Network of African Medical Librarians

FINDING, ORGANIZING AND USING HEALTH INFORMATION:

A Training Manual For Students, Researchers And Health Workers In Africa

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Grace Ada Ajuwon (Team Leader),
E. Latunde Odeku Medical Library,
College of Medicine,
University of Ibadan, Nigeria

Foreword

Regina Shakakata, former medical librarian at the University of Zambia and subsequently at World Health Organization Regional Office for Africa (AFRO), was an early information technology advocate and pioneer in Africa, beginning in the early 1990s. She died suddenly in 2002 but left a legacy of greater use of Information Technology (IT) by medical librarians, physicians, and policy makers on the continent - and her indefatigable spirit. She joined me at a conference at Harvard in 2000 and the following is excerpted from her remarks:

You talk of the underserved here, but if you have not visited Africa- the real Africa-you don't know what information poverty is all about…Those of you who are librarians here, you know that as a librarian, you dust books, you shelve them, you do nothing else. But with information technology, we were the champions…We are talking of empowering our communities, empowering individuals in Africa with appropriate information, so that they can take decisions about their own health, about their well-being. 1

The information communications technology (ICT) landscape in Sub-Saharan Africa has changed radically since those early days, with Internet connectivity, cell phone coverage, and access to information growing beyond anything we could have imagined.

Over the past 14 years, the U.S. National Library of Medicine (NLM), the world's largest medical library, has been engaged in capacity building in Africa and has created modest programs to serve medical librarians, medical journal editors, researchers, clinicians, and medical students at universities, research sites, and clinics in urban and village settings.

This course – **Finding, Organizing, and Using Medical Information** – is the result of NLM's commitment to expanding the leadership of African librarians who have received training as NLM Associate Fellows. The seven librarians who created this course are from Kenya, Zambia, Mozambique, Mali, Nigeria, Uganda, and Zimbabwe and now compose the NLM Network of African Medical Librarians and Deans. NLM's objective in supporting this Network is to assist African librarians who already have links to NLM in creating an approach for strengthening libraries through outreach and training in Africa.

In response to the librarians' interest in creating a course on information retrieval and in collaboration with Kenyatta University in Nairobi, Kenya, NLM convened a ground-breaking meeting of the medical librarians and their deans/provosts from the seven universities where the librarians are based. The objective was to develop a course which would be adopted at their respective universities as a permanent part of the medical schools' curricula. The deans welcomed the initiative, and participants engaged in a lively discussion regarding strategies for expanding the course to encompass basic computer literacy training and the writing of papers for journal publication, thereby strengthening medical journals, and finally for how the course might best be integrated into the curricula.

Based on the enthusiasm generated at this meeting, the librarians collaborated online to produce the seven modules for the course:

Module 1-Information Sources
Module 2-Searching Tools
Module 3- Electronic Information Searching Techniques
Module 4-Intellectual Property Rights
Module 5-Management of Information

Module 6-Evaluation of Information
Module 7-Scholarly Communication Skills

After further development at a workshop in Maputo, Mozambique, they launched the course at the Association for *Health Information* and Libraries in *Africa* **(***AHILA***)** 2010 International Congress in Ougadougou, Burkina Faso. A second workshop in 2011 at Kenyatta University found the librarians creating YouTube videos in order to give a personal introduction to each of the modules. Designed as a course for free web distribution, the modules are introduced in the short videos by the librarians themselves.

In an electronic text and video package, **Finding, Organizing, and Using Medical Information** is now available for free distribution via the web.
There is already evident interest in the use of this course outside of the original institutions involved - from AHILA and the African Medical Journal Editors Partnership Project to bioinformatics workshop training in Morocco and ministry-level programs in Haiti.
At their respective institutions, these librarians continue to be busy, training faculty and students as well as engaging in outreach to areas outside of the capital cities. They have carried out workshops for librarians and researchers from around their countries, produced regular newsletters, presented at faculty board meetings, conducted lunchtime training sessions for staff, and traveled to rural areas to engage people at the village level . Several have developed institutional repositories which can be accessed online.
I am honored to contribute this foreword to the fine efforts of the African Network of Medical Librarians and Deans and salute their creativity, energy, and perseverance as medical librarian change agents of the 21st century! Tweet, twitter, and post your course to the world. Regina and all who have gone before you would be very proud!

Julia Royall, Chief,
International Programs,
U.S. National Library of Medicine

Royall, J., Sadowsky, G. (2000). Report on a Colloquium on Sustainability and Access to Health Information: Critical Assessment of Practical Uses of Information Technology in the Developing World. Harvard School of Public Health, May 31, 2000.

This book is a product of the devotion and dedication of medical librarians in Africa for the development of a healthy society through information literacy. Information literacy has become an essential requirement in today's world of information and technology. The web has revolutionized information retrieval and in today's information world, the word *literacy* therefore goes beyond the traditional definition of knowing how to read and write. Wilson, E an American Scientist rightfully stated "*we are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices widely."* This cannot be overemphasized when it comes to health as information literacy is crucial in ensuring all those

involved with health including healthcare providers, medical librarians and consumers know how to find, use and manage health information. This is due to the fact that access to right and accurate information is a prerequisite to good health.

Whether you are a doctor, a nurse, an allied health professional or a medical librarian, this manual provides answers to the most crucial questions that arise while searching for health information. These questions range from: What information sources are available? What tools are available for searching the web? What techniques do you apply when searching the web? What is intellectual property right? How do you manage and store information once retrieved from the web? How do you evaluate information so as to use what is accurate? How do you use information for scholarly purposes? The authors of this manual have provided answers to these key questions so as to ensure that looking for information does not become a frustrating task and that the right information is retrieved, stored and used in an ethical manner.

Having worked with health information for over 15 years I have come to recognize the challenges involved in retrieving information from the World Wide Web and more so at a time where Evidence Based Information is imperative. This manual has made great strides in trying to answer various issues surrounding information retrieval and I am without doubt that many readers will gain a lot from this invaluable resource. A lot of effort has also been made to have an all inclusive and broad manual. Ultimately, this is to serve as a guide and can be customized where necessary to match individual needs.

Nasra Gathoni
President,
Association for Health Information and Libraries in Africa (AHILA)

Acronyms

ADIN - Australian Drug Information Network
AIDS - Acquired Immune Deficiency Syndrome
AIM - African Index Medicus
AJOL - African Journals Online
APA - American Psychological Association ARC: Australian Research Council
CDROM - Compact Disc-Read Only Memory
CINAHL - Cumulative Index to Nursing and Allied Health Literature
DOAJ - Directory of Open Access Journals
DVD - Digital Video Disc
ELISAD - European Association of Libraries and Information Services on Alcohol and Other Drugs
FMIC - Federal Ministry of Information and Culture
HINARI - Health Internetwork Access to Research Information
HIV - Human Immunodeficiency Virus
HON - Health on the Net Foundation
ICMJE - Vancouver International Committee of Medical Journal Editors
IMRAD- Introduction, Methods, Results and Discussion
IPR - Intellectual Property Rights
JISC - United Kingdom's Universities' Joint Information Systems Committee
MESH - Medical Subject Headings
MLA - Modern Language Association of America
MSDS - Material Safety Data Sheets
NACA - National Agency for the Control of AIDS
NBS - National Bureau of Statistics
NHSEED - NHS Economic Evaluation Database
NIH - National Institutes of Health
NLM - National Library of Medicine
NOAH - New York Online Access to Health
NRC - National Research Council
OPAC - Online Public Access Catalog
PDF - Portable Document Format
PMC - PubMed Central
PPT - PowerPoint
RADCAB - Relevancy Appropriateness Detail Currency Authority Bias
SciELO - Scientific Online Library
UNAIDS - Joint United Nations Program on HIV and AIDS
URL - Uniform Research Locator
VCR - Video Cassette Recorder
WHO - World Health Organization
WIPO - World Intellectual Property Organization
WWW - World Wide Web

Module One - Information sources

Introduction

Information is power and an essential ingredient in decision-making. To obtain timely, relevant and quality information for your study or research work, you need to know the various sources of information available. This module is expected to deepen your knowledge of sources of information in print, non- print and electronic formats. It presents the definition, originators/producers, types, formats, and categories of information sources. The module also shows where information sources could be found e.g. archives, libraries and the Internet.

Learning Objectives

Students/Trainees would learn:

1. The definition of information sources
2. The major producers of information sources
3. Types of information sources
4. The formats of information sources
5. Where to find information sources
6. Categories of information sources
7. Internet information sources

Learning Outcomes

At the end of the module, students/trainees should be able to:

1. Define information sources
2. Identify and list producers/originators of information
3. Determine types of information sources
4. List formats of information sources
5. Determine where to find information sources
6. List and discuss the categories of information sources
7. Identify and use Internet information sources

Table 1: Summary of Content

S/N	Content	Methods	Mode of Assessment
4.1	Definition of information /information sources	Lecture Discussion Brainstorming	Question and Answers
4.2	Producers and originators of information sources	Lecture Brainstorming	Pre and post test Question and Answers
4.3	Types of information sources	Brainstorming Discussion	Question and Answers
4.4	Formats of information sources	Brainstorming Lecture Discussion	Assignment
4.5	Where to find sources of information	Brain storming Discussion	Question and Answer
4.6	Categories of information sources	Brainstorming Discussion	Question and Answers
4.7	Internet information sources	Discussion Lecture Brainstorming	Question and Answers Handson

Producers/Originators of Information

There are three main producers/originators of information. These are:

1. Government Agencies
2. Academic institutions
3. The private Sector
4. Individuals

Government Agencies

Government departments and agencies publish lots of information in print and electronic formats. In various countries of the world, governments at all levels play an important role in producing information for the society they serve. In many occasions, government officials may need information about the society in order to make decisions relating to economic, social and political issues [1]. Some of the information produced by government is grey literature comprising reports such as National HIV/AIDS reports, gazettes, population statistics, census data, government notices, policy documents etc. Since government documents are generated with public funds, they are made available either free of charge or at low cost. This can be done

through the various government agencies including the public libraries or the government Websites. In Nigerian for instance, some government departments and agencies Websites include:

- National Agency for the Control of AIDS (NACA), http://www.naca.gov.ng
- National Bureau of Statistics (NBS), http://www.nigerianstat.gov.ng
- Federal Ministry of Information and Culture (FMIC), http://www.fmic.gov.ng

Academic institutions

Academic institutions such as universities and colleges are major producers of information in a society or country. Academic institutions around the world especially those in the United States (Yale, MIT, Harvard, Johns Hopkins, Stanford, University of North Carolina at Chapel Hill, University of Wisconsin and University of California, Los Angeles etc), United Kingdom (Cambridge, Oxford, University of Liverpool) Africa (University of Ibadan, Nigeria; University of Zimbabwe; University of Zambia; Makerere University, Uganda; Kenyatta University, Nairobi; University of Bamako, University of Witwatersrand, South Africa, and University of Ghana, Legion etc) have conducted extensive researches in various specialties including the health sciences. Numerous publications and knowledge materials are generated from these research studies as technical reports, books and articles in peer reviewed journals. Academic institutions also have other publications such as Newsletters, Magazines, Technical reports, Manuscripts, Maps and lots of other Grey literature. Web addresses of some academic institutions in Africa are listed below:

- University of Ibadan, Nigeria – http://www.ui.edu.ng
- University of Zambia- http://www.unza.zm/
- Kenyatta University, Nairobi, Kenya- http://www.ku.ac.ke/
- University of Zimbabwe – http://www.uz.ac.zw
- Makerere University, Uganda – http://mak.ac.ug
- University of Bamako, Mali - www.ml.refer.org/u-bamako

Private Sectors

A third major producer of information in a country is the private sector. This consists of print and electronic media organizations, commercial business outfits, publishers/vendors and aggregators, performing /film industry that publish and or make their information products and services accessible on the Web either free or by subscription. Others are:

- Non-profit professional organizations
- Profitable organizations and commercial agencies
- International Agencies
- Professional Associations or organizations
- Private institutions
- Corporate laboratories

Unlike government departments and agencies, published reports of research carried out by most organizations, agencies and commercial outfits in the private sector are not made available for public consumption. However, non- profit organizations and agencies do make their publications available to those that need them. Some examples of agencies in the private sector or non profit category are:

- The World Health Organization (WHO) – http://www.who.int/
- Joint United Nations Program on HIV and AIDS (UNAIDS) – http://www.unaids.org
- Elsevier Publishers – http://www.elsevier.com
- Cables News Network (CNN) – http://www.cnn.com

Private Individuals

Individuals also create information. Many print and web documents available today are created by private individuals, some of whom have their own Websites/pages. Some individuals disseminate information through Facebook, Twitter, Blogs, You-tube etc, while others publish information in print as text books, monographs or articles in journals, magazines or newsletters. On the other hand, some important information is not published rather, it is passed on from generation to generation. For example, some parents pass information to their children by word of mouth on how diseases were treated using traditional unorthodox methods in their communities.

Exercises

1. List the various producers of information in a country.
2. Give three examples of the type of information each produces or creates.

Definition of Information /Information Sources

Information is processed data. An information source is where you got your information from; this can be a book or a Website. Information sources are the various means by which information is recorded for use by an individual or an organization. It is the means by which a person is informed about something or knowledge is availed to someone, a group of people or an organization. Information sources can be observations, people, speeches, documents, pictures, organizations. Information sources can be in print, non-print and electronic media or format.

Types of Information Sources

Information can come from virtually anywhere: personal experiences, books, articles, expert opinions, encyclopedias, the Web. The type of information needed will change depending on its application.
Individuals generate information on a daily basis as they go about their work. In academic institutions, staff and students consult various sources of information. The choice of the source to consulted is usually determined by the type of information sought. The three types of information sources are:

- **Primary**
- **Secondary**
- **Tertiary**
- **Primary Sources**

Primary sources are original materials on which other research studies are based. Primary sources report a discovery or share new information [2]; they present first-hand accounts and information relevant to an event [3, 4a and 5]. They present information in its original form, not interpreted or condensed or evaluated by other writers [2]. They are usually evidence or accounts of the events, practices, or conditions being researched [4a, 6] and created by a person who directly experienced that event [7]. Primary sources are the first formal appearance of results in print or electronic formats [3]. Examples of primary sources are: eyewitness accounts, journalistic reports, financial reports, government documents, archeological and biological evidence, court records, ephemerals (posters, handbills), literary manuscript and minutes of meetings etc [3,4b and 6].
The definition of a primary source may vary depending upon the discipline or context. A diary would be a primary source because it is written directly by the individual writing in the diary [7]. Interviews are primary sources because the individual talks about the topic directly from what he/she knows about it. Other examples are:

- Video of the inauguration of the first female president in Brazil
- A scientific publication reporting the development of a new medication to manage patients with sickle-cell anemia

Print	Electronic	Others
- Diaries - Letters - Speeches - Patents - Photographs - Newspaper articles - Journal articles - Theses and dissertations - Survey Research (e.g., market surveys, public opinion polls) - Proceedings of Meetings, conferences and symposia - Original Documents (i.e. birth certificates, wills, marriage licenses, trial transcripts) - Records of organizations, government agencies (e.g. annual reports, treaties, constitutions, government documents)	• Internet • E-mail communication • Communication in Listservs • Interviews (e.g., telephone, e-mail) • Video recordings (e.g. television programs) • Audio recordings (e.g. radio programs) • Web sites • Communications through social networking applications (e.g. Face book, blogs, RSS, U-tube etc.)	• Artifacts (e.g. coins, plant specimens, fossils, furniture, tools, clothing, all from the time under study) • Works of art, architecture, literature, and music (e.g., paintings, sculptures, musical scores, buildings, novels, poems).

A newspaper article reporting the bomb blast in Abuja, Nigeria, during the celebration of the country's 50th Independent Anniversary.

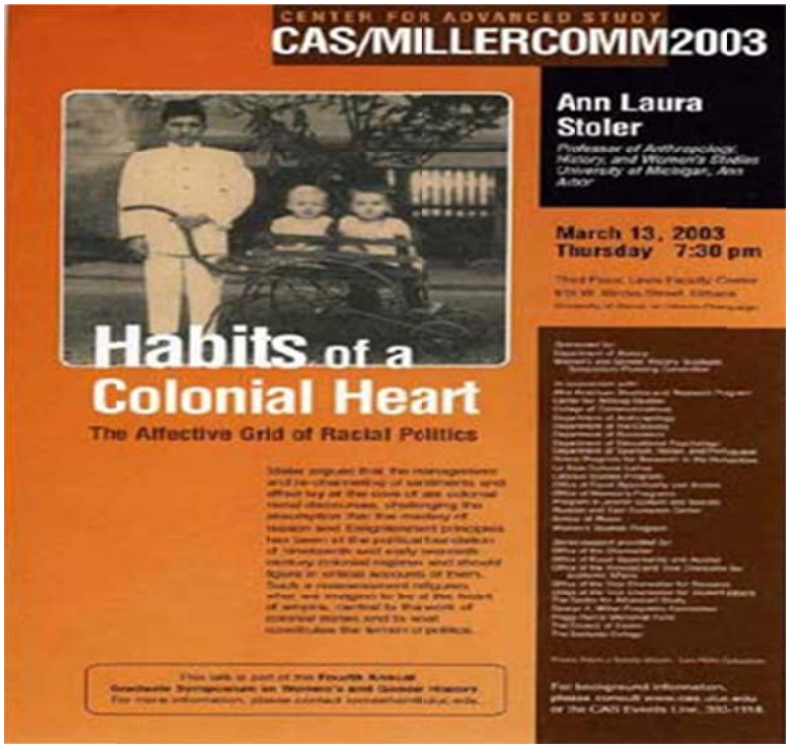
Note: The types of information that can be considered a primary source may vary depending on the subject discipline, and how the material is being used. **For example:**

- A research article in a peer-reviewed journal that proved the effectiveness of a newly developed vaccine for the prevention of HIV virus would be a primary source, however,
- A magazine article that reports the development of a new vaccine for the prevention of HIV infection would be regarded as a primary source.
- Information in a magazine article that reports a study of how compact fluorescent light bulbs are presented in the popular media could be considered a primary source [3].

Grey literature

Grey literature is also important primary source material(s) not available through the usual systems of publication (e.g. books or periodicals) and distribution [11]. Examples are: Conference proceedings, data exchange, environmental impact statements, oral presentations, market research reports, online documents, oral presentations and working papers

Table 2: List of primary sources of information in various formats



This poster advertises a lecture scheduled for March 13, 2003 (Courtesy University of Illinois Library)

Photograph of PubMed/HINARI training by librarians at E. Latunde Odeku Medical Library, College of Medicine, University of Ibadan, Nigeria, for resident doctors at the University College Hospital

Secondary Sources

A secondary source of information is one that was created by someone who *didnot*have first-hand experience or did not participate in the events or conditions being researched [4]. They are generally accounts written after the fact with the benefit of hindsight. Secondary sources describe, analyze, interpret, evaluate, comment on and discuss the evidence provided by primary sources [2]. Secondary sources are works that are one step removed from the original event or experience that provide criticism, interpretation or evaluation of primary sources [7]. Secondary sources are not evidence, but rather commentary on and discussion of evidence. A secondary data is one that has been collected by individuals or agencies for purposes other than those of a particular research study.

