low inadequate salary not commensurate with the strain involved, (b) no time to concentrate on other matters, and (c) negligible incentives offered.

Pillai, S S and Srinivasan, R (1988) made a survey on “Technician Education Students’ Priorities: A Survey” The objectives were: (i) To identify the factors influencing students to join polytechnic courses, (ii) to find out whether the same factors happen to be the most important ones both for engineering and non-engineering diploma courses, and (iii) to examine whether there are any differences in their priorities between men and women students. The major findings are: (i) Seventy-seven out of 354 respondents sated that they joined polytechnic courses because these would help them to attain proficiency in a chosen skill. They gave the least preference to becoming self-employed. (ii) The important priorities expressed by the students pursuing diploma courses in engineering related to (a) ease in getting a job; (b) liking for getting a job nearer to their native places; (c) acquiring proficiency in a skill; (d) the courses demanded only the minimum years of study, and (e) opportunities for earning extra money. (iii) Students of non-engineering diploma courses expressed their preferences as (a) ten possibility of getting a job without waiting for ling; (b) liking for getting a job nearer to their places of residence, and (c) the courses involve the minimum years of study. (iv) Seventy-four per cent of ten women respondents preferred polytechnic courses because they like to be employed neared to the towns where they lived. (v) Nearly two-thirds of the men students said that their primary concern was to get a job and short earning at the earliest to support their families.

Malhotra, M M, Menon, P N, Bedi, S P and Tulsi, P K (1989) conducted a “Status Study of Internal Assessment of Students in the polytechnics of Haryana”. Sen, Biman (1989) while tracing the history of development of TE right the eighteenth century, has analyzed the India scenario in detail with regard to the critical issues, major policy initiatives and reforms pertaining to TE before independence, and after. According to him, the reforms and measures in the pre-independence days could not yield any substantial improvement in TE. After Independence, greater emphasis was laid in India on quantitative expansion of trained manpower.
since it was the only alternative available in the situation of paucity of funds. With the approach, shortage of specialized trained manpower was met by arranging training of technical personnel by crash programmes either in India or abroad. This policy, according to him, left a vacuum in the qualitative improvement of TE and thus affected the research and development. Sen has suggested that a critical analysis of the Indian experiences in the field of TE may be a useful guide to many developing countries for working out and appropriate strategy for developing human resources.

**Pillai, S S and Srinavisan, R (1989)** made an independent study on "Feasibility of Polytechnic-Industry Collaboration: A Survey". The objectives were: (i) To collect views on the desirability of polytechnic-industry collaboration, (ii) to identify the types of assistance technician institutions could extend to the industries, (iii) to list ten possibilities of mutual assistance, (iv) to ascertain whether industries seek/give assistance for particular purposes, (v) to find out the efforts undertaken by the polytechnics to maintain ties with industries, (vi) to list the difficulties experienced in such collaborative ventures, (vii) to identify the causes for lack of collaborative efforts, and (viii) to identify the nature of the rapport existing, if any, between industries and polytechnics. The major findings were: (i) The low rapport between institutes and industries was mainly due to (a) lack of initiatives from either side; (b) reluctance on the part of the staff to make extra efforts, and (c) non-availability of appointed liaison officers in the polytechnics. (ii) One of the constraints in industry-institute ties stated by the principals was that the industries did not generally allow the students from polytechnics to operate the machines, and they were just asked to observe production. (iii) In order to encourage industry-institute ties it was recommended that apprenticeship training, and career guidance and counseling programmes should be organized in all industries. (iv) One member of the faculty should be assigned the responsibility of coordinating polytechnic-industry ties and the curriculum should be updated with help of the industries. (v) The measures taken by the polytechnics to promote ties with entrepreneurs included the following: (a) Technical clubs were organized to regularize the programme of experts' lectures for the benefit of ten students; (b) Occasional visits by the faculty to nearby industries to have first-hand knowledge of the latest/modern production processes. (vi) Principals unanimously opined that industry-institute ties should be stressed.

**Sheereen, Zeba (1989)** carried out a research on “TE and Skill Formation in the Organized Industries in India since 1961”.

**Sastry, L S and Pillai Swaminatha S (1989)** worked on a project entitled “An Action Plan to Improve the Standards of Workshop Training in Polytechnics". The objectives of the project were: (i) To analysis the methodology being followed in imparting training in workshops, (ii) to analyze the use of equipment for purposes of training, (iii) to analyze the various exercises to be completed by the students in workshops, (iv) to analyze the various forms of evaluation being followed in workshop training and (v) to analyze the opinion of students on workshop training. The major findings were: (i) The students reported that they were not in a position to complete the required number of jobs in workshops. On being asked for the reasons for such a situation, (a) Fifty-three per cent reported 'non-availability of material'; (b) Forty-seven percent reported 'non-availability of equipment'. Besides these, 'power failure' and 'students strike' were cited as other reasons. (ii) Eighty-two per cent students felt that they require specific assistance from the staff doing the workshop practice exercises. (iii) Forty-eight percent of the students felt that the tools have to be introduced to them. Only 10% expresses familiarity with the measuring devices. (iv) Seventeen of the 23 instructors felt that evaluation is to be done immediately on completion of the job in hand. (v) The workshop superintendents were in favour of standardizing the jobs and prescribing a uniform code to be followed by all the polytechnics in the state. (vi) Four out of six workshop superintendents felt that the available equipment could not be put to optimum use due to shortage of skilled personnel. (vii) The staff felt that students should be motivated towards workshop training by giving those jobs on utility articles.

