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Information and Technology Related Educational Programmes and its Possibilities in Indian Universities

P.K. Paul[1], A. Bhuimali[2], K. Kumar[3] Poovammal. E.[4] and R. Senthamarai[5]

[1,] FBAS, Indian Institute of Engineering Science and Technology (IIEST), Shibpur- An Institute of National Importance, West Bengal, India

[2]Vice Chancellor, Raiganj University, Raiganj, West Bengal, India

[3]Vice Chancellor, VMS University, Gangtok, Sikkim

[4]Professor, Department of CSE, SRM University, Tamilnadu, India

[5]HOD, Department of Computer Applications, Vinayaka Missions University, Tamilnadu, India

Corresponding author: prancloud@outlook.com

Abstract

Education is a continuous process of changing a human being. Education is the most vital and valuable tool for development of each and every individual. Information Science and other information programmes are important domains of education and play an important role for harmonious development. Information is needed in almost all the sectors and domains like business, commerce, healthcare, education, governance and so on. Modern universities are offering so many educational programmes and courses on information and technology related domain. Both are important for societal development- directly and indirectly. Still Indian universities are offering limited number of programmes on information and technology. Hence huge potential is there to offer such programmes for the development of healthy and sophisticated information and technological infrastructure. This paper talks about education in the domain of information and technology and its existing and future potential in brief manner.

Keywords: Information, IT, Technology, Educational/Academic Programme, Interdisciplinary Studies, Information Infrastructure, Information Society

'Information and Technology' and 'Information Technology' are different keywords having different approaches. Information Technology is a small academic gradient. Both information and technology are related and interdependent. Information programme means the study and research which are purely dedicated to information and similar contents such as knowledge, data. Today in most of the

information programmes, technologies are integrated as valuable ingredients. Information programmes include Information Science, Information Management, Knowledge Management, Library Science, Communication Science, and Information Systems [10, 12, 15]. Information Schools are established with main focus on information in terms of study and training. Information Science is the most recognized domain in information programme which is inbuilt with technologies and computing. Both information and technology are important for healthy Information practice [02]. The generation wise characterization of the domain, 'Information' is depicted in Fig.1.

Objective

The main aim and objective of this study are:

- To know the basics about information programmes and technology programme
- To identify the information related programmes with future potentials
- To look for the technological ingredients in information programmes.
- To understand the current scenario in Indian education sector and technical education sector
- To discuss on the possible courses and possible departments of proposed programme.
- To find out the main challenges, issues and contemporary aspects in relation to information programmes with technology back up.

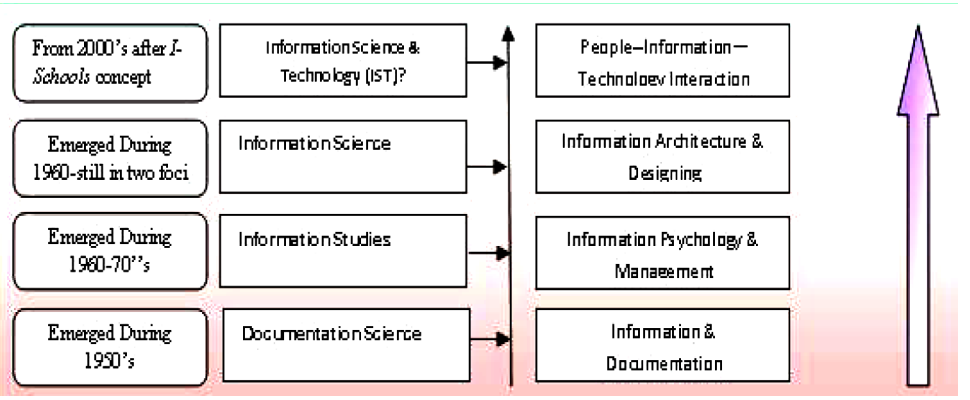

Fig. 1: Depicted the traditional Information field to modern Information Field and generation wise characterization (P.K. Paul, 2015)

Information and Technology programmes

Information and technology programmes are available in different platforms in Indian universities and other academic institutions of the world. Information programmes mainly deal with activities such as information collection, selection, organization, processing, management, dissemination [04, 09]. Virtually information programmes are responsible for information system building and hence such information programmes depend on various types of technological gradients such as Database Systems, Communication and Networking Technologies, Web Technology and Multimedia Technology.

Actually these technologies are used for healthy information practice and more clearly for information processing and management. In information programmes some information ingredients are very much

common, viz., information society, information and knowledge management, information architecture, knowledge economy [12].

Common information and technology oriented programmes which are available in Indian Universities are listed in the Table: 1 with its technological ingredients. The most common and available Information Programme in India is Library Science. As far as the Technology and Engineering fields are concerned some are directly connected with computer science, computer engineering, information technology, electronics and communication engineering and so on [13, 19], though such programmes are also offered in Schools of Information Science.