However, what some define as a secondary source, others define as a tertiary source. For example, if a magazine writer wrote about the speech Nelson Mandela delivered when he was inaugurated President of South Africa in 1990, it will be a secondary source. The information is not original, but an analysis of the speech. If a government department has conducted a survey of, say, family food expenditures, then, a food manufacturer might use this data in the organization's evaluations of the total potential market for a new product [8]. Similarly, statistics prepared by a pharmaceutical company on the production of a particular drug will prove useful to a host of people and organizations, including those marketing the drug.

For secondary sources, often the best are those that have been published most recently [4b]. If you use a secondary source that was published decades ago, it is important to know what subsequent scholars have written on the topic and what criticism they have made about the earlier work or its approach to the topic. The definition of a secondary source may vary depending upon the discipline or context. Most often how a source is used determines whether it is a primary or secondary source [9]. For the purposes of a historical research project, secondary sources are generally scholarly books and articles. Also included in this category would be reference sources such as encyclopedias (also considered tertiary). Other examples of secondary sources are:

- Bibliographies (also considered tertiary);
- Biographical works
- Commentaries
- Criticisms
- Dictionaries
- Histories
- Journal articles (depending on the discipline, these can be primary)
- Magazine and newspaper articles (this distinction varies by discipline)
- Monographs, other than fiction and autobiography
- Textbooks (also considered tertiary)
- Websites (also considered primary)

- **Tertiary sources**

Definition: Tertiary sources consist of information which is a distillation and collection of primary and secondary sources [3]. Generally, tertiary sources are not considered to be acceptable material on which to base academic research [6]. Tertiary sources are usually not credited to a particular author. They are intended only to provide an overview of what the topic includes, its basic terminology, and often references for further reading. Some reference materials and textbooks are considered tertiary sources when their chief purpose is to list, summarize or simply repackage ideas or other information. Examples of tertiary sources include dictionaries and encyclopedias, *Wikipedia* and similar user-contributed online 'encyclopedias' and reference materials, as well as various digests (including the *Reader's Digest*) and schoolbooks [6]. In a nutshell, tertiary sources are:

- works which list primary and secondary resources in a specific subject area
- works which index, organize and compile citations to, and show secondary (and sometimes primary) sources can be used.
- Materials in which the information from secondary sources has been "digested" - reformatted and condensed, to put it into a convenient, easy-to-read form [10].
- Sources which are once removed in time from secondary sources

Table 3: General classification of selected primary, secondary and tertiary sources of information

Primary sources	**Secondary sources**	**Tertiary sources**
• Autobiographies • Correspondence: email, letters • Descriptions of travel • Diaries, • Eyewitnesses • Oral histories • Literary works • Interviews • Personal narratives • First-hand newspaper and magazine accounts of events • Legal cases, treaties • Statistics, surveys, opinion polls, • scientific data, transcripts • Journal articles	• Biographies, Encyclopedias, dictionaries, handbooks • Textbooks & monographs on a topic • literary criticism & interpretation • history & historical criticism • political analyses • reviews of law and legislation • essays on morals and ethics • analyses of social policy • study and teaching material • Articles, such as literature reviews, • Commentaries, research articles in all subject disciplines • Criticism of works of literature, art and music	• Chronologies • Classifications • Dictionaries • Encyclopedias • Directories • Guidebooks and manuals • Population registers statistics • Fact books • Abstracts • Indexes • Bibliographies • Manuals/Guide books

• Records of organizations and government agencies • Original works of literature, art or music • Cartoons, postcards, posters Map, paintings, photographs, films		

- **Difference between Primary, Secondary and Tertiary Sources of Information**

Primary sources of information are original manuscripts, documents or records used in preparing a published or unpublished work. For example, an article in a peer reviewed journal that discussed the development of a new vaccine for the prevention of HIV infection will be considered a primary source. Secondary sources are published or unpublished works that rely on primary source(s). A commentary by a magazine reporter based on the peer reviewed journal article on the newly invented vaccine for HIV prevention, would be a secondary source. Tertiary sources are published or unpublished works that are based on secondary sources. Tertiary sources are index to primary sources. Science Citation Index would be considered a tertiary source. It is sometimes difficult to differentiate between primary, secondary and tertiary sources. The following publication details of the information adapted from University of Wisconsin libraries [12] can be helpful in determining whether a material is primary, secondary or tertiary source:

- **Timing of the event recorded**--If the article was composed close to the time of the event recorded, chances are it is primary material. For instance, a letter written by a soldier during the Second World War is primary material, as is an article written in the newspaper or a soldier's letter home during the Liberian Civil War. However, an article written analyzing the results of the battle during the Liberian Civil War is secondary material.

- **Rhetorical aim of the written item**--Often, an item that is written with a persuasive, or analytical aim is secondary material. These materials have digested and interpreted the event, rather than reported on it

- **Context of the researching scholar**--Primary materials for a critic studying the literature of the Civil War are different from primary materials for a historian studying Civil War prisons. The critic's primary materials are the poems, stories, and films of the era. The research scientist's primary materials would be the diaries and writings of the prisoners.

Your information needs and requirements will determine what source(s) you need to consult in order to meet that need. For example,

If you need:	You might try:
Current information about the political situation in your country or adisaster that has happened yesterday somewhere around the world	Newspapers and the Web
Scholarly articles that discussed research about using cassava for baking or cyanides in cassava	Journals and books (and e-journals or e- books on the Web)
Popular articles about scams on the Internet To search for scholarly articles on a topic such as malaria or HIV and tuberculosis	Magazines (and perhaps e-magazines on the Web) Databases (PubMed, Scopus, Web of Knowledge, EMBASE African Index Medicus (AIM)
General information such as definitions, contacts , Institutions etc	Search engines such as Google, Yahoo etc

Exercises

1. What are primary, secondary and tertiary sources of information?
2. Differentiate between primary, secondary and tertiary sources of information.
2. List 6 primary, secondary and tertiary sources of information.

Formats of Information Sources

Information is available and accessible in two main formats namely, print and non-print and these include published and unpublished sources.

Print Materials (Published sources)

Information could be in print format and these include: all printed books, periodicals, maps, bibliographies, indexes and abstracts, photographs, government documents, technical reports, etc.

Books are the most common type of printed materials. The Oxford Advanced Learner's Dictionary defines a book as 'a set of printed pages that are fastened inside a cover so that you can turn them and read them [13]. A book is described by some people as a written work or composition that has been published, printed on pages bound together while others say it's just the content, separate from its container [14]. Books are categorized into two, namely: fiction and non-fiction. Fiction contains information that are not true and all the scenes and characters are

made up by the author. Non-fiction books deals with information that is true, about real things, people, events and places.

Non-Print Materials

In addition to printed materials, information is also produced in other formats (non-print) including audio, audiovisual, multimedia, microform and electronic books, journals, images, texts/records from the Internet.

Audio-Visual and Multimedia

In the past decades, much of the information created by members of a given society is produced in audio, audio-visual and multimedia formats. Example of audio information is music recorded on CDs and books on audio or video tapes. Video information includes VCR tapes of TV shows, movies and documentaries [1]. Other examples are information on CD-ROMs, DVDs, Flash drives and Web documents etc.

Microform

The American Heritage Dictionary defines microform as an arrangement of images reduced in size, as on microfilm or microfiche. Microforms are any form, either films or paper, containing micro reproductions [15] of documents for transmission, storage, reading, and printing. Microform images are commonly reduced about 25 times from the original document size, (miniaturized or compressed images) which cannot be read without special display devices (the reader). Archival materials are frequently placed in microform format because this medium is very stable and economical for storage of information for extended periods of time. There are two major types, namely: Microfilm and Microfiche.

Microfilm

Microfilm is a roll of transparent film (approximately 100 to 200 feet in length) used to store microscopic images of documents [1]. A microfilm reader is required to read the images in the microfilm. Documents are recorded in microfilm because of the risk of damage to a fragile original or to save storage space. Microfilm when properly processed and stored within special envelopes and placed in a climate-controlled room, has a life expectancy of approximately 500 years [16, 17]. Most libraries have a collection of microfilm stored in their archives.

Microfiche

Is a small sheet of transparent photographic film usually 4 inches by 6 inches containing printed information in a size too small to be seen by the naked eye and needs a special device to read the images [18]. The major advantages of microfiche include storage in a small space, stability of the format, and not needing knowledge to read it. As long as a microfiche machine is available to magnify the print to a readable size, anyone who can read the language can read the information on microfiche. When kept in a temperature-controlled environment, it can last for approximately 500 years; it is a good medium for saving and preserving cultural documents [18].

Unpublished sources- Indigenous Knowledge (IK)

In local communities in Africa, there is a rich body of information or knowledge which has been handed down by word of mouth from generation to generation. This is known as indigenous knowledge. It is neither written nor published but provides people in the community with strategies for survival. Indigenous knowledge is the sum total of knowledge and skills which people in a particular geographical area possess that enables them to get the most out of their natural environment [19]. This information/knowledge is not systematically documented. It is oral in nature, usually transmitted through personal communication; it is culture-specific and often generated within communities [20] for local level decision-making in agriculture, healthcare, food preparation, education, natural resources management and other activities [21]. Examples of areas where indigenous knowledge has been very useful include, among others, African traditional medicine, conflict resolution and culture - dance steps and traditional attire [20].

Exercises

1. What are the formats of information sources?
2. List 2 examples of the various formats?
3. How are indigenous knowledge /information conveyed to among members of a community?
4. What are the uses of indigenous knowledge/information?

Where to Find Information Sources

Places to begin looking for information are:
1. Human sources
2. Archives
3. Libraries
4. Internet

Human Sources (Colleagues/Peers)

Communication with peers and colleagues are a good way of obtaining vital information. For example, doctors have been found to rely on their colleagues for information in order to solve a patient's problems. The value of informal sources of information especially colleagues and peers cannot be overstressed. The good side of it is that human sources (colleagues/peers) are readily available to provide needed information at the right time. If the right person is contacted, quality and up-to-date information will be obtained. The downside of using human sources is that there may be some element of bias in the information provided, or some people will say things from their own point of view or exaggerate it.

Archives

Archives are places where records of all types and formats are kept and made accessible for research and other purposes. They are a good place to find primary sources, both unpublished materials and those that have been published for their parent institution's members or constituencies. Personal and institutional records of all types can be found in archives, as well as media, ephemera, oral histories, and even artifacts. The term *archives*can also refer to the records themselves [4]. The materials housed in the archives are unique, usually one of a kind items. Archives store, preserve and make accessible records of enduring value that have not been produced in great quantities for the general public for research and understanding. Archival materials are rare and irreplaceable and therefore they are not loaned out to users.

Library

When you think about libraries, the first things that come to mind are probably printed materials such as books, journals and magazines. Libraries also provide access to resources such as full-text journal and magazine articles, periodical indexes, and online encyclopedias. Libraries collect quality information in a wide variety of formats. Academic libraries purchase these sources for their "community" of students, faculty, and staff. Unlike archives, libraries have mass produced items such as books, government reports, CDs, DVDs, magazines and journals. The exceptions are rare books, manuscripts, map and other special collections. These resources are different from most of the information that is freely available to you over the Web because they have been reviewed and recommended by the library with input from the faculty members.

Like archives, libraries have primary source materials in many forms: historical newspapers, published letters, diaries, and government reports are just a few of the types of primary sources that can be found in libraries. In addition, some libraries are similar to archives in that they specialize in information materials such as rare books and unpublished manuscripts.

Why Go to a Library for Information?

The main purpose of libraries, particularly those situated in University campuses, is to collect a large quantity of scholarly materials from different time periods and on diverse topics to make research easier for members of the community they serve (staff and students in the case of a university.) Library resources are free for use by members of the community. Libraries purchase materials that are normally too expensive for library patrons. Library materials, unlike those found on the Internet, go through a review process. Librarians select books, magazines, journals databases and even Websites for use by their patrons. This selection process enables the library to collect resources considered to be reliable, relevant and valuable.

In addition, library resources are organized by subjects thus making them easy to find. For easy access, each item of library material has a call number that indicates where it is located on the stack/shelf. Libraries have collections with in-depth information that has been published over time. Both current and out of print books and magazines are stocked in libraries most of which are in print formats. With the advent of the electronic age, some of these are now accessible through digital libraries collections on the Web.

Libraries have trained staff called librarians who serve as a bridge between users and information sources. They assist users in sorting through the maze of information in their library collections. Librarians answer reference questions and also help patrons to learn how to use new information tools. If you need help with accessing information, contact your librarian.

Searching the Library Catalog

For example, you can search the library catalog of a University such as the University of Maryland or University of Zimbabwe to find primary, secondary and tertiary sources of information. See table 3 below for sample searches in the catalog. Module 2 provides details about the library catalog.

Table 3: Sample catalog searches

Primary	*diaries* Nigerian civil war
Secondary	*biography* Nigerian civil war
Tertiary	*encyclopedia* Nigerian civil war

When seeking information for academic purposes, it is advisable to start your search from the library and save yourself time and effort, as well as obtain relevant and quality information. You can then search the Internet if you need more information. Also, if you do not have the skills to search the Internet for relevant information, the librarians are there to assist you.

The Internet

Definition of the Internet and the World Wide Web

The Internet is a global system of networked computers that allow user-to-user communication and transfer of data files from one computer to another on the network [22]. It is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers) on the network [23]. On the other hand, the World Wide Web (WWW) provides the technology needed to navigate the Internet is vast sea of resources [22]. The WWW is a path-way of accessing information over the Internet via Uniform Resource Locator (URL) or web address.

Types of Information on the Internet

In the distant past humans sought to record information for future reference using clay tablets, papyrus, parchment and paper. However; the development of the printing press in the 16th Century forever changed the communication process [24]. Currently the introduction of computers and the Internet has sky rocketed the amount of information now available to students, researchers, scientist, healthcare workers, policy makers, and faculty among others. Unlike the libraries, some of the information available on the Web is not peer-reviewed or

referred as no one individual or group dictates what information should be published or how it should be presented. This freedom to post items allows individuals to publish their opinions, ideas and creative works on the Internet. As a result, the Internet has some information that may be interesting but cannot be referenced and used for academic purposes because no authority takes responsibility for it. Unlike libraries where librarians help users in accessing information, the Web is primarily a do-it-yourself endeavor.
The Internet contains all kinds of information sources including, among others:

- Bibliographic information such as library catalogs
- Multimedia- Audio, video and graphical sources of information
- Reference sources such as Encyclopedias, Dictionaries, Handbooks, and others
- Journals, Newspapers, Magazines and Databases
- Subject related gateways
- Reports /Grey literature
- Movies and videos

1. List three main places where information sources could be found?
2. What are the advantages of information obtained in a library over that of the Internet?

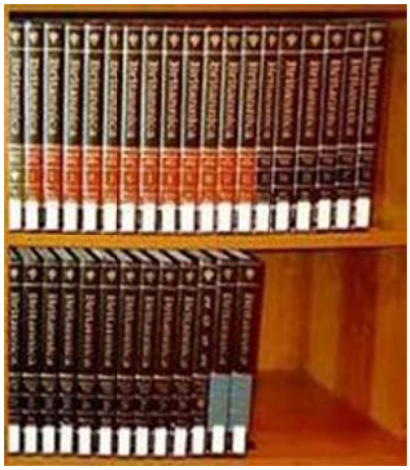
Information Sources in the Library/Internet

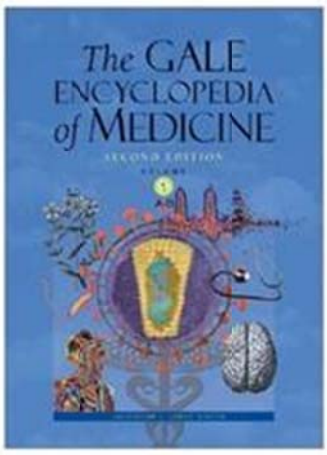
The Internet has become a big library for all kinds of information. Some information sources are available online free of charge while others are fee-based. Examples include online books, databases, journals and reference resources. Some of these are free on the Internet while others are based on subscription or purchase. MEDLINE/PubMed is a good example of a free online database while EMBASE is based on subscription.
Below are the various categories of information sources that could be accessed through the Web.

- Reference
- Monographs
- Periodicals
- Indexes and abstracts
- Drug information
- Databases

Reference Sources

These are authoritative works that provide specific answers or information. As you go through school, you will need to use reference sources to find information about topics, locate facts, and answer questions. There are many types of reference sources, including atlases, dictionaries, encyclopedias, thesauri, directories, almanacs, manuals, biographies, and handbooks, among others. Each type is available either in print, on CD-ROMs and the Internet. Reference information sources can be general or subject specific. For example, The Encyclopedia Britannica is general while The Encyclopedia of Stem-Cell Research, The Encyclopedia of Pain, and The Gale encyclopedia of Medicine are subject encyclopedias. Other reference sources such as dictionaries, atlases, directories also have both general and subject categories.





A set of Encyclopedia BritannicaGale Encyclopedia of Medicine

- **Monographs**

A monograph is a scholarly piece of writing in form of an essay or book on a specific, often limited subject [25]. It is a book that stands on its own rather than being part of a series. According to The National Research Council (NRC), a monograph is a specialized scientific book. Monographs are written by specialists for the benefit of other specialists and demand the highest standards of scholarship. Most monographic manuscripts are critically reviewed and edited resulting in books that are expected to have a reasonably long shelf life [26].

Monographs serve as an important means for conveying basic background information, such as a narrative description of a disease, path-physiology, diagnostic techniques and common therapeutic regimes etc. This trend remains true today, whether the monograph is in the print or electronic format [27]. Monographs can be located using bibliographies that list references of books with detailed bibliographic information (author, title, year of publication, publisher and date of publication). Bibliographies serve as tools for verification, location and selection of monographs. Today, many print sources for monographs are now in electronic formats. To locate monographs in a library collection requires using the library catalog and most libraries now have Online Public Access Catalog (OPAC). A good example is the National Library of Medicine LOCATORplus.

- **Periodicals**

Periodicals are publications such as journals, newspapers, or magazines published on a regular basis - daily, weekly, bi-weekly, monthly, bimonthly, quarterly, yearly, etc. The information in periodicals covers a wide variety of topics and is very up-to-date. Periodicals are available in both print and electronic formats. Common examples of periodicals include popular magazines (or general interest magazines), professional and trade magazines, scholarly journals, newsletters, and newspapers. The two basic types of periodicals are: popular (or general interest magazines), and scholarly.