**Pillai, S S and Srinavisan, R (1990)** carried out an independent study on “A Survey of Problem of Technical Student”. The objectives were: (i) To priorities the identified problems in terms of their felt difficulty as expressed by the students, (ii) to establish the severity of ten problems in terms of the identifies comments, (iii) to find out the differences in ten expressed feelings between students of engineering and non-engineering diploma courses, and (iv) to find out ten differences in the
difficulties encountered by students of the first, second and third year diploma courses. The major findings: (i) Nearly 52% of the students found it difficult to complete all the laboratory/workshop exercise in time, (ii) No significant differences were found in the perceptions of hostellers and day scholars about the environment in which they placed, (iii) There was no significant difference in the ratings of their difficulties between the students of engineering and non-engineering diploma courses. (iv) Compared to the first and the second year those in the final year seemed to be more concerned about their employment prospects. This was so because a significant difference emerged between the rating of third year students and others on this count. (v) Students felt that they were not so fluent either in oral or written communication.

Pillai, S S and Srinavisan, R (1990) studied, “Student Achievement in Technical Institutions: An Analysis”. The objectives of the study were: (i) To find out the number of students enrolled in the different types of courses offered in polytechnics, (ii) to compute the out-turn of technicians produced and the divisions/grades in which they were placed, (iii) to observe the specific distinctions achieved, if any, by the institutions, and (iv) to identify the efforts made, if any, by the polytechnics in arranging placements of their alumni. The major findings were: (i) The total number of students enrolled in these institutions was 13990 in 1986-87, 14095 in 1987-88 and 14688 in 1988-89. Of these 22% were girls. (ii) The total number of technicians produced in all these institutions came to 4244 in 1988-89. Of these nearly one-fourth of the alumni were girls. (iii) On an average, about one fourth of the total number of technicians could secure first division in their final examination while another one-fourth showed poor performance and were placed in the third division. (iv) As regard to specific distinctions, by an institution, it was noticed that five polytechnic in Karnataka and three in Kerala obtained the first five ranks for the period 1986-89. Further, a women’s polytechnic in Tamil Nadu secured 100% results in electronics for two consecutive years. (v) Only nine institutions reported that they organized campus interviews for their students. (vi) Most of the polytechnics did not seem to have any liaison with their past students.

Ramnath Kishan, N (1991) carried out a research on “Cost-benefit Analysis of TE in Andhra Pradesh: A study”.

Sujatha, B N (1991) made an independent study on “Revaluation in BE Degree Examination: An Analysis of Marks”.

Antonisamy, M (1991) made an independent study on “A Study of English Curriculum In Engineering Colleges”.

Goela, Sarla (1992/93/95), studied on “Evaluation of TE in India during First Five Year Plans”.

Bhattacharya, S K (1992) undertook a study on “Design and Development of an Interactive Teaching-Learning System for TE”. The objectives: (i) to develop a work-bench-oriented teaching-learning pedagogy of a reflective nature, (ii) to develop classroom-based activity-oriented learning experiences, (iii) to develop work-bench-oriented experiences using a functional curriculum, and (iv) to experiment with the different types of teaching-learning models so developed and compare their effectiveness. His conclusions were: (i) There was a significant increase in the performance score of students in the examination conducted by the State Boards of Technical Education (SBTE). (ii) There was a significant increase in the performance of students in solving open-ended problems. (iii) The correlation of scores in the examination conducted by the SBTE and problems-solving abilities was found to be poor.

Rajeswari, A R (1994) while discussing the supply and deployment of engineering manpower and their contribution in the industrial and economic development of India has highlighted among other things the employment of engineers by branch and the main activity in 1983-84. She has pointed out that while most of the engineering degree holders out of the total stock, roughly 90% degree holders were employed, maximum numbers of them were performing technical functions in the fields like manufacturing and construction activities. As per the data included in the study for the year 1983-84, 1.78% of the total stocks of engineering degree holders were in the teaching profession. Out of this small number while majority of them were from the disciplines like Civil, Mechanical and Electrical Engineering, the percentage of engineers from other disciplines was very negligible. According to Rajeswari, the increase in technical manpower has not made an
appreciable impact on India's industrial and economic development and hence there is a need to make in depth studies on the impact of technical manpower on the industrial sector by going into the details of their employment characteristics, technology status, skill requirements etc., so that the technical manpower potential could be exploited toward national development.

Sharma, P B (1994) while discussing the new challenges to be faced in the process of managing the technical institutions, particularly, the need for attracting motivated faculty, has observed that highly motivated and qualified professionals can be attracted to teaching only if the educational institutions provide an environment to enable them to flourish as expert technologists alongside their teaching role. According to him, USA, UK and Japan and such other developed countries have been successful in attracting the very best to teaching by giving a high priority to this profession, as its quality and commitment directly affects industrial advancement and the quality of human resources. According to him, the reluctance to join teaching is also due to the value system of our society which does not acknowledge or recognize the value of those who create wealth, while it fully acknowledges and recognizes the role of the managers and administrators of the wealth of the nation.

Awale, Subhash D (1995) in his doctoral research on “Engineering Teachers in the Development of TE System in India”, has focused its attention on the teachers in the degree awarding technical institutions approved by the AICTE. The main thrust of the study being the entire professional life cycle of the engineering teachers, an attempt has been made to study in depth the most critical issues pertaining to the engineering teaching profession. These issues include the interest and perceptions of engineering students about teaching profession, adequacy and effectiveness of the present selection procedures of teachers and the career growth and professional development of engineering teachers the facilitators and barriers. The vacancy level in teaching positions in the degree level institutions and the necessity of long term measures to cope up with the situation are also examined. The data emerged from the opinion-survey have been analyzed and discussed in the respective chapters and the section there under supported by tables, and bar charts. The summary of findings and recommendations in the context of the research questions framed in the first chapter and the objectives of the study are presented in chapter V with the help of conceptual models by way of future strategy.

