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Business Informatics: A possible specialization of MSc-Information Science & Technology (IST): Challenges and Opportunities in Developing Countries Context

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Abstract:-

Information is one of the important domains, which deals with computing, information studies, and principles. Informatics is concerned with so many activities such as information collection, selection, organization, processing, management, and dissemination. Informatics and Information Science are close domains and even in many countries, they are treated as the same domain with different nomenclatures only. Information Science is an Applied Science domain responsible for information solution and at the same time technological solutions of the wider community and society. Information Science is available in so many universities and academic units and the flagship programme on Information Science is MSc-Information Science. Even in some universities specializations like Chemo informatics, Medical Informatics etc. are available. This paper talks about Information Science and its needs, values, characteristics. The Paper also talks about possibilities of introducing MSc- Information Science [Business Informatics] programme and also proposed Business Informatics specialization in Information Science [MSc] programme in Indian universities and elsewhere.

Keywords:-

Retail Informatics, Business Informatics, MSc-Information Science, Marketing Management, MSc-Information Science [Business Informatics], Computing, Information Management

Introduction:-

Information Science is a valuable applied science field which is responsible for so many activities, its major activity being information solution, technological solution, information transfer cycle, information channel building and so on. Information is needed for almost all the domain and departments and sectors such as healthcare, hospital administration, education, business and commerce, Government organizations, Information Science with domain focused

field such as Geo Information Science, Health Information Science, Medical Information Science, Chemical Information Science, Quantum Information Science and Business Information Science have originated [01, 06, 09]. The term 'Information Science' is also treated as Informatics and often as Medical Informatics and similarly [01, 05, 07]. Virtually in many international universities, Information Science with the specialization is offered like MSc- Information Science [Geo Informatics]. Hence a possibility to introduce MSc- Information Science with Business Informatics specialization is there in Indian academics.

Objective:-

The main aim and objective of this study include but are not limited to as follows-

- To know main aspects of Information Science and its characteristics briefly;
- To know educational scenario of Information Science around the world in brief manner and including Indian scenario;
- To know Informatics and its diversity to learn the future possible domain;
- To know the basics about the common MSc- Information Science structure in Indian Universities;
- To design a proposed curriculum and main programme structure of MSc- Information Science with Business Informatics specialization in the Indian scenario.

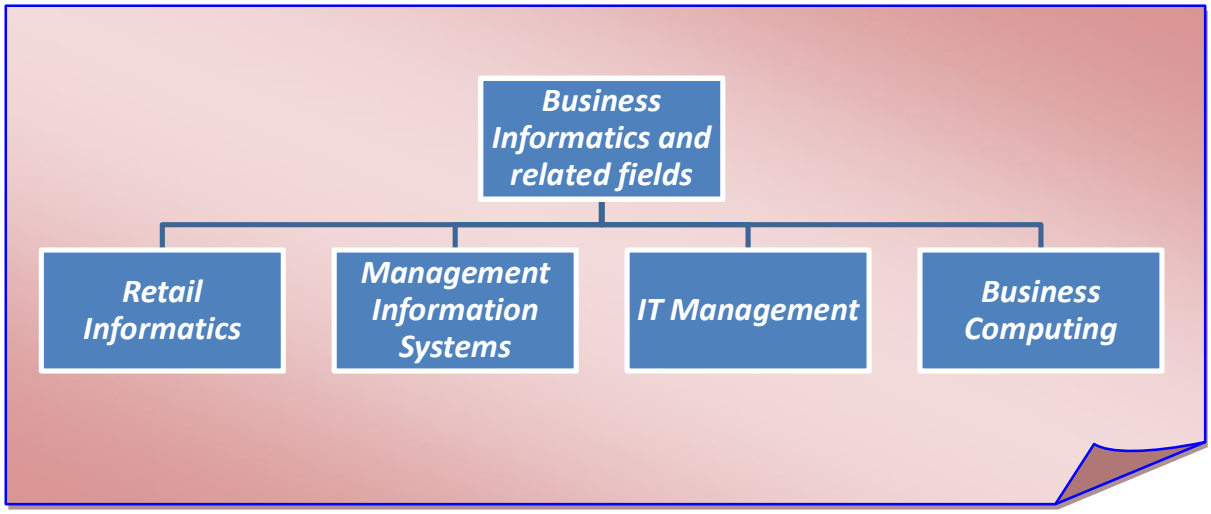

Fig: 1- Depicted the related field of Business Informatics in academic world

Information Science: Fundamentals:

Information Science is an applied science domain responsible for so many Information activities such as collection, selection, organization, processing, management, dissemination of information [08, 10]. Information Science is a broad domain that combines with so many fields which are directly and indirectly related to Information and Technologies; such domains are Computer Science, Information Technology, Management Science, and Cognitive Science and so on. Information Science deals with information and technological application in information

foundations as well as other organizations and institutions for better information infrastructure building, smooth activities and organizational development. As far as its characteristics are concerned, Information Science deals with some social science gradients for information and technological utilization in the society [11-13].