- **Popular**

Popular magazines are periodicals of non-specialist nature. The published articles are usually written by staff writers, and chosen by the editor of the publication [29]. Magazine articles are usually shorter, written in non-technical language, and designed for the general population. Articles in popular magazines are reviewed by one or two members of staff of the organization where they are published [1]. Popular magazines have a glossy appearance, contains many photographs and advertisements.
Examples of popular magazines are:

1. O, The Oprah Magazine
2. Readers Digest
3. People
4. Time Magazine

- **Trade Magazines**

These are magazines that present information about a profession or a particular trade. They are written for members of a specific business, industry or organization. Trade magazines cover industry trends, new products or techniques, and organizational news written by staff or contributing authors. Good examples of trade magazines are: *The Economist, APA Monitor* and *Computer World.*

- **Scholarly Journals**

Journals are written by experts or specialists in a particular field/discipline and geared towards other scholars. The purpose of scholarly publications is to report research or advance knowledge [29]. The articles are usually longer and may contain charts, graphs, statistics, etc., as well as extensive bibliographies. The articles usually involve extensive research and in-depth studies. The writing style is more complex and the language may be technical. Examples of this type of periodical are academic journals and professional journals. Academic journals are written by members of an academic community and are reviewed by their peers while professional journals are written by member of a professional body including librarians, lawyers, doctors and nurses. Examples of academic journals are:

- British Medical Journal
- New England Journal of Medicine
- African Journal of Medicine and Medical Sciences
- East African Medical Journal
- African Health Sciences

Examples of professional/academic journals include:

- Journal of the American Medical Association
- Journal of the Medical Library Association
- African Journal of Library, Archival and Information Science

Access to journals either in print or electronic formats is based on subscription, however; full-text articles of some electronic journals can be accessed free on the Internet. Also, more than 7000 electronic journals are available to students, researchers, scientists, healthcare workers, and policy makers in Africa through the Health Internetwork Access to Research Initiative (HINARI). Using this resource requires institutional registration and login with the User Identification and Password.

- **Newspapers**

Newspaper articles are short and written in non-technical language. They provide first-hand account of an event and so are primary sources. Newspapers come in different forms and are designed for the general public and are business in nature. Newspaper articles are usually short and written in an easy to understand language by staff reporters and reviewed by staff within the organization. Newspapers are also good sources for secondary information. However, not all

information in newspapers is reliable. Newspapers are published daily, weekly or monthly. Example of newspapers include: The New York Times, The Guardian, and Nigerian Tribune etc.

- **Indexes and Abstracts**

Abstracts and indexes provide citations to papers dealing with specific topics in a field of knowledge. Indexes provide the essential bibliographic information needed to identify an article or other publications and usually include information about the author of the work, the source journal or other publication, volume, issue, and pagination [30]. Abstracting tools include the same key elements but also a summary of the work usually written by the author or sometimes generated by the reviewer where an author did not submit one. Most indexing and abstracting services allow access to their content through subject and author indexes. However, each tool differs on how data is presented and the nature by which access is organized. Examples of abstracts and indexes include:

- Index Medicus
- International Pharmaceutical Abstracts
- Index to Dental Literature
- Science Citation Index
- Current Contents: Clinical Practice
- Psychological Abstracts
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)

Most of the popular databases searched by librarians and library users originated from print-based abstracting and indexing services. For example, the Index Medicus resulted in MEDLINE now accessible online through PubMed.

- **Drug Information Sources**

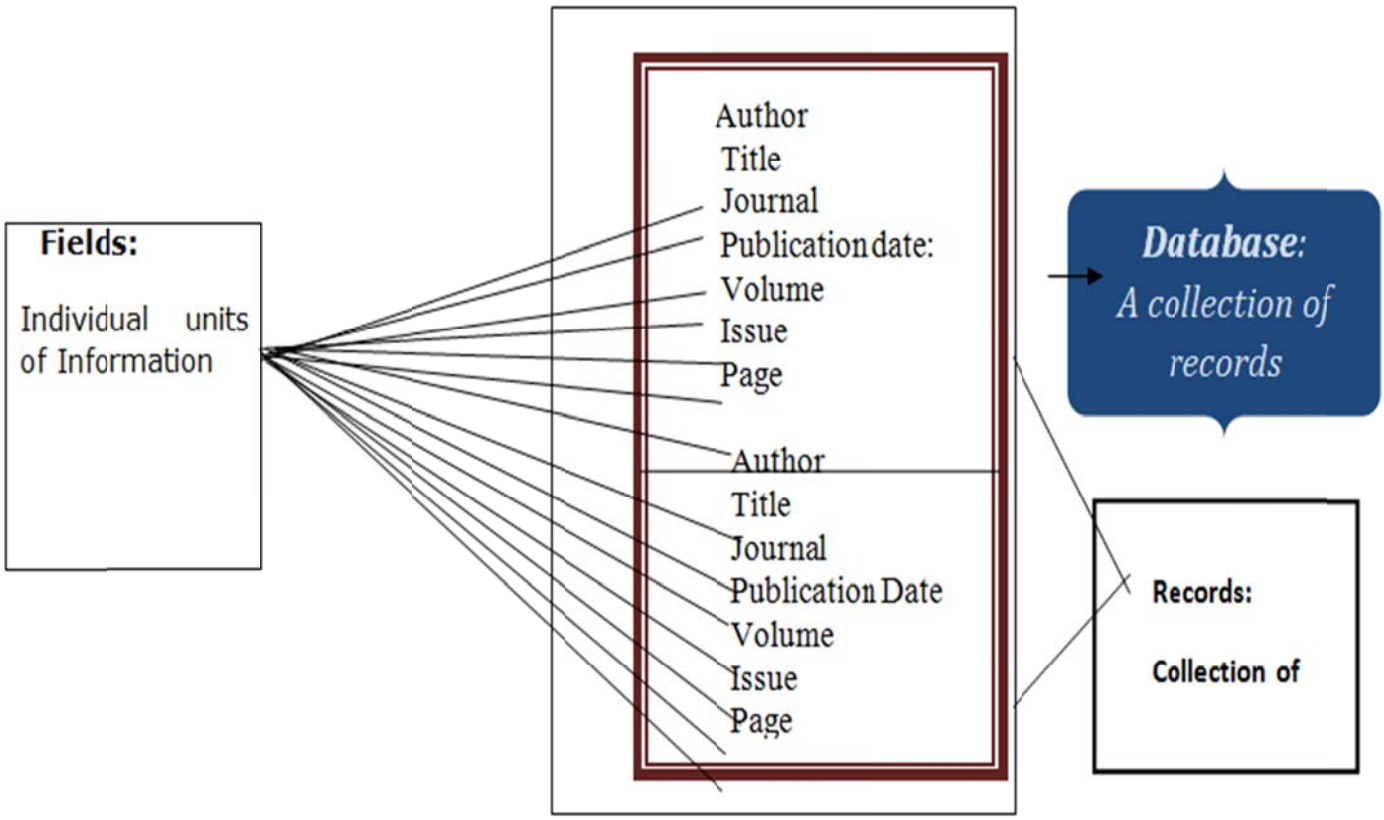
According to Butros and McGuinness (2004), drug information sources cover the fields of pharmacology (the study of the physiological actions of drugs), pharmacy (the compounding, manufacture and dispensing of drugs) and toxicology (the study of hazardous effects of chemicals) [31]. There are as many drug information sources as there are various specialties. Below are some sources for drug information:

1. Clinical Pharmacology. Tampa, Florida: Gold Standard Multimedia. Accessible online at: http://cp.gsm.com
2. MICOMEDEX. Greenwood Village, CO: Thomson MICROMEDEX. Accessible online at http://www.micromedex.com
3. Natural Medicines Comprehensive Database. Stockton, CA: Therapeutic Research Faculty, Accessible online at: http://www.naturaldatabase.com
4. Snow, B. Drug Information: A Guide to Current Resources 3rd Edition. New York, Neal-Schuman Publishers

- **Databases**

These are systematically organized collections of information covering different subject matters or specializing in one given subject or topic [32]. They may be arranged in a table of contents, alphabetically, in numerical order, in an index or in subject categories. A database is made up of records. Each item in the database has one record. Records consist of smaller units of information called fields. Common bibliographic database fields are: author, publication title, article title, subject or keywords, publication date, volume, issue and page number. For example, in the MEDLINE/PubMed database, each journal citation has one record. The record consists of the following fields: author, article title, journal title, date of publication, volume, issue, page number, PubMed ID, and abstract. A digital database is a computer program that organizes, describes, and indexes information. It permits the user to search for specific types of information, depending upon the selected search parameters.

Figure 1: Components of a bibliographic database



Source: NLM PubMed Training Manual, 2007

- **Invisible or Deep Web**

The "invisible Web" is what you cannot find using search engines and what you see in almost all subject directories [33]. They are gold mines of information you need to search directly. These includes all of the licensed article, magazine, reference, news archives, and other research

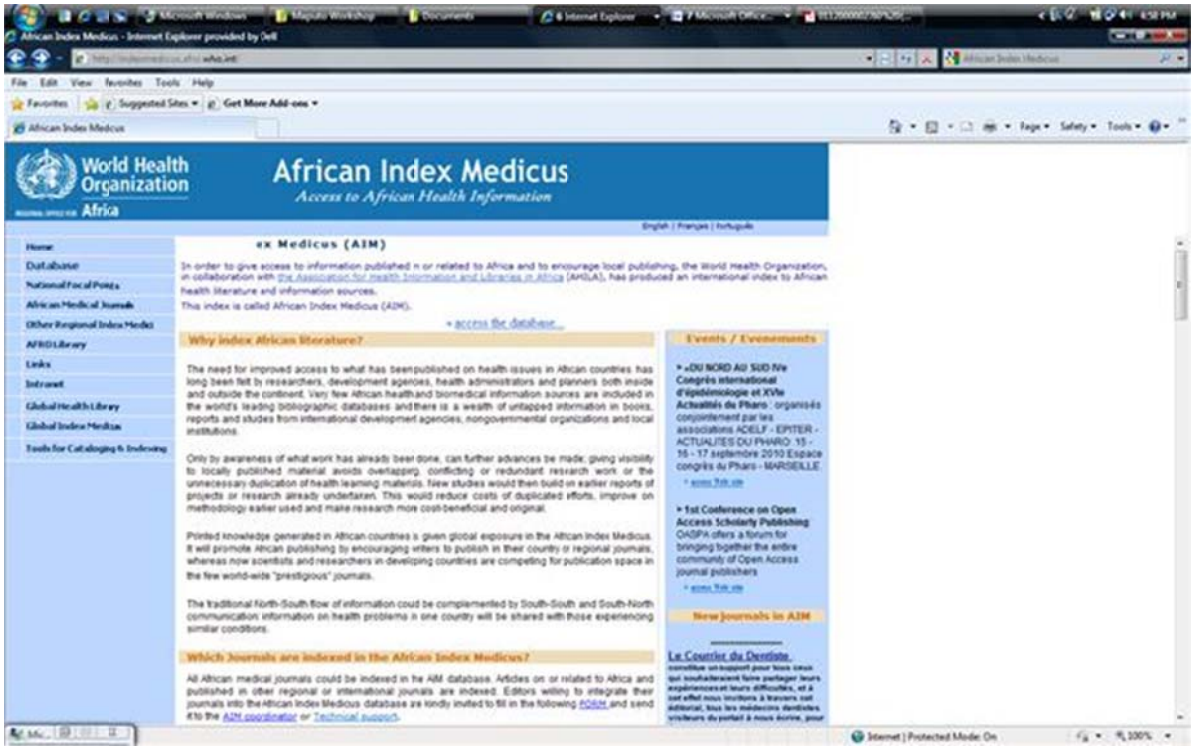
resources that libraries and some industries buy for those authorized to use them. There is lots of helpful information locked away in databases that can never be indexed by search engines. The services that let you search this "invisible Web" or "deep Web include: Invisibleweb.com, Lycos Invisible Catalog, Direct search (http://www.freepint.com/gary/direct.htm) and WebData. Examples of searchable databases containing invisible web pages valuable in academic research are:

- ipl2
- Infomine

- **Online Bibliographic Databases**
    1. African Index Medicus (AIM)
    2. MEDLINE/PubMed
    3. Cumulative Index to Nursing and Allied Health Literature (CINAHL)
    4. Web of Knowledge
    5. Scopus
    6. EMBASE

1. African Index Medicus (AIM)

African Index Medicus (AIM) is a collaborative effort between the World Health Organization (WHO) and the Association for Health Information and Libraries in Africa (AHILA). AIM gives access to information published or related to Africa and also encourages local publishing. A total of 140 journals published in Africa are indexed in AIM as of October 1, 2010. This database provides access to mainly abstracts and a few full-text articles published in African journals. It is at: http://indexmedicus.afro.who.int/



2. MEDLINE/PubMed
MEDLINE is the premier bibliographic database of the National Library of Medicine, Bethesda, Maryland, USA. It covers the field of medicine, nursing dentistry, veterinary medicine, the healthcare systems, the preclinical sciences and other areas related to the life sciences and is updated daily. MEDLINE records contain bibliographic citations from over 5,000 print and electronic biomedical journals published across the globe. It has over 12 million citations of which approximately 76% include abstracts [30]. It is accessible online free of charge through PubMed. MEDLINE/PubMed could be accessed at: http://www.pubmed.nlm.nih.gov. However, to retrieve full text articles, it is better to access PubMed through HINARI at: http://www.who.int/hinari. Details of how to search MEDLINE/PubMed and HINARI will be covered in Module 3.

3. Cumulative Index to Nursing and Allied Health Literature (CINAHL)CINAHL gives access to citations and abstracts for nursing and allied health information. It includes citations from over 2000 journals and abstracts are available for over 1,200 titles with full text of over 7,000 records available in the database [30]. This database also provides some coverage of biomedicine, alternative /complementary medicine and consumer health information. CINAHL is based on subscription. However, it could be accessed free of charge through HINARI by institutions in Africa.

4. Web of Science
Web or science Provides access to the Science Citation Index Expanded and Social Science Citation Index. It covers science and provides technical journals in biochemistry, biology, genetics, biomedicine, genetics, microbiology, nuclear science with abstracts. It covers more than 8,000 journals [30]. It offers current and retrospective bibliographic information, author abstracts and cited references and allows users to conduct broad-based comprehensive searches that uncover all the relevant information they need. It provides cited reference searching, the unique ISI search and retrieval feature that lets users track the literature forward, backward and through the database. It is updated weekly. Web of Knowledge (PubMed) is accessible free of charge via HINARI.

5. Scopus
Scopus is an interdisciplinary bibliographic database that indexes the content of more than 15,000 peer-reviewed journals from more than 4,000 international publishers. It covers subjects such as the physical sciences, engineering, earth and environmental sciences, life and health sciences, social sciences, psychology, business, and management. Scopus content includes MEDLINE and EMBASE citations. Also, Scopus covers 1,000 Open Access Journals, 500 Conference Proceedings, Over 600 Trade Publications and over 125 Book titles. In addition, Scopus covers 386 million quality Web sources including 21 million patents. Web sources are searched via Scirus [34, 35]. Scopus can be accessed at http://www.scopus.com or through HINARI for full text articles.

6. EMBASE

Provides content to biomedical (clinical and experimental) information with extensive coverage of drug research, pharmacology, pharmacy, and toxicology, public health and mental health

topics with abstracts back to 1974 and it is updated daily with pharmacological information. The database indexes more than 7000 journals, has over 18 million records. It has more than the 11 million EMBASE records from 1974 to date and 7 million for unique MEDLINE records from 1966 to the present. This database can be accessed through subscription at http://www.embase.com
Note: All the above bibliographic databases except EMBASE are accessible free through HINARI (http://www.who.int/hinari)

- **Evidence-Based Medicine (EBM) Resources/Databases**

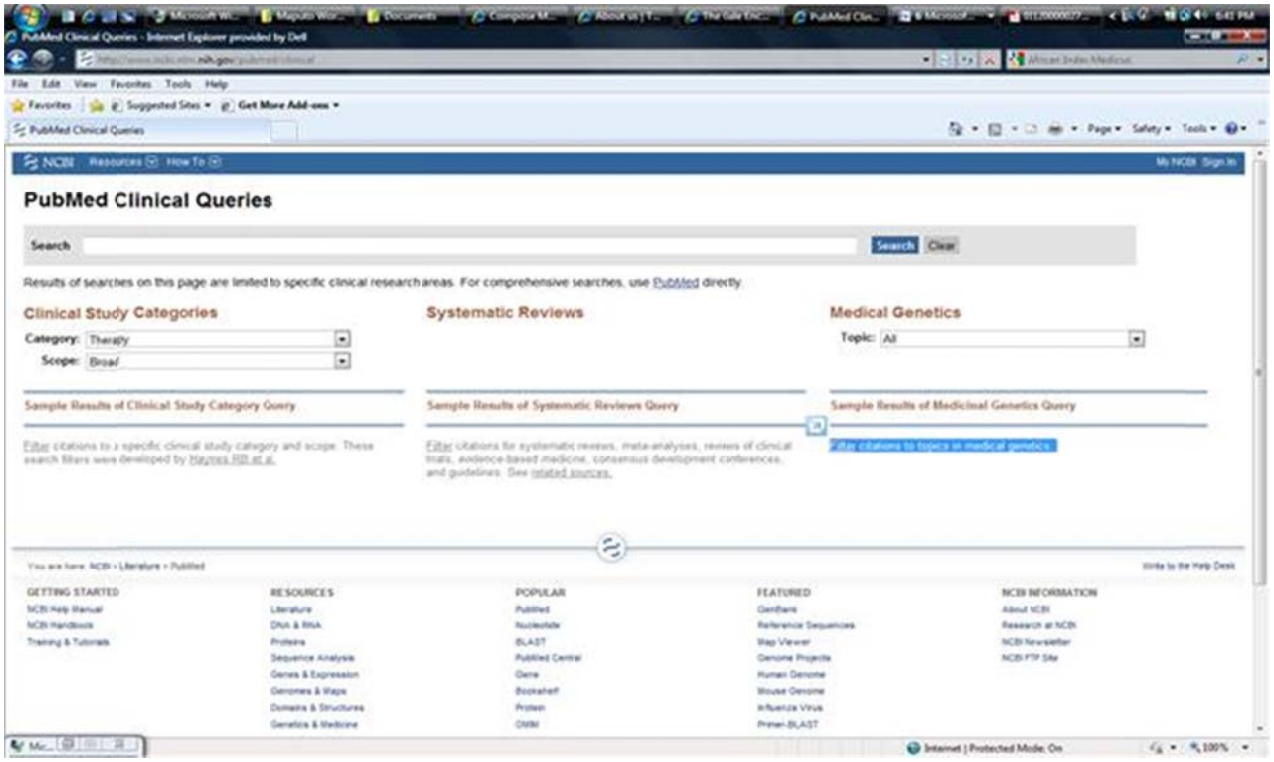
Evidence-Based Medicine is about using information from the medical literature in making informed decision about patient care. Many EBM databases are now accessible online including, among others:

- Clinical Queries
- Cochrane Library
- Clinical Evidence
- DynaMed
- Best Evidence

In this module, Clinical Queries and the Cochrane Library will be discussed

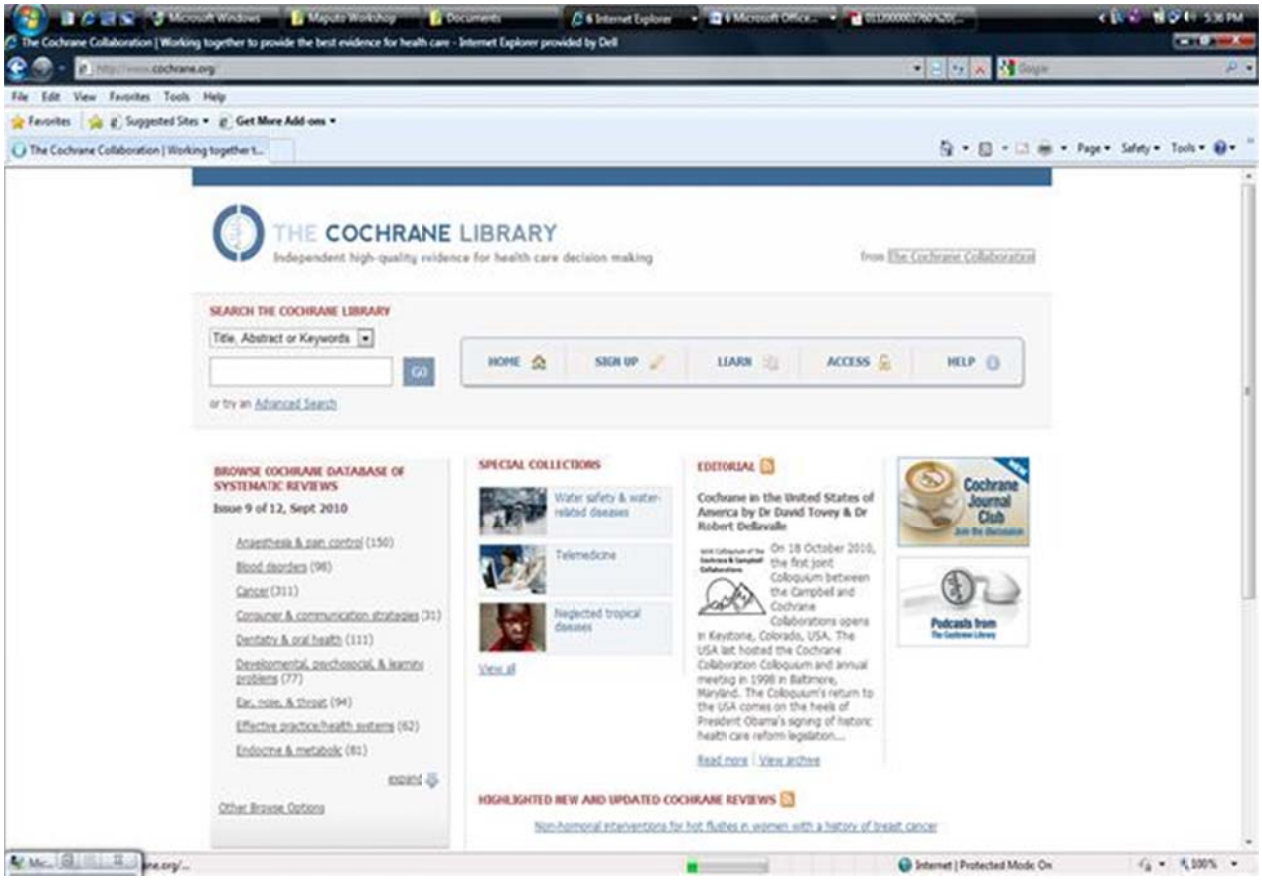
1. Clinical Queries: This is accessible through PubMed and covers three main areas namely:

- *Clinical study category Query*: This filters citations to a specific clinical study category and scope
- *Systematic Reviews:* These filter citations for systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences, and guidelines.
- *Medical genetics:* filter citations to topics in medical genetics.



2. The Cochrane Library is a collection of databases, published on CD-ROM and the Internet and updated quarterly, containing the **Cochrane Database of Systematic Reviews,** the **Cochrane Central Register of Controlled Trials,** the **Database of Abstracts of Reviews of Effects,** the **Cochrane Methodology Register,** the **HTA Database, NHSEED,** and information about **The Cochrane Collaboration. The Cochrane Library has about 4,000 reviews meant for use by health care workers to enable them to make informed decisions with respect to patient care [36].** Reviews are unique because they are both produced by, and are relevant to everyone interested in the effects of health care. Based on the best available evidence, healthcare providers can decide if they should fund production of a particular drug. Practitioners can find out if an intervention is effective in a specific clinical context. Patients and other healthcare consumers can assess the potential risks and benefits of their treatment [37].

- Systematic reviews seek to collate all evidence that fits pre-specified eligibility criteria in order to address a specific research question.
- They aim to minimize bias by using explicit, systematic methods.
- The Cochrane Collaboration prepares, maintains and promotes systematic reviews to inform healthcare decisions (Cochrane reviews).
- Cochrane reviews are published in the *Cochrane Database of Systematic Reviews* in *The Cochrane Library*



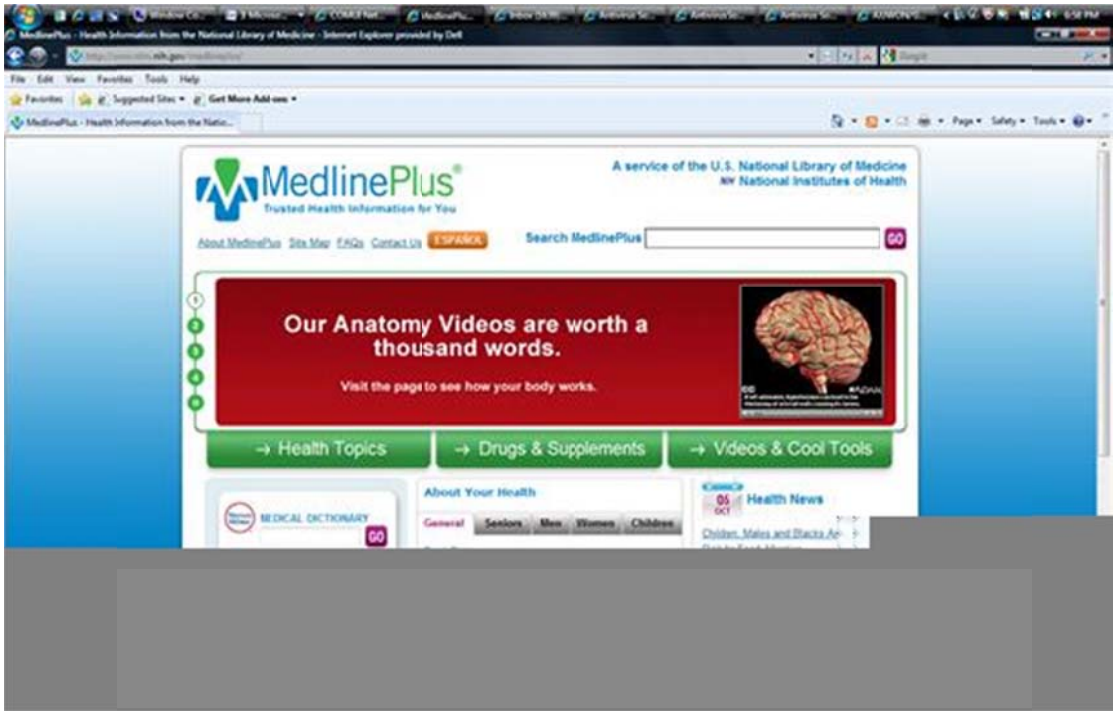
- **Consumer Health Information Resources/Databases**

1. MEDLINEPlus
2. National Institute of Health (NIH) Senior Health
3. New York Online Access to Health (NOAH)
4. HealthyRoadsMedia
5. Toxtown
6. Toxnet
7. Household products database

- **Medline Plus**

Medline Plus is a product of the National Library of Medicine (NLM). Medline Plus offers information on selected, organized links to online consumer health information on hundreds of topics about diseases, conditions, and wellness issues in language you can understand. Medline Plus offers reliable, up-to-date health information, anytime, anywhere for free. You can use Medline Plus to learn about the latest treatments, look up information on a drug or supplement, find out the meanings of words, or view medical videos or illustrations. You can also get links to the latest medical research on your topic or learn about clinical trials on a disease or condition. It also includes tutorials.

Also featured are an online encyclopedia, medical dictionary, audio-visual resources, and extensive links to Spanish-language health information. Medline Plus is the premier consumer health site. It should be any consumer health information seeker's first stop, and can fill the vast majority of information needs. The homepage is very well-organized; everything is accessible from there. When searching, multiple search terms automatically combined with "And". Search engine will detect misspelled words and suggest alternatives. To access Medline Plus go to: http://www.nlm.nih.gov/medlineplus/,or type medlineplus.gov into your browser's address bar.



- **NIH Senior Health**

This is a website for the elderly, developed by the National Institute on Aging and the National Library of Medicine. Senior-friendly features include the ability to adjust font size and contrast, an audio option that reads text on the page aloud, and videos. Seniors with low vision, and anyone with low literacy needs, although most topics are senior-specific (i.e. Exercise for Older Adults). A short list of topics is easy to browse. No search option is included. Audio text-reading function is very literal and function is spotty: may repeat phrases several times and / or skip words or sentences. To access this resource go to: http://nihseniorhealth.gov/

- **NOAH – New York Online Access to Health**

A collaborative effort of New York librarians, NOAH provides access to selected, organized links to online consumer health information. It has a wide range of topics and extensive Spanish-language content. Non-Spanish-speaking users can navigate organized topic pages in English, and then click on "en espanol" link at bottom of page to access available Spanish-

language links for that topic. It is well-organized and easy to browse; browsing is often more efficient than using the search engine [38]. Can be accessed at: http://www.noah-health.org/

- **HealthyRoadsMedia**

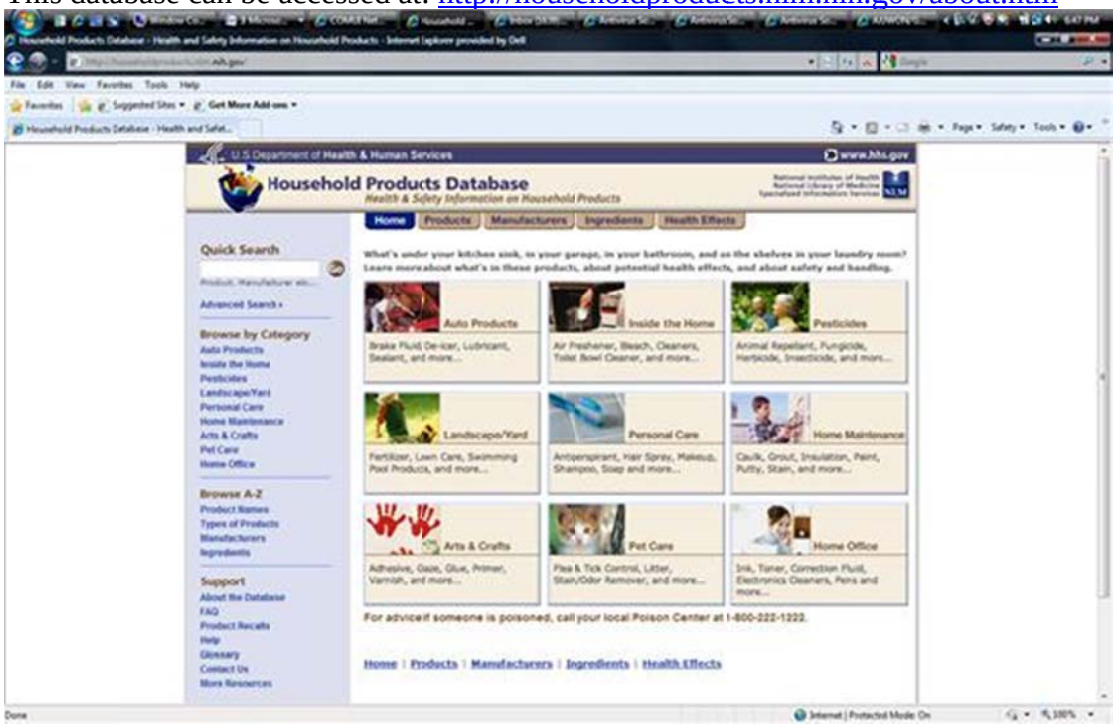
A collaborative effort of many different public health agencies, social services organizations, and librarians, HealthyRoadsMedia collects, creates and provides free online access to multilingual health information overviews on various topics in a variety of formats: audio, audiovisual, and written. Health topics provided in English and 8 other languages: Arabic, Bosnian, Hmong, Khmer, Russian, Somali, Spanish, and Vietnamese. It is best for patients with lower literacy English and / or need for information in a language other than English. Focus is on prevention and wellness, and safety. Not all topics are available in all languages [38]. To access this resource go to: http://www.healthyroadsmedia.org/

- **Household Products Database**

This database links over 10,000 consumer brands to health effects from Material Safety Data Sheets (MSDS) provided by manufacturers and allows scientists and consumers to research products based on chemical ingredients [39]. Household product database was developed by the Specialized Information Services Division at the National Library of Medicine, National Institutes of Health, Bethesda, Maryland, USA.
The database is designed to help answer the following typical questions:

- What are the chemical ingredients and their percentage in specific brands?
- Which products contain specific chemical ingredients?
- Who manufactures a specific brand? How do I contact this manufacturer?
- What are the acute and chronic effects of chemical ingredients in a specific brand?
- What other information is available about chemicals in the toxicology-related databases of the National Library of Medicine?

This database can be accessed at: http://householdproducts.nlm.nih.gov/about.htm

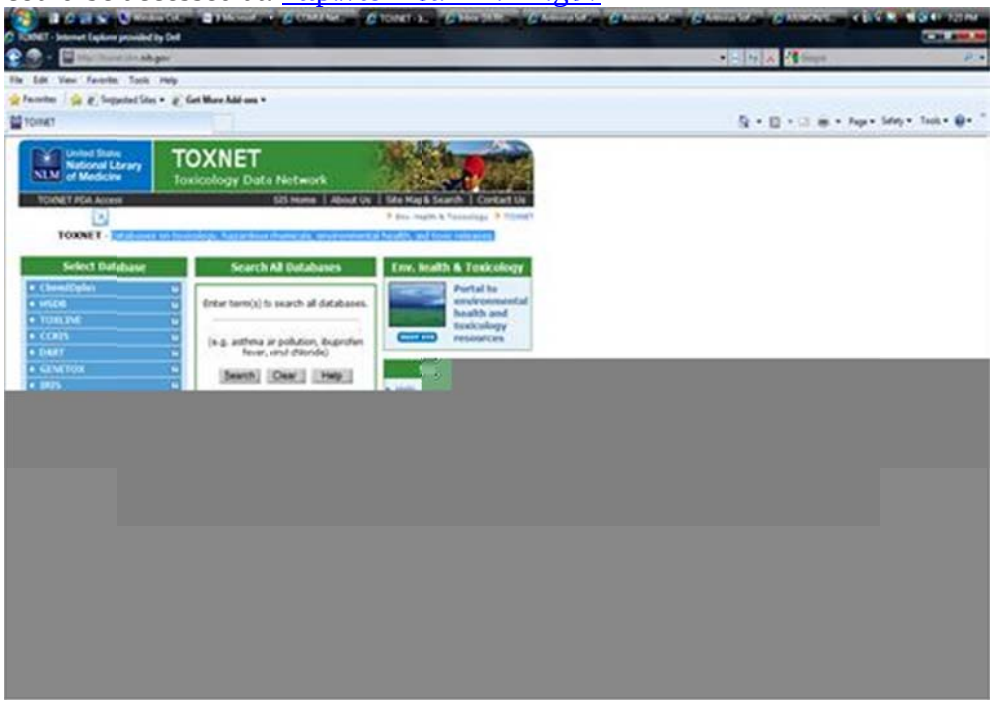


- **Tox Town:** is designed to give you information on:

- Everyday locations where you might find toxic chemicals
- Non-technical descriptions of chemicals
- Links to selected, authoritative chemical information on the Internet
- How the environment can impact human health
- Internet resources on environmental health topics

Tox Town uses color, graphics, sounds and animation to add interest to learning about connections between chemicals, the environment, and the public's health. Tox Town's target audience is students above elementary-school level, educators, and the general public. It is a companion to the extensive information in the TOXNET collection of databases that are typically used by toxicologists and health professionals [40]. This database can be accessed at: http://toxtown.nlm.nih.gov/index.php

6. Toxnet: Is a database on toxicology, hazardous chemicals, environmental health, toxic releases and other information resources from the Toxicology and Environmental Health Information Program. Developed by the U.S National Library of Medicine [40]. TOXNET could be accessed at: http://toxnet.nlm.nih.gov



- **Internet Portals, Digital Archives and Institutional Repositories**

- Health Internetwork Access to Research Initiative (HINARI) http://www.who.int/hinari
- African Journals Online (AJOL) http://ajol.info
- PubMed Central (PMC): http://www.ncbi.nlm.nih.gov/pmc/
- Bioline International (BI): Through this site you can search through free and open access medical journals at http://www.bioline.org.br/is
- Biomed Central: Open Access (OA) journal publisher that allow readers free access to published full text journal articles while authors pay fees to get published. http://www.biomedcentral.com/browse/journals/
- Scientific Online Library (SciELO): An AO publisher that gives access to full text articles. http://www.scielo.org.ar/scielo.php?lng=en
- Directory of Open Access Journals (DOAJ): Gives you free access to online journals related to your subject area. You can access the site at http://www.doaj.org/doaj?func=findJournals
- Loughborough University's Institutional Repository http://www.lboro.ac.uk/library/resources/InstitutionalRepository.html
- Google Scholar**:** While regular Google can be a helpful tool, sometimes you just need scholarly results, and that's just what this tool does, paring down results to the most reliable and academic sources. Google Scholar is accessible at http://scholar.google.com/schhp?hl=en&tab=ws

- **Information Sources on Social Networking Applications**

In recent years social networking applications popularly known as Web 2.0 are now being used as a means of communication, especially in sharing and dissemination of information. Libraries are also using this media to reach out to their clients. Common Web 2.0 applications that have become sources of information include:

- **Facebook**
- **Blogs**
- **Twitter**
- **MySpace**
- **YouTube**
- **RSS**

Exercises

1. What is the difference between the Internet and the World Wide Web?
2. List 5 reference sources that are available on the Internet
3. Give examples of the following databases/resources:
    1. Bibliographic
    2. EBM resources
    3. Consumer health information resources
4. Give an example:
    1. Digital archive
    2. Gateway
    3. Institutional repository

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Module Two - Searching Tools

Introduction

There are various searching tools available to health professionals in both print and electronic formats. These include, among others: Online Public Access Catalogues, indexes, search engines, gateways, databases, portals, subscribed journals, free electronic journals, and institutional repositories (IRs).One of the most used database in medicine and allied health is MEDLINE through PubMed. A brief overview of how these tools aid information retrieval is presented. This module provides content, examples and practical exercises for identifying searching tools.

