

Medical Information Science: Emerging Domain of Information Science and Technology (IST) for sophisticated Health & Medical Infrastructure Building — An Overview

Prantosh Kumar Paul¹, Dipak Chatterjee² and Minakshi Ghosh¹

¹FBAS, Bengal Engineering & Science University, Howrah, West Bengal, India

²IEM Saltlake, Kolkata, West Bengal, India

Abstract

Information Science is one of the important interdisciplinary subjects today. It is actually dedicated to the information activities ranging from collection to dissemination with proper shape and quality. Information Science has so many dimensions and flavors out of which the integration of Medical Science and Information Science has brought to us Medical Information Science (MIS/MISc); which is also treated as Health Informatics. Health or Medical Information System (MIS) works mainly with the utilization of tools, techniques and technologies in the health systems and entities which include hospitals, clinical centers, nourishing homes, diagnostic centers, pharmacy labs and so on. This paper describes many aspects of MISc and its role, needs, challenges in the contemporary Indian scenario.

Keywords: Health Science, Bio Medical, Informatics, Information Systems, Medical Information Science (MISc), Information Science & Technology (IST), Bio Technology.

Introduction

Medical Information Science is actually an integration of Informatics and Health and Medical Science. Health Informatics is also treated alternatively as Medical Information Science (MISc). Medical Information Science is actually a new dimension of Information Science. This field also treated as Medical Informatics and Medical Computing. This field helps

use and application of computer and related tools and technologies for the digitalization of medical documents of the concerned health organization and even digitalization of the health related audit reports, patient documents, prescription or consultancy documents of the doctor/s. MISc has wider usability and applicability in the Medical houses including hospitals, group of hospitals, clinical centers, dental centers,

*Corresponding author: Prantoshkpaul@gmail.com

MS Received: 18th July, 2012

MS Accepted: 14st December, 2012

pharmaceutical labs, allied health clinics. The growing scope of MISc also talks about digitalization of medical books, research papers and theses.

- To learn about Health Information Infrastructure in India; including past and future trends and its potential.

Objective

The main objective of this study is:-

- To learn the basic of Medical Information Science and its interdisciplinary character;
- To learn the advancements of Information Science in Medical Sciences;
- To know the role and values of Medical Science and its related field;
- To know the contemporary scenario and future trends of Medical Information Science;

Previous Literature

A study of Health in relation to Engineering and Computing has already been carried out by so many Medical Technologist and Medical Information Professionals. In the year 1980 National Medical Library [NML], India conducted a major investigation and found the problem of MIS is the non-availability of qualified professionals, lack of properly organized training, facilities and services. Latika (1995) point out that, the main problem is the lack of awareness about MISc among the common masses and also among the medical professionals. Paul, *et al* (2012) mentions that the problems are lack of

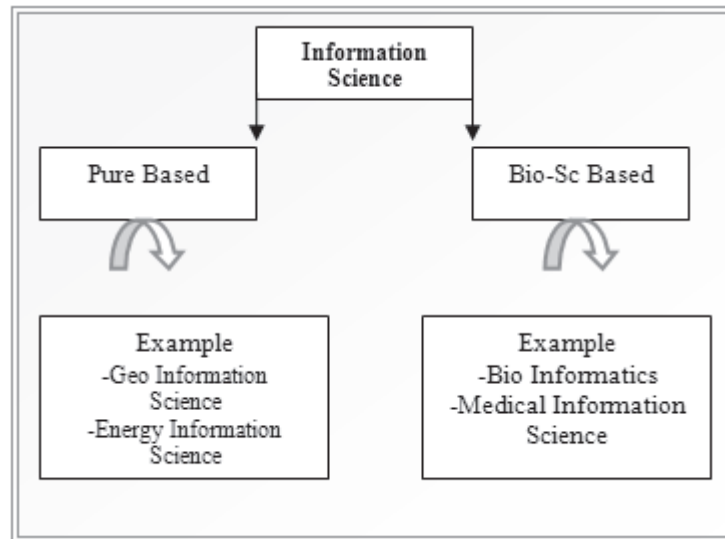


Fig: 1: The Basic two dimension (academic) of Information Science.

