Information Science in various Engineering and Computing Degree programme's specialization: its possibilities, challenges and opportunities

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Abstract— **Information Science is a field of fields or may be treated as discipline dedicated to information; which includes collection, selection, organization, management and processing of information. Information Science [IS] is an Applied Science domain and getting close relationship with Engineering and Technology Field. Information Science and its origin still a controversial matter. Many subject expert thought and express Information Science originated from their respective field like computer science people think that, it is a domain of application of computing in information management. Information field expert [like Library Science, Documentation Science] think that this is actually their field. Virtually this is an independent and full-fledged subject but interdisciplinary in nature with several gradients. This paper examine several aspect of Information Science; including possibilities of IS in Engineering field and its specialization; an attempt has been also made for introducing IS as computing specialization for better Information and Technological utility.**

Keywords:-Information Science, Information and Knowledge, Computing, Carrier, Specialization, Universities, Education

I. INTRODUCTION:-

Information Science [IS] is an interacting field of Information-Technology-People. Information Science and IT mainly differs mainly in Service Science approach. Information Science is restricted in Information Service and side by side technological solutions to the community, people or society. Thus it is directly for society and other service sector like-MNC's, Governmental houses, environmental agencies, educational houses and off course information foundations and institutions for and by which Information Science originated and come to this periphery, due to interaction with other emerging as an Engineering and Technological domain. In so many countries Information Science programmes are offered in Engineering department and faculty. Even in India also this symptom can be seen. Information Science nomenclature is also changing towards IT and computing domain and even in some cases engineering.

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II. OBJECTIVE:-

The main aim of this study is includes:-

- To learn basic about Information Science; including in nature and characteristics;

- To find out main role of Information Science;

- To find out the relationship of Information Science with Engineering or Computing;

- To learn about probable nomenclature of Information Science; in general as well as in computing domain;

- To find out possibilities of Engineering based Information Science programme;

- To find out main challenges and issues related to Information Science programme.
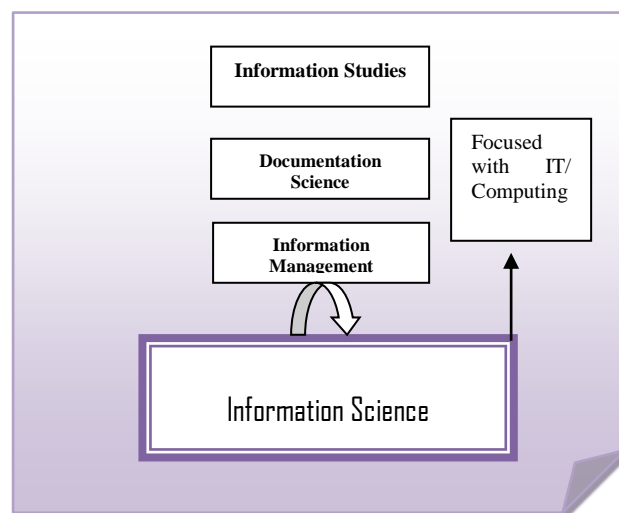

Fig: 1: The subject wise development of IS in international context

III. INFORMATION SCIENCE:-

Information Science [IS] is an interdisciplinary domain responsible for better information activities like information collection, selection, organization, processing and management. This is an emerging domain which was