Learning Outcomes

At the end of this module, you should be able to:-

- Define what a searching tool is.
- List searching tools available for medicine and allied professionals, both in print and electronic.
- Define search engine (and their types) and be able to use selected health oriented search engines.
- Identify and locate different health databases.
- Search MEDLINE/PubMed database
- Identify and use free health journals available over the Internet.
- Identify various searching tools used in the digital environment.

Module Content

	Content	Methods	Mode of
2.4	Introduction to searching tools in the health sciences	Lecture	Q&A
2.5	Online search tools	Lab session	Training questions
2.6	Gateways	Lab session	As above
2.7	Health Databases	Lab session	As above
2.8	Health Portals	Lab session	As above
2.9	Free Medical Journals	Lab session	As above
2.10	Institutional Repositories	Lab session	As above
2.11	Overall Evaluation Exercises	Lab session	As above

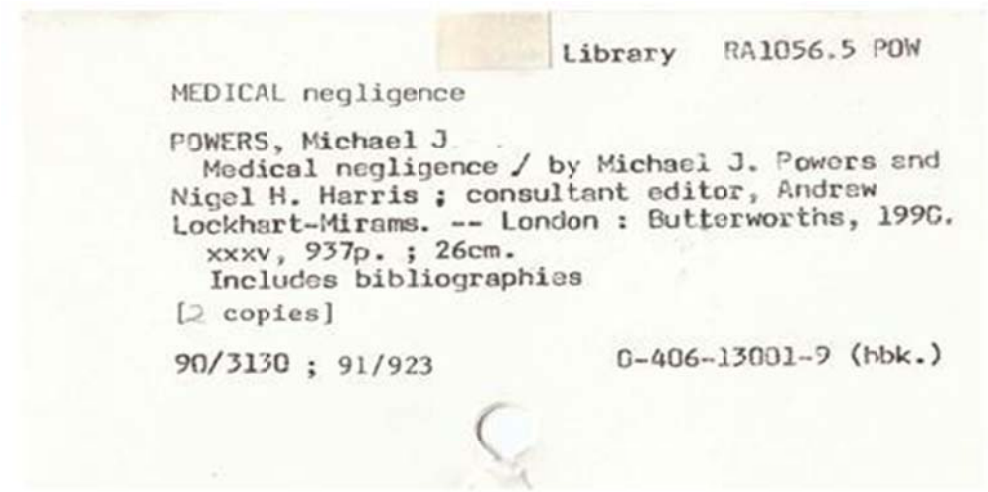
Introduction to Searching Tools

In a traditional medical library some years ago, students were possibly attracted to the card catalogue which was a cabinet of book cards that were filed according to authors, subject and title. It was a formidable to retrieve journal articles if one did not have access to an abstracting or an indexing service. The Internet and specialized medical databases have ushered in a new generation of desktop searching tools that allow users to find information quickly across various sources. In this module, an overview of searching tools that are available to medical students is outlined and practical exercises are provided. There are tools that enable users to retrieve information in a library. These tools have been in existence over the years. The most widely used by students are the card catalogue, bibliographies, indexes, abstracts and indexing journals.

Library Catalogue

The library catalogue is a general tool for finding information. It will enable one to identify and locate books in the collection including reference sources and periodicals. The library catalogue could be a paper card catalog or a computerized catalogue, often referred to as OPAC (Online Public Access Catalogue)

Fig 1: An example of a card catalogue



Library RA1056.5 POW

MEDICAL negligence

POWERS, Michael J
Medical negligence / by Michael J. Powers and Nigel H. Harris ; consultant editor, Andrew Lockhart-Mirams. -- London : Butterworths, 1990.
xxxv, 937p. ; 26cm.
Includes bibliographies
[2 copies]

90/3130 ; 91/923 0-406-13001-9 (hbk.)

In most Universities the catalogue is computerized and searchable over the internet.

Fig 2: An example of Web OPAC page

http://www.itcompany.com/inforetriever/opac.htm

Indexes and Abstracting Journals

Indexes to periodical literature are guides to the contents of published periodicals providing references to articles that have been published primarily in medical journals and medical databases. A popular index for health sciences is the MEDLINE from the US National Library of Medicine. There are many other abstracting services available. CABI Health, Google Scholar and Current Content. Current Content, for example, are awareness services or databases that provides access to abstracts, table of contents and bibliographic information. They abstract articles in issues of leading scholarly journals, as well as more than 7000 relevant websites.

Online Searching Tools

Search Engines

A search engine is a program that searches documents for specified keywords and returns a list of documents where the keywords were found. On the World Wide Web, the search engine utilizes automated robots to gather information and automatically index sites. Any words found on the web pages visited by the search engine are stored in the search engine database. When you search the web for a topic, the key words are matched to the information found on the web pages visited by the search engine. There are many types of search engines available over the World Wide Web, however, below are some of the key features of search engines:-

- Allow natural language queries (i.e. what is H1N1?)
- Use of parenthesis to group terms
- Use of proximity searching
- Relevancy ranking of results.
- Number of search terms retrieved
- Number of times each search term occurs
- Location of search terms (title, text)
- Sub-searching (searching within retrieved records)
- Limiting documents by date, audio, video, language, etc.

Popularly Known Search Engines

The following is a list (the list is not exhaustive) of general search engines which are popularly known:-

- Google (www.google.com)
- Altavista (www.altavista.com)
- Lycos(www.lycos.com)
- Excite(www.excite.com)
- Fastsearch (www.alltheweb.com)
- Exalead (www.exalead.com)
- Hotbot(www.hotbot.com)
- InfoSeek Guide (www.inforseek.com)

Practical Session 1: Google –featured example of a search engine example of a search engine
Exercise 1

- Connect to the Internet and open your internet browser.
- Type in (or copy/paste) the url of Google - http://www.google.com - Click on "GO" or hit the Return key
- In Google search box, type HINARI and click Go
- A link to HINARI home page will be top on the list of retrieved items

Exercise 2

- Search the following phrase: HIV developing countries:
- How many citations did you retrieve?
- What type of material is included in the first two pages of the search result?
- Type in (or copy/paste) the url of Google Scholar - http://scholar.google.com – Click on "GO" or hit the Return key
- Search the following keywords: HIV developing countries:
- How many citations did you retrieve?
- What types of material is included in the first two pages of the search?

Google page

http://www.google.com/

Search Results on a Google page

http://www.google.com/search?hl=en&source=hp&biw=1218&bih=871&q=hinari&btnG=Google+Search

Search Engines Designed For Health

The following is a selection of search engines designed for health professionals:-

- Omni Medical Search (www.omnimedicalsearch.com)

Omni Medical Search brings back search results from 30 different sources, and one can search up to 12 different medical search engines at one time. One can also search using a dropdown menu on the home page. In addition, Omni Medical Search has tabbed search options for more medical information: news, Images, and web2, which search only specific domains among four major search engines.

- Entrez

The term entrez is a French word in second person plural form of verb translated to "to enter" meaning literally 'come in'. This search engine allows users to search multidisciplinary health

sciences databases at the National Centre for Biotechnology Information (NCBI) website. NCBI is part of the National Library of Medicine (NLM).

- GoPubMed

This is a knowledge-based search engine for biomedical text.The Gene Ontology (GO) and the Medical Subject Headings (MesH) serve as the "The Table of Contents" in order to structure the millions in the MedLine database

- WebMD

WebMD is a one stop medical information site. WebMD has a lot of interesting interactive calculators, quizzes, and other fun stuff that helps you understand medical information more easily.

- Genieknows
- Healia
- Searchmedia
- Nextbio (Life sciences search engine)

Types of Search Engines

There are 3 main types of search engines:

- Free-text search engines or keyword searching tools- these cover the web in an unstructured way.
  One has to be very specific in their query because of their wide coverage. Examples are Google and AltaVista. See section 2.4.2.As seen from above free-text search engines, they can be country specific, subject specific, or resource specific (for journal articles i.e. www.findarticles.com)

- Meta search engines-These are search engines that offer simultaneous coverage of the major
  search engine on the world wide web by submitting the same query to each other, for example dogpile www.dogpile.com

An example of Meta-search engine: Dogpile

http://www.dogpile.com/

Web directories-These are manually created by people that do a lot of surfing on the Internet. They browse the Internet, evaluate websites for contents that meet their criteria and add the web link to the directory. It is computed in the same way as a telephone directory. Yahoo is an example of a web directory.

An example of a web directory

http://www.yahoo.com/

Advantages and Disadvantages of using search engines

Advantages of search engines:

- Best suited for complex keyword/concept searches
- Control over search: search terms can be combined as required
- Searches can be limited to period of time, fields, source type,etc.
- Currency of information, made possible by regular addition by web spiders
- Exhaustive information can be retrieved (with lots of patience!)

Disadvantages:

- Time consuming
- False positives
- Search engines vary in terms of search techniques/ syntax
- Dead links, redundant links (same document gets displayed)
- Spamming ('salting' of pages)
- Higher ranking of paying sites

Gateways
Gateways are defined as a node or network that serves as an entrance to another network; gateways organize information in a structured way often in subject categories. For health-related information, there are many useful gateways including the WHO A-Z health topics list (http://www.who.int/topics/en/) and AED/SATELLIFE's annotated, subject-based gateway to health resources for developing countries (http://www.healthnet.org/essential-links/)

Common Features of Gateways

- Quality controlled catalogues of Online resources
- Subject based entrances to quality assessed internet resources
- Classified subject keywords
- You can browse by subject or search by keyword
- Information gateways are going online for resources; what librarians do for books
- They are built by humans.

Examples of Gateways in Health Information.

- MedLinePlus (http://medlineplus.gov) MedlinePlus brings together authoritative information from NLM, the National Institutes of Health (NIH), and other government agencies and health-related organizations. Pre-formulated MEDLINE searches are included in MedlinePlus and give easy access to medical journal articles. MedlinePlus

also has extensive information about drugs, an illustrated medical encyclopedia, interactive patient tutorials, and the latest health news

- Medscape (www.medscape.com) A portal for medical information from WebMD. Categories available include alternative medicine, diseases, health & fitness, human body, mental health, journals, organizations, etc.
- Global Health Library (www.globalhealthlibrary.net) A WHO initiative, aims to strengthen,
  promote and develop worldwide networks on the collection, organization, dissemination and universal access to reliable health sciences information
- Internet Health Sites (www.library.mun.ca/) the resources are selected by the Health Sciences Librarians and provide a starting point for finding health information on the Web. Maintained by MUN.
- AddictionSearch (www.addictionsearch.com) your source for addiction related research on drug rehabs and alcohol treatment programs, treatment centers and rehabilitation information. These resources provide comprehensive drug addiction treatment, drug and alcohol rehabs, and substance abuse treatment research.
- ADIN -Australian Drug Information system-(www.adin.com/au)The Australian Drug Information Network (ADIN) provides a central point of access to quality Internet-based alcohol and drug information provided by prominent organisations in Australia and internationally.
- ELISAD - (www.elisad.uni-bremen.de) (Alcohol and Drugs) :- This addictions gateway is a free online service providing access to the best web resources in Europe on drugs, alcohol, smoking, gambling and related topics. All the resources have been evaluated and a description of each website is given.

Fig 8: An example of an Information gateway.

http://www.healthnet.org/essential-links
Adapted from Wema ,E.(2008?) Search Engines, Directories and Portals .A presentation on the INASP Nairobi workshop

Databases

A database is a collection of information organized in such a way that a computer program can quickly select desired pieces of data. It is an electronic filing system. Traditional databases are organized by fields, records and files. A field is a single piece of information; a record is one complete set of fields; and a file is a collection of records. For example, a telephone book is analogous to a file. The Internet contains numerous hypertext databases, where any object whether it be a piece of text, a picture, or a film, can be linked to any other object.

Types of Databases

- Bibliographic Databases
- Full-Text Databases
- Numeric Databases
- Hybrid Databases

Fig 8: An example of a bibliographic Database: International Health and Disability

http://www.asksource.info/res_library.htm

2.6.1 MEDLINE/PubMed Database

MEDLINE is the premier biomedical database of the National Library of Medicine, Bethesda, Maryland, USA. It is searchable on the Internet through PubMed, a free search tool with over 19 million citations. The use of this database is essential for searching full text journals in HINARI and will be discussed at length in the next module.

An Example of PubMed homepage.

http://www.ncbi.nlm.nih.gov/pubmed

Practical Session 2: Opening and searching PubMed.

1. Connect to the Internet and open your internet browser.
2. Type in (or copy/paste) the url of PubMed - http://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed
3. Click on "GO" or hit the Return key (see exercise # 1 for precise instructions)
4. Search the following keyword subject: HIV in developing countries:
5. How many citations did you get?
6. What words could you use to 'narrow' this search?
7. What type of material is indexed in this database?

Digital Archives

There are some searching tools developed by either governmental agencies or by international health related organizations. Resources developed by health-related organizations include

- Governmental agencies such as the U.S. National Institutes of Health at http://www.nih.gov/
- Inter-governmental agencies such as WHO at http://www.who.int/en/ or WHO: Western Pacific Region at http://www.wpro.who.int/
- Non-governmental agencies such as Popline at http://db.jhuccp.org/ics-wpd/popweb/ or Family Health International at http://www.fhi.org/en/index.htm or SateLife at http://www.healthnet.org/

2.7.1 Governmental Agencies

U.S National Institutes of health: -

http://www.nih.gov/

Portals

2.8.1 HINARI -Access to health
Launched in January 2002 by the World Health Organization and six major publishers, HINARI Access
to Research Initiative enables developing countries to gain access to one of the world's largest collections of biomedical and health literature. Free or very low cost online access is provided to many thousands of health workers and researchers, thereby contributing to improved world health. Since its launch, the number of participating publishers and of journals and other full-text resources has grown continuously

HINARI Homepage

http://www.who.int/hinari/en/

HINARI Login page

http://hinari-gw.who.int/

Free Medical Journals

The movement to provide information free online has also provided health professionals with a lot of free journals. Besides the HINARI program, there are a number of useful e-journal gateways that contain access to freely available full text articles on the WWW. In this section, you will access freemedicaljournals.com, BioMed Central, PubMed Central, Directory of Open Access Journal (DOAJ), Bioline International, ScieLO and Highwire Press.

Free Medical Journals

This website www.freemedicaljournals.com hosts journals in medicine, over 1500 Journals freely accessible via the internet.

Free medical Journals homepage

www.freemedicaljournals.com

Practical Session 3: Free Medical Journals

1. Connect to the Internet and open your internet browser.
2. Type or copy/paste http://www.freemedicaljournals.com into the address box, click on "GO" or hit the Return key.

3. Freemedicaljournals.com lists journals that make content freely available either initially when published or between one month and two years after publication date.
4. How many journals are listed in this gateway?
5. How is the access to the journals organized?

BioMed Central
BioMed central is a publisher in science, technology and medicine, and publishes online peer-reviewed journals. Biomed Central has a portfolio of more than 200 open access e-journals which include general titles such as, BMC Biology and BMC Medicine.

http://www.biomedcentral.com/

High Wire

http://highwire.stanford.edu/

Exercise 4: Browsing High Wire

1. Type in or copy/paste http://highwire.stanford.edu/lists/ into the address box,
2. Click on "GO" or hit the Return key; then click on the Journals With Free Full-text Articles list.
3. The Highwire Press website will open with a list of free access journals.
4. Where would you find information on Highwire Press journals that are 'free to developing economies'?

Institutional Repositories

In a medical related organization, especially an academic one, research work is published in either books or journals. However, not all primary information finds its way into high impact journals. These centres produce reports, technical reports and other documentation daily. This mass of literature is important for medical research work and gives impetus to further research. It is now common for organizations to create institutional repositories as a means of sharing research information.

Institutional Repository at the University of Zimbabwe

http://ir.uz.ac.zw/

Overall Evaluation Exercises for the Module

Below are samples of questions that can be used to evaluate your understanding of the searching tools you have learnt.

1. What is a searching tool?
2. What searching tools are available for print resources?
3. Why would one use an abstracting journal?
4. State three types of search engines you have studied?
5. What are the advantages of using search engines?
6. State 5 tools available in searching online health information?
7. Give a brief overview of PubMed?
8. What is MedLine
9. What are free electronic Journals
10. What is a database? How can you locate health related database.

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Research for Life Learning materials

Module Three - Electronic Information Searching Techniques

Introduction

Within the electronic environment, information is accessed through the Internet, online databases for journal articles and books. Users also access specialized databases that cover specific subject areas such as health, medicine and biomedical research.
Information available and accessible online is massive. To make maximum use of this information and to avoid frustration while looking for relevant information, the user should have search skills that include being familiar with search techniques. The use of search techniques and strategies aims at helping the user retrieve relevant and quality information.
The purpose of this module is to discuss information search strategies and search techniques. The importance of search preparation and the application of search techniques help the user to have successful and focused searches so as to, save time and effort while undertaking online information searches. The module provides the process of developing a search strategy; outlines the various search techniques; and provides examples on how to use the search techniques when searching for information through search tools such as bibliographic databases.

Learning Objectives

The student will learn about:-

1. The types of information searches
2. The importance of search preparation
3. The formulation of search strategies
4. The types of search techniques
5. The use of search techniques in information retrieval
6. The application of search techniques to various search tools

Learning Outcomes
On successful completion of the module, one should be able to:-

1. Distinguish between simple, advanced and meta searches
2. Plan for a search session
3. Formulate search strategies
4. Select the appropriate search tool for the required information
5. Identify and use various search techniques
6. Apply search techniques to various search tools

Summary of Content

	Content	Methods	Mode of assessment
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Preparing the search

In our daily activities whether in learning, working or for personal reasons, information is vital. While looking for information, the starting point will depend on the type of information required. The user may be looking for scholarly information, practice guidelines, information on a certain disease condition such as diabetes or general information.

Depending on the information required, the user may require the services of general search engines such as Google or specialized search tools such as the Cochrane Library. A bibliographic database such as Medline/PubMed is an important starting point for any information related to biomedicine, and health sciences. For example a search relating to information on infectious diseases would yield good results if searched from Medline/PubMed

Types of searches

There are different search options depending on the level and amount of information that is of interest to the user. To search is to carefully look for something and effective searching requires planning. Good searches are planned not accidental.

