Chapter 2

Review of Literature

Literature search is an important part of any research work as it assists the researcher to identify the present status of the study area and the development of the previous work done easily on a specific subject area. Literature search also helps the researchers to be aware of the different aspects involved in a study, different research problems including the development of the concept, design and boundary of the study. During review of literature for the topic, a large number of literatures were found in the present study area in different forms and formats. These are in the form of books, journals, articles, seminar papers along with online sources like e-book, e-journal, blogs etc. Among many more literature, only relevant literature from different sources on “Job Analysis of Library Professionals in Science and Technology Institutes of Assam: An Evaluative Study”, have been taken under consideration for the study. The present review of literature has been undertaken with a view to know the present state of affairs including the scope for further development on the same. It is difficult and likely to be impossible to cite all available literature, which are already published on the concerned area because large numbers of literature are being published in print and digital form. In recent time as there is overflow of literature on different aspects of online resources including the application of ICT, only some of the selected literature have been cited in the study. Printed as well as electronic including online resources covering different aspects of the study area have been scanned and discussed in brief. Following are some
of the micro and macro literatures appeared in different forms which are focusing on the study area.

During the literature survey it is found that only a few literature directly related to Job analysis of library professionals are available. It is also found that most of the relevant documents are in digital or electronic format and very few printed documents are related to the specific research area. Among the few printed mostly are from foreign publishers. The printed documents, digital documents available in different websites of e-journal, e-books and consortia have been consulted to have proper review of the literature already appeared. For the survey of literature personal visits have been made to universities and research libraries in different parts of Assam and Meghalaya. These are NEHU Library (North Eastern Hill University), Lakshminath Bezbaroa Library (Dibrugarh University), Lakshminath Bezbaroa Central Library (Indian Institute of Technology, Guwahati) and Central Library (Tezpur University). Further, the researcher has consulted thoroughly the UGC-Infonet Digital Library consortia and NLIST (National Library and Information Services Infrastructure for Scholarly Content) resources at the Krishna Kanta Handique Library of Gauhati University, Department of Library and Information Science, Gauhati University and at home using NLIST user id and password for downloading and studying the different full text documents and also to read the e-books. All these literature appearing in both printed and electronic formats are thus reviewed and surveyed to have proper knowledge and guidance on the total output of literature on the specific research topic.
A good number of documents both printed and electronic available in the libraries are searched and examined and are discussed in brief. A sincere attempt is made to give an overview of the literature analysis in the form of summary or series of annotation or description of each consulted work, with critical scrutiny of the researcher appended therein. The concept of literature review therefore is arranged in accordance with the development of ideas and within ideas so that it provides enormous convenience for the present purpose; besides, the arrangement is made in accordance with the date of publication of the consulted literature.

For the convenience to understand and present the review of literature, it is streamlined the literature in certain concepts. The entire literature survey is divided into important themes, keywords, concepts and ideas in relation with the study into sub topics. These concepts of the review are as follows; *Job Analysis, Job evaluation, Job Satisfaction, Science and technology in India, Science and technology in Assam, Libraries of science and technology institutions, Library professionals in science and technology (S&T) institutions.* Further while arranging the literature, the documents are arranged in chronological order as per their publication. It may be mentioned here that while regarding the standard of the review of literature concerned, the researcher has followed the APA (American Psychological Association) 6th edition Style <http://www.apastyle.org/> for the arrangement of the listed literature. Further while arranging the literature the documents are arranged chronologically as per they appeared.
**Job Analysis**

Job analysis identifies a particular work behavior and associated tasks that are required for successful job performance. Job analysis is widely recognized as a starting point that needs analysis for training and development activities of the in service employees. The content validity justification for basing training on a job analysis can be used for training evaluation. The utility of a job analysis does not end with selection and training need assessment, but can be extended to training evaluation. Job analysis is the procedure through which employers can determine the duties of these different positions and the skills, knowledge, characteristics of the employee. Job analysis produces information used for writing job descriptions and job specifications.

McFadden, and Norris (1946) in “*A case study in self job analysis*” have given a nice deliberation on the Indianapolis Public Library’s new position classification and pay plan basing on a job analysis pattern of all positions in the library. The authors have illustrated some points of the works done, such as Learn about Job Analysis, Supervision, interviews, Complexity of Duties, Position Classification, Activity of Administration, and Schedule Put into Effect. Further they opined that there is a strong need for more job analysis work in libraries. Expert’s help can be taken to accomplish it or can be carried out with a staff committee working under guidance. Indianapolis learned that there is a common ground upon which many similar jobs may be gathered, and this knowledge was gained without demolishing the staff ego. It has to be remembered that job analysis is a constant process, so whenever positions are changed, the analysis must be done again for further betterment.
Gluck (1996) in “Exploring the relationship between user Satisfaction and relevance in information systems” has stated the prime objective of the study as to bring better comprehensive of the relationship between relevance and user-satisfaction, the two dominant aspects of user-based performance in information systems. The ultimate outcome shows that relevance had strong relationships (gamma values from 0.74 to 0.89) with process, product and overall user satisfaction measures where as relevance and cost-benefit satisfaction measures had little significant relationship (gamma value of 0.049). This analysis also interpreted that relevance or user-satisfaction never subsumes the other concept, and the comprehension of the proper units of analysis for these measures helped to resolve the strange paradox of the management information system concerning user-based information system performance measures.

Rungtusanathan & Anderson (1996) in the book “A clarification on conceptual and methodological issues related to the Job Characteristics Model” have commented on ‘Comparing the effects of cellular and functional manufacturing on employee’s perceptions and attitudes’ by Shafer, Tepper, Meredith, and Marsh (Journal of Operations Management, 1995, 12, 63-74). Three significant conceptual concerns related to their description of the job characteristics model, along with two methodological concerns with the utilization of the job diagnostic survey to measure the five job characteristics and the motivating potential score as an aggregate index of a job’s 'motivating potential' have been identified and explicated so far, while explicating the author’s intention was to clarify and guide for further conceptual and empirical research in operations management involving the Job Characteristics Model, the Job
Diagnostic Survey, and the Motivating Potential Score. Thus the authors’ remarks are found to be constructive as well as in the spirit of scholarly advancement.

Lehner (1997) in “Reconsidering the Personnel Selection Practices of Academic Libraries” has criticized the usual methods for selecting academic librarians from the viewpoint of research on selection procedure. The author made remarkable statement that academic library methods could be improved by employing some of the current approaches presented in human resources management and psychology literature on personnel selection procedure.