The study has brought out very significant facts and aspects in the form of answers to the research questions which fulfill the objectives of the study.

Ghosh, A K (1995) while discussing the role of TE in the Economic Development of India has talked about the multiple structure of industrial enterprise scales, economic patterns and hierarchies of technological level and the need of planning and development of TE to deal with the complexity in the level of technologies needed and the mixed character of technical manpower required to deal with this. He has, therefore, suggested that the TE must generate application oriented qualifies technical personnel for the regional economic development and at the same time to foster in technology.

Jagadeesh, R (1995) while focusing the role of engineering educators as researchers and the facilitators/barriers has emphasized the need for
1. Educating and enlightening the faculty about the multinational benefits of research.
2. Properly scheduling other activities to enable the faculty to devote adequate time for research.
3. Exposing the faculty to already running research activities and providing first hand information on various aspects of research. He adequate stressed that a conductive atmosphere and provision of adequate facilities for research, free of bureaucratic is quite essential in the technical institutions.

UNEVOC – ACEID (1996) published a report on “Case Studies on Technical and Vocational Education in Asia and the Pacific – India”. The major highlights of the report are enumerated below:

Education has a place of high priority on India's national development agenda. The educational system is of monumental size, yet the country's overall educational and training achievements leave much to be desired. The formal schooling is referred to as 10 + 2 + 3 pattern with ten years of general, two years of diversified and three years of first degree education.
Work education, in one form or another, is an integral element of school curriculum and competency based vocational programs are offered at the higher secondary stage. Vocational courses at the tertiary stages of general education have recently been introduced. Work education is inherent in the educational philosophy of India. The TVE system in India is multi-sectorial with each ministry responsible for manpower development in that sector. The TVE programs in the formal education system are either state delivered or state financed.

The higher secondary vocational education program is the emerging mode for skill training for informal and unorganized sector and aims to the educational requirements for self employment.

This program is collaborative in nature and its dependence for instruction on the employment sector/ industry is greater than the other sectors of formal TVE. Its national curriculum underscores communication and entrepreneurial skills along with the technical skills of theory and the practice of the concerned vocation. The technician education is primarily the responsibility of the polytechnic, and the craftsman as well as apprenticeship training is looked after by the Ministry of Labour.

Educational policy formulation is a complex exercise, carried out at many levels by all the concerned agencies, such as National Development Council, Planning Commission, and Ministry of Human Resource Development, many national and state level institutions, mass media and many others. There are fewer legislation in the field of education in India than in many countries. The Union Government has suggested an elaborate management set up for VE which is gradually coming into existence in all the states while that for TE is well in position for a long time.

A number of steps are being taken to improve TVE in India. For TE, there is a major World Bank financed scheme which addresses the present weaknesses in this system. Vocational education being an emerging system is continuously evaluated and reviewed to bring in new features to improve its output and performance. The problems are identified by public men/women, voluntary organisations, mass media and education from various angles. This leads to development of a holistic and balanced viewpoint. Some of the future directions of improvement are: introduction of first degree level vocational courses, internal resource generation through the vocational program outreach studies in schools, creating and expanding the open learning system for greater flexibility in delivery for wider outreach and effective linkage with industry and the world of work. These steps also address the issue of enhancing the status of TVE, more particularly, vocational education in India.

Palit, Sajal K (1998), in his research article entitled “The Development of Engineering and TE in India” discusses the current development of undergraduate and postgraduate engineering education in India, and presents two case studies detailing the engineering education programmes of two nationally and internationally leading institutions: the IIT, New Delhi, and Birla Institute of Technology and Science (BITS), Pilani. The case studies focus on several important aspects, such as the administrative structures, departments and centres, admission procedures, course structures, scholarships, methods of teaching, evaluation of performances, research, practical training, industry links, continuing education and the resources available at these institutions. A unique and innovative industry-linked engineering education and training system recently adopted at BITS is also presented. IISc, Bangalore, a leading postgraduate institution, and the REC, Nagpur, one of seven NIT recently chosen by the Government of India for providing the best engineering education, are briefly discussed. Strategic plans, policies and programmes that have been adopted for implementation as the ninth five year plan of the AICTE to meet future technological global challenges are also outlined.

This research article describes technological development and the engineering and vocational education systems in India. Two world-leading institutions are chosen as case studies and their administrative structures, admission procedures, curriculum development, teaching and research areas and facilities, and other professional activities are studied. The paper also includes strategic plans, policies and programmes adopted for implementation as the ninth five year plan by the AICTE to meet future technological global challenges.

Thete, Ajit Ram Rao (1999) undertook “A Comparative Study of the System of TE in Germany and India with Special Reference to Maharashtra State” with the objectives:
1. To investigate aims and objectives of TE in Germany and to compare these with those in India.

2. To study the administrative patterns in Technical Institutions in Germany and to compare it with Indian system.

3. To study the system of TE in Germany and India with reference to
   a) Admission policy
   b) Course and curricula taught.
   c) Examination system.

4. To carry-out intensive study of polytechnic institutes of Germany in terms of
   a) Curriculum development process.
   b) Course and curricula taught.
   c) Teaching methodology.
   d) Examination system.
   e) Industry institutes interaction.

