SUBJECT INFORMATION GATEWAYS AS THE SCHOLARS' PATHWAYS FOR AVOIDING THE INTERNET CHAOS: NEW PROSPECTS AND CHALLENGES FOR LIS PROFESSIONALS

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Abstract

Describes the emergence of Subject Information Gateways as the pathways for finding and accessing authentic and scholarly digital information sources and other resources in different media and formats that are available on the Internet. Highlights the role and significance of Subject Information Gateways in the present era of chaotic proliferation of information on the Internet. Draws attention to the prospects and challenges confronting the library and information profession, and suggests some methods that can be adopted by library and information professionals for promoting the use of Subject Information Gateways.

Keywords: Subject Information gateways; Internet; Library and Information Professionals; Information Access; User Awareness

1. Introduction

From handling clay tablets and papyri rolls in ancient times to the present era of providing access to global digital information, libraries have indeed come a long way. In the traditional library and information environment, human intermediaries such as librarians, documentation specialists and information scientists find, analyze and evaluate information sources so that end-users are able to search organized collections of surrogates of knowledge. The first few years of the new millennium has already witnessed the way traditional techniques of information handling are transforming, while many have become obsolete, largely due to the onslaught of the information technology juggernaut which has had an unprecedented impact on the way information is produced, transferred and used.

Today, users are increasingly thinking in terms of the Internet as a means to quick and direct access to vast amounts of information available in various formats. However, users are expected to be in a position to identity and evaluate the enormous quantum of information in order to satisfy their information needs.(1) With the information explosion and proliferation of digitised resources, most users are simply not capable of coping with this phenomenon because of the increasing necessity for them to use computerized databases to gain access to much of this information. The proliferation of information has intensified the need for users to be able to evaluate information, but the challenge lies not in being able to find enough information, but in being able to select the most useful and most relevant resources for meeting specific information needs. Unfortunately, users do not always have

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the time or skill, and very often, the inclination to search the Internet for information that could support their work. The proliferation of information available on the Internet has raised a number of issues concerning the quality of information and access to it.

Pitschmann, as with many others, is convinced that the problem with relying on the Internet and Search Engines to provide data is that search results can be so overwhelming that the user cannot be expected to evaluate them in a reasonable length of time. Search results may be far removed from, or totally unrelated to, the desired findings. The search technologies employed by the major Web discovery tools are insufficient to retrieve and adequately evaluate scholarly content (2). He further argues that 'Searching the Web on any topic will retrieve all information pertinent to one's query, but there will be no qualitative evaluation or filtering of the content.' (3). He states that "Only when sites have been reviewed, evaluated, selected, and catalogued will users be spared the ambiguities resulting from the randomness and 'quantity without quality' of Web search results." (4). Kerr and MacLeod too agree, arguing that 'as the indexes of … large search engines are created by indiscriminate trawling of the Internet, there is no emphasis on quality of resources retrieved.'

Users are exposed to an ever increasing amount of networked information and are expected, often unrealistically, to be able to handle this themselves. As a response to this, Subject Information Gateways have been introduced to provide users with an organized collection of digital information. The explosion of information on the Internet, and the need to tame the potential chaos, was one of the reasons why gateways became so popular and prevalent.(6) Under the circumstances, library and information professionals are inevitably forced to acknowledge the fact that one way of helping the end-users find relevant and authentic information is to teach them how to utilize one of the fastest growing Internet-based technologies generally known as Subject Information Gateways (SIGs).