Mathews (1997) in “An investigation into Internet training for academic library staff” has investigated on the issue of Internet training for academic library staff. The book covered an extensive literature search, a survey of 15 UK academic libraries, and personal interviews with three training librarians. The study also considered the development of the Internet in the field of academic environment and training in academic libraries. Analysis of internal training methods and external training courses were included in the study stated and implementation of formal evaluation procedures illustrated.

Nkereuwem (1997) in his precious book “Alleviating professional immobility among librarians in Nigerian universities” has conducted a very prolific survey among the Nigerian university librarians, and has given a detail deliberation on the different perspectives of career mobility. This includes sociological approach, psychological approach, job mobility in librarianship. The study really focused on the attitude of
University Librarians towards proposal for exchanges. This demonstrates that University librarians’ dilemma with respect to such proposal varies with their quality of the librarians concerned. Wide numbers were willing to positively consider the possibility of exchanges.

Chi (1999) in “A study on job placement for handicapped workers using job analysis data” has accorded job titles which could be accurately performed by various types of disabled workers. These job titles were selected basing on their loading scores on a number of critical job elements procured from a factor on job interpretation data. The author is of the view that the study results can be utilized by the Employment and Vocational Training Administration to expand both the counselor and counselee's attitudes about job possibilities and job requirements.

Jain (1999) in “On-the-job training: a key to human resource development”, has made survey of a total of 64 library users and 64 library staff (31 professionals and 33 diploma holders). The main on-the-job training needs were identified as: information technology, job orientation, customer service/public relations, marketing/publicity, refresher courses and managerial skills. These could be of immense importance in the study area.

Green, Chivers and Mynott (2000) in “In the librarian's chair: an analysis of factors which influence the motivation of library staff and contribute to the effective delivery of services” have suggested that ensuring a high level of staff motivation requires a range of managerial, sociological and psychological skills on the part of managers for which
they have had really very little training. These skills include effective communication with all members of the staff, the encouragement of good workplace relationships, involving the staff in the decision making process, helping staff to accommodate with change, promoting proper job rotation, recognising and rewarding genuine initiative and providing relevant training for staff, which proves to be really worth in the long run.

Messing Lippel, Demers and Mergler (2000) in “Equality and Difference in the Workplace: Physical Job Demands, Occupational Illnesses, and Sex Differences”, have given potential focus on the issue of struggles of women for secure and balanced integration in the workplace confront discourse on biological differences as well as the reality prospects of job/ worker interactions. Biological specificities in fact cannot be kept apart, particularly in blue-collar, manual jobs. Extreme job demands may sometimes be incompatible with the physical spare and capabilities of most women. Being experts in genetics, ergonomics, law, and physiology, the authors here argue that of biological differences between women and men is really essential in order that the workplace should be suitable to the physical dimensions and capacities of both sexes. The alternative to adapting jobs may be risky to women’s health issues and employment possibilities. However, resistance to integrated women has, little to do with biological differences and must be overcome by political acts. The authors have suggested for suitable action by consulting working women in the context of a partnership with labor unions in a collective manner.
Olorunsola (2000) in “Job rotation in academic libraries: the situation in a Nigerian university library” has profoundly examined to determine the staff opinion concerning job rotation at the University of Ilorin Library. The author observed that the reaction to the possible initiation of job rotation was generally positive. The study suggested that the library manager should consider the introduction of a fair policy of job rotation chronology in the library and indicates an opposite approach that could really be used when it is introduced.

McKillip (2001) in “Case studies in job analysis and training evaluation”, has prepared a job analysis and identified work behavior and its related tasks that are essential for successful job performance. It is widely recognized that job analysis is a starting point to analysis the need of training and development activities. Justification of the content validity and relevance for basing training on a job analysis can appropriately be used for training evaluation. The author has also explained that the effective training should only have an impact on job analysis for training evaluation.

Snyman (2001) in “Do employers really know what they want?: An analysis of job advertisements for information and knowledge managers” has investigated the business/practical world’s perspective of the role and responsibilities of the information and knowledge manager and established the analysis of the findings against a theoretical/academic background. Information about employment opportunities and requirements for the position of information and knowledge managers was extracted from job advertisements, which appeared in the three weekly national newspapers with the highest circulation figures in South Africa. The findings of the study revealed that
employers face problem in defining the position and role of the information and knowledge manager in their organisations. It also indicated in the study that organisations should be aware of the idea that what they communicate to the public via job advertisements can really reflect on their knowledge of information and knowledge management.

Croneis and Henderson (2002) in “Electronic and Digital Librarian Positions: A Content Analysis of Announcements from 1990 through 2000”, have examined job announcements published during one decade i.e.- 1990 and 2000 in College and Research Libraries. News that involved either the word “electronic” or “digital” in the position title. These positions were found to contain similar responsibilities, primarily because both apply technology to have access to information. The stated study findings demonstrated the nature, magnitude, and swiftness of changes in the profession that arrived owing to the use of technology. Libraries are paying more head to the use of electronic and digital information resources. Specific job responsibilities have been found to appear to handle resources. An increase in digital announcements is thus seemed to be prevalent.

Wade and Parent (2002) in “Relationships between Job Skills and Performance: A Study of Webmasters” have suggested an assimilation of organizational and technical skills demanded of Webmasters, and the degree to which those skills really influence the required job performance. The study recommended that employers intent to take up technical skills over organizational skills, where as the Webmasters consider organizational skills as more important in performing their jobs. It is also noted that
deficiency in both technical and organizational skills leads to lower category of job performance. Further, the effect of organizational skill deficiencies on job performance was pursued to be much more than that of technical skill lacks.

Raschke (2003) in “Hiring and Recruitment Practices in Academic Libraries: Problems and Solutions” has summed up that academic libraries need to change their recruiting and hiring procedures to stay competitive in the contemporary and changing marketplace. By taking too long to find and to hire talented professionals in a tight labor market, academic libraries are losing out on top candidates and limiting their potentiality to become innovative and dynamic organizations. Traditional, deliberate, and risk of hiring models lead to positions remaining open for long periods. Opportunities are lost as top prospects find other positions, and the result is a reduction in the overall talent level of the organization. To be more competitive and effective in their recruitment and hiring processes, academic libraries must foster manageable internal solutions, look to other professions for effective hiring techniques as well as models. Further, employ innovative concepts from modern personnel management literature should also be promptly made.

Wei and Salvendy (2003) in “The Utilization of the Purdue Cognitive Job Analysis Methodology” have interpreted the utilization of the Purdue Cognitive Job and Task Analysis methodology, the Human Centered Cognitive Performance model based Purdue Cognitive Task Analysis Questionnaire. The idea is that it not only analyzes jobs and tasks, but also deals with a mechanism for improving cognitive job and task
performance. Further, the utilization of this methodology could help to assess job evaluation, job design and job rotation, and personnel selection and training.