5. To study the curriculum objectives of sub-system of TE related to the manpower in industry.

6. To find out the nature and extent of industry institute interaction in Germany and India.

7. To study the input of polytechnic education on industry and vice-versa in Germany and India.

8. To study the qualitative and quantitative aspects of TE system in Germany and to compare with those in India.

9. To investigate the operational aspects which maintain quality in system of TE at all levels in Germany.

10. To make strategic suggestions for the development in system of TE in India in general and Maharashtra in particular.

He found that: 1. The aims and objectives of TE in India and Germany are same, except emphasis on profession and professional training in objectives of TE in Germany. 2. The vocational schools and university of applied sciences are autonomous and 3. Vocational school in Germany adopt State-wide common curricula unlike in India which is common nationwide. The Implications of the study are: 1. For better utilization of human resources and other physical resources, the control of manpower should be developed. 2. The academic and training support to the institutes is provided to improve the quality of work in the industry and 3. Discipline was forums of technical teachers should be formed at different levels.


P Geetha Rani (2006) in her article on “Economic Reforms and Financing Higher Education in India” pointed out that it is unambiguous that Policy of the Government of India now encourages augmentation of resources for covering a larger portion of cost of higher education. Recent policy changes in India often favour to divert resources from higher to primary level of education and favours for full cost recovery from students even in public higher education institutions. Cost recovery measures comprising of increase in fees, student loans currently operated by commercial banks and privatization will exacerbate inequality in the society. Indeed, there seems to be a nexus between the present student loan scheme and full cost recovery. Increasing reliance on student fees, student loans and privatization without considering the low-income groups may produce regressive effects in the society. Under the deep waves of globalization and competition, important economic rationale for government funding especially for higher education is neglected. Public support for higher education remains essential to ensure a balanced achievement of educational and social missions, apart from surviving in the knowledge-based society. It is essential that funding sources must be diversified but cost-sharing with students has social and political limits, and excessive commercialization of higher education should be forbidden.

Agarwal, Pawan (2006) conducted a research on “Higher Education in India: The Need For Change”. He found that higher education in India suffers from several systemic deficiencies. As a result, it continues to provide graduates they are unemployable despite emerging shortages of skilled manpower in an increasing number of sectors. The standards of academic research are low and declining. Some of the problems of the Indian higher education, such as - the unwieldy affiliating system, inflexible academic structure, uneven capacity across various subjects, eroding...
Higher education in India has expanded rapidly over the past two decades. This growth has been mainly driven by private sector initiatives. There are genuine concerns about many of them being substandard and exploitative. Due to the government's ambivalence on the role of private sector in higher education, the growth has been chaotic and unplanned. The regulatory system has failed to maintain standards or check exploitation. Instead, it resulted in erecting formidable entry barriers that generate undesirable rents. Voluntary accreditation seems to have no takers from amongst private providers and apparently serves little purpose for any of its stakeholders. Despite, its impressive growth, higher education in India could maintain only a very small base of quality institutions at the top. Standards of the majority of the institutions are poor and declining. There are a large number of small and non-viable institutions. Entry to the small number of quality institutions is very competitive giving rise to high stake entrance tests and a flourishing private tuition industry. The stakes are so high that quota-based reservation of seats in such institutions in the name of affirmative action has come to occupy centre stage in electoral politics. Despite some merit, it has resulted in fragmentation of merit space and further intensified competition for the limited capacity in quality institutions. While public funding declined (in real terms), enrolments in higher education institutions grew to meet the surge in demand. This further deteriorated academic standards. As a result, the institutions were forced to raise their tuition fees to sustain themselves. Emergence of private providers and increase in tuition fees in public institutions without any substantial programme for students' financial aid has made higher education beyond the reach of the poor. The paper discusses feasible strategies to overcome this and make higher education affordable and accessible to all. This paper takes a comprehensive look at the various facets of higher education in India. It adopts a systems approach for achieving policy coherence and multi-level coordination required to address genuine concerns in the Indian higher education on a long-term basis and uses the experiences of other countries to suggest measures to tackle its various systemic deficiencies.

Goel, Sanjay (2006), in his paper on “Competency Focused Engineering Education with Reference to IT Related Disciplines: Is the Indian System Ready for Transformation?” pointed out that the growth of the Indian IT industry has been of great interest to the international IT community. Nearly one third of fresh Indian engineering graduates are currently joining the IT industry irrespective of their specialization. The success of the Indian IT industry, however, has not been yet been leveraged for developing India as a preferred destination for engineering education, even in the disciplines related to information technology. Internationally, reforms in engineering education have a long but slow history. Last decade saw an increasing recognition of the need for the transformation of engineering education. Many accreditation agencies have even transformed their accreditation criteria in the last few years from a resource-based approach to an outcome-based approach.

