Chapter - II

Review of Relevant Literature

This Chapter covers the extensive review of the selected topic of the study. Researcher has reviewed books, national, international journals, various reports and commissions recommendation related with the topic. The review is taken with subtopic as review on expert system, review on higher education and review on quality assessment.

Review of Literature.

- Review of literature on Expert System
- Review of Literature on Higher education.
- Review of literature on Quality assessment and enhancement.

2.0 Introduction

The Researcher has made an attempt to have an access to the relevant literature pertaining to the study. An attempt is made to make review of articles concerned with Higher education, expert system and other related topics pertaining to the research area. However it has been noticed that limited research has been carried out in this subject and whatever available references have been detailed below.
Literature Review:-

2.1 Review of Expert System

The expert system has developed from a branch of Computer Science known as Artificial Intelligence (AI). AI is primarily concerned with knowledge representation, problem solving, learning, robotics and development of computers that can speak and understand human like languages.

The 1950 started the real development of AI and related programming languages. During the early 1950s, Arthur Samuel of IBM developed the first game playing program for checkers. The Samuel machine learning programs were responsible for high performance of the checkers game player. By the mid of 50s the term “Artificial Intelligence (AI) was coined by John McCarthy of MIT. In 1956 Dartmouth Conference, the first conference devoted to AI, later he invented the LISP language. At almost the same time, Allen Newell, J.C. Shaw and Herbert Simon wrote and demonstrated the Logic Theorist (LT) the first running AI program. The trio later demonstrated a General Problem Solver program. The decade ended with Marvin Minsky and John McCarthy by starting a Laboratory at MIT devoted to the study of AI. In 1960 James Salge of MIT used LISP to write the first symbolic integration program. In 1962, the first Industrial Robot Company, Unimotion Inc. was founded. In 1965 J. Allen Robinson invented a mechanical proof procedure, the resolution method, which allowed programs to work efficiently with formal logic as a representation language. Lotfi Zadeh brought fuzzy logic to prominence. At MIT Joseph Weizenbaum built ELIZA, an interactive dialogue expert system. In the year 1960 the development of much knowledge based AI applications that imitated scientific methods were developed. On the west coast at Stanford, Edward
Feigenbaum, Joshu Lederberg, Bruce Buchanan and Georgia Sutherland developed DENDRAL, the first such program for scientific reasoning. In MIT Joel Moses demonstrated the power of symbolic reasoning for integration problems in the MACSYMA program the first successful knowledge based program in Mathematics. Another MIT researcher, Richard Greenblatt built a knowledge based chess playing program MACHACK.

During the 1970s AI applications were developed with the goal of being more useful to people. Jamie Carbonell developed SCHOLAR an Interactive program for Computer aided instructions based on semantic nets as the representation of knowledge. Alain Colmerauer developed the PROOLOG language in 1972. The Stanford team from 1972-1980 developed first rule based expert system MYCIN. It demonstrated the power of rule based systems for knowledge representation and inference in the medical diagnosis and therapy profession. In 1970 Jack Myers and Harry Pople at the University of Pittsburgh developed a expert system INTERNIST was an knowledge based for medical diagnostic designed to help Doctors diagnose their patients. It was based on Jack Myers clinical knowledge.

**Review of BOOKS:-**

Baggeley, John and Beawati, Tina (2010) [1] have studied use of technology in extended the education in the distance mode so that maximum learners can take the benefit. They have given the network model for use of educational material through theses system. Problems and prospectus of distance learning are given so that the education system can be improved.

Bamett Ronald (1992) [2] has given the total quality care and its implementation in higher educational Institutes in the book entitled “Improving higher education Total quality care “ he has discussed various parameters of quality and means to improve. The stakeholders are the
important to maintain total quality management in higher educational Institutes.

Danny Kopee and Stephen Lucci (2013) [3] the authors have given historical perspective of Artificial Intelligence to current advanced topics in AI. The examples are given using Dijksra’s algorithm. The expert system case studies with application of expert system in business organisations.