2. Subject Information Gateways

Several definitions of SIGs have been proposed by various authorities, some of whom have defined SIGs as:

1. Internet-based services that "provide lists of quality-tested resources in specific disciplines, and often a variety of value-added services relevant to the specific disciplines." (7).
2. Online services and sites that provide searchable and browseable catalogues of Internet-based resources and which typically focus on a related set of academic subject areas" (8)
3. A gathering place of discipline specific resources … a process of identification, filtering, description, classification and indexing before they are added to a database which is freely available in the World Wide Web" (9)
4. A Web-based mechanism for accessing a collection of high quality, evaluated resources identified to support research in a particular subject discipline".(10)

From the above definitions, it can be clearly understood that SIGs are Internet-based quality controlled information services that allow easier access to network-based resources in a defined subject area. Through SIGs access is provided to relevant information services including websites, documents, data, multimedia files and other resources available on the Internet. Each Internet resource is described with a brief annotation and grouped under the appropriate category. Users can either search the information by keyword or browse the resources under subject-headings. SIGs also help

users to judge the relevance of the resources. They also minimize the possibility of repetition in search results.

SIGs are also known variously as Subject-Based Information Gateways, Subject-Based Gateways, Subject Index Gateways, Virtual Libraries, Clearing Houses, Subject Trees, Path Finders and other variations. Whatever the nomenclature, SIGs work on the same principle - they employ subject experts and information professionals to select, classify and catalogue Internet resources to aid search and retrieval for the users. Users are offered access to databases of Internet resources which they can search by keyword or browse by subject area assured with the knowledge that they are looking at a quality controlled collection of resources.(11)

There are different types of subject information gateways if one were to categorize them on the basis of their levels of sophistication. The simplest types are the sets of Web pages containing links to resources. Some gateways index their lists of links and provide a simple search facility. More advanced gateways offer a more enhanced service via a system consisting of a resource database and various indexes that can be searched and/or browsed through a Web-based interface. Each entry in the database contains information about network-based resources such as web pages, websites, mailing lists or other document surrogates.

To sum up the definitions and broadly speaking, a 'Subject Information Gateway' is basically a computer program that functions as a front-end to an online library catalogue as well as to other information resources on the Internet. It provides guidance and instructions for users on how to proceed through an information search that integrates the access and use of print and digitized information. The system serves as an online "bridge" to other computer-based information sources and services enabling the user to apply major elements of the search strategy process while gaining access to relevant digital resources. A SIG is designed to allow users to bypass any step of the search strategy not applicable to their information needs and go directly to specific sources/resources that are more applicable and relevant.(12)

A SIG leads users to the best information for their needs regardless of the materials' formats. Each SIG provides instructions and guidance in identifying the best material to meet their needs - where the materials are located and how to evaluate and use them. A SIG provides on-screen instructions that enable users to find, identify, locate and select materials that might prove to be useful. A SIG offers a greater level of independence to search new avenues and utilize unfamiliar but relevant materials and also introduces users to searching new sources of information regardless of the format, origin of database, or the user's computer experience. As a rule, a SIG is usually designed to be flexible and expandable so it can be continuously adapted to changes in technology.

3.   Characteristics of Subject Information Gateways

There are now a considerable number of Web-based gateways that can be used to locate network-based resources in some particular subject area. Nearly all of these gateways have unique features, additional subject-based services, and different approaches to how information about network-based resources is stored in the resource description database. While offering a single point of access to Internet-based resources in a given field, selective subject gateways have one key feature which distinguishes them from more commercial enterprises – they are characterised by a quality

control methodology based on skilled human input from the relevant academic discipline. (13) The major characteristics that distinguish SIGs from other Internet-based technologies include the following (14):

a. Basic Gateway Facilities: Most subject gateways allow the end user to either search or browse the database of resource descriptions. For example, the Astro Web Gateway consists of a browseable multi-level menu of sub-areas and resources as well as a WAIS-based search mechanism. In addition, most gateways allow the user the options of case sensitive searching and stemming, where resource descriptions containing variations of a term are located. For example, 'paint' begets painted, paints, paintings and other items beginning with paint.

b. Additional Searching Facility: Some gateways provide extra facilities for enhanced searching. For instance, SOSIG (Social Science Information Gateway) incorporates a thesaurus containing social science technology. This gives the users the option of generating alternative terms/keywords with which to search the resource catalogue. SOSIG also allows users to search for resources that are located in distinct geographical areas, such as in the whole world, just in Europe or just in the UK. Another gateway, EELV (Edinburgh Engineering Virtual Library), allows users to search on a subset of types of resources, such as electronic journals, mailing lists and/or conference announcements. PAW (Physics Around the World) gateway allows users to select the level of suitability for educational physics resources, e.g. kids school or university level.