Givord and Maurin (2004) in “Changes in job security and their causes: An empirical analysis for France, 1982–2002” have scrutinized on the changes in the risks of involuntary job loss in France between the period of 1982 and 2002. These risks are higher in the 1990s than they were in the 1980s as the authors admitted. The study developed an econometric analysis to isolate the effects of institutional changes from the effects of contemporary technologies. The study also reveals that the rise in job loss rates is significantly much expressed in industries that have the largest share of R&D workers and the largest rate of new technologies’ users. These findings suggested that presence of technological changes contributed to decrease the incentive to keep workers for long period of time as well as to increase job insecurity in industrial sectors.

Prien, Prien and Gamble (2004) in “Perspectives on Non conventional Job Analysis Methodologies” have presented that the nonconventional approaches and methods could be applied to various job content domains, including work activity data and other job descriptors of job skills/competency data.

Smith (2004) in his “Continuing professional development and workplace learning 9: human resource development: measuring return on investment” has illustrated precisely on the outlines of multiple frameworks for the evaluation of human resource
development programs such as the return on investment model, the cost/benefit ratio approach, and bottom-line evaluation.

Johnson and Lindsay (2006) in “Why We Do What We Do: Exploring Priorities within Public Services Librarianship”, have investigated on the issue of which job components are really significant for public services librarians. The study revised the opinions about of librarians satisfaction and issue related to tenure and librarian education. The results showed a contradiction between what librarians regard as important to users and what really is important for achieving the scheduled tenure.

Kennan, Cole, Willard, Wilson and Marion (2006) in “Changing workplace demands: what job ads tell us” while discussing on the Australian snapshots over time showed that there is an increasing lack of clarity about the skills and competencies required for academic librarians. The American job ads as the authors stated seemed to rank jurisdictional knowledge and professional qualifications much higher than their Australian counterparts. The study also reveals that Interpersonal skills, behavioural characteristics and technical services skills are in high demand in both countries stated.

Reiter-Palmon, Brown, Sandall, Buboltz and Nimps (2006) in “Development of an O*NET web-based job analysis and its implementation in the U. S. Navy: Lessons learned” have described job analysis as the process of building block of most Human Resource functions. In recent years, many human resource functions have been automated or adopted to computer and technology applications; however, the use of computers for job analysis is somehow lagging. The study illustrated a web-based job
analysis process that is based on O*NET. The web-based job analysis process is more flexible and less resource intensive than the available traditional job analysis methods. The study further interpreted the application of the web based job analysis process in the U.S. Navy and discussed strengths and limitations of this system.

Bal, Lange, Jansen, Mandy and Velde (2008) in “Psychological contract breach and job attitudes: A meta-analysis of age as a moderator” have investigated on the influence of age concerning psychological contract breach and the development of job attitudes. The study revealed two dimensional pattern that the relations between contract breach and trust and organizational commitment were really stronger for younger workers, whereas the relation between contract breach and job satisfaction was stronger for older or aged workers.

Boyd (2008) in “Staffing the Commons: job analysis in the context of an Information Commons” has viewed on the application of principles from the area of industrial and organizational psychology on organizational analysis and job analysis to select successful candidates for employment in an Information Commons. The study concluded that the Library administration must provide time to formulate mission, value, goals and vision for the Information Commons while undertaking the organizational analysis and pattern.

Singh (2008) in “Job analysis for a changing workplace” has elaborated a proper review of the Job analysis of all human resource initiatives, making it a crucial management activity in every organization. The increasing competition, shorter
product life-cycles, rapid technological innovations, and the changing nature of organizational structures, its underlying assumptions have been confronting vital queries in today's dynamic work environment. The author stated that the methods followed by traditional job analysis are simply not applicable to many new and emerging jobs. Some authors feel that it might even be an obstacle to organizational uplift. This has led to calls for a more proactive and strategic approach to job analysis in order that the procedures would continue to be relevant. In the study the author emphasized the need for a strategic approach to job analysis, presenting a strategic job analysis framework, and discussing implications for organizational success.

Zhang (2008) in “Foreign Language Skills and Academic Library Job Announcements: A Survey and Trends Analysis, 1966–2006”, has examined that foreign language skills are vital for academic and research librarian positions. Technical and public services were most likely to require language skills, whereas administrator and system librarian positions are the least likely in the same aspect. Thus, the requirements show a constant development until the mid-1980s and a gradual decline after this point.

Choi and Rasmussen (2009) in “What Qualifications and Skills are Important for Digital Librarian Positions in Academic Libraries? A Job Advertisement Analysis” have examined the academic qualifications and skills required for professional positions engaged in digital resources, services, and technologies as changing patterns in contemporary academic libraries. The study clearly demonstrated the shifts in staffing needs and required qualifications with digital focus on collections, services, and technology applications in academic libraries. The outcome ascertained that a
digital librarian is an emerging position in trend in the academic libraries. LIS educational implications and further investigations to ensure the results are recommended properly.

Cumings and Coryn (2009) in “A job analysis for k-8 principals in a nationwide charter school system”, have seriously examined in total, 314 essential job tasks which were identified across 8 functional job categories. The job analysis condensed redundant job tasks and excluded job tasks that were not pursued by half of the subject matter experts (SMEs) that is a final set of 84 essential job tasks. SME’S ratings of the essential job task were based on multidimensional aspects that were used to measure job task importance. Out of 84, 46 essential job tasks were forward based on to achieve the level of quality importance in terms of reaching organizational goals. A collaborative group that included the job analyst, principal recruiters and one SME identified the knowledge, skills, abilities, and other characteristics (KSAOs) required for accomplishing the 46 essential job tasks. During the final phase of data collection, SMEs rated the KSAOs on the following dimensions: necessary for principal applicant to possess, practicality of finding a principal applicant with the KSAO, and consequence if KSAO is ignored in the selection process. Forty-nine of the 53 KSAOs was found to possess the criteria based on the ratings of the started dimensions

Laitinen (2009) in “Importance of performance information in managerial work” has analysed the connection between managerial job and importance of job-relevant performance information. The outcome of the study demonstrated that the type of job immensely influences the importance of different information types in managerial work.
However, information gap does not really depend on the type of work but on the contextual variables of the job.

Yoon and Kim (2009) in their “A study on the job analysis of public libraries in Korea” have elaborately studied on the jobs and duties involved in Korean public libraries. They have provided a clear picture of such relevant issues. Simultaneously a basic library duty model has also been presented reflecting rapidly the changing information technologies and information types of Korean public libraries basing on a few library duty analysis projects of advanced countries.

