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## SUBJECT GATEWAYS TO HEALTH SCIENCE INFORMATION: AN EVALUATIVE STUDY

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In the Internet family, the WWW gained popularity and became the second most widely used application. In fact many people equate WWW with the Internet. The friendly user interface and the hypermedia features attract a significant number of contributors and users to the Web. As such the Web became a huge information reservoir. It is like finding a needle in haystack for the user of information. The Internet is an important source of scholarly information of all types. LIS profession is mainly concerned with the scholarly information that is being transmitted through the Web. Often, it is easy to find a few sites with useful information for a given topic. However, it is always not the best and there may be some more information that's left invisible. Further, a page's existence on the Internet is no guarantee that its contents are reliable. Also, it is easy to be overwhelmed by thousands of pages resulting from a search, to find nothing relevant, or to miss sites that would be significant for academic or research purpose.

Indeed the Web contains millions of pages and the sheer quantity of available information is often problematic. In other words, the electronic environment is not rosy, as it appears to be. The major issue is content organization. The information is poorly structured on the web while libraries have successful methods for information processing and retrieval. The content mapping, semantic web, ontology are under experimental stages for the purpose of effective organization and retrieval of web resources. Hence users are apparently in need of librarians to assist them in accessing pertinent and precise information. To use the Web effectively and browse or search information of choice, a number of tools have been developed. These tools are – *search engines, directories, subject gateways*.

- ◆ Search Engines – computer databases with keywords about the websites. E.g. Google
- ◆ Web Directories – Offers a collection of links to websites, organized into subject



categories. E.g. Yahoo, Lycos, Ask Jeeves (Target audience is generic)

❖ Subject Gateways - There's life beyond Google and Yahoo! —there exists number of *subject gateways* that are extremely efficient and innovative.

The expansion in the availability of electronic healthcare information on the Web in recent years has given access to a wealth of resources. To find out the treasure of health information available and to highlight the tools available to find health science information specifically the subject gateways the present study has been taken up.

### **Definition:**

“Subject gateways are internet based services designed to help users locate high quality information that is available on the internet. They are typically databases of detailed metadata records which describe internet resources and offer a hyperlink to the resources” (Dhiman, 2003)

“A subject gateway, in the context of network based resource access, can be defined as some facility that allows easier access to network based resources in a defined subject area.” (John Kirriemuir; <http://dlib.org/january98>)

### **METHODOLOGY OF THE PRESENT STUDY**

The present study aims to analyse the tools available to identify the health science resources on the Web with special reference to subject gateways. Subject gateways have two distinct factors. Best available sources that help user in surfing quality internet resources and specific subject area designed for smaller and specific target group. This makes them advantageous over the other types of search tools, taken for study.

### **Problem Specification:**

Subject Gateways to Health Science Information – An Evaluative Study.

### **Objective:**

The objectives of the present study are:

- ❖ To study the nature of health science information available on the Web.
- ❖ To study the search tools available to find out health information on the Web.
- ❖ To identify the subject gateways available to search / browse health related websites.



- ❖ To explore the effectiveness of selected (five) subject gateways in health sciences.

### **Hypothesis:**

- ❖ Subject Gateways are advantageous in finding information on the internet.
- ❖ There are well developed Subject Gateway available to search Health Science information on the web.
- ❖ All the Subject Gateway in Health Science are equally good in providing access to quality information.

### **Scope:**

The scope of the study is restricted to subject gateways that provide access to selected websites of health literature. Further for evaluation purpose only five subject gateways that are more popular are included in the study, though all subject gateways are included in descriptive part. The subject gateways evaluated are:

- o Intute: Health sciences
- o Web Health Central
- o Hardin.Md
- o Medline Plus
- o National Library of Medicine Gateway.

### **Methodology:**

The methodology is primarily based on the internet based literature search for health related search tools. The data gathered through browsing the internet for health information related tools like search engines, web directories, medical databases (PubMed), subject gateways. Therefore 'internet browsing' is the primary data collection tool. This is supported by current literature on subject gateways published in journals and conference proceedings.