c. Additional Subject-related Services: Some subject gateways have built a considerable number of related services and information sources around their core searchable/browseable gateway. Biz/Ed (Business and Economics SIG) for students, teachers and researchers, contains large amount of business and economic information, such as financial data and economic data sets. ELDIS (Electronic Development and Environmental Information Service) provides access to several electronics and environment related bibliographic databases. History, a gateway to network-based history resources, provides details of historians and their search and teaching interests. OMNI, a medical and health subject gateway has a section which allows users to purchase health-related CD-ROMs. OMNI also allows users to search across other databases of resources, such as databases of dental resources provided by DERWEB.

d. Resource Cataloguing: The key difference between subject gateways and the popular automated large-scale Web indexing systems or search tools such as Google or Alta Vista is the quality of the results that the end-user receives. This is dependent on the nature of the indexing technique adopted by a particular gateway.

e. SIGs are hand-crafted, in the sense that the resources in their searchable databases have been examined by teams of experts who have identified, described and classified each item before inclusion in the gateway. Resources are included in the SIG databases only if they fulfill criteria according to usefulness, relevance and subject content. The SIG databases are, therefore, smaller and more focused than the large search engines. The resources included in the databases are organized on a subject basis and arranged to facilitate retrieval according to various relevant categories powered by computer-generated criteria, and quality assurance is of utmost importance. The results of a typical query in a SIG database will tend to consist of a list of links to quality resources that are accompanied by descriptions of the documents.

e. Quality Control: Quality control is the most fundamental concern of SIGs achieved through the application of definite selection criteria. The key issues in quality assurance are authority, accuracy, appropriateness and accessibility. A comprehensive list has been developed and

organized into five main categories that reflect the main areas to be considered in the evaluation of Internet resources: (15)

i) Content Criteria: This involves evaluating the subject content of information resources on the basis of Validity, Authority and Reputation of Source, Substantiveness, and Adequacy of Maintenance.

ii) Form Criteria: This involves evaluating the medium and format in which resources are available on the Internet on the basis of Ease of Navigation, Provision of User Support, Use of Recognized Standards, Appropriate Use of Technology, and Aesthetics.

iii) Process Criteria: This involves evaluating the system and support facilities extended to available resources. Under these criteria, the concerns relate to Information Integrity (work of the information provider), Site Integrity (work of the Webmaster/site manager), and System Integrity (work of the systems administrator).

iv) Scope Criteria: These criteria relate to considerations for the users. The specific criteria relate to Information Coverage, Access Policy, Cataloguing Policy, and Geographical Coverage.

v) Collection Management Criteria: These are the criteria pertaining to the various services and resources to be made available. These include Collection Coverage and Balance, Availability of Internet Resources, and Availability of Library Resources.

Given the above stringent criteria for quality control, SIGs have assumed a significance far superior to other Web search engines, Web directories, and commercial technologies insofar as provision of access to scholarly Internet resources is concerned.

4.   Significance of SIGs for the Library & Information Professionals

The emergence of SIGs during the 1990s was viewed initially with skepticism by many in the library and information world. However, SIGs soon became a vital point of convergence of ideas and efforts, as well as cooperation, among subject experts and library/information professionals for the sole benefit of the end-users. Ward rightly argues that "The library and its trusted information specialists are in a unique position to guide people to research quality information."(16) The significance of SIGs, including the prospects and challenges confronting the library and information professionals can be briefly outlined as follows:

4.1   SIGs Offer a New Role for Librarians

Developers of SIGs generally expect librarians and other information professionals to turn their skills and spare some time towards Internet information provision, and in effect, help manage the global electronic library. Since many users are increasingly using the Internet to meet their information needs, SIGs are now appealing librarians who are interested in using the Internet to meet the information needs of their users, and to use SIGs as a means of doing so.