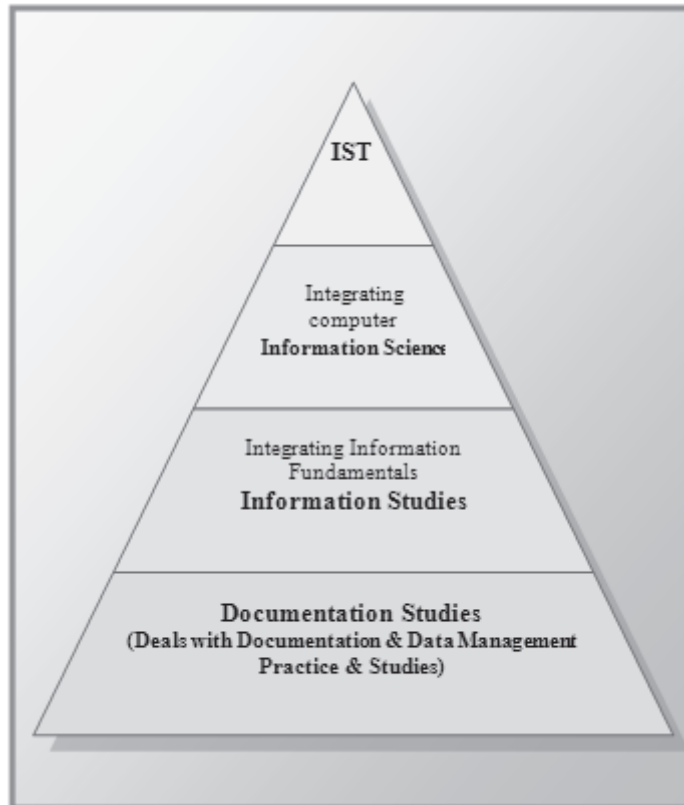


Fig. 2: The Increasing shape of Information Science at a glance; the last stage, IST is basically result of advance computing, technological & cognitive science integration with Information Science Field

initiative and, limited availability of Medical Informatics Educational programmes in the Indian Universities and it also highlights the main challenges and issues.

Information Science & Technology (IST): Overview

IST is a new emerging field of Applied Science & Technology for proper information activities, more clearly

Information Transfer Cycle (ITC). IST comes with so many dimensions like GIS which is the result of integration of Geological Science to Information Science, Integration of Biological Science with IST promoted and developed Bio Information Science as a new academic field from the practicing field of 'Bio-Informatics'. Similarly Information Science & Technology (IST) promote the overall information and documentation procedure

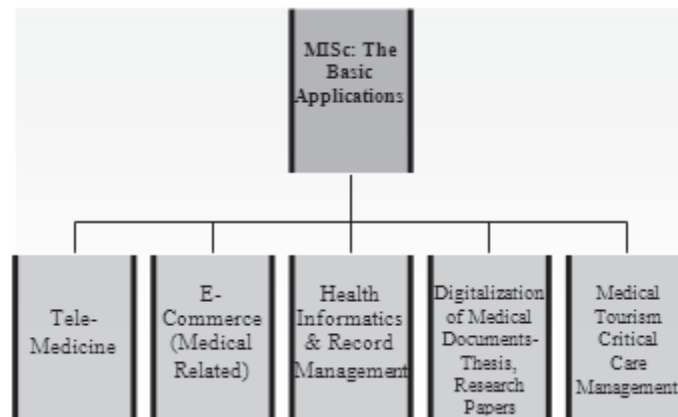


Fig. 3: The General and popular utilization field of MISc

and practice of an organization with the help of automated tools and technologies.

Medical Information Science: Practice

Medical Information Science is actually more or less synonymous with Medical Informatics. The main differences of these are, MISc is a study and practice field where as Health/Medical Informatics mainly deals with practicing of Informatics in the Health Systems. Information Collection, organization and dissemination related to Medicine, Health Science, Para-Medical science, Pharmacy, Clinical Research, and Regenerative Medicine and the like. MISc is dedicated to digitalization of all the medical information of clinical section including promotion of information, report card preparation and tele-medicine and medical tourism, e-reports, e-prescription. E- Medical system is the contemporary health informatics, more clearly MISc.