Zhu (2009) in “Employers’ expectations for head of technical services positions in academic libraries” has suitably stated that in the last one decade, technical services emerged with tremendous changes due to the impact of advances in technology, scholarly communication, research, information retrieval and higher education. The employers’ expectations for the head of technical services positions changed in the past 10 years or so. The study compared employers’ expectations for head of technical services positions in 1996–1998 to those in 2006–2008 to track the growing changes through job ad content analysis. Its outcome was really well-defined.

Jana and Panigrahi (2010) in “Motivating parameters for betterment of library services: an evaluative study among non-government college librarians in West Bengal”, have clearly enquired and identified the root factors behind the poor motivation towards work. They suggested motivating steps to initiate parameters for non-government college librarians in west Bengal. The study revealed that many factors like status,
salary, service conditions, recruitment and promotional policy and managerial relations, etc. are responsible for such low motivation. The authors suggested the authorities to initiate various motivating factors in order to have motivated non-government college librarians who can provide their best services in their respective institutions.

Peng, Hwang and Wong (2010) in “How to Inspire University Librarians to Become ‘Good Soldiers’? The Role of Job Autonomy”, have used a structural equation model to evaluate the effect of job autonomy on the relationship between job satisfaction and organizational citizenship behavior of university librarians in Taiwan. The findings indicated that this relationship is stronger when job autonomy is high. The authors further discussed a few implications for the librarianship profession, with developed skills.

Safdar and Rafiq (2010) in “Impact of Job Analysis on Job Performance: Analysis of a Hypothesized Model” have worked on the employees of Pakistan Public sector regulatory authorities of telecommunication, oil and gas, power, media, security exchange, banking sector and organizations are being regulated by these authorities. It is an attempt to develop and test a hypothetical model linking HR importance of job analysis with job competency of the employee. The survey result of 568 employees had showed that practice of job analysis was immensely combined to employe’s job performance. The findings of the study suggested that an organisation-wide policy of job analysis is an important source of competitive advantage in its own merit, and requires essential attention of HR professionals. The scope of the study and its findings
of the HR employee job performance research pursued in Western countries extended to a non-Western context.

Blount (2011) in “Employee management and service provision: A conceptual framework” has built up a novel idea regarding the technical and social subsystems in the context of e-commerce adoption. The author has explained that the employees interacting with customers using business-to-consumer technologies is very complex. Hence the employees here require different levels of skill and capability than those required in face-to-face interactions. The study provides implications for prolific human resource management processes such as job design, recruitment and retention, performance management and training.

Corrall and O’Brien (2011) in “Developing the legal information professional: A study of competency, education and training needs” has enumerated a wide range of competency requirements and clarified the required specific subject knowledge. Participants seemed to favour a feasible combination of formal and informal learning. Most participants as the study shows wanted specialised professional education specific for the sector.

Fourie (2011) in “Personal information and reference management Librarians’ increasing creativity” has presented the critical issues where librarians can assist end-users to consider the real implications of (personal information management) PIM and reference management to contextualise their job and task, as well as other information
needs such as studies and teaching, against what the latest technology can offer the users.

Goffin, Rothstein, Rieder, Poole, Krajewski, Powell and Mestdagh (2011) in “Choosing job-related personality traits: Developing valid personality-oriented job analysis” have developed a Personality-Oriented Job Analysis (POJA) process for choosing job-oriented personality traits. It was completed by using 15 expert raters and approximately 330 medical students each of whom completed at least six different “jobs” in which their job performance was evaluated. There was tremendous consistency across experts in POJA ratings of the job-relevance of personality traits. Further, POJA ratings of the personality traits were correlated with the actual criterion-validity of the traits. Traits that received the highest POJA ratings were prompted to predict job performance. The stated study is the foremost published work to present remarkable evidence of the criterion-validity of POJA.

“Efficiencies and responsible staff stewardship: a library manager's critical self-reflection” by Harris (2011) is a very prolific book where the writer has explored the myriad non-financial ways in which library managers persuade employees and address performance issues, reducing erosion and increasing productivity and satisfaction without increasing salaries. The study highlighted the issue of responsible staff and practical management to the forefront in an effort to engage library leaders and managers in a discussion about engaging with literature of other disciplines for suggestions on how to maintain productive, satisfied staff while confronting with fewer resources for rewarding good work.
Hu, Schaufeli and Taris (2011) in “The Job Demands–Resources model: An analysis of additive and joint effects of demands and resources” have inspected on the additive, synergistic, and moderating influences of job demands and job resources on well-being (burnout and work engagement) and organizational outcomes, as provide by the Job Demands–Resources model. The study opined with concluding remark that the hypothesized additive effects of the Job Demands–Resources model were present but the evidence for additional synergistic and moderating effects was found to be fable.

In the book “A study on the development of Korean academic libraries' duty model based on the job analysis” the authors Kim and Lee (2011) on the basis of their study reported that perceived levels of frequency, importance, and difficulty of duties in the field of academic libraries were surveyed and average values for each duty were compared and analyzed to prepare a duty model and action plan. A basic library duty model representing the rapidly changing information technologies and information types of Korean academic libraries based on the job analysis was thus presented with considerable caliber. It is hoped that through this process, university libraries will be able to optimize human resources management and achieve efficiency in organizational management. It would also create materials to support education/training and performance management, which would ultimately help in the process of the rationalization of their operation.

Laskowska (2011) in “Personal controlling as a management tool for library staff in the example of selected Polish libraries” has divided the strong and the weak points,
opportunities and threats existing in the library periphery, and thus eliminate accidental events and steer the activities to be adopted in the future. The possibility of controlling usage in the libraries optimizes exploitation of owned human resources and contributes to the achievement of the library’s purposes as the study revealed.

Wenjing (2011) in “Evaluation and Analysis of Job Satisfaction of Technical Staff in Energy_Enterprise-Based on a Sample Survey in Guangdong”, has pointed out that the lack and loss of the technical staff of energy enterprises has become the key bottlenecks that makes problems in the process of further development of the energy industry. The study makes an evaluation of the job satisfaction with aspects viz work itself, work rewards, human relations and business development vision of the energy enterprises relying on the job satisfaction surveys done on the technical staff in energy enterprises of Guangdong Province. It is pursued that the overall job satisfaction of energy enterprises were on a medium level of satisfaction index; the job satisfaction of work itself and work rewards are found to be relatively low.