originated long back during 1960's-70 in USA and Canada. The nomenclature Information Science was replaced from Documentation and apart from its changing names it also includes so many ingredients such as- Advance Computing, IT and Management, Cognitive Science and Psychology. Information Science today consider as field of fields and practiced by so many professional and department like-Library, Documentation, Communication Science, Information Technology, Communicating Technology and so on. Today separate Information Science Universities and schools are coming worldwide due to importance of Information Science.
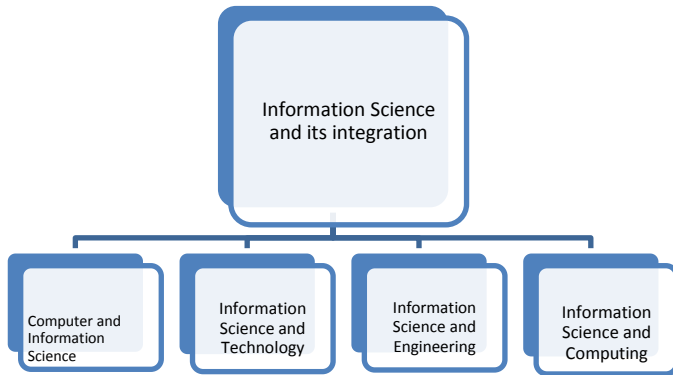

Fig: 2—Some new nomenclature related to Information Science

IV. INFORMATION SCIENCE AND ENGINEERING RELATIONSHIP:-

Information Science and its changing domain are responsible for designing and development of new nomenclature. As Information needs several activities such as collection, selection, organization and management and ultimately dissemination; thus today it is essential to use several computing and technologies. Virtually, relationship between the technologies with Information Science is responsible increasing its shape, rapidly. Practically it is very much essential that, Information Science should connect with other domain for better Information Management and Dissemination. Now let us check the engineering which are connected with Information and reason behind this:-

- Computing Engineering has connection for several information activities such as storing data and information and utilization of this data depending upon requirement thus here use of Database Management is possible. For current and pinpointed Information Network dedicated IRS or Data Mining tools may be user. To use or display Information Multimedia Systems may be uses; thus here it is possible to use Multimedia Technology. Finding any information is tough enough in the age of Information explosion and thus here use of Search Technology is possible;

- Communication Engineering has close relationship with Information Science some activities like- Communication between Information Centers, in house information sharing, to communicate with Information Systems and its apex or sub systems. Internet is also fall under this category;

- Mechanical Engineering and Robotics also has good connection with Information Science and higher affiliation may be provided. Application of Agricultural Intelligence and Expert System is possible in SDI, CAS services. The ERP and Decision Making may also get priorities win better Mechanical

- Engineers and Information Science connection;

- Electrical and Electronics Engineering is also gaining huge connection with Information Science. Some of the relation like use of Green Computing, Green Technology in Information Science practice like energy consumed Eco Friendly Information System building, Networked Information Infrastructure building.

V. UNUSUAL INFORMATION SCIENCE SPECIALIZATION FROM COMMON ONE:-

Thus tremendous possibilities are there for utilization of Information Science in Computing and Engineering. Here possibilities are there to introduce Information Science in these Engineering domains; the probable Engineering nomenclature may be—

- BTech/MTech/BE/ME- Computer Science [Information Science];

- BTech/MTech/BE/ME- Electronics and Electrical Engineering [Information Science];

- BTech/MTech/BE/ME- Mechanical Engineering [Information Science];

- BTech/MTech/BE/ME- Communication Engineering [Information Science];

- BTech/MTech/BE/ME- Information and Communication Technology [Information Science] and others.

However apart from these specializations of Information Science in engineering it is possible to launch full-fledged MTech/ME/BTech/BE programmes on Information Science. Designing and development of this programme is crucial enough and challenging as we need to mixed or cluster science, engineering and humanities in one bottle. Here use of some humanities gradients is urgently requires as Information