Ian Millington (2009) [4] author has highlighted on modern approach to Artificial intelligence approach. He has discussed various application of AI to natural language processing and game theory. He has given some examples which can applied in business organisations.

K. Warusick (2011) [5] The author has explained basic concepts of AI in a very easy and lucid manner the expert systems with rule based are discussed by writing rules for business application, he has also given model of expert system with inference engine working and concept of knowledgebase with way to store in different techno is given by the author.

Peter Norvig (2012) [6] author has explained the artificial intelligence with modern approach concept he has discussed artificial intelligence and various applications of AI to recent devices and he has given examples with respect to Prolog and LISP . The Artificial Intelligence difficulties in implementing in recent devices are also given in detail.

Review of JOURNALS:-

Abdur Rashid Khan et.al, [1] (2011) the authors paper depicts adaption of expert system technology using fuzzy logic to handle qualitative and uncertain facts in the decision making process. An expert system is developed and applied to the acquired knowledge about the problem domain that showed interesting results providing a sketch for students and
researchers to find solutions to such problems related with teachers performance.


Ashwini Kumar [3] (2005) studied the expert system application for learning and explained domain information, user representation and students evaluation in web support technology.

Ashish Kumar et al. [4] (2006) The Quality of Education being offered in institutions of Higher Education is a question being debated widely. With the growing cost of Higher Education in India, the question has become especially pertinent for all its stakeholders – students to policymakers alike. This paper attempts to look into IT based Knowledge Management as a techno-management tool for redressing their concerns. Various probable avenues are discussed where IT based KM interventions could make an impact on the existing Indian Higher Education system. For example by affecting the overall quality of Higher Education in India and in addition making it more stakeholders friendly. An insight about the priorities assigned to various IT based KM interventions in different areas of Indian Higher Education System is statistically analysed, based on the inputs from a cross-section of Indian Academia. Adoption of the proposed system shall not only improve the “Quality of Service (QoS)” but also decrease the economics of Higher Education in India. The authors have designed the questioners to the stakeholders and various factors related with quality are studied.
Belousa I (2002) [5] (2002) has explained the spirituality in education system. He has traced on moral, personality and other factors affecting the learners. He has explained how to create the good environment in the educational Institutes. He suggests that it complements the system of the education.

Bonnet A. Phston J-M Truong [6] (1988) The Authors have conducted research in Artificial Intelligence. They have studied practical applications of Artificial Intelligence. Prominent among these applications are the body of aids to decision making now known as expert systems. Which AI, to reproduce in the Computer the way in which a human being reasons and calls on past experience and stored knowledge when faced with problem. Authors have discussed various applications of expert system in business applications and implementation of expert system is given in detail.

2.2. Review of Expert System In Higher Education

Berit Kjeldstad[7] (2003) The author has explored why academic leadership matters in developing education, quality assurance reforms and qualification frameworks where study programmes are developed based on learning outcomes, credits and different types of learning. Many universities have introduced predefined study programmes for most students. In Norway, this principle was introduced in 2003 as a part of the Bologna Process. Some programmes are inter-disciplinary and students take courses at many departments or at different faculties.

D.E. O Leary et al [8] (1989) have reviewed the applications of expert system in auditing and identified the benefits of expert system to the auditors as a aid for auditing.

Dr. M Anandakrishnan [9] (2004) Has traced on involvement of students in the quality enhancement processes of their academic life yields substantial
personal returns on their investment of time and effort during their learning phase, besides creating an enduring bond with their institutions in later life. It is of immense value in the maturation process of young minds, leading to leadership traits and responsible behaviour. The prestige of the institution is continuously advanced, by the quality of graduates. The prospects and constraints in involving students in quality enhancement need deeper examination in the Indian context.

Dr. R.V. Kulkarni, S.S. Gulwani [10] (2011) have reviewed a framework for knowledge management methods its practices and technologies in their paper knowledge management methods are required for extraction of knowledge from experts from the domain.

Dr Jagannath Patil [11] (2011) ‘Student participation in Quality’ is the recent initiative launched simultaneously by the NAAC and PQN- Asia Pacific Quality Network. The APQN project on Student Participation in Quality Assurance aims to collect, analyse and disseminate theory, good practices and experiences of student participation in quality assurance in Asia Pacific Region.