This paper collates recommendations about core competencies for engineering graduates by NSF, National Academy of Engineers (NAE), Engineering Professor's Council (EPC), and authors like Felder, Bordogna, and others. It brings together the contemporary prescriptions of accreditation agencies in US, UK, Australia, Singapore, and Japan and also the recommendations made by ACM, IEEE, and other professional bodies with specific reference to various IT related disciplines. These accreditation agencies, NAE, IEEE, ACM, other professional agencies, and researchers have identified a number of core competencies as essential attributes of graduating engineers. There are great similarities in these recommendations that are now being increasingly used for enhancing the quality of engineering education. However, in order to further enhance the value of engineering education, it is proposed that ability to create wealth, self-sufficiency and a sense of well being through successful engineering enterprise, ability to assist others through philanthropic donation, and ability to work in multi-location teams may also be added to the list of recommended competencies, especially at the master's level. Based on Marzano's (1993) Dimensions of Learning, a three dimensional taxonomy of competencies has been proposed to
categorize the recommended competencies along the three dimensions of attitudes and perceptions, productive habits of mind, and meaningful usage, extension, and acquisition of knowledge. This taxonomy is projected to have the flexibility to suit varying and emerging needs. The paper then presents current accreditation criteria practiced by the National Board of Accreditation (NBA) of AICTE, the accreditation agency in India. The accreditation criterion of NBA continues to be based on the traditional resource-based approach. Recommendations by National Association of Software and Service Companies (NASSCOM) and the Indian Government task force set up to examine the human resource challenge for IT and IT-enabled Services (I*TeS) sector have been briefly discussed. Both of these agencies have underrated some skills such as spoken English, creativity, and team working and have categorised them as desirable rather than necessary. The accreditation criteria of NBA and also some recommendations of NASSCOM and the Indian Government task force are not in alignment with the contemporary global perspectives on this issue.

The Indian engineering education sector can tremendously help the Indian IT industry to make a much larger contribution in higher value-added markets. It needs to focus on competence building by transforming its traditional teaching, learning, and assessment processes. This focus will also help in leveraging Indian IT industry's success for developing India as a preferred destination for engineering education at least in selected disciplines related to information technology. Further, faculty's unfamiliarity and inexperience with real-life engineering projects as well as research on learning also need urgent attention in order to meet these objectives. Keywords: Engineering education, engineering competencies, general professional competencies, attributes of engineer, skill shortage in IT industry.

Banerjee, Rangan & Muley, Vinayak P (2008) carried out a research survey on “Engineering Education in India” sponsored by Observer Research Foundation. The research survey highlighted that India has the potential to be a global technology leader. Indian industry is competing globally in software and even in areas such as automobiles, chemicals and engineering equipment. A critical issue for the future success of Indian industry is the growth of engineering education in India. Since independence, the initial focus of government policy was to provide the engineers required for the developing economy. The settings up of the IIT, the REC's (and their subsequent conversion to the NITs) were targeted at achieving this. Indian engineers established their reputation for engineering and design skills. Engineering in India is the preferred option for bright students at the 10+2 level. This has resulted in a spurt in engineering colleges primarily in the private sector. Despite this, industry leaders complain about the absence of quality engineers for their industry. This is accompanied by significant unemployment rates amongst graduating engineers.

There is a dearth of publicly available data on India’s engineering education system. We document the trend in the student intake, number of engineering graduates, post-graduates and PhDs. In order to obtain these we used assumptions of Output / Sanctioned strength ratios and their trends. It is seen that there is a regional disparity in engineering degrees with Tamil Nadu, Andhra Pradesh and Karnataka having the highest number of engineering graduates per population. India awarded about 2.3 lakhs engineering degrees, 20000 engineering masters degrees and about 1000 engineering PhDs in 2006. India’s doctorate degrees are less than 1% of graduate engineering degrees. The percentages of doctorate degrees to engineering degrees is much higher for most of the other countries studied (9% USA, 10% UK, 8% Germany, 3% Korea).

A comparison of a few select Indian institutions - an IIT, a NIT and a private engineering college reveals some interesting results. An international comparison shows that most Indian institutions have not effectively evolved from under-graduate teaching institutions to teaching and research institutions. One of the biggest advantages of the top engineering colleges in India is the high selectivity - approximately 2-3% of the applicants are selected. This is much lower than reputed international universities. However the engineering education system has been unable to attract the best engineering students towards post-graduate studies. The IITs and IISc contribute to less than 1% of the engineering graduates in the country, 20% of the MTechs and 40% of the PhDs. Only about 1% (or less) of the graduating BTech class of an IIT opt for an MTech in India, while only 2% of the graduating MTech class opt for PhD in India. About 75% of the engineering graduates are taught at the private engineering colleges.
There are more than 1100 private engineering colleges. However a ranking of the top fifty engineering colleges reveals only a small percentage of private colleges. More than 90% of the private engineering colleges are affiliated colleges that have little academic autonomy. The existing administrative structure and nature of private colleges results in very little financial autonomy with regulated fees and salaries accounting for 80% of the budget. A comparison of the Indian engineering colleges with some of the leading institutions of the world shows that it is possible for institutions to have student to faculty ratio of 15:1 or more and yet maintain a significant research output. In the report peer reviewed journal publications per faculty and UG engineering degrees per faculty are used as indicators of the research and teaching output of institutions. Most Indian institutions are improving their research output but are below the norms attained by some of the best international institutions. The challenge for our engineering education system is to make the transition from primarily teaching institutions to teaching and research institutions. We developed a normative scenario that increases the output of quality engineering graduates from Tier 1 (IITs, IISc) and Tier 2 (NITs) institutions and increases the engineering PhD output to 10,000 per year. This would involve the launch of a National PhD initiative. A series of initiatives are required to attract our brightest students to pursue research. This would need partnerships and commitment from industries, strengthening existing PhD programmes and research facilities and facilitating quality jobs for the doctoral students. One of the biggest constraints for the development of engineering education in the country is the shortage of quality faculty. This is linked to the issue of less number of PhDs, salaries and incentives for engineering educators. Steps to address this must consider incentivizing performance, enhanced societal and industry linkages and a periodic review mechanism. There is a need for the industry, government and academia to formulate a strategy for engineering and science education in India. We need to have a mechanism to identify important areas and disciplines that should grow and develop policies and institutions that facilitate this. There needs to be a high-level think tank that reviews the higher engineering and science education system in India and provides direction for future growth. It is important to understand the actual trends in numbers, placements, salaries, employability, research output and compare and benchmark performance with other institutions. An understanding of the reality should form the basis of policy changes that ensure that the engineering education system meets the changing needs of the industry and society.