### **Evaluation criteria:**

The analysis part of the work involves evaluation of selected subject gateways for their efficiency against the set criteria. There are several criteria available for the purpose designed by individuals and organizations. The criteria for evaluation are designed based on the IMeSH: International Collaboration on Internet Subject Gateways. The evaluation criteria applied include:



1. Authority
2. Gateway Scope and coverage
3. Types of sources / services
4. Expert Involvement
5. Updation
6. Partners
7. Ability to cross check other gateways
8. Selection criteria.
9. Cataloguing of resources
10. Collection management
11. Audience
12. Plans for expansion

## **EVALUATION OF SUBJECT GATEWAYS IN HEALTH SCIENCES**

The evaluative study included only five subject gateways. The selection policy is based on the popularity of the subject gateways.

The American Evaluation Association<sup>1</sup> embraces utility, feasibility, propriety and accuracy as standards for “good” program evaluation. (H. Heather, 1994)

Maxine Freshwater (Ba Hons) in his work on subject gateways: an investigation into their role in the information environment (Dissertation, 2002) chosen criteria like:

Level of resource description:

Description of the resources’ content

Intended audience for the resources

Level of resource evaluation

Quality of content of resources

Assessment of resources usability

Authority of resource authors

Guide Design



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Layout

Navigational aids

Guide meta-information

Mission of guide, why it was created, what it contains and what it leaves out

Information about authors

Information on how to contact the authors

Update frequency

Other services

His study is with particular reference to AERADE, the Gateway / the web portal for aerospace and defence which is run by information professionals from Cranfield University and the Royal Military College of Science Specific studies on evaluation of health science gateways can not be found although there were studies separately on Intute Social Sciences etc.

The National Library of Australia developed the framework to measure their national subject gateways (com) the following criteria:

- Gateway coverage,
- The quantity of resources and their update strategies,
- The percentage of Australian and non-Australian content,
- The ability to cross-search gateways simultaneously,
- Current partners,
- Plans for expansion within Australia, and
- Planned international partnerships.

The IMesh Subject Gateways community (DESIRE Project) has provided Guidelines (including evaluation): a wealth of experience in creating and managing internet gateways, and the costs of these activities, exists in the community and quality of service: issues regarding quality assessment and agreements over quality criteria. However these are forbidden from open access.

Therefore the following criteria are devised for the evaluation of selected subject gateways in health sciences.



1. Authority
2. Gateway Scope and coverage
3. Types of sources / services
4. Expert Involvement
5. Updation
6. Partners
7. Ability to cross check other gateways
8. Selection criteria
9. Cataloguing of resources
10. Collection management
11. Audience
12. Plans for expansion

**TABLE DISPLAYING THE FEATURES OF SUBJECT GATEWAYS IN HEALTH SCIENCES**

Evaluation Criterion	INTUTE	Hardin.Md	Medline Plus	National Library of Medicine Gateway	Web Health Central
<b>Autho- rity</b>	Intute is a consortium of seven universities working with a whole host of partners, bringing together the expertise of people and processes through which web resources are evaluated and provide a structured approach to find information. It originates from the Resource Discovery Network (RDN).	Hardin MD was first launched in 1996 as Hardin Meta Directory (directory of directories) Created and maintained by Hardin Library, University of Iowa.	Developed and maintained by National Library of Medicine (USA) and National Institutes of Health (NIH, USA)	Developed by the Lister Hill National Center for Biomedical Communications (LHNCBC) at the National Library of Medicine (NLM), a part of the National Institutes of Health (NIH).  The NLM Gateway was released to the public on October 16, 2000.	This site is designed, developed and maintained by Tata Consultancy Services, Asia's largest software consultancy, in association with some of the region's top medical institutions and professionals.
<b>Gateway scope / coverage</b>	<b>Subjects covered include:</b> medicine, nursing, midwifery and allied health, veterinary medicine, agriculture, food, and forestry, biological sciences,	Hardin MD provides access to the best resource sites in 37 medical disciplines  <u>The Hardin Meta Directory of Internet Health Sources brings out the strengths of the</u>	It covers authoritative information from NLM, the National Institutes of Health (NIH), and other government agencies and health-	The Gateway connects users with multiple NLM retrieval systems and also provides a search interface for meeting abstracts. It collects materials and provides information and research services in all areas of biomedicine and health care.	The portal aims at offering comprehensive IT solutions and products including HealthCare consulting and an end-to-end solution to the HealthCare Industry.  The group