Alhijji and Cox (2012) in “Performance measurement methods at academic libraries in Oman” have examined measurement procedures that are in vogue in various aspects of academic libraries in Oman. The outcome was that all libraries had used one or more methods in evaluating the upgradation of their services, including performance of their staff members. These methods include: surveys; reports; key performance indicators; statistics; and interviews, along with to appraisal forms which are essential for staff evaluation. Alongside internal evaluation by librarians, an external evaluation by Oman Accreditation Council and other international bodies took place in some libraries.
Ostberg and Elmroth (2012) in “*GJMF-A composable service-oriented grid job management framework,*” have investigated upon the best practices for grid software design and development, and thus propose a composable, loosely coupled Service-Oriented Architecture for grid job management. The architecture is designed for use in federated grid environments. It defines a model for transparent grid access with objectives to decouple grid applications from grid middlewares and facilitate concurrent use of multiple grid middlewares. The architecture model is viewed from the angle of an ecosystem of grid infrastructure components, and is presented along with a proof-of-concept implementation of the architecture.

Otopah and Dadzie (2013) in “*Personal information management practices of students and its implications for library services*” have examined the personal information management practices among the students and its implications for library services at the University of Ghana. The study outcome showed that format, skills, size of collection, memory, and habits became accountable for diverse personal information management practices among students. The study showed that inadequate skills, information fragmentation, inappropriate habits, and imperfect memory are the major demerits in this regard. These aspects if and when improved would really enhance the effectiveness of students’ personal information management practices.

Sare, Bales and Neville (2012) in “*New Academic Librarians and Their Perceptions of the Profession*” have talked about several development steps relevant for new academic librarians’ perceptions. The authors propounded a contextual theory consisting of six
categories that coined weigh upon novice librarians’ perceptions of the profession. (1) Deciding upon a career, (2) Experiencing graduate school, (3) Continuing education, (4) Defining the work, (5) Evaluating the work, and (6) (re)Imagining the future

**Job Satisfaction**

Job satisfaction is simply to know how people feel about their jobs and different aspects of their jobs. It is the extent to which people like or dislike their jobs in a wide range. As it is generally assessed, job satisfaction is an attitudinal variable. In the past, job satisfaction was approached by the researchers from the perspective of need fulfillment that is, whether or not the job met the employee’s physical and psychological needs for the things provided by work. Job satisfaction can be considered as a global feeling about the job or as a related constellation of attitudes about various aspects or facets of the job. The global approach is used when the overall or bottom line attitude is of interest.

D'Eliam (1979) in “The Determinants of Job Satisfaction among Beginning Librarians”, has identified the factors which are most highly related to job satisfaction among librarians. The study results indicated that job satisfaction among librarians is not related to their sex, the type of library in which they worked, or their vocational needs, but is related to the characteristics of their job environments. The supervisory climate and the intrinsic characteristics of the job itself are the two most important determinants of job satisfaction. The author suggested that a supervisory climate which permits a librarian to exercise initiative and professional judgment in the performance of the job is conducive to job satisfaction.
Leckie and Brett (1997) in “Job Satisfaction of Canadian University Librarians: A National Survey” have tried to explore the relationships between faculties, administration, and the participation of librarians in library planning and decision-making, university affairs, and professional activities. The authors argued that academic status librarians were significantly more satisfied with their involvement in university affairs and promotion and tenure processes, however they were not more satisfied with other dimensions of their work, such as workload and salary. Administrative librarians, on the other hand, were significantly more satisfied with most of the major aspects of work being measured, and perceived themselves to be much more involved in library planning and university affairs than the non administrative librarians.

Sierpe (1999) in “Job Satisfaction among Librarians in English-Language Universities in Quebec” has used Spector’s Job Satisfaction Survey to measure the job satisfaction of librarians in the three English-language universities in the Province of Quebec, Canada (Bishop’s, Concordia, and McGill). The study explained that although librarians working in these institutions are generally satisfied, they are however dissatisfied with communication and operating methods. The relationship between job satisfaction and demographic characteristics, such as gender, age, academic rank, and tenure status, were also investigated and compared with previous research findings.

Pors and Johannsen (2002) in “Job satisfaction and motivational strategies among library directors” have made the survey emphasizing on a whole array of topics linked,
connected with leadership qualities and proper perceptions of different challenges. The analysis correlated job satisfaction with a number of both extrinsic and intrinsic factors; however levels of job satisfaction among the library directors are present.

Burd (2003) in “Work Values of Academic Librarians: Exploring the Relationships between Values, Job Satisfaction, Commitment and Intent to Leave” has intended to study the role of values in the contemporary library. The study indicated that librarians in organizations that support participatory management, open communication, opportunities for achievement, and relationships built on honesty and trust, are more satisfied and committed, and less likely to leave. Libraries, characterized as bureaucratic hierarchies less satisfied, less committed, and more likely to leave the organization perhaps even the profession.

Pors (2003) in “Job satisfaction among library managers: a cross-cultural study of stress, freedom and job conditions” has done a survey on the British and Danish Library Managers and explored the concept of job satisfaction and its relation to stress, job content and job conditions. The study really evoked the theories of tentative explanation of national differences. The study analysed job satisfaction in relation to a range of demographic variables. On the basis of a multitude of questions and statements the author in the study forms several composite variables.

Togia, Koustelios and Tsigilis (2004) in “Job satisfaction among Greek academic librarians” have investigated on the issue of job satisfaction among academic librarians in Greece, used the Employee Satisfaction Inventory. The instrument had assessed six
dimensions of job satisfaction: working conditions; pay; promotion; job itself; supervision; and organization as a whole. The findings were that Greek academic librarians were found to be most satisfied with job itself, supervision, and working conditions where as with pay and promotion they are a bit less satisfied. Prior working experience contributed negatively to the prediction of satisfaction with working conditions, supervision, and organization as a whole, whereas participation in decision-making positively influenced job itself and organization as a whole.

Snipesa, Oswaldb, LaTourc and Armenakis (2005) in “The effects of specific job satisfaction facets on customer perceptions of service quality: an employee-level analysis” have included an unprecedented analysis of the effects of specific facets of job satisfaction on customer perceptions of service quality. The authors suggested that certain job satisfaction facets may have a larger effect on service quality than others.

Regha and Rani (2006) in “Job Psychograph of Library and Information Science Professionals in higher education institutes of Tamil Nadu” have opined straightly to find out the importance of certain traits as identified by library professionals employed in higher educational institutions in Tamil Nadu. The study revealed the fact that sincerity, clarity of thought, good interpersonal relationship and honesty are considered more important by LIS professionals then the teaching ability and empirical stability.