Shah, Seema & Mishra, J N (2009), carried out a survey entitled “An Analytical Approach of Faculty Members on the Frame work of TE in India”. The objective of the work is to find out dynamic matrix of embryonic technological developments with its concurrent adoption by technical institutions in India. The education particularly the TE is backbone of development of any country. Therefore, the study under reference has enormous importance & need to find out the critical matching parameters. The responses of faculty members, a sector shaping the future of the country through quality students output confined mainly around, course deliveries, examinations, participatory opportunities in policymaking and management planning, satisfaction level in both technical laboratories and technical personnel, manpower assessments, personality development of students, additional pre-requisites (perks), welfare schemes, contributions in placement of students in various employment sectors, quality production of research papers, status of electronic communication etc. for the two sample technical institutions called as T1 & T2 under study. The nature of T1 is a singular faculty whereas T2 is multi faculty. It has been observed that in most of the deliverables received from faculty members on the designed questionnaires threshold of T1 is higher than the T2. The obtained results are quite pertinent to most of the Indian Technical Institutions and to the Government of India to formulate proper policies for the implementation of observations in all such institutions of India.

Saket, Ranjan Praveer & Deshmukh, P B (2010) investigated the “Student Perception of TE a Study on Higher Secondary Class” to find out what are the factors of students’ perception which significantly influence the institute selection decision while getting admission? They came out with the findings that all the variables viz. Placement; Faculty Competence; Brand Name/reputation; infrastructure/ Physical facilities; Ease of Communication; and Safety and Security are significant while making clusters as demographic groups are insignificant. All the components of institute selection criteria are found to be highly significant. It suggests that the students highly consider the determinants namely Placement; Faculty Competence; Brand
Name/Reputation; Infrastructure/Physical facilities; Ease of Communication; and Safety and Security while selecting institutes for admission. It is also remarkable that the demographic groups both Medium of Education and Gender are not significant while making decision. Table I explains that the above six factors are significant irrespective of medium and gender. It is suggestive that the students of both the mediums and genders highly consider the determinants. Three clusters have been made by the students. All the three clusters have been dominantly dictated by the English medium female students. The first cluster little considers ease of communication and safety and security; average considers placement, brand name/reputation and infrastructure/physical facilities, and highly considers faculty competence. The second cluster considers on an average placement facility and brand name/reputation and highly considers faculty competence; infrastructure/physical facilities; ease of communication; and safety and security. Third cluster considers ease of communication and safety and security while very highly considers placement; faculty competence; brand name/reputation; and infrastructure/physical facilities.

There has been a tremendous rise in the Indian economy during the recent few years especially after economic liberalization. This has brought an overall sartorial growth to the whole economy. Chhattisgarh, the then integral part of Madhya Pradesh, could not remain untouched. But after splitting from Madhya Pradesh the changes in this state are vividly speaking and boasting of dramatic developments. Like other states, every sector has been positively influenced but the most significant development has been observed in the education sector. Within the period of just nine years, numbers of engineering colleges have come into existence and yet continuously mushrooming. The situation has simplified the path of admission-seekers, rather overwhelming to some extent which has caused a sort of competition amongst the academic institutions associated with TE. One of the most effective constituents of the existence of institutions is the student. A study has been conducted through multivariate analysis which aims at findings out the student perception of TE. The study is supposed to contribute to the policy makers of the institutes.

3.1.3 STUDIES CONDUCTED ON TE IN NE REGION

The review of research and related literature in the area of TE in North East India has far reaching implications for the present study. Prof. T. N. Barooah (1985) and Gopal Krishna Dhar Senapati (1995) studied TE in Assam, which shows some guidelines for the present study. The World Bank Project regarding TE in Assam & other NE states have also helped in the study. The review shows there is no doctoral study on TE for NE Region as whole has been taken. The details of the other related studies are given below:

Sungoh, Sherwin (1988) made a study on the topic entitled, “A Survey of the Educational and Vocational Aspirations of the Doordarshan-Viewing Pre-University Students in Shillong” The objectives of the study were: (i) To find out the educational aspirations of those pre-university students of Shillong who were exposed differentially to television programmes, (ii) To find out the vocational aspirations of those pre-university students of Shillong who were exposed differentially to television programmes, (iii) to find out the correlations between the educational and vocational aspirations of the viewers, between their educational aspirations and socio-economic scores, and their vocational aspirations and socio-economic status scores. The Major Findings were: (i) Female students, rare viewers of TV, and commerce stream students showed significantly higher educational aspirations as compared to their respective counterparts. (ii) Male viewers and science students had significantly higher vocational aspirations as compared to their respective counterparts. (iii) There was a high negative correlation between the educational and the vocational aspirations of students. (iv) Socio-economic status was positively related to the educational aspirations of students.

Baruah, Mukul Kumar (1988) Conducted a study on the topic entitled “Socio-Psychological Characteristics of Professional and Non-Professional Students”.

Sungoh, Sherwin, M (1991) carried out a research on “A Study of Vocational Education and Attitude Towards Vocationalization of Education in East Khasi Hills”. The objectives were: (i) To study the status of vocational education including problems of vocationalization of education in the east Khasi Hills District, (ii) to survey the attitude of pre-university students in the East Khasi Hills District towards vocationalization of education, and (iii) to suggest measures for effective
implementation of vocational education in the district. The major findings are: There was no significant differences in the attitude towards vocationalization of education between pre-university male and female students; rural and urban students; commerce and science students; but the difference was significant between tribal and non-tribal students; commerce and arts students, and arts and science students.