This paper provides the snapshot of findings of this mapping exercise undertaken by the author as the Project Group Leader of APQN project on student participation. About 150 HEIs including accredited as well as not accredited colleges/universities in India have responded to the survey which included a structured questionnaire followed by brief interaction with select HEIs. The paper also highlights some of the good practices in student participation in HEIs and QAAs across Asia-Pacific. The interim survey
report essentially provides a reflection on the facts and fictions about student participation and tries to present a roadmap for generating demand for the Quality from the bottom i.e. from the students.

Fan, J. P., Tina, K. M., & Shue, L. Y [12] (1996) The authors have presented an educational supporting system that constructs a parallel structure besides an actual university and even beyond has been presented. To handle and improve such higher education system architecture as a backbone to access goals in various educational activities has been proposed. This construction core is designed and based on an expert system. An expert system has been used to increase the achieving capabilities, minimize cost and increase the reliability.

H. Chris Tseng [13] (2007) has studied the system with respect to neuro-fuzzy techniques in handling vague, large-scale and unstructured data is an ideal match for internet related problems.

Jay E. Aronson [14] (2004) has traced on the basic concepts of artificial intelligence (AI) The subfield of computer science that is concerned with symbolic reasoning and problem solving. Expert A human being who has developed a high level of proficiency in making judgments in a specific, usually narrow, domain. Expert systems shell a computer program that facilitates the relatively easy implementation of a specific expert system. Similar to the concept of a decision support system (DSS) generator. Inference engine The expert system component that performs reasoning. Knowledge Understanding, awareness, or familiarity acquired through education or experience. Anything that has been learned, perceived, discovered, inferred, or understood. Knowledge acquisition the extraction and formulation of knowledge derived from various sources, especially from experts. Knowledge base a collection of facts, rules, and procedures
organized into schemas. The assembly of all of the information and knowledge of a specific field of interest. **Knowledge engineering** the engineering discipline through which knowledge is integrated into computer systems to solve complex problems normally requiring a high level of human expertise. **Knowledge representation** formalism for representing facts and rules about a subject or a specialty. **Production rule** A knowledge representation method in which knowledge is formalized into rules containing an IF part and a THEN part. **AN EXPERT SYSTEM (ES)** is a system that uses human knowledge captured in a computer to solve problems that ordinarily require human expertise. The term expert system was derived from the term *knowledge-based expert system*. Expert systems imitate the reasoning processes of experts in solving specific problems. The main purpose of an ES is to provide expertise to a novice user, who can then exhibit expert-level performance in their decision making. ES propagate scarce knowledge resources for improved, consistent results. These systems can also be used by experts as knowledgeable assistants.

**K.P. Tripathi [15] (2011)** reviewed on the topic knowledge based expert system its concept and architecture for Birla corporation human resource, data is used to test the system. He has highlighted on special issues of inference engine and knowledgebase.

**Maithili Arjunwadkar, Dr. R.V. Kulkarni [16] (2010)** have studied on robust security model for biometric template protection in which prevention technique is used to secure template by session key. The session key is generated using chaotic phenomenon. The session key generated using this approach, makes this model robust to avoid risk of guessing of session key.

**Maithili Arjunwadkar, Dr. R.V. Kulkarni [17] (2010)** The authors have suggested the rule based intelligent intrusion detection and prevention model
for biometric system that contains scheduler to prepare schedule, when to check different logs for possible intrusions, detectors to detect normal or abnormal activity. If abnormal activity found the rule engine fires the rule to detect intrusion point and type of intrusion. The model also contains an expert system to detect source of intrusion and suggest best possible prevention technique and suitable controls for different intrusions. This model is also used for security audit. The researcher can also use these models in Institutions of higher education as a security model.

**Mariana Hentea [18] (2007)** has discussed that there is a need for the increase of automated auditing and intelligent reporting mechanism for the cyber trust. Intelligent system are emerging computing systems based on intelligent techniques that support continuous monitoring, controlling and decision making by providing mechanism to enhance the active construction of knowledge about threats, policies, procedures and risk, author also focused on requirements and design issues for basic components of the intelligent system.