Bowling (2007) in “Is the job satisfaction-job performance relationship spurious? A meta-analytic examination” has analysed using meta-analytic data and suggested that the satisfaction–performance relationship is largely spurious. More specifically, the
satisfaction–performance relationship was discarded partially after controlling either for general personality traits (e.g., Five Factor Model traits and core self-evaluations) or for work locus of control and was almost completely eliminated after controlling for organization-based self-esteem.

Choo and Bowley (2007) in “Using training and development to affect job satisfaction within franchising” have ascertained some facts that the effectiveness and efficacy of a training program are dependent on evaluation of training quality, course design and learning experience. Employee satisfaction is found to be influenced by work environment, company values and job responsibilities.

Sousa-Poza and Sousa-Poza (2007) in “The effect of job satisfaction on labor turnover by gender: An analysis for Switzerland” have analyzed the effect of job satisfaction on labor turnover by gender using data from the first two waves of the Swiss Household Panel (1999 and 2000). The authors confirmed that job satisfaction is a very good predictor of future quits and, more important, reveal that job satisfaction does not influence the inclination to become non-employed; that is, neither men nor women self-select out of the labor force due to dissatisfaction. The authors clearly refuted the claim that the gender/job satisfaction paradox (i.e., the fact that women tend to be more satisfied at work than men) is being driven by self-selection. The authors illustrated that, based on job satisfaction information and quitting behavior, there is no apparent difference in firm attachment between men and women.
Tella, Ayeni and Popoola (2007) in “Work Motivation, Job Satisfaction, and Organisational Commitment of Library Personnel in Academic and Research Libraries in Oyo State, Nigeria” have talked in detail about the new information and a new perspective, of job satisfaction, motivation and commitment of librarian particularly in the context of Oyo state, Nigeria. The findings of this study revealed that a correlation exists between perceived motivation, job satisfaction, and commitment, although correlation between motivation and commitment was negative. The author observed no difference in the perceived motivation of professional and non-professional library personnel. The study showed that differences exist in the job satisfaction of library personnel in academic and research libraries, and that no relationship exists in the organizational commitment of library personnel based on their years of experience.

Bowling and Hammond (2008) in “A meta-analytic examination of the construct validity of the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale” have used meta-analysis to examine the construct validity of the Michigan Organizational Assessment Questionnaire; Job Satisfaction Subscale. As far as outcome of the study is concerned it showed that the Michigan Organizational Assessment Questionnaire; Job Satisfaction Subscale became a reliable and construct-valid measure of job satisfaction.

Chen (2008) in “Job satisfaction among information system (IS) personnel” has examined relationships between achievement motivation and job characteristics on job satisfaction among information system personnel. The study results revealed that the dimensions of the achievement motivation of information system personnel are
perseverance, competition and difficulty control. Regarding job characteristics, the job characteristics of information system personnel are task identity, professionalism, feedback, autonomy and significance. Moreover, the dimensions of the job satisfaction of information system personnel are social, job-related and self-actualization satisfaction. Job characteristics affect the job satisfaction of information system personnel and job characteristics and job satisfaction are positively related. Regardless of whether information system worker achievement motivation is high or low, information system workers engaged in jobs with high job characteristics have higher job satisfaction. Jobs with the features of feedback, professionalism and autonomy can most easily increase the job satisfaction of IS personnel.

Lim (2008) in “Job satisfaction of information technology workers in academic libraries”, has examined the job satisfaction of library professionals working with Information Technology (IT) in relation to demographic, socioeconomic, and work related variables, such as a sense of belonging, faith in wanting to belong, a feeling of acceptance, paying dues, job autonomy, the broker's role, and promotion opportunities. The study found that IT workers salary, for an master of library science degree, a sense of belonging, faith in wanting to belong, a feeling of acceptance, job autonomy, and promotion opportunities were related to job satisfaction of the library. The study further provided some explanations as to why some IT workers are more satisfied with their jobs than others, thereby contributing to improving the quality of their work lives.

Shahu and Gole (2008) in “Effect of Job Stress and Job Satisfaction on Performance: An Empirical Study” have attempted to examine the relationship between job stress, job
satisfaction and performance among 100 managers of private manufacturing firms. The study recommended that higher stress levels are related to lower performance while higher job satisfaction indicates higher performance.

Mallaiah (2008) in “Performance Management and Job Satisfaction of University Library Professionals in Karnataka: A Study” has discussed performance management and job satisfaction of university library professionals in Karnataka. The author concluded that the conducive and congenial physical, social, and psychological conditions present in the workplace have potential to enhance the job satisfaction of the library professionals. The bottom line is that library administration should pay proper, adequate, and timely attention to the interaction and reinforcing nature of ‘Motivation Performance Satisfaction’ cycle.

Mallaiah (2009) in “Management of employee expectations, performance and satisfaction in university library: An empirical study” has unfolded some major implications for management system and process in university libraries. The study reported on the view and perception of university library professionals in respect of their job, job environment and organization in addition to identifying and analyzing the key individual, work and organizational characteristics influencing their performance expectations and job satisfaction. The author looked forward to that the consequence of the study will help library administrators in managing library personnel effectively and efficiently.
Adio and Popoola (2010) in “Job satisfaction and career commitment of librarians in federal university libraries in Nigeria” have examined the dissatisfaction of library users and the manager of each federal university library vis-à-vis the complaint of the librarians working in those libraries on inadequate funding, lack of promotion, poor condition of service and lack of recognition which affected their dedication and career commitment. The study propounded that job satisfaction has significant influence on career commitment of librarians working in the federal university libraries. The study also focussed that demographic variables and job satisfaction were accounted for 20 percent in variability of career commitment of the respondents.

Hart (2010) in “Job Satisfaction in a South African Academic Library in Transition” has noted that the key positive finding of the study was that 61% of respondents reported regarding overall job satisfaction-with the core work of an academic library, providing for the information needs of clients, the source. However, it is also mentioned that only 51% claimed to be proud to work at their library and 50% are open to other job offers. The causes behind the restlessness included a sense of stagnation, frustration with inadequate resources, and anger at poor financial connection.

Judge, Piccolo, Podsakoff, Shaw and Rich (2010) in “The relationship between pay and job satisfaction: A meta-analysis of the literature” have used meta-analysis to estimate the population correlation between pay level and measures of pay and job satisfaction. The study results suggested that pay level was correlated 0.15 with job satisfaction and 0.23 with pay satisfaction. The authors clearly explored the extent that despite the
popular theorizing, results of the study showed that pay level is only marginally related to satisfaction. Theoretical and practical implications of the results are discussed.