	natural history, biomedical ethics, history of medicine, and public engagement with science, science communication and the impact of science on society.	<u>library to the web</u>  The work of the	related organizations. MedlinePlus pages contain carefully selected links to Web resources with health information on over 750 topics.	Coverage include bibliographical, consumer health and other information resources.	specialises in the development, customisation, implementation and the support of various healthcare information and management-related solutions and HealthCare products.
<b>Types of resources / services</b>	<p>a. It is made up of <b>eight individual subject gateways</b>, covering the broad subject areas. Each SG has its own collection policy. It's formed with <b>5 SGs</b> OMNI, BioResearch, AgriFor, VetGate and Natural Selection.</p> <p><b>b. Wellcome Trust provides 3 SGs:</b></p> <p>Biomedical ethics – BioethicsWeb</p> <p>History of medicine MedHist</p> <p>Public engagement with science</p>	<p>It includes sites from many of the large "umbrella sites" that have several medical/health subjects, including <b>Medmark, Karolinska Institute, Mining Company, MedWebPlus, Yahoo, healthfinder, NOAH, SciCentral,</b> and <b>MedlinePlus.</b> Several of these are from a library environment, as a identified by the University of Washington and Yale University. It also includes independent sites that</p>	<p>MedlinePlus has extensive information from the National Institutes of Health and other trusted sources on over 750 diseases and conditions. There are directories, a medical encyclopedia and a medical dictionary, easy-to-understand tutorials on common conditions, tests, and treatments, health information in Spanish, extensive information</p>	<p>The bibliographic resources include Medline/PubMed; Toxline; NLM Catalog; DART; Meeting Abstracts; ClinicalTrials.gov; DIRLINE; Clinical trials etc.</p> <p>Data type include journal citations from 1950 to date; records for books, a/v; full text biomedical books; toxicology references; meeting abstracts on select subjects; health information from NIH; Generic and brand name drug information; articles about diseases, tests, symptoms, injuries, surgeries etc.; databases, organizations, directories; information about common house hold products etc.</p>	<p>The portal provides information on diseases and conditions, healthy living, health corners, tools and resources, community advice, alternative medicine.</p> <p>The tools and resources include health calculators, medical calculators, online consultation, medical and health records, drug guide.</p> <p>Free online consultation in over 20 moot medical specialties.</p> <p>Student Centre provides following information to</p>





	and tech. Psyc-Com	concentrate on health and medicine. There are sites done by physicians and nurses, as well as librarians & patients.  The topics covered include:	on prescription and nonprescription drugs, health information from the media, and links to thousands of clinical trials.  Pre formulated MEDLINE searches are included in MedlinePlus that give easy access to medical journal articles.  MedlinePlus also has extensive information about drugs, an illustrated medical encyclopedia, interactive patient tutorials, and latest health news.		medicos: A vast database of MCQs on various subjects; Information on Forthcoming exams; Model Question Papers; Personalised Feedback on performance; Chat Room  The Hospital Management System, addresses all the major functional areas for hospitals.  It is a source for general information rather than scholarly information.
<b>Update</b>	Daily	Regular	Daily	Irregular intervals (Last updated Nov 2008)	Regular



<p><b>Expert involvement</b></p>	<p>Expertise of a network of subject specialists across the UK who find, evaluate and catalogue web resources for education and research.</p> <p>Continuous evaluation by selected network of subject specialists across United Kingdom</p> <p>Records are regularly reviewed alongside the website it describes. Records for review are identified automatically via a review date, and are allocated by subgateway.</p>	<p>Library professionals are involved in the creation and maintenance of this meta directory</p>	<p>Medline Plus Advisory Group constituted with 25 experts representing different subjects in health science discipline contributes to the collection development and management.</p> <p>Distinguished experts from the world's largest medical library, the National Library of Medicine from both professionals and consumers add a goldmine of good health information.</p>	<p>The National Library of Medicine relies on the advice of outside experts in many fields--medical, scientific, academic, library, and public policy.</p>	<p>Involves group of specialists in the development, customization, implementation and the support of various healthcare information and management-related solutions and HealthCare products.</p>
<p><b>Partners</b></p>	<p><a href="#">The University of Nottingham</a></p> <p><a href="#">The University of Oxford</a></p> <p><a href="#">The Royal Veterinary College</a></p>		<p>National Library of Medicine's and National Institutes of Health (USA)</p>	<p>NLM works with federal agencies, public health institutions and international organizations to provide access to health and scientific information.</p>	<p>Association with some of the region's top medical institutions and professionals. (Names of experts listed under 'Expert speak')</p>