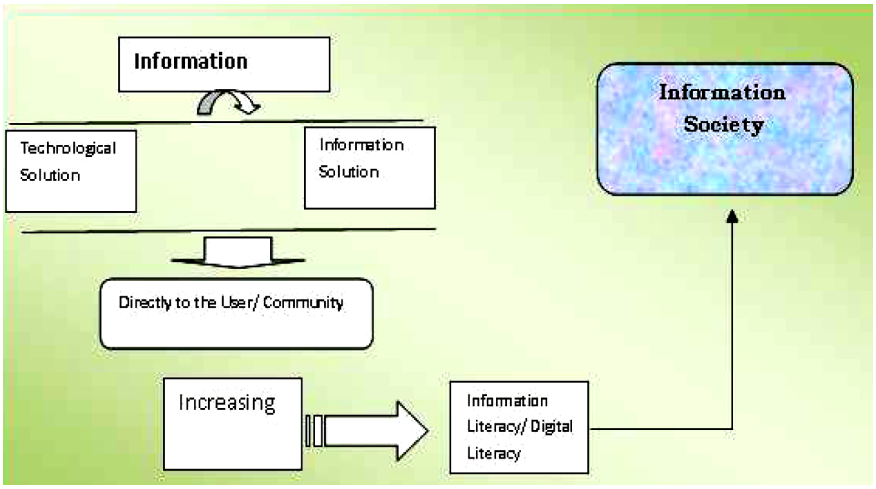

Fig. 2: Depicted General role of information related papers (P.K. Paul, 2015)

Information Science and Technology in Indian Universities

Information Science is treated as a flagship programme in most of the countries in the world. In India, there are thousands of higher educational institutes which include 600+ universities, 50+ Institutes of National Importance, 200+ Central Research Institutes with many institutions specially dedicated to technology, science, pharmaceutical, medical, architecture and management. These are briefly listed in Table-1. As far as information field is concerned, India is still in the growing stage with minimum number of educational institutes, programmes, and research specialization [15]. DRTC or Documentation Research and Training Centre, Bangalore is one of the leading institutes in Information Science and Information field in India. Refer Table: 3 for details.

In India, near about 300 universities are running information related programmes which are focused on Library Science, Technology and Engineering with information processing and management.

Table 1: Depicted Information related programmes in Indian Universities at a glance

Courses	Brief Description
BSc/MSc-Information Science	Offered by only around 10 institutions with both manual and digital Information Systems Building with focus of Information

BSc/MSc-Information Technology	Offered by numerous schools and university departments with focus on IT system building, software development
BTech/MTech-Information Technology	Offered by numerous engineering colleges with schools and university departments with focus on IT system building, software development
BTech/MTech-Computer Sciences	Offered by numerous engineering colleges with schools and university departments with focus on Computer Designing, Development IT system building, software development
BSc/MSc-LIS or BLIS/MLIS	Offered by near about 300 institutes with focus on Information Systems designing of Information Foundation and deals with less computational gradients
BSc/MSc-Communication Studies	Offered by around 100 educational institutes with focus on manual and digital communication
BCA/MCA	Offered by numerous engineering colleges with schools and university departments with focus on IT system building, software development
BBA/MBA-Information Systems	Offered by numerous business colleges with schools and university departments with focus on IT system building, MIS development.
MSc-Information Systems	Offered by numerous business colleges with schools and university departments with focus on IT system building, MIS development

Information Science and Technology - New Nomenclature: Possibilities and Challenges

Information Programmes in India are common with the following nomenclature:

- Information Science.
- Communication Science.
- Library Science.
- Library and Information Science.
- Information Technology.
- Computer Science.
- Computer Engineering.
- Electronics and Communication Engineering and so on.

However, possibilities are also there to start some new interdisciplinary domains such as - Information Science and Technology, Information Science and Engineering, Information Science and Computing, Information Engineering, Information Systems and Management, Informatics Engineering [14, 06]. Based on courses and research possibilities such nomenclature may be adopted in the following departments and schools in Indian Universities and Engineering colleges and departments. Refer Table: 2.

Table 2: Depicted possibilities of interdisciplinary Information related programmes opportunities in Indian Universities at a glance

Domain/Departments	Available In
Information Technology [Tech]	In Engineering Colleges/ University

Information Technology [Sc]	In General Colleges/ University/ Study Centers
Computer Science [Tech]	In Engineering Colleges/ University
Computer Science [Sc]	In General Colleges/ University/ Study Centers
Electronics and Communication Engineering [ECE]	In Engineering Colleges/ University
Computer Application [MCA]	In Engineering Colleges/ University
Library Science	In University mainly
Communication Studies	In University mainly

Hence in this way it is possible to start Information Science and other information programmes in some other departments. Initially guest faculty and adjunct professors may solve the problem of teaching the interdisciplinary courses. They should do the research support initially. Gradually the concerned schools or departments may adopt full time faculty members to boost healthy research and teaching activities.