Medical Information Science: Role and Values in 21st Century

As an Applied Science field, MISc plays a leading role in modern age. Both Health Organizations and the beneficiaries will be benefited. The patient party may get the benefit of E report and Tele Medicine where as the health organizations may digitalize all the medical documents for the current and future use. It can also be used for the promotion of medical research by providing digitalization and indexing of all medical documents and study materials of the medical colleges and schools. Initially Medical Informatics was considered as a practice of IT in medical profession whereas MISc is the study and also the practice area which includes digitalization of medical documents and computation and storing of all the data of a patient, medicine from the first to the last stage. In today's age MISc also helps the medical literature, theses and dissertation by using the latest

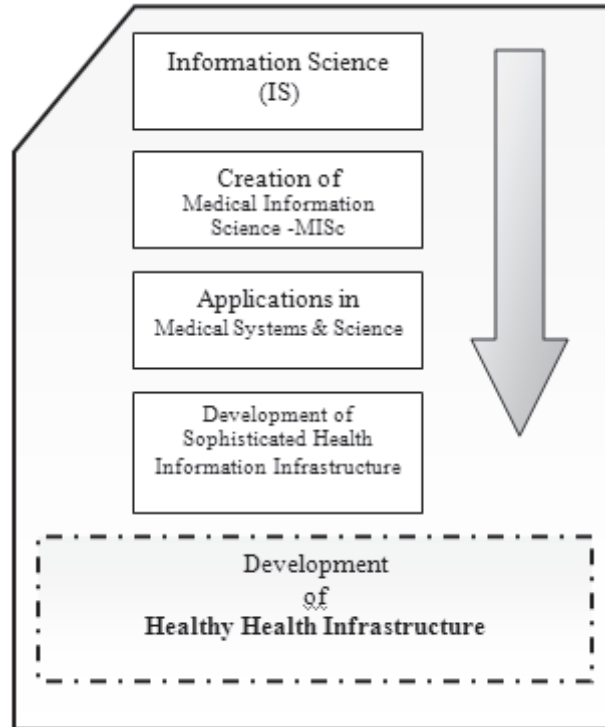


Fig. 4: The Way of healthy Medical Systems and development of all stakeholders

computerized and manual knowledge organization tools. Fundamentally the following are the main reasons for treating MISc as a discipline in the universities as a field of study.

- Collecting, selecting, organizing as well as disseminating of information and contents in the field of medical and health information;
- With the help of Informatics application, one can get health related information even if she/he is in a remote place;
- Medical Science research is widening its scope day by day, the

Informatics turns out to be the right option to cope up this;

- MISc also helps to get Bio Medical information from any where and any time; Prescription and report of the doctors; may be digitalized and thus helpful for further work and also be implement by tele-medicine.

Medical Information Systems Practice in India

Still in India many problems loom large during this study, which include:-

- Use and application of computer and graphics technology is a crucial task;
- Construction as well as formation of the task is also valuable for several purposes;
- Adequate budget and financial supports are needed for contemporary MISc;
- The Government still do not have any Informatics Education Policy;
- Most of the staff in Government Health Systems are not so much aware of this field; they learn MISc only by training; but for overall sustainable development we need to build a separate MISc academic specialization in Medical Science and Computer Science/ Information Science curricula.

Health Information Management in India started by MEDLINE in the year 1970. In the year 1979 the Health Literature, Library and Information service (HELLIS) started Medical Information Science (MIS) practice by starting a small health information network. But for so many reasons the project failed. Again National Informatics Centre (NIC) tried to improve the health information system by building Health Information Database containing the indexing and abstracting of Health and Medical books, journals, articles, and dissertations. Though NICs were built connecting 200 health centers around 160 countries, recently the Government of India has taken health and technological projects for sophisticated MISc practice. The

Medical Council of India recently (2012) declared that introduction of computers (MISc) is mandatory for the first Bachelor Degree in Medicine i.e. MBBS. This initiative is no doubt a healthy decision by the MCI for creation of Techno Savvy medical practitioners. India is going to reach the economic hub of the developed countries; So we need to build powerful health systems and good MISc practice. It is essential that, the following parameters should reach India as soon as possible.

- Updating Bio Medical Information;
- Building Infrastructure for tele-medicine;
- Developing medical tourism;
- Introduction of mandatory IT in Medical Science;
- Introduction of MISc specialization in MSc/MCA courses;
- Building Information Network properly.

Findings

- Health Informatics is a practice field where as medical information science is study and academic field including practice area;
- Still in India big health information networks or consortiums are absent;
- Funding and proper planning are also important issues;
- Commonly Health Informatics or Medical Information Science is treated as digitalization of all

medical reports and documents, but today it includes indexing of medical documents and Theses and Research Papers.