Science is not only deals with IT and Information but actually for its real utilization and interaction with common people and society or industry.
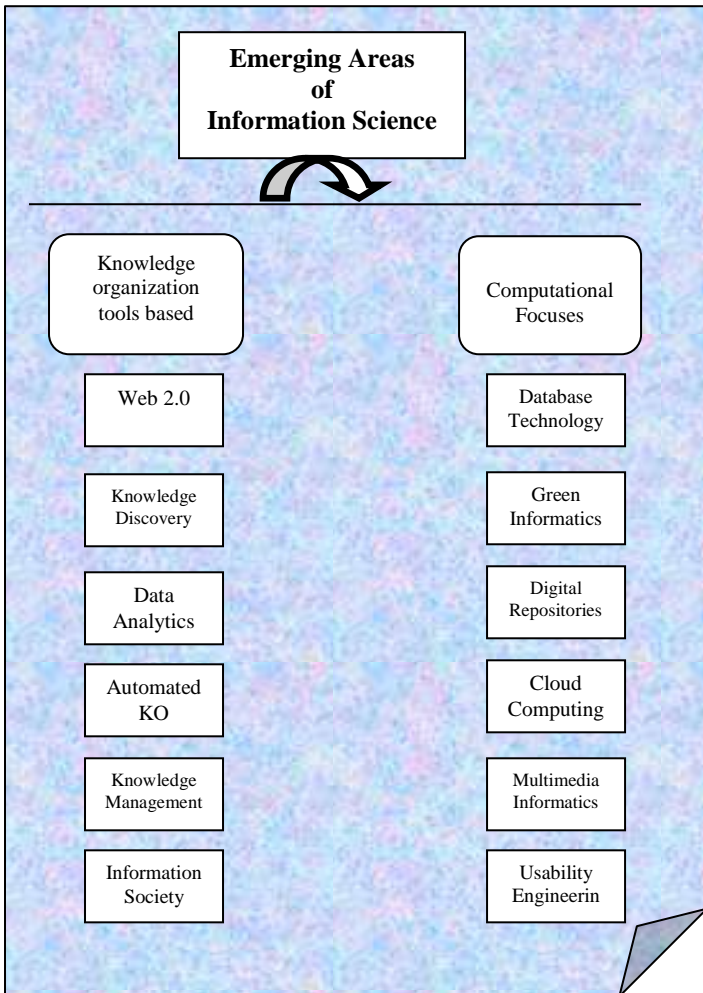

Fig: 3- Two foci of Information Science and its emerging domain

Al like Engineering, Information Science may also be introduced in Computing or Computer Science or related programme. Some probable programme in Indian scenario is as follows:-

- MCA-[Information Science];

- MSc-Information Technology[Information Science];

- MSc-Computer Science [Information Science];

- MSc- Computer Technology [Information Science];

- BCA-[Information Science];

- BSc-Information Technology[Information Science];

- BSc-Computer Science [Information Science];

- BSc- Computer Technology [Information Science] and so on.

Introducing Information Science in Engineering domain in tough enough particularly in India, for several reason like- Engineering Institutions in India already has two information and computing related Degree programme these are- Information Technology/ Information and Communication Technology and another is Computer Science [CS] thus starting a new nomenclature may not be possible in each and every institutions. However the main opportunities of BTech/MTech- Information Science [IS] is , it is responsible for better information management and information systems building ; which may be computerized or manual based on knowledge organization tool [like- cataloguing, indexing, abstracting and so on]. Thus in Information Science practicing gradients of information is included to study its behavior wider utilization and application including preservation. A model MTech-Information Science curriculum need to include so many aspect like engineering, computer, information, management and social science for better interaction and utilization of information and technology. Some course gradients in MTech-IS or MTech in Computing with Information Science specialization may be:-

- Information and Knowledge;

- Engineering Fundamentals;

- Applied Mathematics and Information Science;

- Computing and Computer Science;

- Knowledge Management;

- DBMS;

- Data Mining and Storage;

- Knowledge Organization;

- Data Analytics;

- System Administration with CISCO;

- ERP;

- Management;

- Cloud Informatics;

- Advance DB 2;

- Web Technology;

- Usability Engineering;

- Information Analysis Consolidation and Repacking [IACR];

- Digital Repositories;

- Programming.