Information Science Education: A brief overview:-

Information Science education and departments are mostly interdisciplinary in nature (Fig. 1). Information Science comes with Science Degree in the United States and its follower countries and comes with BS/MS- Information Science degree and fall under the faculty of Science/ Technology/ Engineering/ Information Studies and so on [14, 18, 21]. The pioneer institutes in this field are listed in Table-1 as far as the United States and worldwide trends are concerned [38]. In some universities, Information Science programmes are come with the specialization as—

- *MS- Information Science [Health Informatics];*
- *MS- Information Science [Tele- Communication];*
- *MS- Information Science [Human Computer Interaction];*
- *MS- Information Science [Geo Informatics] and so on.*

Table: 1-Some popular Information Science and allied domain Schools/ Universities [38]

Some I-Schools & IST Focused Universities
The Pennsylvania State University
University of Michigan
University of California, Los Angeles
University of North Carolina
University of Illinois at Urbana-Champaign
University of Washington
University Of Toronto
University of Pittsburg
Drexel University
Singapore Management University
Wuhan University, China

In some universities, information programmes are special domain focused in nature with so many nomenclatures like-

- BS/MS-Health Information Science;
- BS/MS-Geo Information Science;
- BS/MS- Chemical Information Science and so on.

Though, as far as India is concerned, India has more than 700 universities, 20000+ colleges, 50+ Institute of National Importance, more than 200 Central Science Research Institutes. But still the number of programmes on Information Science is very limited and only approximately 10 institutes offer such programmes and out of 28 states in India, West Bengal leads in offering Information Science; here 6 institutes offer such programmes. The number of programmes offered in Information Science is illustrated in the Table-2.

Table: 2-Depicted Information Science progammes and offering institutions in India

Institutes	Programme of Study
Institute of Engineering and Management, **Saltllake, Kolkata, WB**	**MSc-Information Science**
Techno- India, **Saltllake, Kolkata, WB**	**MSc-Information Science**
Dr. BC Roy Engineering College **, Durgapur, WB**	**MSc-Information Science**
Kotibarsha Institute of Technology and Management **, Buniadpur, DD, WB**	**MSc-Information Science**
DATM, Jalpaiguri**, WB**	**MSc-Information Science**
Techno- India, **Hooghly, Kolkata, WB**	**MSc-Information Science**
Periyer University, Tamilnadu	**BSc/MSc-Information Science**
Manipal University	**MSc-Information Science**
Ravensaw University, Orissa	**BSc-Information Science and Telecommunication**
BIT Mesra, Ranchi	**MSc-Information Science**

Some leading Institutes which offer Information Science related programmes and research programmes are Documentation Research and Training Centre, NISCAIR, MCIS-Manipal University, WBUT, BIT Mesra and others [14, 18]. In India, Information Science nomenclature with the related domain is offered as 'Library Information Science/LIS'. In some universities, a programme called as 'Computer and Information Science/CIS' is offered with core and only computing focus for information processing. This CIS programme only trusts on computing and IT devices for information activities and does not deal with manual KO tools and practicing gradients. However, Information Science needs to become both computational and manual tool dependent. After analyzing the Indian curriculum we provide the analysis report in Figure-6 based on curriculum and gradients [15, 19].

Business Informatics: Basics

Informatics is an important domain which talks about not only information activities with the help of manual knowledge organization tools; but also computational tools. Informatics has so many foci and domain dependency; more clearly Informatics with concentration and integration with other domains creates so many new domains. The integration of Business Studies and Management with Informatics provides Business Information solution and side by side technological solution. Business Informatics is a study and a practice field which mainly deals with Business, Organization Information, Infrastructure building which includes Management Information Systems designing and development, Enterprise Resource Planning, Decision Support Systems, and Business Information and Documentation solution with the help of manual tools and computerization systems [15, 19, 22].