- Ultimately such programmes may satisfy the requirements of healthy information professionals who depend on tools and techniques. Still availability of Software Engineers are mainly from the departments like Software Engineering/ Information Technology/ Computer Science and Engineering/ Information and Communication Technology. Though readily available are some other information professionals, this is not the case with Information Scientist, Chief Information Officer, Information Analyst, Information Expert, Information Architect, Information Administrator, Data Manager, Usability Engineer and Network Administrator. But Information programmes with a blend of sophisticated technologies may solve this problem and help all- recruiting organizations, education providers [10, 16].
- Introduction new nomenclatures such as 'Information Science and Technology', 'Information Science and Engineering', 'Information Science and Computing' or other information programmes in existing engineering departments like IT, Computer Science, Communication Engineering is easy as such departments are well stocked with healthy intellectual, knowledge resources and other backup. Hence the existing IT related departments may also introduce such programmes.
- However, India is a vast country having variety of education system and running a new course under the pre-permission and accreditation from approved bodies.

Table 3: Showing Indian Higher Educational Institutes at a glance [Source: UGC, MHRD]

Universities/ Higher Educational Institutions	In Numbers	Location
Central Universities	**44**	Pan India with 28 States and UT
State Universities	**304**	Pan India with 28 States and UT
State Private Universities	**165**	Except some states and UT
Deemed Universities	**130**	Except some states and UT

Indian Institute of Technology [IITs]	16	Bhubaneswar, Chennai, Delhi, Gandhinagar, Guwahati, Hyderabad, Indore, Jodhpur, Kanpur, Kharagpur, Mandi, Mumbai, Patna, Ropar, Roorkee and Varanasi
National Institute of Technology [NITs]	30	Agartala, Allahabad, Arunachal Pradesh, Bhopal, Calicut, Delhi, Durgapur, Goa, Puducherry, Hamirpur, Jaipur, Manipur, Meghalaya, Mizoram, Nagaland, Jalandhar, Jamshedpur, Kurukshetra, Nagpur, Patna, Raipur, Rourkela, Sikkim, Silchar, Srinagar, Surat, Karnataka, Tiruchirappalli, Uttarakhand, Warangal
Indian Institute of Management [IIMs]	**13**	Calcutta, Ahmedabad, Bangalore, Lucknow, Kozhikode, Indore, Shillong, Rohtak, Ranchi, Raipur, Tiruchirappalli, Udaipur, Kashipur
Indian Institute of Science Education and Research [IISERs]	**05**	Calcutta, Mohali, Thiruvanthapuram, Pune, Bhopal
Other Central Funded Higher Educational Cum Research Institutes	**Approximately 150+**	Pan India with 28 States and UT

Merging of IT, Computer Science, Library Science, and Communication Department - An Important Challenge

Building healthy Information School is possible with healthy interaction or integration of the information departments such as IT, CSE, LIS, and Communication Studies. In most of the universities so far as India is concerned, information programmes are available in two flavors. In the *first approach* in some universities and colleges, information programmes are offered by Electronics and Communication Engineering, IT, Computer Science and Engineering and other Engineering Sciences related to Information Processing and management. However, in such programmes, information and its core aspect is minimum. On the other hand, in some universities and colleges, Information Programmes are offered with a clear bias on Information and Knowledge Management fundamentals and conceptual Information Studies. Such departments are no other than Information Studies, Communication Science, Library Science, and Documentation Science and so on [10, 14].

Hence a better and healthy approach will be, to merge all information related departments into one single department or big school and do information programs and carry on activities under one umbrella. Some special unit and research centre may be established depending upon the need. Another way is to keep existing departments in their own way and maintain a close relationship with information focused departments to offer Information and Knowledge Management focused programmes.

Conclusion

Information is the most valuable and important concept in today's age. Today, each and every work is directly and indirectly related with information sector such as Business, Commerce, Education and Government. Growing amount of data has become tougher to manage and hence a better and healthy way will be to introduce technology based information infrastructure for sophisticated development and system building. Apart from design and development of information programmes in existing core engineering

departments, merging information programmes with so many departments for further development of such departmental activities and domain will be much easier [10, 14, 19]. By this way, it is possible to introduce some healthy information infrastructure in some other domains like Chemical Information Infrastructure, Geographical Information Infrastructure, Medical and Health Information System. Hence Government and Educational Institutes need to take proper initiative for the complete and healthy Information Infrastructure building for the development and modernization of our society at large [20].

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