Librarians and other information professionals can enhance their effectiveness by teaming with the developers of SIGs by assuming the roles of SIG correspondents. The SIG correspondent model works on the same theory as many traditional cataloguing consortia, where many librarians feed catalogue entries into one shared system for the mutual benefit of all involved. The idea is to have many librarians assume the role of SIG correspondents as part of their work, and to spend time in

finding and cataloguing Internet resources for the concerned SIGs on a regular but informal basis. The advantages of this approach can be summarized as follows:

a.   A one-stop shop for users;
b.   A comprehensive collection of Internet resources; and
c.   Economy of scale.

By becoming SIG correspondents, librarians can create a new role for themselves on the Internet, and be widely acknowledged as having an important part to play in the management of Internet information. The contributions of all correspondents are formally acknowledged on the SIG home pages with the option of having an individual profile that states the library in which they work, their area of expertise, and the part of the collection that they have contributed.

SIGs also offer both short and long term methods for libraries to increase their involvement in Internet information provision. SIGs also encourage academic librarians to become correspondents as part of the team of information professionals and academics working remotely from their respective work places to select resources for the gateway. SOSIG (now merged with Intute to become Intute: Social Sciences), for instance, has suggested that major European libraries should consider setting up a social science information gateway for their respective country. On the lines of the SOSIG model, a network of national gateways can be created that can be cross-searched via a single interface. This is a big opportunity for librarians to assume an important role on the Internet and to work together to build an integrated electronic library comprehensively covering the various fields of knowledge.

4.2   SIGs as Virtual Libraries

Most SIGs can be accessed free of charge by registered users. In most cases, even the registration process is free. SIGs are fundamentally online catalogues that provide quality and customized services, and point to collections of high quality Internet resources. Any SIG generally aims to serve as a 'one-stop shop' for users who wish to find out what the Internet has to offer that is potentially relevant to their work.

In many ways, SIGs are now emerging as the Internet version of the academic library. Though these gateways point to Internet resources, they have applied many of the principles and practices of traditional librarianship. Every resource item is selected, catalogued and classified by information professionals, and sometimes by subject experts. SIGs have specific collection management policies, quality selection criteria, systematic classification systems and cataloguing rules. As such, when users access SIGs they can have the same confidence that they would have on entering an academic library - they can be assured of the quality of the resources, and there is a well-established system to help them find the information they need.

In the printed world, it is acknowledged that librarians are vital 'information filters', whose expertise saves the users' time and effort in information retrieval and access. In the same way, librarians can serve their users more effectively by creating tailored services and collections of Internet resources to meet the specific requirements of particular users. There are, indeed, significant benefits to be had from sharing the expertise of information professionals in the global effort to exploit the services and resources available on the Internet.(17)

4.3 Rising to the Challenge

Most academic libraries and institutions are currently looking for ways to help their users identify and access high quality information on the Internet in a quick and effective way. It will be interesting to see if librarians and other information professionals are willing to make Internet resource selection and cataloguing a part of their work. Several SIGs, such as SOSIG for instance, have set up a system to make collaborative and distributed cataloguing of Internet resources possible. The response from the library and information profession is yet to be seen.

In India, a major effort towards the creation of a SIG has been the "SP Mukherji Information Gateway of Social Sciences" (SPM-IGSS). The initiative for the creation of this gateway was taken by ICSSR, with NASSDOC playing an active role in its development. SPM-IGSS was inaugurated on 12th May 2000.(18) The creation, development, maintenance and significance of SIGs need to be publicized, especially in a country like India where there is certainly no dearth of infrastructural, institutional, and manpower resources. There is still a wide scope for the creation of SIGs dedicated to diverse subjects and in different languages, with emphasis on various aspects of the indigenous milieu.