Need of Business Informatics as specialization of flagship Information Science programme:-

There are so many reasons to introduce MSc-Information Science [Business Informatics] programme development; some of them are as under-

- To design and develop organizational information systems with computing support [*such as database, networking systems, multimedia systems and others]* and manual documentation and content division mare heavy and transparent;
- To design complete ERP (Enterprise Resource Planning) for IT System development for better information communication inside and outside of an organization and so on [12, 13];
- To build heavy and sophisticated information infrastructure building, manual task, journal, fields of everyday activities and so on;

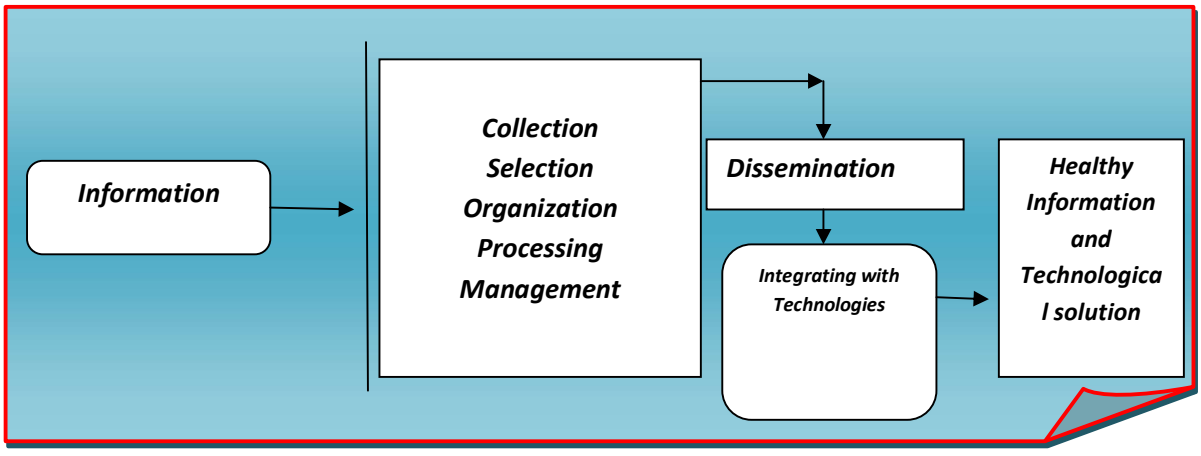

Fig: 2-Depicted basic role of Information Science towards information organization

- For better networking design; which including inside organization and outside organization;
- To design heavy and improved Decision support systems as per organizational requirement and its continuous up-gradation [11];
- As far as manpower is concerned, MSc- Information Science [Business Informatics] may be helpful for producing direct interdisciplinary and skilled professionals which are in general not available directly from other programmes. Such professionals are Chief Information Officer, Information System Auditor, Information Analyst, Information Scientist and so on [13].;

Table: 3 depicted general information related jobs including business related job with the proposed programme

General	Technological Job or Post with Business Informatics Specialization	Other Job
Reference in charge	***Information Scientist***	**Teacher/Lecturer of Computing**
Cataloguer	***MIS Professionals***	**Teacher/Lecturer of LIS**
Classificationist	***Database Managers***	**R & D Activities**
Indexer	***Network Security Expert***	**Public Relation Officer**
Abstractor	***Multimedia***	**Media Person**
Information Officer	***System Analyst***	**Archivist**
Information Manager	***Knowledge Engineer***	**Documentation officer**
Knowledge Manager	***Knowledge Broker***	**Educationalist**
	Web Administrator	**Consultant**
	Programmer	**Information System Developer & Designer.**

- Academically MSc- Information Science [Business Informatics] may be helpful as they are able to get both types of jobs. They can get general information related jobs which are listed in Table 3 and also able to join business organizations and corporate houses with management focused IT/ Information job. Thus, the students of this may also get placement/ research and other career benefits from this programme;
- The institutes which are running Information Science programmes in India and abroad may also start MSc- Information Science [Business Informatics] programme smoothly as they do not need to take the full initiative to start such programmes. Here, the concerned department is able to offer such programmes with the assistance of adjunct professors or guest professors and hence another type of technocratic information professionals are possible to help the business sector (Fig. 3). The general approach to information solution

they will be able to do as part of Business Informatics with the nomenclature of MSc-Information Science.