Pedrycz, Russob and Succi (2011) in “A model of job satisfaction for collaborative development processes” have reflected on existing models of job satisfaction in collaborative environments, create one for modern software development processes, and validate it with a retrospective comparative survey run on a sample of 108 respondents. The study investigated the impact on job satisfaction and its model of the agile practice of Pair Programming that pushes job sharing to the extreme. The findings showed that Pair Programming actually carried a strong positive effect on satisfaction, work sustainability, and communication.

Sell and Cleal (2011) in “Job Satisfaction, Work Environment, and Rewards: Motivational Theory Revisited” has discussed that psychosocial work environment factors like information about decisions concerning the work place, social support, and influence, have significant impacts on the level of job satisfaction. The author have brought into focus that the maximizing rewards did not compensate public employees to an extent that ameliorated the negative effects on job satisfaction of experiencing low levels of any of these factors whereas influence did not impact job satisfaction of private employees.

Wenjing (2011) in “Evaluation and Analysis of Job Satisfaction of Technical Staff in Energy Enterprise-Based on a Sample Survey in Guangdong” has critically evaluated the job satisfaction with aspects of work itself, work rewards, human relations and business development vision of the energy enterprises. The study was based on the job
satisfaction surveys of technical staff in energy enterprises of Guangdong Province. The author expressed that the overall job satisfaction of energy enterprises is on a medium level of satisfaction index; the job satisfaction of work itself and work rewards are found to be relatively low. The job satisfaction of technical staff in various types of energy enterprises is generally worrisome.

**Job Evaluation**

Job Evaluation is a method or framework for comparing the different jobs even though they are not somewhat similar. The content of the job is examined against a number of criteria or factors. Job evaluation is the process of establishing the value of jobs in a job hierarchy. Job values may be determined by negotiation or fixed on the basis of broad assumptions about market rates and internal relativities. Job evaluation is a comparative process based on a whole series of tasks, responsibilities and obligations, including the skills, knowledge and mental agility required qualities of initiative, reliability of the employees and so on. It aims at establishing pay structures that are fair and equitable in the sense of ensuring equal pay for jobs demanding what are considered to be broadly similar sacrifices and of rewarding appropriately the greater efforts and hardships involved in some jobs as compared with others.

Pigage and Tucker (1952) in their book “Job evaluation” describe all types of issues regarding the labour management and secure the facts which will lay the foundation for future progress in the whole field of labour relation. This book is designed to carry out these aims by presenting information and ideas on subjects of interest to persons active
in the field of labour management relation. This book is non technical, for general and popular use.

Armstrong and Murlis (2004) in the book “Reward Management: A Handbook of Remuneration Strategy and Practice” have described based on the authors' experience, research and benchmarking activities, this definitive book explains that reward management is about performance- of individuals, teams and the whole organization. It examines in detail the processes and various approaches that can be adopted to achieve and reward outstanding skill and competence levels in the workplace. Comprehensive and highly practical in its approach, it takes a strategic perspective and addresses the wide gap that exists between theory and practice, with a focus on the implications for practitioners.

Armstrong and Cummins, (2005) in their book “The Job Evaluation Handbook: A Guide to Achieving Equal Pay” discusses on job evaluation which focuses on equal value issues, dealing not only with job evaluation techniques but also with the practical implications of using job evaluation to achieve equal pay and provide essential data for use in equal pay reviews. In the light of increasing awareness of the need to take action to remove gender pay inequalities and the considerable work recently carried out by the Equal Opportunities Commission on developing equal pay guidelines and procedures for conducting equal pay reviews.

Ogheneruemu (2007) in “Evaluation of the Practicum Trainee Librarians at Delta State University” discusses the students' Industrial Work Experiences Scheme as a
skills training programme, which forms part of the approved minimum Academic Standard in the various degree programmes for all Nigerian Universities. It is an effort to bridge the gap between theory and practice in engineering and technology, sciences, agriculture, medicine, management, and other professional educational programmes in Nigerian tertiary institutions. It teaches students about machines and equipment, professional methods, and ways of safeguarding work areas and workers in industries and organizations.

Barom (2012) in “Job rotation program evaluation: the Niger Delta University Library” has Evaluated the Niger Delta University Library job rotation program, including the impact of the program on newly employed librarians and their job performance, and the university library. The study revealed that the job rotation program is an important program for allowing librarians to acquire new skills, enhance staff productivity, develop new relationships across the university library and gain skills needed for future career advancement. The study result showed that the interviewed people are highly satisfied with the job rotation program.

Science and Technology in India

The progress of S & T in India is quite significant. Many new methods, products and better quality goods have been developed in the country. India has made rapid progress in the frontier areas of S & T like space research and atomic energy. At present the country has a strong base in modem technology. It also has the third largest scientific and technical manpower in the world.
Buchanan (1965) in “Technology and social Progress” has described about the impact of technology on modern society. Technological achievement has enabled the enormous increase in the productivity of industry, and thereby enabled the industrial society to maintain an ever-growing population at a rising standard of living.

Grogan (1976) in “Science and Technology an introduction to the literature” described that scientists must be totally circumspect, must expunge every trace of their own personalities from their work, as they record only what is there. The scientist must view the world through some impersonal ocular device, the spectacles of objectivity, rather than through the eyes of a person. The scientist must weigh the world not in a hand but in a balance; must measure it not with a stride but with callipers.

Clarke (1985) in “Science and technology in world development” describes that S & T are of great importance in the world today. Science today can alter the conception of human being. In the 19th century, science based technology began to transform the whole industries. The advent of modern technology has transformed the whole industries and has even changed the ideas of work.

Olby, Cantor and Christie (1990) in “Companion to the history of modern science” describe that there is not only the curiosity of general reader about development of modern science but scientists and specialists is also curious to know about it. The authors describe quantitative analysis of science and scientific development. The authors have described various innovative concepts for developing the society using the S & T.
Pikay (2002) in “New science, technology and innovation developments in India” has reviewed the S & T policies of India and how these have fashioned India’s technology capability over the years. The paper demonstrates that while India has achieved enormous strides in the area of science, technology and innovation, inappropriate policies in the past have hampered the development of an effective national innovation system. The author concluded by drawing lessons for the development of an EU-wide S & T policy.

Watson, Crawford and Farley (2003) in “Strategic approaches to science and technology in development” has examined the different ways of S & T to support poverty alleviation and economic development and how these themes have been given emphasis or short shrift in various areas of the World Bank’s work. They presented policy options for enhancing the effectiveness of S & T systems in developing countries, review the previous experience of the World Bank and other donors in supporting S & T. The authors have suggested some change patterns that the World Bank and its partners should adopt to increase the impact of the work currently undertaken in S & T basically in the areas: education and human resources development, the private sector, the public sector and information communications technologies.