Pulmate, L & Abrol, D (2005) in their paper entitled “Development of Scientific and Technical Manpower in Northeast India: Deficits and Mismatches” examined the deficits and mismatches in the development and deployment of scientific and technical (S&T) manpower in Northeast India. The findings of the paper are: Development of general education in the region is comparable to those in other region/state. However, the development with respect to S&T manpower and institutions in the region is slow and deficient. The availability of engineering institutions and intake capacity in these institutions are low compared to those in the Eastern, Southern regions and All India. These deficits coupled with high failure rates among the students in the region resulted in low outturn of S&T manpower. Imbalances in the growth of engineering disciplines also encouraged migration of students outside the region. The growth of new and emerging engineering disciplines in the region is inadequate to match those in other regions. The deployment of engineers and PGs and PhDs in S&T in the Northeast shows that the Government and public sector continue to be major employers of this manpower. The low absorption rate leads to widespread unemployment among S&T manpower. Migration for employment is rampant among the engineers.

Tiwari, Rajiv (2005) conducted a survey on “Engineering Education in North East India: A Survey”. He reviewed the engineering education, with particular emphasis on degree level courses, in north east (NE) India with special emphasis on brief history of the NE engineering education, details of engineering colleges, courses offered by them, disciplines, number of intakes etc. A comparison has been made of the NE zone with the rest of zones in the country in terms of number of engineering colleges and their yearly intake. Based on the survey conclusions and recommendations are made for the future course of actions.

3.1.4 STUDIES CONDUCTED ON LIBRARY & INFORMATION SERVICES IN THE TECHNICAL INSTITUTES IN INDIA & NE REGION

Bavakutty, M (1984) on “a critical study of the organization and utilization of libraries in higher educational institutions in Kerala”. The main objectives of the study were: 1. To assess the existing state of libraries in the colleges under study with respect to their administration set-up, Organizational efficiency, mode of financing, method of book selection and acquisition, technical processing, servicing and physical facilities. 2. To assess the existing library facilities and resources in the colleges under study, in terms of their ability to cater to the varied requirements of modern higher education. 3. To the service efficiency of the libraries under study with the help of indices like the rate of use of library resources and facilities by both the students and the teachers in the institutions, and To work out solutions for some of their crucial problems so as to ensure a more efficient organization and operation. The main findings were:
1. No library advisory committee was functioning in the majority of colleges.
2. In a majority of the colleges, the traditional practice of placing a teacher in charge of the library, as a control over the librarian, was in evidence. The status of the librarian, in this situation, was reduced to that of a clerk or attainder.
3. Nearly 75 percent of the colleges covered by the study maintained departmental libraries besides a central library.
4. The main sources of finance for a college library being special fees from students, Government and UGC grants, there were variations in finance.
5. The percentages proportion of annual expenditure to the total college expenditure varies between six and nine. The average percentage was far below the proportion recommended by the education commission (1964).
6. The colleges under study did not follow any scientific principles for selection of books.
7. In nearly 90 percent of Government College and 60 percent of the private college libraries, the books were not properly classified and catalogued.

8. Private colleges had an average collection of 17,574 volumes as compared to the average of 14,853 volumes of government colleges. There was no relationship between book collection and strength of students.

9. The libraries were open on all working days, but the colleges differed in the working hours.

10. Special library services were not attempted in any colleges under study.

11. The salary of college librarians was very low.

12. The general qualifications of librarians varied widely, with only 50 percent having a bachelor’s degree in library science.

13. Physical facilities of libraries were very poor, with only 24 percent having separate buildings.

14. Only a small percentage of teachers and librarians were satisfied with the condition of libraries.

15. The frequency of use of library by students was satisfactory, but there were no differences between the different classes of students.

16. The libraries were used more for extra-curricular requirements than for curricular purposes by students, and vice versa by teachers.

**Bharali, Bhrigu Ram (1996)** conducted a study on "Role of Special Libraries in Assam and its Socio-economic Impact on Societies - A Study". The major objectives of the study were to make an effort to find out the role, performance and ideals of the special libraries, which are considered, now as a social need. All efforts have been to give a composite picture of the special library system in Assam and its socio-economic impact on different societies. The study undertaken was an attempt to assess the performance and ideals of the special libraries, which are considered, now as a social need. All efforts have been made to give a composite picture of the special system in Assam and its socio-economic impact on different societies. The study undertaken was an attempt to assess the view that how far special library system in Assam has proved to be an effective agency in regard to the socio-economic activities of the people and to favour and formulate measures for its development so that it can be a real and active participation in the nation building process. The major findings of the study were:

1. The development of social libraries in the most scientific way is very much low in the state of Assam. Though the growth and development of this type is under progress, the spirit of challenge is visible in the special libraries of Assam. This trend has been noticed in the newly developed libraries attached with different coming-up organizations.

2. The British Government which took up the administration of our state in 1826 felt the establishment of the special libraries in order to utilize the resources hitherto unexplored in the state. Thus the process of scientific enquiry for the economic development and social upliftment started by the British Government had its own legacy to this day, but now in a broader way. The dynamic change that has been achieved in this present scientific and industrial study actually begins from this process.