Common MSc-Information Science general course component at BIT Mesra, Madras University and WBUT	*Focuses of the course*
BIT Deemed University: - 1.Foundation of Information Science 2.Theory & Practices of Knowledge Organization and Information Processing 3. Fuzzy Logic & Neural Networks Applications 4 .Internet And Web Technology 5. Data Structures 6.Data Base Management System 7.Operating Systems 8.Computer Communication Networks 9.Management Of Information System & Centers10.Information Psychology &Information Architecture 11.Research Methodology &Quantitative Techniques 12.Digital Library And Multimedia And Other 2 Electives	**Core IT/ Computing based information solution with basic and fundamental of information and knowledge organization for both Information Foundation and Organizational Information Unit**
Madras University:-1.Evolution of information science 2.information sources 3.Knowledge organization 4.Introduction to information technology 5.Soft skill 6.Management of information centre Information service 7.Information processing-classification 8.Information and Communication technology 9.Information storage and retrieval 10.Information processing-cataloguing 11.Research methods 12.Preservation of information material 13.Knowledge management 14.Marketing of information 15.Digital libraries And electives, internship.	**Mainly deals with informational solution for information foundation with traditional KM tools**
WB University Of Technology:-1. Mathematics for information science 2.Data structure with c/c++ 3.Computer organization 4.Business communication 5.Library and information science 6.Object technology 7.Operating system and system programming 8.Software engineering 9.Information theory 10.Soft computing 11.Digital image processing 12.Values & ethics in profession 13e-commerce	**The course focuses for IT/ Computing based Information System building and suitable for organizational Information practice instead of Information Foundation's uses**

Fig: 3: Depicted General Structure of MSc-Information Science programmes in India

Information Science: A possible and proposed curriculum:-

In India and many parts of the world the Degree programmes of 3 year duration and PG degree comes with 2 year duration are offered. As this study purely depends on Indian education system and hence this proposed study has been designed with 2 years PG programme preceded by minimum 3 years UG degree (Fig. 4). In this proposed structure of MSc- Information Science [Business Informatics] courses are designed with semester pattern; here in each semester proposed name of the papers, credits, lab requirement, affiliation requirement are mentioned briefly [13-15, 21].

Name of the proposed papers	Credit of the Paper	Lab [Yes/ No]	Possible Departments; if not possible In house
Semester 1/ Year 1	*Semester 1/ Year 1*	*Semester 1/ Year 1*	*Semester 1/ Year 1*
Information and Knowledge	2	No	In House is possible
Information Science and Technology	2	Yes	In House is possible
Business Management	2	No	If Needed/ Possible in Management Department
KO [Theory and Practice]	3	Yes	In House is possible
Computer Networks	2	Yes	In House is possible/ or IT department
Semester 2/ Year 1	*Semester 2/ Year 1*	*Semester 2/ Year 1*	*Semester 2/ Year 1*
Business IT solution	2	No	In Management /IT department
Information Solution and Organization	2	No	In House is possible
Information Processing and KO-I	3	Yes	In House is possible
Information Architecture and Organizational Information Systems	2	Yes	If Needed/ Possible in IT/ Computing Department
ERP-I	2	Yes	If Needed/ Possible in IT/ Computing Department
Semester 3/ Year 2	*Semester 3/ Year 2*	*Semester 3/ Year 2*	*Semester 3/ Year 2*
ERP-II	2	Yes	If Needed/ Possible in IT/ Computing Department
Knowledge Economy	2	No	In house is possible
Business Informatics and DSS	2	Yes	If Needed/ Possible in IT/ Computing Department
Knowledge Management and Organization	2	No	In house is possible
Management Information Systems	2	No	In house is possible
Semester 4/ Year 2	*Semester 4/ Year 2*	*Semester 4/ Year 2*	*Semester 4/ Year 2*
Information Society and Organization	3	Yes	In House is Possible
Business Analytics	2	No	If Needed/ Possible in IT/ Computing Department
DBMS Practice	3	Yes	If Needed/ Possible in IT/ Computing Department
Advance Communication with Cloud Computing	3	Yes	If Needed/ Possible in IT/ Computing Department
Future Information Professionals, Ethics and Research Methods	3	No	In House is Possible
Dissertation	4	Based on Topic	Based on Topic

Fig: 4- Depicted Proposed MSc-Information Science [Business Informatics] curriculum for healthy Business Information solution

Findings:-

- Information Science domain is increasing day by day; Now many new fields have been incorporated with Information Science programme for better and intelligent information infrastructure building;
- MSc- Information Science offered in more than 10 institutions out of which West Bengal is in leading position [09];
- MSc- Information Science with Business Informatics is not at all offered in any other university and thus it has wider and ready job potentials;
- Information Science comes with MS/MSc in many institutes around the world, but we did not find any institute with ME/ MTech- Information Science degree programme [12, 17].