	<p><u>The Royal College of Nursing</u></p> <p><u>Higher Education Academy Centre for Bioscience</u></p> <p><u>Higher Education Academy Health Science &amp; Practice</u></p> <p><u>Higher Education Academy Centre for Medicine, Dentistry and Veterinary Medicine</u></p> <p><u>The Wellcome Trust</u></p> <p><u>The NHS Scotland e-Library</u></p> <p><u>HONNI (Health On the Net Northern Ireland)</u></p> <p><u>MIDIRS (Midwives Information and Resource Service)</u></p>			<p>Partners include: <u>National Network of Libraries of Medicine (NN/LM)</u></p>	
<b>Ability to cross search other gateways</b>	Provides cross searching of 8 health related subject gateways	The Web enables to communicate the results of the work to the world beyond the	At present, MedlinePlus rarely links to sites outside the United	It's a one stop searching for many NLM for many NLM resources or databases. It provides cross searching to all	Cross search facility within the interactive portal



		doors of the library, and to work closely with people throughout the world.  Its popularity is shown by the thousands of links to it from around the Web, and by reports on it in the medical/health sciences press and the lay press	States of America	bibliographical databases of NLM like PubMed, MedlinePlus etc.	
<b>Selecti on criteri a</b>	Criteria include: Subject knowledge; Core criteria; Intellectual content; Objectivity; Structure and form; System&maintenance Public suggestions	Link checking methods are used for quality control of websites  Hardin MD is very much like the traditional library world of reference, collection development and cataloging, the only difference being that the work of our analytical efforts are on Web resources instead of in books.	MedlinePlus follows a list of guidelines for the inclusion of Web sites; available at <a href="http://www.nlm.nih.gov/medlineplus/criteria.html">http://www.nlm.nih.gov/medlineplus/criteria.html</a>  Web sites are evaluated based on these guidelines.		
<b>Cataloguing of resources</b>	Cataloguing guidelines are based on Dublin Core, the RLLMAP, and the Anglo-American				



	Cataloguing Rules (AACR2).				
<b>Collection management</b>	Ensures the collections retain relevance to changing user needs and that collection management is focused on user needs and their use of online info.				
<b>Audience</b>	Primary audience comprises students, researchers, teachers, lecturers, librarians and others studying or supporting the subjects. Records are <i>free of charge</i>	Medical scientists and practitioners.	Medical scientists, researchers, practitioners, students	Audience may include physicians and other health care providers, researchers, librarians, students, and increasingly, patients, their families, and the public.	Exclusive Portal for Healthcare Institutions, Hospitals, Doctors and Medical students  More useful for consumers and general audience
<b>Plans for Expansion</b>	Plans to introduce portal functionality later this year. It also plans to develop and include selected content in the search from the health and social care subject areas of the RDN catalogue.			A comprehensively redesigned version was released on April 4, 2005. New versions are released periodically.  In future versions, links within and across databases will be exploited. Searches in clusters of NLM databases (or in <i>all</i> databases) will be offered.	



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## ANALYSIS

The above table displays a comparative analysis of subject gateways in health sciences. Analysis of the factors displayed has been made to find out most useful gateway among the above and thus to identify the best features of a subject gateway.

**Authority:** Authority is more essential for any resource to have reliable and dependable information. Generally the reputation of author, contributor, institutional affiliation and publishers are the sources to identify the authoritativeness of a work. In case of subject gateways the sponsors or organization(s) associated with creation and maintenance of subject gateway is important to assign authenticity of the gateway.

The table reveals that Medline Plus and National Medical Library Gateway are developed and maintained by the world reputed National Library of Medicine, Bethesda, USA and other national institutes. Hence the gateways are authoritative. Intute Health and Life Sciences gateway is a consortium of seven universities working with a host of [partners](#) having expertise in the field hence can be considered as more authentic as academicians are involved in its designing and development is the gateways, Hardin.MD is being created and maintained by University of Iowa library professionals. The library professionals are trained and experienced in filtering and listing authentic information. Therefore it is also authentic. The last one, Web Health Centre is by a commercial Information Technology firm Tata Consultancy Services. The developers are IT experts but host of doctors involved in free online consultancy services. Hence its authenticity can't be established fully with regard to subject though the firm is highly reputed in IT field.

It can be inferred from the above analysis that all the subject gateways are authentic though World Health Centre's authenticity with regard to subject is doubtful.