- Simple search
- Advanced search
- Meta search

Simple search

A simple search is when the user uses some keywords to perform a quick information search from a database or from a search engine. A simple search may retrieve a huge amount of search output that may take time to sieve through for any relevant information item. In simple searches, browsing rather than focused searches is done. In simple searching one or two concepts can also be used. The user may use simple searches when not sure of the type of information required and when the topic is not focused on any area. A topic such as Malaria and Africa can cover any period, can affect adult or children, male or female and can be from English, French or Portuguese speaking Africa. This simple search can also retrieve information on Africa not related to malaria. The search results may be overwhelming and the user would be required to apply search techniques to focus the search for relevancy.

Advanced search

Advanced searching is the use of techniques that help to define the information that is being searched. In advancing searching, some filtering is done to reduce the amount of items retrieved. Filtering refines the search for relevancy. In advanced searching the user is able to apply multiple search fields that can help to broaden or narrow the search depending on the topic and the search strategy.
The use of advanced searching helps the user to:-

- Apply filtering
- Reduce number of items retrieved
- Apply multiple search fields

Advanced searching tools are available in most search tools such as Medline/PubMed.

Meta search

A Meta search is when the user uses a variety of search tools simultaneously. This is done with the use of Meta search engines such as Dogpile, Search.com; Metacrawler and Vivisimo. These Meta search engines searches many search tools such as Google, Yahoo, and MSN among others. Searching from a Meta search engine is conducted in the same way as in single search engines. A search can be a simple search or an advanced search. The only difference between

Meta search engines and single search engines is that the search results will come from different search engines simultaneously.

Use of Keywords

Keywords are the words and phrases that are used to closely describe the topic or subject by the author or through indexing. Keywords capture the ideas described in a document. In using keywords, it is important to consider related terms such teenager or adolescent, variations in word spelling such as American and English versions such as anemia or andemia, plural or singular versions, synonyms such as infant or newborn, or use of controlled vocabulary that gives alternative terminology to a word e.g. Cancer is referred to as 'neoplasm' in controlled vocabulary terminology.
The difference between the use of plural and singular in search terms can produce varying results as can be seen by this search
Malaria **infections** in children in Africa – Pubmed= 2,138 Google= 2,540,000
Malaria **infection** in children in Africa- Pubmed= 1,586 Google= 253,000
The use of plural infections instead of singular infection has increased the amount of retrieved information significantly in two search tools, PubMed and Google.

Controlled vocabulary

The use of controlled vocabulary is to give uniformity and consistency to the indexing of the literature. The controlled vocabulary ensures consistency in presentation of information for related topics. It also tries to standardise the language used by authors. The Medical Subject Headings (MeSH) is a distinctive feature of MEDLINE- the foremost biomedical literature database. It is the most used controlled vocabulary or thesaurus for biomedical literature. It is used in the Medline database. MESH is used in the preparation of Medline and a search tool through PubMed. For more information on how to use MeSH for information retrieval, please refer to the following link http://www.nlm.nih.gov/bsd/disted/pubmed.html. Click on the video: searching with the Mesh database.

Through the use of controlled vocabulary, the user is likely to retrieve more relevant results. In Medline/Pubmed, only records that have gone through the indexing process are assigned MESH terms. Those records that are not Medline records may not have the MeSH terms and searching through MeSH will exclude such records.

Case sensitivity

Electronic information can be presented in upper and lower case. It is advisable to control the use of upper and lower case while searching for information. Some search terms such as names of people and places may require the use of capital letters. However, the use of uppercase will retrieve only those words that are presented in uppercase. Using lowercase at all times helps retrieve information whether the information is presented in capital letters or not. Users should know when to use upper and lowercase letters. The use of lowercase should be preferred to avoid missing out useful information**.**

Use of Abbreviations

Some search terms are commonly presented as abbreviations. For example the use of HIV instead of Human Immunodeficiency Virus may **affect the end results. The user has to be vigilant on the effect of such abbreviations on the outcome of the search.**

Steps in Developing Search Strategy

In search preparation, the search topic is sometimes presented as a question. It is only by coming up with the search topic that the user is able to come up with words that are important in the search. This is because most Search tools such as Google use keywords in searching for information. For example a search topic such as "What is the prevalence of HIV/AIDS in teenage girls in Kenya?" would break the topic in keywords such as (prevalence, HIV/AIDS, adolescents/teenage, girls, Kenya). The user may also decide the publication period to be covered by the search, the type of information required whether reviews, journal articles or any other information. The process of preparing for the search and coming up with a search plan is referred to as 'formulating a search strategy.'
The user should also be familiar with certain search tools in the area of subject interest

- **Use of Search strategies**

What is a search strategy? This is a plan that helps the user to articulate the type of information that is required. A search strategy is a plan that guides the user to answer some questions such as:

- What is the purpose of the information?
- Is there a time frame for the required information?
- Is the information required general or specific?
- What sources would best retrieve the required information, general or specific tools?
- Would the information be specific to a certain geographical location?

A search strategy relates to having good guidelines that will lead to a successful search output. Having a search strategy helps the user to:

- Define the topic e.g. Malaria treatment in infants in Africa.
- Break the topic into concepts or keywords such as*:* malaria, treatment, infants, Africa.
- Use search techniques such as Boolean operators to refine the search
- Try out the search strategy and refine it as necessary for better results
- Identify the appropriate search tool and search techniques
- Decide on whether to start with a general search engine such as Google or a specific tool such as Medline/Pubmed, or a more specialised database such as Cochrane
- Have alternative choices such as starting from print-based information sources such as reports or grey literature.

- **Advantages of search strategy**

- Saves time
- Helps retrieve relevant information
- Can be stored for later use.

- **Requirements for a successful information retrieval**

- Defining the search problem
- Developing a search strategy
- Using search techniques
- Learning how to use a search tool e.g. PubMed
- Using correct spelling
- Considering other forms of information sources such as print and audio-visual
- Evaluating the retrieved information
- Using the information appropriately

Search techniques

Search techniques are ways of using search terms in finding required information from search tools. Search tools are many, e.g. Online Public Catalogues- OPAC, general search engines, search directories and portals as well as online databases or deep web.
To achieve good search results, it is necessary to use search techniques.
The following are some of the most common search techniques that are applicable to various searching tools.

- Boolean Logic
- Parenthesis
- Phrase searching
- Truncation
- Wildcards
- Field searching

Boolean Logic

Boolean logic is a logical relationship of search terms. It is named after the British mathematician George Boole (1815-64). Boolean logic is used to narrow or focus the search or to broaden the search depending on the information that the user wants to retrieve. Boolean logic helps the user to achieve relevancy in the search results and it also assists in quick retrieval of information. The logic uses the following operators AND, OR, NOT

- OR - Broadens the search
- AND – Narrows the search
- NOT – excludes unwanted words or concepts to focus the search

Boolean Searching on the Internet

When a user searches the Internet using a search engine, the use of Boolean logic may be presented in the following ways:

1. Full Boolean logic with the use of the logical operators
2. Implied Boolean logic with keyword searching
3. Use of symbols
4. Boolean logic using search form terminology

- Full Boolean Operators.

Most search engines use Boolean logic operators, AND, OR, NOT. However it is important for the user to know how each search engine works so as to have effective searches.

- Implied logic

Most search engines use AND as a default. In PubMed, for example the search term *Malaria in Africa* will be searched as malaria AND Africa automatically, and there is no need to type the word AND. Other search engines may default to OR. It is therefore important to know how each search tool presents its information.

- Use of symbols

Some search engines uses symbols to describe the logical relationship of terms instead of words for example the use of:-

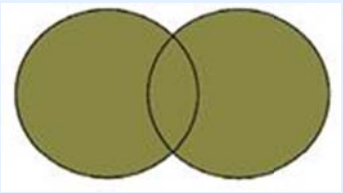
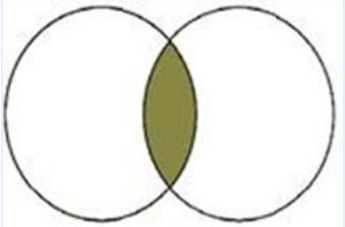
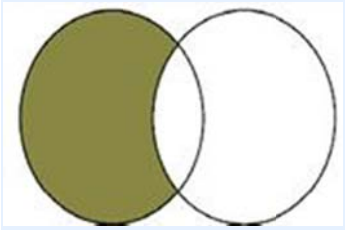
+ instead of AND
- implying NOT
It is advisable to check “help” pages in each search tool to understand the way information is searched.

- Boolean logic using search form terminology

Most search engines have an advanced search mode that helps the user to focus the search. In the advanced search mode a template is presented that guides the user in selecting the relationship of the terms – NOT, OR, AND

The use of Boolean logic can be used in various search engines. The user should however check with “help” in each search engine to understand how the Boolean operators are presented. They can be presented either in word format or symbol format. It is also important to keep in mind that most Search Engines require that Boolean operators be typed in Capital letters.

An example of a Boolean search

Search statement- Mosquitoes and malaria	**Types of records retrieved**	**No of records Retrieved from PubMed**
Mosquito OR Malaria	Documents that discuss either mosquitoes OR malaria. The OR operator searches the keywords simultaneously and independently of each other to broaden the search. The OR operator is most useful when a user wants to include words that represent the same concept. The OR operator broadens the search as the operator provides a wider selection of the search by retrieving records that have either of the keywords. This operator can be helpful when the user wants to look at a subject area comprehensively.	OR=81883 
Mosquito AND Malaria	Documents that discuss both mosquito AND malaria. The use of AND helps in refining the search to reduce the number of results especially if a search term is too general.**AND** is useful when performing a search that is focused to specific keywords or phrases.	AND= 8557 
Mosquito NOT Malaria	Documents that discuss mosquitoes as parasites but excludes malaria. This operator widens the search for better results. NOT should be used, when a search retrieves many items that are not related to the search topic. The use NOT may block relevant items from retrieval and it should be used with caution.	NOT =24430 

Search engines such as Google use keywords to query their databases and produce results. Results match the keywords. It can be seen that the use of Boolean logic or any other search technique depends on the type of information the user wants to retrieve.

Parenthesis

This search technique is used to force the order of how information is retrieved. For example the retrieval of information related to diabetes prevention and control can be searched as – *Diabetes AND (Prevention OR control).*

The keywords in the brackets will be searched first and then matched with the results of the keyword outside the bracket. In the absence of brackets all the keywords will be searched together from left to right. The use of brackets controls how the search is executed. Results returned through the use of parenthesis are more relevant. Parenthesis uses more than one Boolean operator and is used to perform complex searches.

A search in PubMed for *Diabetes AND (Prevention OR control)* returns104,519 records whileas a search without the use of parenthesis - Diabetes AND Prevention OR control-returns 2,374,036 records. There is a huge difference in the amount of records retrieved without the use of parenthesis.

Phrase searching

This technique surrounds the search keywords in quotes "…." It instructs the search engine to search only words that appear side by side inside the quotes. This method narrows search results significantly leading to more relevant results. An example of a phrase search "HIV/AIDS and tuberculosis" would only retrieve records focusing only on HIV/AIDS and tuberculosis together. In PubMed, the use of phrase searching is not recognised as it may lead to omission of relevant citations. This is due to the fact that PubMed performs automatic term matching, but when the search words are under quotation marks, the automatic term matching is not done.
A search example from Google on "HIV/AIDS and tuberculosis" as a phrase retrieves about 2,580,000 results while as a search statement on HIV/AIDS and tuberculosis retrieves about 6,600,000 results. There is huge difference in the amount of records retrieved without the use of the quotation marks.
In PubMed, the search "HIV/AIDS and tuberculosis" retrieves 1057 records and the search HIV/AIDS and tuberculosis retrieves 1057 records.

Truncation

Truncation is the process of using an asterisk mark (*) while searching. The purpose of truncation is to broaden the search results. Through the use of truncation at the root of the word, the search tool searches all word variations after the asterisk eg. the use of * with Child* will retrieve child, children and childhood. In the example below,

- Child* retrieves 1,694,851records
- Children retrieves 1,649,662 records
- childhood retrieves 150,545 records

Depending on the root word and the place where the asterisk is placed, use of truncation can sometimes retrieve some irrelevant results. Each search tool treats the use of search techniques differently. The user is advised to check if the search tool in use allows the use of truncation.

		Search results	
Search topic	**Truncation symbol**	**PubMed**	**Google**
Malaria infection in child* in Africa	*	0 records	About 292,000 records
Malaria infection in child$ in Africa	$	1434 records	About 217,000 records.
Malaria infection in child! in Africa	!	1434 records	About 217,000 records.
Malaria infection in child# in Africa.	#	1434 records	About 217,000 records

- PubMed and Google uses the Truncation symbols $, ! and #

Wildcards- Special Symbols or "Wild Card"

Wildcards are characters that are used to assist in searching for information. Wildcards are used to represent one character or letter in a word. Wildcards are especially useful in situations when the user is not sure of the correct spelling of a word. In medicine, there are variations in the use of American and English word spelling for medical terms. Wildcards can be used when the user is not sure of the exact spelling of a certain word. It is advisable to check the wildcard symbols used by each search tool or search engine. The most commonly used wildcard is "?". Below is an example

- An?mia will retrieve all records that contain either anaemia or anemia
- Colo?r will retrieve all records that contain colour and color

However most search engines do not currently support the wildcard facility

Field Searching

An electronic record is presented as a field. Within a bibliographic database, there are data fields for the title, author, affiliation, journal or book title and language, among others. The user can use any of these fields to retrieve the required information.

As an example, a user can search for an article by a certain author on a specific topic such as teenage pregnancy in Africa by David Mukamba. This is a focused search through the author field. The user can also focus a search through the use of the title, subject or publication type such as journal article.

In most search tools, such as Pubmed, there is also the possibility of limiting the searches to such fields as year of publication, language, affiliation, review articles, age, gender or just the abstract of the article. Field searching, therefore, focuses on specific information that the user may require.

Field searching is mostly available through the advanced searching mode of most of the search tools. The use of field searching in Medline/PubMed will be shown within the search examples.

Searching from health information sources- Examples

'Invisible' or 'deep web' is a phrase used to describe information content that is usually found in searchable databases. This information is not accessible through general search engines such as Google. Information found in these databases is accessible through subscription to commercial databases such as EBSCO. Access is also possible through the use of user names and passwords. Information in the deep web can also be free, for example the Medline/PubMed database is free. However, the user should know the existence of such a database and how to use it for information retrieval. Databases such as Medline are easy to access information since the information is presented in a structured format through search fields such as title, author, and journal, year of publication, affiliation, and subject. The information content of the deep web is believed to be of high quality and covers a high percentage, about of all web based content.

Searching from Search Engines

Search engines are huge databases composed of Internet files collected by a computer program (sometimes called a crawler, robot, or spider). Search engines have no policies for selection of content. Search engines use the web browsers such as Internet Explorer to query the databases. Once information is retrieved, the computer programme indexes the information from the files into indexing terms such as title, author, URL, etc. Search engines use mostly keywords to search for information. An example of a search engine is Google.
When to use search engines

- For general information
- When topic has many facets
- For current information

Information retrieved through the search engines may not be what is expected. This is due to the fact that search engines have no information selection and evaluation policies.
To improve on the search results, it is advisable to constantly check on "help" pages of each search tool. Each search tool provides some information on searching tips. Web technology is dynamic and changes all the time and searching tips provided last year may not work in the next year.

Use of Google Scholar

Google scholar is a useful search tool for academic information. This tool has scholarly material such as books, patents, journal articles and conference papers, among others. It has a search facility that links to the full text of an article and links to sites or databases that provide more information to the retrieved results including related or similar articles.

A search on Malaria +Africa gave results from a book and from journal articles. By clicking on the article "*Estimating mortality, morbidity and disability due to malaria among Africa's non-*

pregnant population, you will be taken to the PubMed database where the article will be displayed. To get a free full text version, click on the link described as free full text article in PubMed Central on the right hand side. When in Pubmed Central click on the pdf link for the free article.

From PubMed to Pubmed Central

PubMed Central Free full text access

A Link from an article in Google Scholar to PubMed and PubMed Central

http://www.ncbi.nlm.nih.gov/pubmed/10516785

Searching from a search directory

A subject directory is a service that offers a collection of links to Internet resources submitted by site creators or evaluators and organized into subject categories. Information in the directory services uses selection criteria for choosing links. The selection criteria vary from service to service, but most services provide information on the selection criteria that they have used. An example of a directory is Yahoo and virtual library. These directories are easy to use and they are also searchable.

A search from Yahoo for health information is as shown below. Clicking on Yahoo Health Guides A-Z leads to a page of health topics arranged in alphabetical order. Clicking on any disease or health topics leads to more information on that topic. For example, clicking on the topic or disease 'Asthma' will lead to a page with more links and information on Asthma, including related topics, health research and videos. Clicking on any topics of interest will lead to further information on the topic.

Searching from a search directory: Yahoo

http://dir.yahoo.com/health/

Searching from a search directory (Yahoo) on Asthma

http://health.yahoo.net/search?q1=asthma

- **Characteristics of search directories**
- Can be commercial or academic
- Breaks down information into general categories
- Uses human beings to index the information
- Requires minimal understanding of the topic to retrieve relevant information

- **Search directories: Advantages**
- Information is rated, annotated and categorised
- Contains fewer resources and therefore easy to scan
- High Likelihood of retrieving relevant results

- **Search directories: Disadvantages**
- Information updated less frequently
- Subjectivity in rating and annotating resources.

Searching MEDLINE/PubMed

MEDLINE is a bibliographic database. The database is created by the National Library of Medicine of the United States and is the world's largest biomedical library. It is searched through the use of a search engine called PubMed. It is a specialized database for Biomedical and related information sources. The database is freely available through the Internet.

PubMed is a service of the U.S. National Library of Medicine. It comprises more than 20 million citations for biomedical literature from MEDLINE, life science journals and online.http://www.ncbi.nlm.nih.gov/pubmed. Citations may include links to free full text content through PubMed Central and publisher web sites - http://www.ncbi.nlm.nih.gov/pmc . PubMed has a variety of search modes that meet individual needs. There is a simple search and the user can use the advanced search to perform a complex search using Boolean commands. The user can also access information through the use of medical subject headings or MESH. There are other search options such as the use of 'Limits' to help narrow or refine a search according to the user's information needs. The search can be limited to records that were published in a particular year, that are specific to a certain subject, gender or age group. The use of Limits helps the user in narrowing the search results in accordance with information needs. PubMed also allows the user to refine the search through the use of Preview and the index search facility.

PubMed simple search
PubMed is searched by entering a search term or terms in the search box as shown below. The simple search can bring out a huge amount of search results that the user may find difficult to sieve through for relevancy. The search below on "Malaria in Africa" returned 12,096 records.