Suggestions:-

- Information Science programme need to be introduced in the universities and it is very easy to start with advance support of existing IT/CSE programmes;
- It is better to start Information Science based specialization as MSc- Information Science with specialization rather than direct specialization on MSc-Business Information Science. Because earlier approach may be helpful to get a job and carry research in both fields -Information Science and Business Informatics simultaneously.

Conclusion:-

Information Science programme and its importance are gaining importance day by day in almost all sectors including Education, Healthcare, Business, Government Organizations, and so on. Versatile programmes on Information Science are essential for the development of Information Systems in each and every sector [04, 06]. Information Science with Business Informatics is needed in so many organizations and institutions for better organizational Information System designing, ERP System, Decision Support System improvement and so on.

References:-

[1] Cohen, Eli B. and Nycz Malgorzata Learning Objects and E-Learning: an Informing Science Perspective. Interdisciplinary Journal of Knowledge and Learning Objects, 2006; 2(02): 20-23.

[2] Martin, S.B. Information technology, employment, and the information sector: Trends in information employment 1970–1995. Journal of the American Society for Information Science, 1998; 49(12):1053–1069.

[3] Michael Buckland and Ziming liu "History of information science" Annual Review of Information Science and Technology, 1985; 30: 385-416.

[4] Pau1, P.K.,Bibhuti Bhusan Sarangi and Dipak Chaterjee "Cloud Computing and its strategic and technical application in Information Networks in Indian Scenario in IEEE sponsored procedings of National Conference on Information and Software Engineering [NCISE-12], 2012; 2(02): 146-149.

[5] Pau1, P.K., Dipak Chaterjee and Bhaskar Karn "Cloud Computing: Issues and challenges with probable solution in Indian Perspectives" IJIDT International Journal of Information Dissemination & Technology, 2012; 2(01): Page- 31-33.

[6] Pau1, P.K.,, K V Sridevi, Minakshi Ghosh, Ashwina Lama "Education Technology: The Transparent Knowledge Delivery through QPN and Cloud Computing" IJSD-An International Journal, 2012; 12(02): 455-462.

[7] Pau1, P.K., Ajay Kumar, M Ghosh "Cloud Computing: the 21st Century Friend for Virtualization" in Procedinngs of International Confernce of Computer Applications and Software Engineering, CASE-2012, 2012 01(01): 37-40.

[8] Pau1, P.K., M K Ghose, "Cloud Computing: Possibilities, Chalenges, and opportunitities with special reference to its emerging need in the academic and working area of Information Science", ICMOC, Procedia Engineering,2012; 38: Page-2222-2227, DOI-10.1016/j.proeng.2012.6.267, 1877-7058 C.

[9] Pau1, P.K., Dipak Chaterjee, Ashok Kumar "E Learning: New Age Knowledge Model Delivery through Advance Information Technology and Cloud Computing: An Overview" BRICS International Journal of Educational Research, 2013; 03(01): 22-25.

[10] Pau1, P.K., S Govindarajan, Dipak Chaterjee, " Cloud Computing: Emphasizing Hybrid Cloud Computing on Android Computing Platform-An Overview" International Journal of Applied Science and Engineering, V.1, N1, ISSN-2321-0745, Page- 21-28 New Delhi-Publishers,New-Delhi.

[11] Pau1, P.K., M Ghosh "Cloud Computing and its possible utilization in Health and Hospital Administration" Journal of Business Management [JBM]- An International Journal, 2013; 05(02): 147-152.

[12] Pau1, P.K., "Cloud Computing: Its Opportunities and Advantages with Special Reference to Its Disadvantages- A Study" in International Journal of Neural Network Application - IJNNA, 2013; 06(02): 84-88.

[13] Pau1, P.K., M Ghosh, D Chatterjee "Cloud Computing Utilization in Food and Nutrition Sector- Empowering Information Transfer:Challenges and Opportunities" International Journal of Soft Computing Bio Informatics- IJSCB, 2013; 04(02): 90-95

[14] Pau1, P.K., "Cloud Computing Based Green Information Infrastructure: The Future of Eco Friendly Information Science Practice" PARIPEX Indian Journal of Research, 2013; 02(11): 122-124.