**Paranto, S. And Neumann [19] (2006)** this paper describes the results of using a simulated testing package to assess student performance in an advanced computer applications course. A pre-test/post-test format was utilized in assessing whether the level of knowledge and skills attained by students who completed the advanced course increased significantly when compared to the knowledge and skills the students possessed when entering the course.

**S.H. Abbas Mehdi, T. Padma [20] (2007)** the authors have provided an overview of the main components of Intelligent Tutoring System. These systems achieve their Intelligence by representing pedagogical decisions about how to teach as well as information about learner. They have
discussed current trends in the application of AI in education. Finely it leads to future directions of Artificial Intelligence in education field.

**Tiberiu Marius et. [21] (2004)** have developed student’s evaluation of the teaching staff by using feedback forms. The data is stored in Mysql database, they have used PHP programming.

**Turban, E [22] (1988)** the author elaborates an overview of expert systems. The expert system technology is provided from a development point of view. The intent is to provide assistance in the practical aspects of constructing expert systems. Emphasis is placed on the benefits and limitations of expert systems, the various phases of the development processes, and the software tools used to expedite the development. Special attention is given to the interface with engineering management.

### 2.3 Review of Quality in Higher Education.

The researchers have reviewed the concepts, quality parameters & policy decisions regarding enhancement of quality in higher education. The advanced technology used in present situation.

The quality in higher education as process of quality enhancement that the quality in higher education springs from never ending process of reduction and elimination of defects. The quality is driven by the inquest Are we doing things right? and by the complementary question. Are we doing the right things?

**Dr. M.S. Prasad, S.A. Kadam [23] (2007)** the education environment has evolved through various generations, leading to the present fifth generation. The fifth generation of education advocates the use of Information Technology and advanced tools. They studied the role of IT in teaching –
learning process. They conclude by providing conceptual frame work for virtual learning in higher education.

**Eaton J.S [24] (2003)** has explained the role of US accrediting Organizations with respect to global situation in the education sector. The common standards for making the Institutes of higher learning with quality at all levels will have positive effect on awareness of the Institutes to compete in International market. He has highlighted on that the International providers would have to adhere top a code of practice as relating to publicity in order to facilitate informed decision making by students and their parents. The internationalisation of higher education has highlighted the need to maintain the quality of education.

**Gnanam A and Stella A [25] (2003)** have studied the quality assurance with respect to International context and across national boundaries. The education can not be restricted to one country due to use of advance technology in dissemination of educational material the standards with proper control over educational activities will have benefit in improving the quality of higher education Institutes.

**Hazem M. El-Bakry [26](2005)** Quality management standards are seen as a major pillar supporting the drive for continuous quality improvement through total quality management. Planning brings to decision making the capability of being proactive and thus anticipates future events and the necessary actions to meet those events positively. Reaching high level of Quality Assurance (QA) has become an essential goal for educational institutes. Therefore, we have to construct an intelligent computer-based system to manage the quality standards and the evaluation processes within universities. Having such a system will prevent a lot of burden on resident quality in any educational institution. The main objective of this paper is to
provide a description of a framework for a total quality assurance management system (TQAMS). This can help the quality evaluator to evaluate the performance of an educational institution without effort, automatically, and without time loss. Full schematic UML charts of the proposed system are given. Moreover, a comprehensive analysis of the system components is presented.

**Jenny Lee et. Al [27] (2010)** the authors have studied the professors and framing them as knowledge workers in the new, global economy. In addition to addressing long standing issues in study of faculty time allocation, salaries and global market for the professors. The authors conclude with an analytical synthesis of the theories that have been utilized to study faculty, tracing the implications of these theories for the sorts of questions we ask about professors.

**Joseph Benjamin [28] (2013)** In the article entitled “Evaluating the Ranking – grading Criteria for sustaining Quality in Higher Educational Institutions” author has identified various criteria inline with NAAC and has given road map to sustain quality in higher educational Institutes. He has compared various accrediting agencies in India with respect to ranks.