5. Promoting Subject Information Gateways

SIGs offer a potential role as well as challenges for library and information professionals today. Unfortunately, the majority of academics, on the other hand, do not know much about SIGs; in fact, many have not heard of SIGs at all. This is one area that demands immediate attention. Any effort aimed towards promoting SIGs must invariably include the following:

Developing the requisite competencies for using SIGs. Library and information professionals must first of all equip themselves with a thorough knowledge about SIGs, their features, including their limitations, and the basic skills required for effectively using them through actual online interactions. Only then, can such knowledge and skills be imparted to the users.

Compilation of Links to SIGs and uploading them on the institution's/library's website. The task of identifying, locating, compiling and editing/updating the links to SIGs must be taken up in right earnest. While printed lists of the URLs of SIGs may be prepared initially, the links to SIGs must invariably find a prominent place on the college/university library's website/webpage.

Widespread publicity through lectures/demonstrations, institution's newsletter, handbills, posters, radio talks, mass media, personal interactions, etc. The need for publicizing SIGs can never be overemphasized.

Organizing User Orientation/Awareness Programmes with emphasis on Internet-based scholarly resources and their access through SIGs. The regular user orientation/awareness programmes conducted by the library must include a special session on SIGs. The ineffectiveness of popular web search engines and directories as tools for searching and identifying authentic, relevant, reliable and scholarly information resources for academic activities must be emphasized. Practical step-by-step online demonstrations are most helpful in persuading users to utilize SIGs.

Follow-up action on actual use of SIGs by user members of the institution's academic community. Efforts must be made to interact with the users who have been newly introduced to SIGs. Surveys can also be conducted at periodic intervals to assess the level of actual use of SIGs by faculty members, research scholars, students, technical staff and other users. If such a survey indicates any lack of inclination to use SIGs, further instructional awareness programmes can be initiated to promote the use of SIGs among the users/members of the institution.

Search and Identification of New SIGs must be undertaken on a regular basis. It is generally agreed that the number of SIGs has more than doubled, though some have merged, during the past decade mainly due to the proliferation of web-based information resources on diverse and emergent fields of knowledge. As such, there exists the need to constantly search, identify and update the links to new SIGs.

6.   Conclusion

Considering the dynamic nature and overwhelming amount of information available on the Internet, it is indeed a pleasant relief to witness the development of SIGs as a pioneering and global effort towards a systematic, purposeful, and user-oriented technique of organizing and integrating quality services and resources available on the Internet. It is also equally encouraging to note that library and information professionals have a potential role to play in the creation and maintenance of SIGs. The challenges are enormous; the tasks require expertise, the participation involves unwavering commitment, and the future directions quite unforeseeable in view of rapid developments in information-based technologies. However, library and information professionals will need to adapt to the changing times and changing needs of users by exploring all possible avenues, in order to overcome the severe constraints associated with the traditional methods and tools of library and information service.

The need of the hour, therefore, is to redefine the role of the library professional against the backdrop of the digital information environment: (i) from being a library administrator to an information manager; (ii) from the curatorial/archival role to that of an information intermediary and filter; (iii) from a librarian obsessed with collection development (the just-in-case model) to a facilitator of connection development (the just-in-time-with-the-right-stuff model); and (iv) from the passive informer metamorphosing into an active communicator/collaborator/consultant. Today, there is an urgent need to take initiatives aimed at bridging the digital divide and thus ensure equitable access to relevant, authentic, accurate and timely information from across the globe. The navigation of the future would tend to integrate with the human-assisted information retrieval from the networked universe and would support rapid information navigation and precision retrieval.(19) Thus, library and information professionals need to recognize their great potential in the digital era by shedding their traditional image as collectors and custodians of information, by seeing themselves as knowledge navigators browsing and filtering digital resources and electronic information services, and by embracing information technology as a tool rather than an end in itself.

Only an immediate realization of the potential benefits of integrating new information and communication technologies, followed up with active involvement and sustained commitment to serve the users, can take the library and information profession to greater heights.