3. A special library which tries to cater to the needs of special types of users demands documentation services to utilize the resources in their mobility and to serve the time of the users who are otherwise engaged in their responsibilities and duties in their parent organization. Creation of databank in the same field will help in easing the situation. Computer, which is not a part of librarianship rather it has become a fact of librarianship cannot be underemphasizes. Moreover network services with the proper co-operation of other such libraries will help a lot. INTERNET, INFLIBNET, DELNET, CALNET and such other programmes can suitably be tapped in this line. Almost all the special libraries of Assam are not in a position to avail of such services.

An important work has been done by **Lahkar, Narendra (1997)** on "Prospect of Automated Cataloguing in the three university Libraries in Assam". The objectives of the study:

1. To study the University library system in Assam and to find out how far the present systems are satisfactory in providing service to the users.

2. To study automated library system and to find the merits in introducing automated system in the libraries of Assam.

3. To study automated catalogues and to find out it’s advantages in having access to information.
4. To find out the advantages in meeting readers needs with OPAC (Online Public Access Catalogue).

5. To study the present manual card catalogue system practiced in the university libraries of Assam and to find out to what extent such catalogues could reflect the actual potentiality of the library.

6. To find out whether existing card catalogues could satisfy readers in meeting various approaches under-author(s), title, subjects, etc.

7. To find out whether different entries in manual catalogue system helping locating and retrieving documents successfully from library collection.

8. To find out whether users are satisfied with preparation, maintenance and functioning of manual catalogues by the libraries.

9. To find out the deficiencies in existing card catalogues in meeting its stated objectives in order to retrieve information specifically, sufficiently and instantly.

10. To find out bibliographic standard for creation of bibliographic database of the library collection in the university libraries of Assam.

11. To find out and suggest a phase-wise scheme for introducing automated catalogue system in the university libraries of Assam.

12. To study the different existing conditions regarding management, finance, staff, collection, users, etc. and to find out the ways to deal with these aspects in the process of automation.

Some of the principal findings were:

1. University library plays a major role for achieving the objectives of the parent institution, preserving and dissemination knowledge among the enlightened class of people and all study and research activities being radiated from them. However university libraries in Assam have seemed to fail achieve the stated objectives. Use of library services by its users is very discouraging.

2. It is found that a large number of University students have not again those enrolled members are casual in visiting the library as found from visitor’s registers of the libraries. The gap between potential users and actual users is much.

3. Of the different categories of reading materials, the three university libraries have a large percentage of books of it’s total collection. Subscription of current periodicals by the libraries is very discouraging, although the situation in Dibrugarh University library is comparatively better than the other two. The growth trend of collection in the university libraries of Assam is found to be uneven and not up to the mark. It is very discouraging fact that the three university libraries have not given due weight age on the book purchase and subscription of current periodicals.

4. While library budget is not sufficient in the three university libraries, the budget allocation is not found to be scientific. A lion’s share of the library budget has been spent on staff salary head leaving very less amount on other heads including collection development.

5. Different services that a university library should offer in the present day situation have not been introduced in the libraries. Problems in operations and rendering services in different areas of libraries are increasing rather not improving due to continuation of still the traditional methods. While number and variety of publication are increasing day by day only lending and some kind of casual reference services are provided for by these libraries.

6. Although, the number of research scholars in comparison to total number is more in Assam Agricultural University (7%) in comparison to Gauhati (2%) and Dibrugarh University (2.6%), the use of library is less in Assam Agricultural University than in other two university libraries. This implies that documents of Assam Agricultural University are not used enough for research purpose.

7. The three university libraries of Assam are using card of catalogues prepared and maintained manually inviting much time in preparation and used as well as maximum floor area of a library is being occupied by the catalogue cabinets containing card catalogues.

8. No up-to-dating, no replacements, no checking, no withdrawal of unnecessary cards are found in practice in the catalogue boxes resulting in chaotic conditions of the catalogue which makes the catalogues not no useful.

9. Records of card catalogues are found not uniform, consistent and complete. This has resulted in barriers in sharing bibliographic resources among libraries.
10. Although the library catalogue is a tool for retrieving document instantly and specifically, readers are found to be not at all seriously aware of the advantages of the existence of catalogue of the three university libraries.

11. The process of library automation in this NER of India is at the initial stage. Lack of expertise in the area, financial, infrastructural, and such other constraints are there. Moreover, management of libraries is still in the state of indecision in matters of opting for automation.

Arambam Hileima Devi and Th. Purnima Devi (2005), in their study on “Application of Information Technology in Special Libraries of Manipur: A Case Study” highlighted the problem of IT in six (6) selected special libraries in Manipur. They found that the main problems of application of IT in these special libraries were the lack of fund. The state government is not in a position to provide adequate funds for automating these special libraries. They stressed on the requisite of IT to improve the condition of the special libraries of Manipur state.

Another study was conducted by Vasishta, Seema (2007) on “Status of Libraries in Higher technical Education institutions: with special references to deemed universities of North India”. The objective of the survey was to find that the present conditions in libraries in technical deemed universities of North India. The study was based on the analysis of physical facilities, open access and working hours, budget professional staff, organizational structure, library holdings (print as well as non-print), users, technical processing etc. Based on the results of the survey, few suggestions have been given for planning and policy making of libraries in technical deemed universities.

The findings of different studies that have been stated above reveal that very few studies have been undertaken to appraise the status of TE, facilities available in the technical institutions, utilization of technical institute libraries and information services provided in the technical institutes of North East India in particular. Also the study of the above referred literature strengthened the investigators’ conviction to undertake the study. As such it was considered worthwhile to make a study on TE in NE India. Thus, the study has been entitled as “TE in North East India with Special Reference to Information Services: An Exploratory Study”.

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