**Leonard L. Baird [29] (2011)** author reviews evidence for the unique power of environmental and climate variables to affect student outcome, describes the current efforts to use environmental assessments for research and practical purposes, critiques those efforts and suggests some new theoretical approaches that could lead to better assessments.

**Liang Zhang, Scott L. Thomas [30] (2011)** Economic theory suggests that private investments in higher education will be commensurate with the private return realized. Escalating costs of attendance and scarcity of seats at
more prestigious colleges and Universities in the United States have significantly increased the costs associated with attending schools costs.

**Natalia Bukhshtaber [31] (2009)** has explained the stakeholders role in quality enhancement. The public accessibility to the reports, findings and follow-up actions arising from internal (university-managed) and external (IUQB-managed) quality assurance processes, while respecting institutional autonomy, independence and diversity. Enhancement of higher-education quality with a focus on the major stakeholders.

**Patel N.V. [32] (2003)** in his article “A Holistic approach to learning and teaching has critically studied the learners capabilities to learn and use of the holistic approach while interacting with the students. The interaction between the teacher and the student is a social act that needs to encompass the personal, professional, social and human needs of the learner. These requirements are not merely the need to learn knowledge, but also the need to be heard, need to be praised, the need to accepted into the community of learners, as well as other human needs. Thus teachers and college must develop good environment and approach in education so that the students may be confident and achieve more in education.


**Prof. Dr. Arun Nigavekar [34] (2003)** has traced in quality inline with the present situation of the higher education. The higher education system in India has grown in a remarkable way, particularly in the post-independence period, to become one of the largest system of its kind in the world. However, the system has many issues of concern at present, like financing
and management including access, equity and relevance, reorientation of programmes by laying emphasis on health consciousness, values and ethics and quality of higher education together with the assessment of institutions and their accreditation. These issues are important for the country, as it is now engaged in the use of higher education as a powerful tool to build a knowledge-based information society of the 21st Century. Recognizing the above and the basic fact, that the Universities have to perform multiple roles, like creating new knowledge, acquiring new capabilities and producing an intelligent human resource pool, through challenging teaching, research and extension activities so as to balance both the need and the demand, the University Grants commission (UGC) had initiated nation wide discussion on the said issues during its Golden Jubilee Year, 2003.

**Prof. Yoginder Verma [35] (2005)** has explained the need to maintain and enhance the quality. Quality of education cannot bear fruit without active participation of the students. In the recent years, the quality consciousness, as a result of NAAC’s efforts, has set the ripples for pondering on the issue of sustaining quality with the active participation of students along with other stakeholders. On the one hand, we are to understand students perspective of how to participate and contribute significantly in the education process while on the other hand, it is teachers who are to ensure student participation not only in learning process but also organization and management of education enterprise. The teachers must understand what are student’s expectations and requirements and accordingly involve them in the whole process. But then their perceptions must be realistic and match with the student’s expectations. In this paper, an effort has been made to critically examine the teachers’ perceptions and viewpoint about how to ensure students participation in quality enhancement. The findings are based on the
responses collected during five workshops conducted by Academic Staff College, Shimla.

Sheela Ramchardan and Hema Nalini [36] (2013) the article entitled “The Roadmap to Competency and Quality in Higher Education”. The authors have given the detailed outline to improve the quality in higher educational Institutes. The model to show the quality enhancement and competency development through various inputs during the educational activities is given in the article.

Review of Ph.D. Thesis:-

Al-Harbi [37] (1997) Author has given the recovery strategy for IT centres. He studied the effects of disaster on organisation and importance of adopting disaster recovery plan. This research has developed a methodology and delivered an expert system that would assist IT Directors to obtain answer to disaster recovery questions it has phases like Threats Assessment, Business Impact Assessment, Recovery Strategy, Analysis, Cost Analysis and Recommendations