PubMed simple search

http://www.ncbi.nlm.nih.gov/pubmed?term=malaria%20africa

PubMed: Use of Fields to refine searches

These search results can be refined through the use of fields. The following fields have been used

- age - Infants 1-23 months
- period of publication- 2years
- type of publication- review

The new search that has selected specific fields has retrieved 11 records

Results of search limited to 3 items

The use of field limits reduced the search results significantly from 2,223 to only 11. The user is, however cautioned not to limit the search to too many limit choices as the search may yield no results at all.
In PubMed, the Limits search function is selected from the screen. It is important to remove the Limits search function before another search is done as the search may be limited to the same fields that had been previously selected. PubMed records the limits selected when the results are retrieved to remind the user in case of doubt.
http://www.ncbi.nlm.nih.gov/pubmed/limits

PubMed Use of Boolean Operators
PubMed has an Advanced Search option that applies Boolean operators. This option helps the user to use the Search Builder feature to refine the search. The user has the option to select the field search such as author and with the use of the Boolean operators, AND, OR, NOT a search can be build. The advanced search page also shows the search history that can also be used to refine a search. Below is an example of an author search.

PubMed advanced search
This search facility enables the user to build the search through search fields and the use of Boolean operators
http://www.ncbi.nlm.nih.gov/pubmed/advanced

Practical Exercises *

- Select and open the **MeSH Database**.
- In this exercise we will look for a MeSH term for cancer
- Enter your search terms in the empty search query box- type in the following statement: **cancer.**
- Then click on the adjacent "***Go***" button.
- From the results found you can see that the MeSH term for cancer is "**neoplasms**".
- Click on the hyperlinked term to display more information.
- Look at the definition provided for neoplasms.

Searching from a Specialised Database: The Cochrane Library

The Cochrane Library is composed of many databases. It has the world's best medical studies in evidence-based healthcare.
The database has reliable evidence from

- Cochrane and other systematic reviews
- Clinical trials
- Method reviews
- Technology Assessments
- Economic evaluations

Simple searching in Cochrane
This is done through the use of a search screen and typing of keywords. Cochrane uses Boolean operators. A simple search for malaria AND pregnancy is shown below. The Cochrane library searches in all the databases and the total result from each database is displayed. The records from Cochrane reviews are displayed first. The Cochrane library has full text of the articles. Some of the articles can be very long, and it is advisable to check on the length before a decision to print is made.

Simple Search, Cochrane

http://www.thecochranelibrary.com/view/0/index.html

Advanced Search, Cochrane
The Cochrane library can also be searched through advanced searching. In advancing searching, the user is able to apply the Boolean operators to filter the search for more focused search results. In the advance searching page, the user is given search tips, especially how to use the Boolean operators, parenthesis and phrase searching to focus the search. The Cochrane library uses the AND as default, just like PubMed and Google. This implies that AND will automatically be added to search terms irrespective of proximity to each other.

Advanced Search, Cochrane

http://onlinelibrary.wiley.com/o/cochrane/cochrane_search_fs.html?newSearch=true

Practical Exercise 1*
Access Cochrane from HINARI

- From the **Full-text journals, databases and other resources** page, go to the **Reference Sources,** drop down menu, and click on **Cochrane Library.**
- In the **Title, Abstract or Keywords** search box, enter **malaria** and click on **Go**.
- What is the number of records found in the **Cochrane Database of Systematic Reviews**?
- Go back to the **Title, Abstract or Keywords** search box, enter **malaria AND pregnancy** and click on **Go**
- What is the number of records for this more precise keyword search?
- View the abstracts of the articles of interest to you.
- Complete one keyword search using a topic of interest to you in the **Title, Abstract or Keywords** search box and note the number of **Results**.

Searching HINARI

HINARI is Health InterNetwork Access to Research Initiative set up by the World Health Organisation (WHO) together with major publishers. It enables users from developing countries to gain access to one of the world's largest collections of biomedical and health literature. HINARI is targeted to health workers, researchers and policy makers and in turn, contributes to improved world health.
Currently access to HINARI is through the use of an Institutional username and password. The

Institutional library or any other institutional department that is mandated to do so by HINARI has the user name and password information.

HINARI: Log In

http://hinari-gw.who.int/

HINARI is a tool for finding information journal articles and books available in publisher websites or from Medline/PubMed. Information in HINARI can be searched by subject, language or through a list of journal titles (A-Z). HINARI provides access to online databases such as the Cochrane Library, a specialised database in evidence based medicine. Other information resources available through HINARI are reference sources and free medical information resources such as Biomed central, Highwire and Bioline International.
a) Search by journal title
Once logged into HINARI, a journal can be searched through its title. Looking at the A-Z list, the user can click on any letter when the journal title is known. A user looking for the *Tropical Journal of Pharmaceutical Research* will click on the letter T and then scroll down through all the journal titles until the required title is found. Clicking on the required journal title will bring the user to the website of that journal as shown below. From the journal webpage, the user can search for the needed information. The journal web page also gives the user the opportunity to register for journal alerts. These journal alerts are a service to users for current awareness on a subject of their choice.
This is simple searching through the field technique.

HINARI journal search through the title

Click on the letter "T" scroll down and select

http://extranet.who.int/hinari/en/journals.php

- Tropical Journal of Pharmaceutical Research ~ Pharmacotherapy Group, Faculty of Pharmacy, University of Benin, Benin City, Nigeria **(Bioline International) v. 1 (2002) - current issue**

b) Advanced searching in HINARI
In Hinari advanced searching is made through the use of PubMed. From the HINARI search page, click on search 'HINARI journal articles through PubMed/Medline' link. Clicking on this link will lead to the PubMed Homepage. At the PubMed home page the user can search for journal articles as will be shown below. After the search, the results page will show the number of records available and the number of journals that have full- text access through HINARI. The user should note that the PubMed database displays search results in summary format, but other display formats such as abstract can be selected as the user may choose. Searching directly from PubMed will not show journals that are available through HINARI. The user may have to access HINARI to get the full text article if the article is not free from PubMed or PubMed Central. It is,

therefore advisable to access PubMed through HINARI as the user has an advantage of the filtered HINARI journals. A search in PubMed on "Malaria in Africa" through HINARI retrieves 12277 but will show that 4,852 records are in HINARI. This means that the user has access to 4,852 free full-text results. PubMed has also filtered other results indicated as free full text (4195) that are freely available to all users irrespective of access through HINARI.

Advanced searching in HINARI

http://extranet.who.int/hinari/en/journals.php

Clicking on the link Search HINARI journal articles through PubMed (Medline) will lead to the Pubmed database .

In the HINARI search page there is a link to Other Free Collections. These resources are freely accessible without having to use the Institutional user name and password. In searching for relevant articles, the user should remember to apply the search strategies as well as search techniques

Practical Exercise

- Log in to HINARI
- From the HINARI find journals by title - select the letter 'T'
- Find Tropical Journal of Pharmaceutical Research
- Select it from the list by clicking on the title.
- Select an article from the latest issue available to you and open the full text.
- If the article is of relevance to your area of interest, save it for later use

Practical Exercise

Finding journal titles by subject in HINARI website

- From the HINARI Full-text journals, databases and other resources page, go to Find journals by subject.
- Find Infectious diseases by clicking on the Drop Down menu.
- Select Journal of Infectious Diseases from the list by following the hyperlinked title.
- Journal of Infectious Diseases will open on the publisher's website.
- Select an article from the latest issue available to you and open the full text.
- What is the title and author of the full-text article you viewed?
- Go back to the drop down menu of subjects. Choose a subject that is of interest to you.
- Which subject did you choose? Name three journals that are of particular interest to you.
- When you have finished, return to the HINARI Full-text journals, databases and other resources page.

* Exercises adopted from HINARI

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Module Four - Intellectual Property Rights

Introduction

Intellectual Property Rights (IPRs) are critical in protecting the rights of creators of knowledge; once that knowledge has been expressed down in any medium. Intellectual property is "an all-encompassing term now widely used to designate a group of the following fields of law: patent, trademark, unfair competition, copyright, trade secret, moral rights, and the right of publicity" Field (2006). According to the United Kingdom's *Universities'* Joint Information Systems Committee (JISC) (2008) "the objective of intellectual property law is to grant the creator of a work certain controls over the exploitation of that work, as the unfettered ability of others to copy the work or invention may deprive the creator of reward and incentive". The World Intellectual Property Organisation (WIPO) Convention of (1967) gives the following as protected under IPRs:

- "Literary, artistic and scientific works;
- Performances of performing artists, phonograms, and broadcasts;
- Inventions in all fields of human endeavor;
- Scientific discoveries;
- Industrial designs;
- Trademarks, service marks, and commercial names and designations;
- Protection against unfair competition; and
- All other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields" (WIPO, 1979).

IPRs are an important component in the learning and research process. Their importance lie in the fact that one is able to use other people works without necessarily taking that knowledge and passing it off as one's own; and this can be done through acknowledging another person's work or where those ideas arose from.

Learning Objectives

The objectives of this module are:

- Discuss some key Intellectual Property Rights concepts,
- Identify the uses and benefits of Intellectual Property Rights,
- Discuss Copyright in the learning and research process,
- Know sources of information on Intellectual Property Rights
- Identify some Sources of information on Intellectual Property Rights

Learning Outcomes

At the end of this Module, trainees should be able to:

- Understand the various Intellectual Property Rights regimes,
- Appreciate Fair Use of Intellectual Property Rights principles; rights and duties in the learning and research process,
- Appreciate Copyright and its effect on Information Use and,
- Identify some Sources of information on Intellectual Property Rights.

Table 1: Summary of Content

	Content	**Methods**	**Mode of Assessment**
1	Understand the various Intellectual Property Rights (IPRs) regimes	Brainstorming Lecture Discussion Demonstration	Pre and Post Questionnaire Question and Answer
2	Appreciate Fair Use Intellectual Property Rights principles; rights and duties? in the learning and research process	Lecture FGDs Demonstration	Question and Answer
3	Appreciate Copyright and its effect on Information Use	Lecture Focus Group Discusion Demonstration	Question and Answer
4	Identify some Sources of information on Intellectual Property Rights	Discussion Lecture Demonstration	Question and Answer

Overview of Key Types of Intellectual Property Rights

Overview of key types of Intellectual Property Rights
Copyright, Patents, Trade Marks and Trade Secrets amongst others are included in Intellectual Property Rights. Intellectual Property Rights are rights that are due to people for products resulting out of their thinking process. There are international treaties defining standard benchmarks of each IPR, and every country has laws that govern the use of these regimes. This module will discuss IPRs but will mainly focus on Copyright as it affects the learning and research process.

Patents
The World Intellectual Property Organisation (n.d) defines a patent as “an exclusive right granted for an invention, which is a product or a process that provides a new way of doing something, or offers a new technical solution to a problem”. It is “a contract between society as a

whole and an individual inventor. Under the terms of this social contract, the inventor is given the exclusive right to prevent others from making, using, and selling a patented invention for a fixed period of time — in most countries, for up to 20 years in return for the inventor's disclosing the details of the invention to the public" (Field, 2006).

Trade Marks

Trademarks are "commercial source indicators, distinctive signs that identify certain goods or services produced or provided by a specific person or enterprise" (Field, 2006). According to Korn (2005) Trade Marks can be distinguished under the following:

- it is distinctive for the goods or services for which an application is made to register;
- it is not deceptive, or contrary to law or morality;
- it is not similar or identical to any earlier marks for the same or similar goods or services.

Trade Secrets

Field (2006) defines Trade Secrets as "any information that may be used in the operation of a business and that is sufficiently valuable to afford an actual or potential economic advantage". A definition by WIPO (n.d) says "any confidential business information which provides an enterprise a competitive edge may be considered a trade secret. Trade secrets encompass manufacturing or industrial secrets and commercial secrets. The unauthorized use of such information by persons other than the holder is regarded as an unfair practice and a violation of the trade secret". Trade secrets "protect the development of new ideas as well as established information that derives value from not being publicly known" (Krotoski, 2009). However as argued by HO1 (2001), "Intellectual Property assets like any other physical assets need to be protected legally so that there is clear ownership of the asset. When you purchase a house, you would want to have a deed to prove your ownership of the property". He further describes different types of protection for IPRs as indicated in Table 2.

Table 2: Types of IPR Protection (Hoi, 2001)

Type of Protection	**Protection Term**	**Protection Method**	**Example**
Trade Secret	As long as the information remains secret	Take measures to protect the secret. Obtain contractual rights to protect the secret.	Soft-drink formula
Copyright	Life of the author plus 50 years	Rights accrue on "fixation" of the work. Copyright registration.	Software in BIOS ROM
Trade Mark	For as long as the mark is used in commerce	Rights accrue on the use of the mark. Additional rights available upon registration.	Brand name or make of a computer
Patent	Twenty years from the date of filing	Rights accrue at the time the patent is issued.	Network Security

Copyright
Any information resource whether in print or electronic format should be used responsibly. Responsible use of any information resource requires that it is duly acknowledged by citing the author of the work. It is in this context that copyright exists so that information users are assisted in their use of information and therefore avoid any abuse or misuse of information sources. Korn (2005: 4) defines copyright as a "legal term describing the economic rights given to creators of literary and artistic works, including the right to reproduce the work, to make copies, and to perform or display the work publicly". Nowadays copyirhgt is assumed automatically upon the expression of an idea in any medium without necessarily having to put the copyright symbol ©. Some works become public domain after the expiry of copyright. And other works enter the public domain because they never really were copyrighted in the first place, as they were meant to be freelly used by the public.

Several rights are conferred under copyright laws; such that only the owner of a copyrighted work can authorise to:

- reproduce the work,
- prepare derivatives work,
- distribute copies of the work,
- perform the work, and
- display the work in public" (Hoi, 2001).

There are essentially two types of rights under copyright that accrue to an author or creator of an idea. These are:

- "Economic rights allow the rights owner to derive financial reward from the use of his works by others.
- Moral rights allow the author to take certain actions to preserve the personal link between himself and the work" (World Intellectual Property Organisation, n.d).

Public Domain
Public domain are "works that are either ineligible for copyright protection or with expired copyrights. No permission whatsoever is needed to copy or use public domain works" (University of California, 2003). Some works become public domain after the expiry of copyright. Other works enter the public domain because they never were copyrighted in the first place, as they were meant to be freely used by the public. Public domain is "different from "open access," which typically refers to works that are copyright-protected, but whose authors or publishers have chosen to make the work freely available to the public. Even if works are in the public domain, users should still acknowledge the source of the work, since failure to do so could constitute plagiarism" (Eisenstadt, 2008).

Fair Use
Fair Use is a concept that allows certain works to be copied but with certain conditions attached to that process. It "permits certain limited uses without permission from the author or owner. Depending on the circumstances, copying may be considered "fair" for the purpose of criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or

research" (Library of Congress' Copyright Office, n.d). However the author of the works still needs to be acknowledged. According to the University of Maryland University College "some general examples of limited portions of published materials that might be used in the classroom under fair use for a limited period of time include": the following:

- "A chapter from a book (never the entire book).
- An article from a periodical or newspaper.
- A short story, essay, or poem. One work is the norm whether it comes from an individual work or an anthology.
- A chart, graph, diagram, drawing, cartoon or picture from a book, periodical, or newspaper.
- Poetry
    - Multiple copies of a poem of 250 words or less that exist on two pages or less or 250 words from a longer poem.
- Prose
    - Multiple copies of an article, story or essay that are 2,500 words or less or excerpts up to 1,000 words or 10 percent of the total work, whichever is less.
- Illustrations
    - Multiple copies of a chart, graph, diagram, drawing, cartoon, or picture contained in a book or periodical issue" (University of Maryland University College, n.d).

Several factors generaly applu when using copyrighted material under fair use. Some of these fours factors have been identified by the University of North Carolina at Chapel Hill School of Education, (n.d):

Table 3: Four factors determining fair use

What is the character of the use?
What is the nature of the work to be used? How much of the work will you use?
What effect would this use have on the market for the original or for permissions if the use were widespread?

Columbia University Libraries/Information Services (2009) gives examples where the courts in the USA found that fair use did not apply. See Table 4. As indicated before; the purpose, nature, amount and the effect of the copying under fair use are always taken into consideration to determine whether it qualifies under this usage.

Table 4: Case Summary of Infringement of Fair Use

Princeton University Press v. Michigan Document Services, Inc., 99 F.3d 1381 (6th Cir. 1996).

A private copy shop created and sold "coursepacks" under circumstances similar to the Kinko's

case. The copy shop here was also found to have acted outside the limits of fair use.

- ***Purpose***: The fact that the use was commercial and was not transformative caused this factor to weigh against fair use.
- ***Nature:***Although they were nonfiction materials, copied excerpts contained some degree of creative expression, cutting against fair use.
- ***Amount:***Defendant used between five and 30 percent of each work. This factor weighed against fair use.
- ***Effect:*** The court gave particular emphasis to the effect on the market; accordingly, the court provided relatively little analysis of the other three factors. The court noted that licensing or potential licensing opportunities existed for all copied works, and other commercial copy shops routinely requested permission to reproduce copyrighted works. Such an existing licensing system was said to weigh heavily against fair use.

Conclusion: The court held that such photocopying by a commercial copy shop does not constitute fair use. As in the Kinko's case, this court did not address the question of whether similar activities may be fair use if conducted by a university or nonprofit copy shop. This appeal was heard by all judges of the Court of Appeals for the Sixth Circuit. Evidencing that even judges can disagree about fair use, eight judges joined the ruling against fair use, while five judges dissented and would have found that the copying was fair use (Columbia University Libraries/Information Services,(2009)

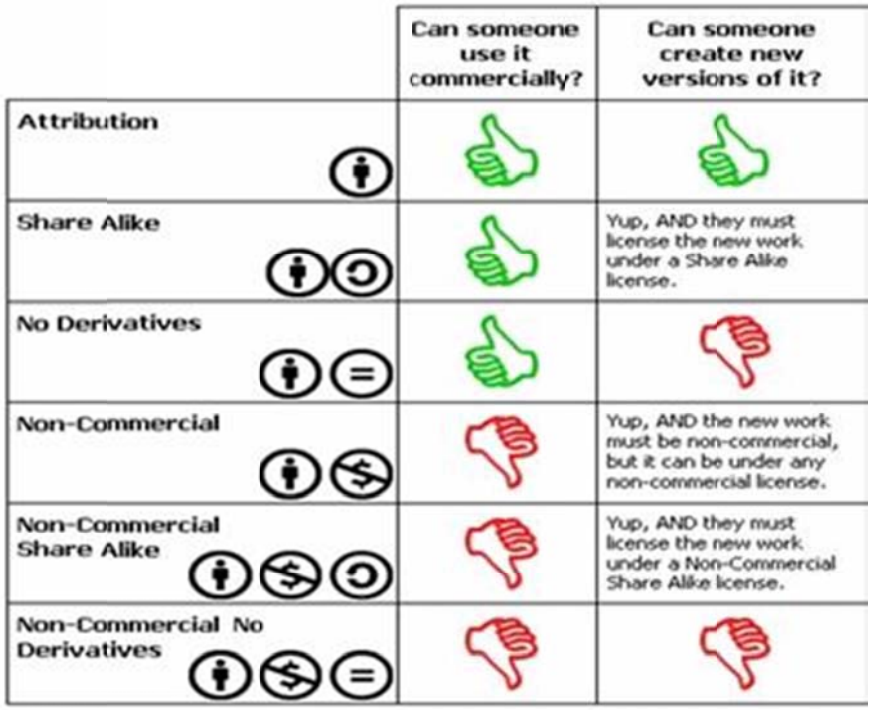
Open Access

Open Access is a "cost-effective way to disseminate and use information. It is an alternative to the traditional subscription-based publishing model made possible by new digital technologies and networked communications. As used by ARL, open access refers to works that are created with no expectation of direct monetary return and made available at no cost to the reader on the public Internet for purposes of education and research" (Association of Research Libraries, 2004).