Suggestion

- There should be adequate health policy containing the problems of health Informatics;
- Government should make adequate budget and funding;
- There should be a mentality towards introduction of combined Health Networks;
- The Information Schools, IT schools should start Medical Informatics or MIS specialization;
- The health and medical degrees like MBBS, BPT, BDS, BHMS, BPharm, should incorporate IT or Informatics as a paper.

Conclusion

It is very much essential to start a new full-fledged Information Networks dedicated to the complete health care solution. The Information Systems or Networks may also combine with state Health Information Networks which should be based or connected with district level Health Centers for complete range of health related Information. The National Health Information Grid may solve the problem of tele-medicine many ways as it contains E-reports, E-prescription and online consultancy with the help of VSAT. The Medical Information Science is also helpful

for the advancement of Medical and Health Education and Research as it is also responsible to design Information Repository containing health documents of students, Teachers and Medical professionals. So MIS is no doubt helpful for building sophisticated Health Information Professionals backed by tools and computing technologies.

References

- Handbook on library and information science. New Delhi: Association of Indian Universities. 1997
- Sharma, Dev Raj. 1997. Doctoral research in library and information science in Indian universities. Palampur: The Author.
- Shera, J.H. 1976. Introduction to library science. Littleton, CO: Libraries Unlimited. Clin Physiol 1992; 12(3): 313-7
- Mobley, B.A., Leasure, R., Davidson, L. 1995. Artificial neural network predictions of lengths of stay on a post-coronary care unit. Heart Lung; 24(3): 251-6
- Mylrea, K.C., Orr, J.A., Westenskow D.R. 1993. Integration of monitoring intelligent alarm anaesthesia: neural networks - can they help? J Clin Monit, 1993; 9(1):31-7
- Westenskow DR, Orr JA, Simon FH et al: 1992. Intelligent alarm reduce anaesthesiologist's response time to critical faults. Anaesthesiology, ; 77(6): 1074-9
- Hamamoto, I, Okada S., Hashimoto T., Wakabayashi, H., Maeba, T., Maeta H. 1995. Prediction of the early prognosis of the hepatectomized patient with hepatocellular carcinoma with a neural network. Comput Biol Med, 25(1): 49-59

- Gurney, J.W., Swensen, S.J. 1995. Solitary pulmonary nodules: determining the likelihood of malignancy with neural network analysis. *Radiology*, **196**(3): 823-9
- Tourassi GD, Floyd CE, Sostman HD, Coleman RE: Artificial neural network for diagnosis of acute pulmonary embolism: effect of case and observer selection. *Radiology*, 1995; **194**(3): 889-93
- Ravdin PM, Clark GM, Hilsenbeck SG et al.: 1992. A demonstration that breast cancer recurrence can be predicted by neural network analysis. *Breast Cancer Res Treat*, **21**(1):47-53
- Baker JA, Kornguth PJ, Lo JY, Williford ME, Floyd CE Jr: Breast cancer: prediction with artificial neural network based on BI-RADS standardized lexicon. *Radiology*, 1995; **196**(3): 817-22
- Satija M.P. "Forty years of doctoral research in classification and indexing in India, 1957-1997." *Library Herald* **36**(2): 80-87. 1998.
- Paul, P. K "Information Science: Trends and Analysis 2003-07" Dissertation, University of North Bengal, India.2008.
- Sharma, Dev Raj. 1997. Doctoral research in library and information science in Indian universities. Palampur: The Author.
- Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn 'Information Management: emphasizing traditional and technology focused approach – An Overview' accepted in in *IEEE/CSI/AICTE* co sponsored National Conference on Paradigm shift in Education Technology & Content Management, DIT, Techno India (AICTE-NBA-WBUT approved) Paper published
- Paul, Prantosh Kumar, Mrinal Kanti Ghose, Dipak Chaterjee 'Education Technology: its benefits and utilization with special reference to EduNxt, Knowledge Delivery Model of Sikkim Manipal University-A Study' in *IEEE/CSI/AICTE* co sponsored National Conference on Paradigm shift in Education Technology & Content Management, DIT, Techno India (AICTE-NBA-WBUT approved) Paper published
- Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn "Cloud Computing: Issues and challenges with probable solution in Indian Perspectives" *IJIDT* International Journal of Information Dissemination & Technology, MMU, Ambala. **2** .2.