B.L. Desai [38] (2001) under the guidance of Dr. R.V. Kulkarni the thesis entitled “Knowledge based system in Banking Sector” Department of Commerce and Management, Shivaji university, Kolhapur – 2001. The Researcher has developed the rule based system which takes the decision for credit and loan sanction in the bank. He has tested the system by taking real life situations from various banks. For developing a prototype Rule based Expert system he has used VIDWAN a product of National Centre for Software Technology (NCST) and some part of the system is coded in VB 6.0. Input screens and validation is properly done.
Desai Karanam Sreekantha 2013 [39] under the guidance of Dr, R, V. Kulkanri the thesis entitled “Credit Risk evaluation of Micro , Small and Medium Scale Enterprises using Evolutionary Neuro Fuzzy Logic” The Researcher has developed the expert system for credit risk evaluation using neuro fuzzy logic he has written rules to check various conditions of credit risk. Rule based expert system is implemented and tested for various cases in the banks by the researcher.

Mohamed Shaluf [40] (2004) Development of an Expert System for the Analysis of Technological Disaster in Malaysia. He has taken the review and analysis of technological disasters which occurred in Malaysia. The objective of the study was to identify factors responsible for technological disaster a combination of which triggered the technological disaster. The Expert system that could be used to aid management of major Hazard Installations. The field survey and interview of the domain experts was done in the study.

Review of Various Commissions on Higher Education.

Kothari Commission on Higher education [41] The Commission was appointed under provision of a resolution of the Government of India, dated 14th July, 1964. The Commission included eminent educationists in diverse fields from India and abroad. It consisted of total 17 members, where 14 members, 1 member - secretary, 1 Associate - Secretary and Dr. D.S. Kothari, chairman of the U.G.C. was appointed as the chairman of the commission. Therefore, it is also known as the Kothari Commission. Among the members of the commission 5 educationists were from England, America, France, Japan and Russia. J.P. Naik was appointed as number secretary of the commission and J.F McDougall as associated secretary.
The Commission has given following recommendations to improve the quality of higher educational institutes in the country. An expansion of higher education which provides students with choices and creates competition between institutions is going to be vital in enhancing accountability.

- There must be stringent information disclosure norms for all educational institutions such as their financial situation, physical assets, admission criteria, faculty position, academic curricula as also their source and level of accreditations.

- Evaluation of courses and teachers by students as well as peer evaluation of teachers by teachers should be encouraged.

- There must be a focus on upgrading infrastructure, improving the training of teachers and continuous assessment of syllabi and examination system.

- It is particularly important to enhance the ICT infrastructure. Websites and web base services would improve transparency and accountability. A portal on higher education and research would increase interaction and accessibility. A knowledge network would connect all Universities and colleges for online open resources.

- Talented faculty members must be appointed with very good salary package.

- It is necessary to formulate appropriate policies for the entry of foreign institutions into India and promotion of Indian Institutions abroad. While ensuring a level playing field for foreign and domestic Institutions within the country.

- Ensure access for all deserving students.
National Knowledge Commission on Higher Education.[42] The National Knowledge commission is a high level advisory body to the Prime Minister of India, with the objective of transforming India into a knowledge society. In its endeavour to transform the knowledge landscape of the country, the national knowledge commission has submitted around 300 recommendations on 27 focus area during its three and half year term. The Implementation of NKC’s recommendations is currently underway at the central and State levels. It suggests improving the academic performance of the Institutes. Efforts should be done to create a second wave of Institution building and of excellence in the field of education, research and capability building so that we are better prepared for 21st Century. NKC was constituted in the year 2005 under the Chairmanship of Shri. Sam Pitroda. With in three years commission has been given mandate to guide policy and direct reforms, focusing on certain key areas such as education, science and technology, agriculture and e-governance and easy access to knowledge.

Conclusion

The extensive review of literature is taken by the researcher and it is found that expert systems are used in various fields. The expert system or knowledge base system can be developed by setting quality parameters by consultation with Vice-Chancellors, Experts from AICTE, NBA,NAAC and other academic experts for assessment and enhancement of quality in Higher Education.

The researcher has not found considerable and target oriented study with respect to this crucial area in the review of literature. Thus this review reveals the specific area in quality assessment and enhancement in higher educational Institutes.

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