**Gateway Scope and coverage:** The scope is important for any resource as it indicates the boundaries of the coverage. The inclusion of subject (s), geographical and time periods indicate the worthiness of the source both quantitatively and qualitatively. In a way it indicates the limitations with regard to subject, class of readers, upto datedness of materials and about the overall coverage. It further indicates the consistency of plan followed with regard to coverage and the extent of supervision.

The table indicates that Intute and National Library of Medicines Gateways include a diverse field of subjects in medicine. Intute cover a broad range of subjects like medicine, nursing, midwifery, veterinary medicine, ethics, impact of science on society and science communication. Hence the scope of Intute has an overall coverage



in the different fields of medicine. National Library of Medicine Gateway provides abstract service only. Its coverage includes bibliographical information and research services in biomedicine and consumer health care. Therefore its gateway coverage is limited to have branches of medicine and health.

Hardin.MD coverage provides access to the best Web sites in thirty seven medical disciplines, which indicates a good coverage of the discipline. The gateway scope of Medline Plus is supported by National Library of Medicine, United States of America and other National Institutes of Health as well as government agencies. Its scope is limited to web resources that cover information on over 750 topics.

The primary coverage of Web Health Central portal is health care information but also includes management related solution about health care products. Its scope is consumer oriented and not truly professional. For professionals, it provides product information rather than subjects. Hence its coverage differs from the other subject gateways.

It can be inferred from the above description that all the subject gateways have broad scope in the field of medical sciences except Web Health Central. However Intute coverage is wider as it offers full-text access.

**Type of resources/services:** The nature of resources play the most on the role in any organization. Based on the types of the nature of resources available, services offered can be assessed.

The table point out that Intute and Medline Plus have good collection of resources in the form of either individual subject gateways or perform mutual gateways searches. Both subject gateways offer resources in the form of directories, encyclopedia, interactive patient tutorials and latest health news besides the e-books and e-journals. Both provide health information in Spanish. Similarly, the resources and products of National Library of Medicine Gateway, DIRLINE, is significant. It provides primary, secondary and tertiary sources of information about diseases, tests, symptoms, injuries, surgeries and common health products. Thus its resources are effective and lead to efficient information services/products. The Web Health Central is a portal whose services are not only confined to medical professionals but also useful for general medical information. Haridn.MD offers its service through well/qualified practitioners, nurses and librarians identified by the University of Washington and Yale University. It's resources provide access to best 37 medical disciplines.



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It can be interpreted from the above analysis that Intute and Medline plus resources and services are equally providing access to core health science literature with focus on scholarly communication. While Web Health Central portal is of little importance to medical professionals but more to consumers of health science.

**Updation:** It is very essential to update the gateways/portals regularly with current literary and news output. Then only the site can disseminate current information to the end-users.

From the table it can be inferred that Intute and Medline plus are updated daily. Hence they are more reliable and dependable to access nascent developments in medicine. Hardin.MD and Web Health Central are updated at regular intervals while a National Library of Medicine gateway is updated at irregular intervals.

Therefore once again Intute and Medline plus proved to be effective owing to their daily updation policy.

**Expert involvement:** The focus of subject gateways is on expert involvement in filtering and selecting the accurate and pertinent websites. Indeed the intrinsic value of subject gateways lies in the involvement of experts. The gateways are engaging professionals, experts and distinguished scientists in the field as experts to review the mass of web sites on medical information on the web.

The table reveals that Intute, Medline plus, Web Health Central and National Library of Medicine Gateway involves subject specialists representing different subject in health science discipline. The unique feature of Intute is its subject specialists are confined only to United Kingdom. On the other hand Hardin.MD involves library professionals, who create and maintain meta directory.

It can be inferred from the above analysis that Intute and Medline Plus are an edge over the other gateways as medical subject experts are involved in reviewing and selection. This human expertise of specific subject certainly makes the gateway qualitatively effective.

**Partners:** The growth and development of the subject gateways depends on the types of partners who are involved, in creation and maintenance of the gateway. This factor is important as it indicates the quality of service and the sustenance of the gateway as nothing is permanent on the Web.