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LIST OF MAJOR SUBJECT INFORMATION GATEWAYS WITH THEIR URLs

AHDS: Arts and Humanities http://ahds.ac.uk/

ALTIS: Hospitality, Leisure, Sports, Tourism http://www.altis.ac.uk/

Artifact: Art, Design, Architectural Planning, Landscaping http://www.artifact.ac.uk/

Arts Resources: The Arts http://wwar.com/

BIOGATE: Biological Sciences http://biogate.lub.lu.se/

BIOME: Health and Life Sciences http://biome.ac.uk/

Biz/Ed: Business and Economics http://www.bized.ac.uk/

CAIN: Conflict Studies http://cain.ulst.ac.uk/

ChemDex: Chemistry http://www.chemdex.org/

EdWeb: Educational Reform and Information Technology http://www.edwebproject.org/

EEVL: Engineering, Mathematics and Computing http://www.eevl.ac.uk/

ELDIS: Development & Environmental Studies http://nt1.ids.ac.uk/eldis/

GEM: Educational Resources http://thegateway.org/

Geo-Information Gateway: Geography, Geology & Environment http://www.geog.le.ac.uk/cti/info.html

GEsource: Geography and Environment http://www.gesource.ac.uk/

History: Historical Research http://www.ihrinfo.ac.uk/

HUMBUL: Humanities http://www.humbul.ac.uk/

iLoveLanguages: Language-learning & Linguistics http://www.ilovelanguages.com/

InfoLaw: Law http://www.infolaw.co.uk/

Internet Directory for Botany: Botany http://www.botany.net/IDB/botany.html

LawLinks: Law http://library.ukc.ac.uk/library/lawlinks

Links for Chemists: Chemistry http://www.liv.ac.uk/Chemistry/Links/link.html

Math Forum: Mathematics http://mathforum.org/library/

MCS: Media and Communication Studies http://www.aber.ac.uk/media/Functions/mcs.html

MedHist: History of Medicine and Allied Sciences http://medhist.ac.uk/

Music: Music http://link.bubl.ac.uk/music/

NOVAGate: Forestry, Food, Veterinary and Agricultural Sciences http://novagate.nova-university.org/

OMNI : Medical Science http://omni.ac.uk/

PADI: Preserving Access to Digital Information http://www.nla.gov.au/padi/

Philosophy Around The Web: Philosophy http://users.ox.ac.uk/~worc0337/phil_index.html

Philosophy in Cyberspace: Philosophy http://www-personal.monash.edu.au/~dey/phil/

PhysicsWeb: Physics http://physicsweb.org/resources/

PORT: Maritime Studies http://www.port.nmm.ac.uk/

Portal of Legal Resources: Law http://www.venables.co.uk/

psci-com: Communication of Science; Science in Society http://www.psci-com.org.uk/
PSIgate: Physical Sciences http://www.psigate.ac.uk/
PsychWeb: Psychology http://www.psychwww.com/
RUDI: Urban Design & Planning http://www.rudi.net/news.cfm
Sapling: Architecture, Planning and Landscape http://www.sapling.org.uk/
SciCentral: Science and Technology http://www.scicentral.com/index.html
SOSIG: Social Sciences http://www.sosig.ac.uk/

LIST OF OTHER MULTI-SUBJECT INFORMATION GATEWAYS

About.com Education: All Subjects http://home.about.com/education/index.htm
Academic Info: All Subjects http://www.academicinfo.net/index.html
BUBL Link: All Subjects http://bubl.ac.uk/link/
DMOZ: All Subjects http://dmoz.org/
DutchESS: All Subjects http://www.konbib.nl/dutchess/
INFOMINE: All Subjects http://infomine.ucr.edu/
Intute: All Subjects http://www.intute.ac.uk/   (New! Merger of UK-Based SIGs)
MetaMatters: All Subjects http://metabrowser.dtdns.net/dcanz2/mb.aspx
Resource Discovery Network: All Subjects http://www.rdn.ac.uk/
Renardus: All Subjects http://www.renardus.org/
Scout Report Archives: All Subjects http://scout.cs.wisc.edu/archives/
VirtualLibrary: All Subjects http://www.vlib.org.uk/