[15] Pau1, P.K.,Jhuma Ganguly, "Green Information Infrastructure: Stakeholders-A Study" International Journal of Pharmaceutical and Biological Research (IJPBR)",2013; 04(04): 159-164.

[16] Pau1, P.K.,Jhuma Ganguly, "Green Computing: The Emerging tool of Interdisciplinary Environmental Sciences-Problems and Prospects in Indian scenario" International Journal of Pharmaceutical and Biological Research (IJPBR)",2013; 05(04): 210-214.

[17] Pau1, P.K., Jhuma Ganguly, Dipak Chatterjee "Green Information Science [GISc]: Journey towards Environmentally Friendly Information and Technological World" in The Sci-Tech International Journal of Engineering Sciences,2013; 01(01): 80-87.

[18] Pau1, P.K., "Cloud platform and the Virtualised World: Take a look" International Monthly Refereed Journal of Research in Management & Technology, 2013; 02(09): 112-119.

[19] Pau1, P.K., "Distance Education and Online Education empowered by Cloud Computing: the Proper Information Infrastructure" Abhinav National Journal of Arts and Education, 2013; 02(09): 1-8.

[20] Pau1, P.K., "Digital Repositories: some Tools, Technique and Technologies and Social issue" International Monthly Refereed Journal of Research in Management & Technology, 2013; 02(10): 63-68.

[21] Pau1, P.K., "Virtual World: Empowered by Cloud Computing- A Conceptual Study" International Monthly Refereed Journal of Research in Management & Technology, 2013; 02(10): 82-89.

[22] Pau1, P.K., "Education 2.0: Promoting Technological Knowledge Delivery" Abhinav National Journal of Arts and Education, 2013 02(12): 43-49.

[23] Pau1, P.K., "BSc-Information Science: Need, Value with Special Reference to a Proposed Curriculum with Multi Entry and Multi Exit System" Abhinav National Journal of Science and Technology, 2013; 02(12): 01-11.

[24] Pau1, P.K., "Green Computing and Informatics: Way to Green and Energy Consumed World" International Monthly Refereed Journal of Research in Management & Technology, 2013; 02(13):70-77.

[25] Pau1, P.K., "Digitization: Establishment and Some Requirement in Cloud Age" Scholars Journal of Engineering and Technology (SJET)2013; 1(4):257-260.

[26] Pau1, P.K.. Green information science: Information science and its interaction with greencomputing and technology for eco friendly information infrastructure. *International Journal of Information Dissemination and Technology,* 3(4), Dec-2013, Page- 292-296

[27] Pau1, P.K., K L Dangwal "Cloud Computing Based Educational Systems and iits challenges and opportunities and issues" Turkish Online Journal of Distance Education-TOJDE, 2014; 15(01): 89-98.

[28] Pau1, P.K., K Kumar, D Chatterjee, R Rajesh "Usability engineering and user interface design for electronic information systems and its subsystems: Overview" 2014; 20(01): 23-32.

[29] Reichman, F. (1961). Notched Cards. In R. Shaw (Ed.), The state of the library art 04(01), pp. 11–55). New Brunswick, NJ: Rutgers, The State University, Graduate School of Library Service.

[30] Saracevic, T. (1996). Relevance reconsidered. Information science: Integration in perspectives. In Proceedings of the Second Conference on Conceptions of Library and Information Science (pp. 201–218), Copenhagen, Denmark: Royal School of Library and Information Science.

[31] Saracevic, T. (1975). Relevance: A review of and a framework for the thinking on the notion in information science. Journal of the American Society of Information Science, 26(6), 321–343.

[32] Saracevic, T. (1979a). An essay on the past and future of information science education. I. Historical overview. Information Processing &Management, 15(1), 1–15.

[33] Saracevic, T. (1979b). An essay on the past and future of information science education. II. Unresolved problems of 'extemalities' of education Information Processing & Management, 15(4), 291–301.

[34] Vickery, B.C., & Vickery, A. (1987). Information science in theory and practice. London: Butterworths.

[35] White, H.D., & McCain, K.W. (1997). Visualization of literatures. Annual Review of Information Science and Technology, 32, 99–168.

[36] www.en.wikipedia.org (Information Science Accsed on 02-02-2014).

[37] www.infosci.cornell.edu / (Department of Information Science Accsed on 02-02-2014).

[38] www.ischools.org (Home Page of Information Schools Accsed on 02-02-2014).

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