Shivani & Khorana (2012) in “Technical education system in India: Present Scenario” have conducted an elaborate study on technical education system in India. The authors’ main objective is to understand the concept of technical education system and some
useful insights on the underlying philosophy, policies, choices and rationale, which have helped to shape the systems of technical education and training in India.

Gaikwad and Solunke (2013) in “Growth of Higher Education in India” have profoundly examined and established that in the process of expansion of higher education the problem of disparity has also been raised. The paper also added that merely growth of higher education will not serve the basic purpose of education policy. It is necessary to monitor and guide the Universities and colleges to provide quality education to the masses. There are some Universities and colleges with poor infrastructure, lack of skilled manpower creating barriers in providing quality education. There should be strict rules and regulations to avoid malpractices and unhealthy practices in some institutions related to the higher education.

Unnikrishnan and Das (2014) in “Technical education in India: challenges and prospects” have made a study and explored the current scenario of Technical Education prevailed in the country, the different challenges faced along with the future prospects. Further, it is very unfortunate that the overall scenario of higher education in India does not match with the global quality standards. Hence, there is a need of enough and increased assessment of the quality of the all educational institutions for better performance.

Science and Technology in Assam

The Assam Science Technology & Environment Council (ASTEC) was constituted in 1986-87 as an autonomous Council of the Department of Science Technology &
Environment, Govt. of Assam for implementation of some of the major programmes in the sectors of science and technology, remote sensing, energy (non-conventional and renewable sources) and environment as the institutional organization of the Department to formulate policies on various aspects of science, technology and environment which are in the interest of the state and the country.

Naskar (2009) in “Higher Education in the NER: Current Situation and the Initiatives Adopted” has analysed the scenario of higher education in the North East region. The study highlighted upon the very limited scope of higher and specialized education in the region, apart from the relative intra state gap in terms of availability of education. The paper made an understanding of why national or international academic institutions have not been proactive about expansion in these areas for so long. Political instability, insurgencies and internal displacement have largely discouraged the national and international education institutions to spread their wings in the North East region.

Pant (2011) in “Technical Education in North Eastern India: Problems and prospects” has made an attempt to study the problems in Technical Institutes of North Eastern India and suggested some remedies to enhance their role in shaping India's global economic position. The author has explained that the limited institutions imparting technical education due to continuous negligence and inadequate infrastructural and other facilities are increasingly getting infected with numerous problems. This effects the overall development of these states, which otherwise holds very high promises and has potential to ‘turn economy of these states around’.
Saikia (2013) in “Challenges of higher Education in Assam for Development of Human Resources” has highlighted the perceptible challenges of higher education in Assam in the way of developing human resource and management in the State. The author also described a comparison of Higher Education in India in general and in Assam in particular. Further the author has tried to disclose the points which are barring to perform its optimum role in the direction of Human Resource Development.

**Libraries of Science and Technology Institutes**

Science and Technology Institute libraries play an important role in the educational and research needs for all the students, scientists, research scholars. The S & T Institute library serves the user by providing specific information to the user. The advances in the information technology and society have led a considerable effect on libraries and their services. These advances in the technology have forced the libraries for the use and application of these modern technologies.

Barman and Thakuria (2010) in “Re engineering of Systems and Services of Selected Technical Institute Libraries in Assam: A Qualitative Study” have explained the status of re-engineering concept of some major libraries and their services. The authors have also suggested some remedial measures for improvement in the context of digital environment. The paper provided a detail idea along with action plans how a quality system can be established through re-engineering of library setup and services.

Karmakar, Chaudhury and Goswami, (2012) in “Use of online resources among the students of science and technology libraries of Guwahati: A study” had tried to evaluate
the use of online resources among the science and technology students of selected libraries of Guwahati and examined the problems in accessing the online resources, student’s level of satisfaction, frequency of use and various aspects of online resources.

Satpathy, Sarma and Sarma (2012) in “E-Resource Management in Technical Institute Library: A Case Study on NIT Silchar” the authors defined the concept of e-resource highlighting the different aspects like uses, advantages, policies, price and copyright. The study has also enumerated the e-resources subscribed by NIT Silchar and presented a case study on e-resource management of the Central Library of NIT Silchar.

Library Professionals in Science and Technology Institutes

The volatile and pervasive nature of technological change presents libraries and librarianship with unprecedented challenges. At the same time, a section considers in the field consider these changes as opportunities. While ownership of print collections is yielding to across and customize delivery of relevant ideas and information in an increasingly electronic information environment, those librarians who embrace change and chance risk are likely to have evolved a new customized information paradigm for librarianship.

Osorio (1996) “Library Services for Engineering and Technology Distance Learning Programs” has made a study on seventy institute libraries offering academic programs in engineering or technology fields through distance learning and reports that general libraries are providing available services to distance learning program students by expanding existing ones, rather than creating services exclusively for distance learning.
students. Libraries are also experimenting with pilot programs on different ways to serve these users. On the other hand, there are indications that the institutional support to libraries for these services is at a minimal level. There are some apparent variances on the level of services that offered to bachelor, master and beyond master programs.

Vasishta (2007) in “Status of libraries in higher technical education institutions: with special reference to deemed universities of North India” has examined the conditions in the libraries of the technical deemed universities of north India. The author has enumerated the strengths and weaknesses of the libraries. Based on the survey findings the author has forwarded some suggestions. The author also stated that these suggestions are useful for planning and policy making of libraries particularly in technical deemed universities.

Jayaraman (2009) “Science, Technology and Innovation Policy in India under Economic Reform: A Survey” has concluded in a study that the Indian Science, Technology and Innovation system still substantially depend on the capacities built in an earlier era. The author has made it clear that the original drive for scientific and technological development is powerful enough to have delivered in many ways even when the policy substantially downgraded.

Satpathy and Maharana (2011) in “ICT Skills of LIS Professionals in Engineering Institutions of Orissa, India: A Case Study” have revealed that the LIS professionals working in various engineering institutions of Orissa are mostly computer literate and have acquired considerable basic ICT skills to manage the library. The authors have
also affirmed that there is enough scope to enhance their ICT skills and to implement these skills in libraries to provide modern ICT based library services to users. The authors have also made some suggestions for the improvement of ICT skills of LIS professionals.

The overall literature review has concluded with the presupposition of the circumstances of the present study. Throughout the literature survey it is found that only a few literature directly related to core area of the subject study are available. A sincere attempt is made to give a total overview of the study area as well as to make an effort to cover available literature assessed in my study period. It is really very difficult to cite and cover all or even part of the literature published till date on the area of study, as mentioned earlier. At the end, the references are arranged as per author’s surname alphabetically.