From the table it is observed that Intute is established by the collective effort of well known Universities of like University of Nottingham, University of Oxford and





other higher educational institutes. Hence it is one of the best medical subject gateways. Medline plus has National Library of Medicine Gateway and National Institutes of Health as its partners confined to United States. National Library of Medicine Gateway is library based service with the support of federal agencies, public health institutions and international organizations to provide access to health and scientific information. Its renowned partners include national Network of Libraries of Medicine (NNLM). Hence sustainability of this service is guaranteed. Web Health Central is associated with top medical institutions and professionals of Asian region. It claims to have well renowned partners for consultancy services. Harind.MD is unique and maintained by the Hardin Library, University of Iowa, Hence no partners at regional or national level.

It can be deduced from the above analysis that as far as partnership is concerned all the gateways are effective except Web Health Central that do not have any partnership.

**Ability to cross search other gateways:** The facility to cross search other gateways helps users of subject gateways to access faster, data through other subject gateways. In other words it will be a single window / one stop search for a gamut of information in the field.

The table reveals that Intute has the best capacity to search health related information by linking the eight subject gateways. Hardin.MD has vast communication network to communicate the result beyond the doors of the library. So it is popular by displaying links from and around the Web. Further this subject gateway is more popular prior to the creation of Intute and cited by almost all search engines. Medline plus has least ability as it rarely links sites outside United States of America. National Library of Medicine Gateway and Web Health Central have limited ability to cross search with other resources.

It is clear from the above analysis that Intute is the best of all the subject gateways with regard to cross searching of other gateways.

**Selection criteria:** The primary function of subject gateways is to review the ocean of website, filter the unwanted and select the best sites and put them in a systematic order. To perform this function standard selection criteria must be devised.

From the table it is understood that Intute has followed the best selection criteria for selection of websites. The criteria include intellectual content, objectivity, structure and form etc. Hardin.MD is important as it bring out the analytical efforts of



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the library and make them available as web resources. Medline Plus follows a set of guidelines; websites are evaluated based on these guidelines.

Therefore it can be inferred that Intute has a systematic selection criteria followed by Medline plus and Hardin.MD. The National library of Medicine Gateway and Web Health Central do not mention any specific selection criteria

**Cataloguing of resources:** Organization of web sites is very essential to identify the resources as fast as possible. In the case of subject gateways standard cataloging codes likes AACR2, Dublin core can be applied.

The table indicates that only Intute follows cataloguing guidelines based on Dublin Core. Hardin.MD, Medline plus, National Library of Medicine Gateway and Web Health Central did not indicate the nature of organization of their web resources. They might be following general alphabetical arrangement taking the keywords from MeSH.

**Collection management:** Collection management is the major task of any library. The better the management the better will be its outcome i.e. easy and timely access. Infact the Five Laws of Library science are the guiding principles for collection management both in traditional and web era.

It can be inferred from the table that Intute has given importance to its collection management. The other four subject gateways have not mentioned this feature which indicates that they have not given considerable weight age to this factor.

**Audience:** Audience means to whom the service is actually intended to. In the case subject gateways under study the audience include medical practiconers, health science researchers, medicos, nursing staff et al.

The above table indicates medical gateways aims at reaching medical practitioners, researchers, students, para-medical professionals and general public.

The analysis of the data given in the table indicates that all the gateways are striving to reach to the specified audience except Web Health Central, that aims more at consumers of health information than the medical professionals.

**Plans for Expansion:** Future plans for expansion of the Gateway is an important feature that looks for the sustenance of gateway. Hence data gathered to find out their future plans. The table reveals that Intute plans to introduce a portal and develop RDN catalogue. Hence it has good plans for expansion. National Library of Medicine Gateway has a vision to link with databases of medicine that it offers. The other



subject gateway like Medline plus, Hardin.MD and Web Health Centre remain silent on this aspect.

Hence once again the Intute outstand the other subject gateways under study.

### **Conclusion:**

Knowledge is human in nature as it is generated and used by the humans. This knowledge is being recorded for sharing by others which leads to the growth of the society in general. However the intrinsic value of knowledge lies in its dissemination and utilizations. Traditionally print has played pivotal role for recording and dissemination of knowledge and has monopolized for more than four centuries. Though microforms and audio/visuals have been developed they remained to support the print and never superseded it. Now the advent of internet and its public availability since 1993 brought in this systematic channelization of knowledge through print records. The electronic media has superseded the print as there millions of documents that are available only in e-format and not available in print. Hence it is nevitabl for Library and Information Centres (LICs) to adopt these technologies and provide access to e-resources. Otherwise the users will be deprived of accessing that percent of literature that is available in e-format.

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