VI.   ENGINEERING DOMAIN AND INFORMATION SCIENCE:-

Practically Information Science provides several opportunities as far as interaction with engineering domain is considered. And Information Science as full-fledged engineering domain may provide following benefit [but not limited to]:-

- Better utilization and preservation of Information and knowledge; including collection, selection, organization, management and processing for building healthy knowledge based systems; thus it promote industrial growth many ways and also promote communication between industries to industries or to common mass;
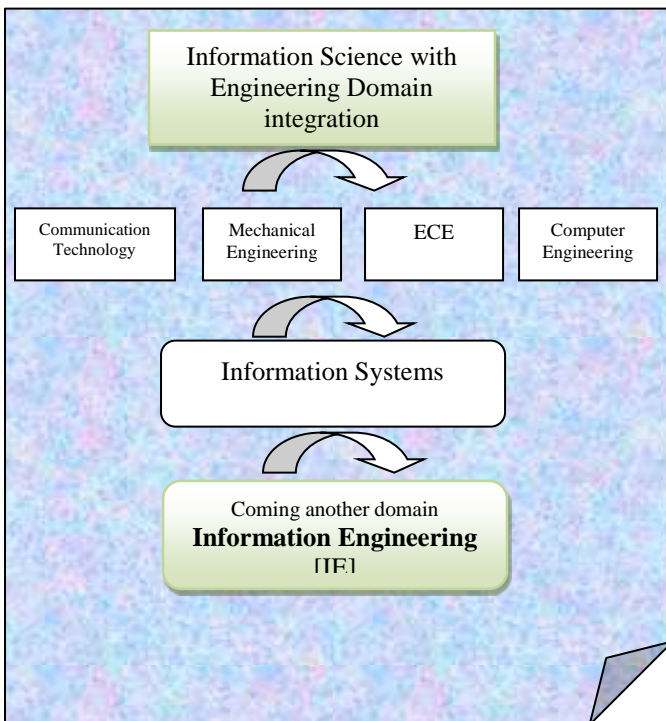
Fig: 4- depicted the step wise IS based degrees/ domains

- Due to interdisciplinary nature, it may provide the opportunity to contact several subject like IT, Computing, Management, Psychology, and so on and thus it promote interdisciplinary research many ways;

- Interaction with other Engineering domain may create healthy knowledge base and development;

- It provides chances to community development; directly and indirectly as it serve for proper information and communication delivery or transformation. Interaction between information-technology and people is most important benefit of information science with engineering flavor;

- It is able to provide multiple job opportunities which includes Information [like knowledge manager, cataloguer, classification, indexing, abstracting and so

on] technology [like CTO, Technology Management, System Manager or Computing job or position [like cloud expert, information analysist, usability engineering, database administration and so on]. Practically main problem of Information Science in Engineering/Computing integration are integrating engineering, computing, information science, humanities in one line, qualified and interdisciplinary manpower, sophisticated stakeholder, initial interest among the educationalist, a balanced Techno focused and Information rich curriculum for better utilization of each and every domain.

VII.   FINDINGS:-

- Information Science [IS] is a trans discipline and incorporated with IT, Computing, Management, Information Studies and Psychology;

- There are several dimension are available in information science [mainly traditional and computational];

- Information Science may start as MTech degree by inclusion of equal distribution of knowledge gradients;

- IS with Engineering needs qualified faculty members and experts.

VIII.   SUGGESTION:-

- Information Science has potential as an emerging domain as Information and Technology;

- Information Science may be started as integration with other domain like Information Science and Technology [IST] , Information Science and Computing [ISC];

- Engineering colleges has potential to start various Information Science nomenclature as so many related departments are exist and their merging is also possible;

- Various unusual and non traditional jobs may be possible from Information Science programme.

IX.   CONCLUSION:-

Information Science has so many potential which includes Researcher and industrial application. Information Science has possibilities as emerging Applied Science. Computing is a field which is focused on computing systems other hand it is responsible for technological solution. But Information Science has potential as information related requirement and other hand technological. Thus Information specialization in computing and other engineering degree programme may solve manpower problem many ways.

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