Creative Commons

Creative Commons is as "an internationally active non-profit organisation that provides free licenses for creators to use when making their work available to the public. These licenses help the creator to give permission for others, to use the work in advance, under certain conditions" (The ARC Centre of Excellence for Creative Industries, n.d). The Creative Commons licenses are "a flexible and straightforward tool for creators or right-holders that valued accessibility and use of their works over the establishment of a traditional market with monetary incentive" Charbonneau (2010). Creative Commons assigns several licenses to creators or owners of knowledge. Table 5 shows some of the types of licenses available under Creative Commons *(Burrough and Mandiberg, 2009)*.

Table 5. Creative Commons Types of Licenses



Reproduction of Copyrighted Works

Copyrighted works could be reproduced without seeking the authority of the authors, if such copying meets certain conditions. These legally reproduced works are permitted under what is called Fair Dealing or Permitted Acts. In Fair Dealing "the copying must not be prejudicial to the interests of the rights holders" (Korn, 2005). In such instances, copying is then allowed when the work fall in the following categories:

- Non-commercial research and private study
- Criticism and review
- Making temporary copies
- Copies for visually impaired users (Korn, 2005).

Plagiarization

Information gained from other sources when used in one's work must always be acknowledged. It is always important to acknowledge that we used another person's work, and this can be done by citing them. If one does not acknowledge the sources of that information then one is stealing that person's Intellectual Property Rights. This is commonly referred to as plagiarisation, which essentially means cheating. In simple terms, Plagiarisation is using another person's work without acknowledgement. According to Higgins "plagiarism" is the attempt to pass off other people's work (ideas, words, phrases or passages) as your own. Plagiarism is not

acceptable; regardless of which writing style, format, guide or publication manual you may be using to complete an assignment" Higgins, M., Ohri, L., Scheirton, L., Malone, P., Alekha Dash, A. and Padilla, R. (2005). . They further cite Iverson (Higgins, M., Ohri, L., Scheirton, L., Malone, P., Alekha Dash, A. and Padilla, R. 2005) detailing four types of plagiarism. See Table 3.

Table 3: Types of Plagiarism

- "Direct plagiarism: Verbatim lifting of passages without enclosing the borrowed material in quotation marks and crediting the original author.
- Mosaic: Borrowing the ideas and opinions from the original source and a few verbatim words or phrases without crediting the original author. In this case, the plagiarist intertwines his or her own ideas and opinions with those of the original author, creating a "confused, plagiarized mass".
- Paraphrase: Restating a phrase or passage, providing the same meaning but in a different form without attribution to the original author.
- Insufficient acknowledgement: Noting the original source of only part of what is borrowed or failing to cite the source"

Iverson C, Flanagin A, Fontanarosa PB, Glass RM, Glitman P, Lantz JC, et al. American

Khumalo (2009) acknowledges ignorance about the prevalence of plagiarisation at universities in South Africa; which maybe the case in most African universities. When participating in a "debate held at the Durban University of Technology about plagiarism at our universities" he found that students did admit copying from various sources but "they claim that their dilemma is that the authors of original recognised texts "put it so well and so authoritatively" that it would be futile to change it - and undermine the original texts!" However what should be of contention is why they fail to acknowledge the sources of that information? He further argues that the whole essence of acknowldging a source is in the end to "to add your unique voice, your authoritative deduction or conclusion from what you have read from the original sources"

There are many reasons that can be attributed to plagiariasm. It may be an indication that students are increasingly becoming lazy, fail to think or just don't want to put much effort into reserach and knowledge creation. Others are not aware that plagiriasm is just like stealing of goods and services; is a serious offence. Copyright has become especially important in the digital age; as conceptions of ownership becomes blurred. Below are examples of what students said when found to have copied other peoples work without acknowledgin the source.

Table 4: Student Perspectives on Plagiarism

At DePaul University, the tip-off to one student's copying was the purple shade of several paragraphs he had	At the University of Maryland, a student reprimanded for copying from Wikipedia in a paper on the Great Depression	One of the teachers said that when some students were confronted with this charge, they did acknowledge that they had culled

lifted from the Web; when confronted by a writing tutor his professor had sent him to, he was not defensive — he just wanted to know how to change purple text to black (Gabriel, 2010).	said he thought its entries — unsigned and collectively written — did not need to be credited since they counted, essentially, as common knowledge (Gabriel, 2010).	material from various sources. The students claim that their dilemma is that the authors of original, recognised texts "put it so well and so authoritatively" that it would be futile to change it - and undermine the original texts! (Khumalo, 2009).

According to the University of South Africa (2005) rules and regulations; the following is an infringement on author moral rights:

- “failure to acknowledge the author where phrases or passages are taken *verbatim* (word-for-word) from a published or unpublished text;

- use of a summary of a work which contains the ideas of others and presents the essence of an argument in language that condenses and compresses the original language of the source without acknowledging the author of the work;

- using the patch-writing (cut-and-paste) method, where pieces of other persons works, including those taken from the internet, are blended with one’s own words and phrases without acknowledging the author of the source work”.

According to the Univeristy of South Africa (2005), in research work copyright is infringed upon when an authors exclusive rights are not recognised. This situation can arise in differrent situations but especially in the following cases under fair dealing:

- “failure to indicate clearly (e.g. with quotation marks or indent and different font) phrases or passages taken verbatim (word-for-word) from a publishedor unpublished text without crediting the original text and author;

- paraphrasing of an article, a book or an electronic text without acknowledging the source(s) and the author of the work. This amounts to reproducing a text in different words as the author, by changing the word order of the text, the sentence types and the style of the author;

- using more than a substantial part of the work will not be fair dealing, even if an acknowledgement of the source and the author”.

The University further indicates that such infringement may constitute criminal liability and the following actions fall under this category:

- copying information from another person (e.g. another students assignment or portfolio) and submitting identical work where such work is not the result of teamwork and indicated as such by all participants,
- buying an essay from a ghost-writing service and pretending that it is one's own work;
- asking someone else to do an assignment on ones behalf.

Citation

IPRs are an important component in the learning and research process. Their importance lie in the fact that one is able to use other people's works without necessarily taking that knowledge and passing it off as one's own; and this can be done through acknowledging another person's work or where those ideas arose from. Citation is important:

- "Because ideas are the currency of academia
- Because failing to cite violates the rights of the person who originated the idea
- Because academics need to be able to trace the genealogy of ideas" (Hunter, n.d).

According to Rutgers, The State University of New Jersey (2010) citing is important for the following reasons:

- "T*o back up your assertions.*
- *To give credit to others for their ideas.*
- *To demonstrate to your teachers the work that you have done."*

Citation Methods

There are several ways or methods to acknowledge another person's work or ideas, namely:

- Quote the exact words of the author and put them in quotation marks
- Summarise the author's key points
- Paraphrase the author.

Although citations may vary in general, citations should include the following:

- "Author Name — Personal or Corporate
- Date of Publication or Last Update in Parentheses. Use "n.d." (stands for no date) if date cannot be found.
- Title of document or article
- Source of document or article, for example the title of the journal or the complete work, if relevant
- Other publication information, for example volume number, page numbers, etc., if relevant
- A retrieval date statement, for example: Retrieved January 27, 2001, from the World Wide Web

- the URL — the World Wide Web address, for example: http://knowledgecenter.unr.edu" University of Nevada. (n.d).

Citation Styles

There are several ways of citing. The following are the most commonly used citation styles in the Health Sciences: The National Library of Medicine (NLM) Style Guide, the Harvard style of citation and the Vancouver style (Uniform requirements for manuscripts submitted to biomedical journals). Always consult with your university or institution on what citation style is used. If you are writing an article for submission to a journal, check with the journal what the citation format is used. It is always important and critical to consult the latest editions of the referencing styles from either the internet or other locations.

The following are some of the most commonly used citation styles:

- Vancouver Style Guide arose of the 1978 Vancouver International Committee of Medical Journal Editors (ICMJE) meeting. It prescribes Uniform requirements for manuscripts submitted to biomedical journals. (Available from: www.icmje.org)
- The National Library of Medicine (NLM) Style Guide. (Patrias, K. Citing medicine: the NLM style guide for authors, editors, and publishers [Internet]. 2nd ed. Wendling, DL, technical editor. Bethesda (MD): National Library of Medicine (US); 2007. Available from: Available from: http://www.nlm.nih.gov/citingmedicine)
- Harvard System of Referencing Guide. Available from the following websites: www.shef.ac.uk/library/libdocs/hsl-dvc1.pdf *http://libweb.anglia.ac.uk/referencing/harvard.htmor* http://www.unisa.edu.au/ltu/students/study/referencing/harvard.pdf
- **APA Style Guide,** from the American Psychological Association. (Available from: http://www.apastyle.org/)
- **MLA Style Guide** from the Modern Language Association of America. (Available from: www.mla.org/style)
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Module Five - Management of Information

Introduction

“Where did I read this information?”, “I know that I printed a copy of this article, but I don't remember where I kept it.” These are very common situations among researchers, students or anybody whose works involve using documents. In the course of learning, teaching and research, information accessed from diverse sources accumulates. Without a proper information management practice; such information may be difficult to find and later locate. In certain instance some people may print the same documents again and again, or search for the same information every time they need it. As a consequence there is a need for this information to be organized so that it becomes easily accessible. Managing this information properly will save time, energy and lead to increased productivity. This module discusses tools and techniques for collecting, storing, organizing and using information. Special attention will be given to the management of the following categories of information: bibliographic references, primary documents such as books or articles, user’s notes and manuscripts.

Learning Objectives

In this module we will:

- Explain the benefits of good organization of information,
- Present referenced management tools,
- present bookmark management tools,
- Discuss information management techniques.

Learning Outcomes

At the end of the module, one should be able to:

- Understand the importance of managing information,
- Use a reference management software for storing bibliographic references,
- Cite and reference documents used to produce an intellectual work,
- Use web browser bookmarking functionality in a more effective way.

Summary of Content

Content	Methods	Mode of Assessment
5.1Importance of Managing Information	Brainstorming Discussion Lecture	Pre and post Question and Answer
5.2 Management of bibliographic references	Lecture Discussion	Questions and answers
5.3 Using Reference Manager software to manage bibliographic references	Lecture Demonstration	Assignment
5.4Managing Bookmarks/ Favorites	Lecture Demonstration	Assignment

Pre-Evaluation

1. What are the elements required to identify a book you need?
2. What tools do you use to store the documents you would like to read later?
3. What elements do you remember about a very interesting web resource you read a month ago?
4. What is the most appropriate order to organize your notes?

Importance of Managing Information

Organizing the information you work with or you will probably need later has many advantages: it helps save time, energy and has a positive impact on productivity.
Having a good management system prevents loss of information. The information is lost when it is not kept properly and a person forgets about its existence. Sometimes it is lost because the person cannot find it again. Storing information prevents from loosing and organizing it makes it easier to retrieve.

Good organization of information saves time and effort. Retrieving information requires time and energy. A good organization of information saves a lot of time and energy in trying to search and retrieve the same documents or information later. Taking notes while or after reading helps remember the topic of a document or one's opinion about it.improperly managing information and documents usually finds himself going into circles or being chaotic in his work: searching for the same information more than once, reading the same documents more than once, unable to have clear views of where it is heading. A good organization of information ensures that a person will be looking for new information, finding new documents, asking new questions, exploring new perspectives.

Management of Bibliographic References

A bibliographic reference is a set of elements that describe a document in order to identify it in a unique way. In online library catalogs, bibliographic databases, and reference management software each bibliographic reference is stored as a record. In addition to the document description, a record may provide information about the content and the location of the document.

The description of the document itself generally consists of the title of the document, authors' names, the source of the document, the place of publication, the date of publication, the size of the document. In reference management software each element is stored in a field. The nature of elements that compose a bibliographic reference depends on the type of document being described. See the example in Box 1.

BOX 1: Examples of bibliographic references or citations

- **Sample list of references**.

The first citation describes a journal articles, the second describe an web page and the third is a book description

- Teklehaimanot A, McCord GC, Sachs JD. Scaling up malaria control in Africa: an economic and epidemiological assessment. Am J Trop Med Hyg. 2007 Dec; 77(6Suppl):138-44.
- Malaria Consortium (2007) Malaria: a handbook for health professionals, Macmillan Publishers Limited. Available from TALC at http://www.talcuk.org/books/malaria-a-handbook-for-health-professionals.htm
- Breman, J., Alilio, M & Mills, A. Eds. (2004) the intolerable burden of malaria: II what's new, what's needed.
- **A PubMed record**

With abstract (AB) and keywords (MH). Note that the record reproduced is not a complete. (*It was shortened by the author of this chapter*).

PMID- 20387743
OWN - NLM
STAT - MEDLINE
DA - 20100414

DCOM- 20100430
IS - 1028-8880 (Print)
IS - 1028-8880 (Linking)
VI - 12
IP - 19
DP - 2009 Oct 1
TI - Medicinal plants used in traditional medicine in the centre east region of Burkina Faso.
PG - 1287-98
AB - The present research focused on the inventory and the use of plants in traditional
medicine for the treatment of diseases in this area. The
method was based on
ethnobotanical surveys with semi-directing interview,
conducted from [...]
AD - University of Ouagadougou, 07 BP 5252 Ouagadougou, Burkina Faso.
FAU - Ky, J M K
AU - Ky JM
FAU - Zerbo, P
AU - Zerbo P
FAU - Gnoula,
C AU - Gnoula C
FAU - Simpore, J
AU - Simpore J
[…]
JT - Pakistan journal of biological sciences: PJBS
JID - 101247723
RN - 0 (Plant Extracts)
MH - Burkina Faso
MH - Herbal Medicine
MH - Humans
MH - Medicine, African Traditional/*methods
[...]
SO - Pak J Biol Sci. 2009 Oct 1;12(19):1287-98

Content description is achieved by keywords or abstract. Keywords are terms that designate the topics, the geographical locations, the people and other aspects of the document. An abstract is a short text that summarizes the content of a scholarly publication. An abstract may have different purposes but in general it highlights the key concepts, objectives, methods, findings and recommendations.
The information about the location of the document helps retrieve the original when it is needed. In a personal collection of references it is a good idea to indicate in which office, closet and folders the document is stored.

5.7.1 Bibliography Management Tools

Bibliography management tools, also called reference management software, citation management software, and personal bibliography software are computer programs that allow users to collect, store, organize references and use them in different ways. They also help annotate documents and generate list of references.
Reference management systems can be categorized by the operating system they run on, where they store data and also their functionalities. There are reference management systems for Windows, Linux, MacOs and other operating systems. Reference management systems can store the information locally (on user desktop) or online (on a remote server). In addition, reference management systems provide functionalities such as the ability to import from external sources, the possibility to add notes and attach files, the capability of sharing information with colleagues, the possibility to generate a list of references, etc.
There are many reference management software including: Zotero, EndNote, RefWorks, ProCite, CiteUlike, Connotea, Mendeley among others. When choosing a bibliographic management software you may consider the following: the price, storage mode, source from which it can import information, the output, the ease of use, the integration with text processing software.

Box 2 : Quick overview of some reference management software

Zotero : is an open source reference management software available as an add on for Firefox web browser. With zotero users can collect, organize, share and cite bibliographic references. It enables users to create references manually or import them while searching online bibliographic databases, library catalogs and a growing number of online research tools. In zotero, references are grouped in collections. Users can add keywords to references and annotate them as well. It is also possible to attach Portable Document Files (PDF) and other types of materials to a reference. The software extensions can be used with Microsoft Office Word and OpenOffice.org Writer to generate bibliographies and lists of references. More information about zotero can be found on the official web http://www.zotero.org/.
Connotea: is a free online reference management system that enables users to store, organize and share bibliographic references and web links. With Connotea users can save links to any online resource: scientific articles, bibliographic references, books, etc. New records can be created by filling forms on connotea website or using addon buttons on users' web browser. Saved links can be organized using tags and shared with colleagues. Connotea is accessible at http://www.connotea.org/
EndNote is commercial desktop software for managing references and citations. It runs on Windows and Mac Os operating systems. It allows users to create, import, organize, cite, and share citations. In Endnote, citations are stored in libraries. Within libraries citations can be organized using groups and subgroups. Endnote offers several features such as searching online collections, importing citations, generating lists of references in OpenOffice.org and Microsoft Office Word text processing software. For more information and a 30 day free trial version go to: http://www.endnote.com/ . Endnote Web is free through HINARI http://www.who.int/hinari/.

Mendeley is a free desktop application for reference management. It runs on different operating

systems including GNU/Linux and Windows. Mendeley allows users to create collections of bibliographic citations, organize references, share documents and generate lists of references. Data can be collected in different ways: manual editing, importing from other reference management systems, extracting references from PDF documents, etc. Mendeley also allows users to store and annotate pdf documents; and generate a list of references using text processing software. To find more information about Mendeley download the software, visit http://www.mendeley.com/.

5.7.2 Managing Bibliographic References

Once installed, a reference management system allows its user to create collections, add citations, edit, and comment and annotate citations, generate a list of references.

- **Collecting bibliographic references**

A collection of bibliographic references is built by creating citations manually one by one or by importing them from external sources such as bibliographic databases.

Importing allows user to add many records at once in the collection. The most common external sources of citations are bibliographic databases or library catalogs. Collecting references from these sources includes three main steps.

- Retrieving relevant citations in search tools,
- Saving them in a file,
- Importing the file in a reference management tool.

Users need to manually create citations when they work with documents that are not referenced or the bibliographic references are not available for import. In other situations, the bibliographic database or library catalog searched by the reader does not provide a way to import references into the reference management software. Records are then manually created by using “add new” or “create new” function of the reference management software. It opens up a new blank form, where users fill up elements that describe a document as per the example below.

Box 3 : Adding Data Into Zotero

References in Zotero can be created by the user or imported from online search tools. To import PubMed records into Zotero :

- go http://www.pubmed.gov
- Enter keywords to search for your topic. Example: malaria treatment clinical trials
- when the results are being displayed an [] icon appears on the location bar
- click on it,
- select the references you want to save

To create new records in zotero.

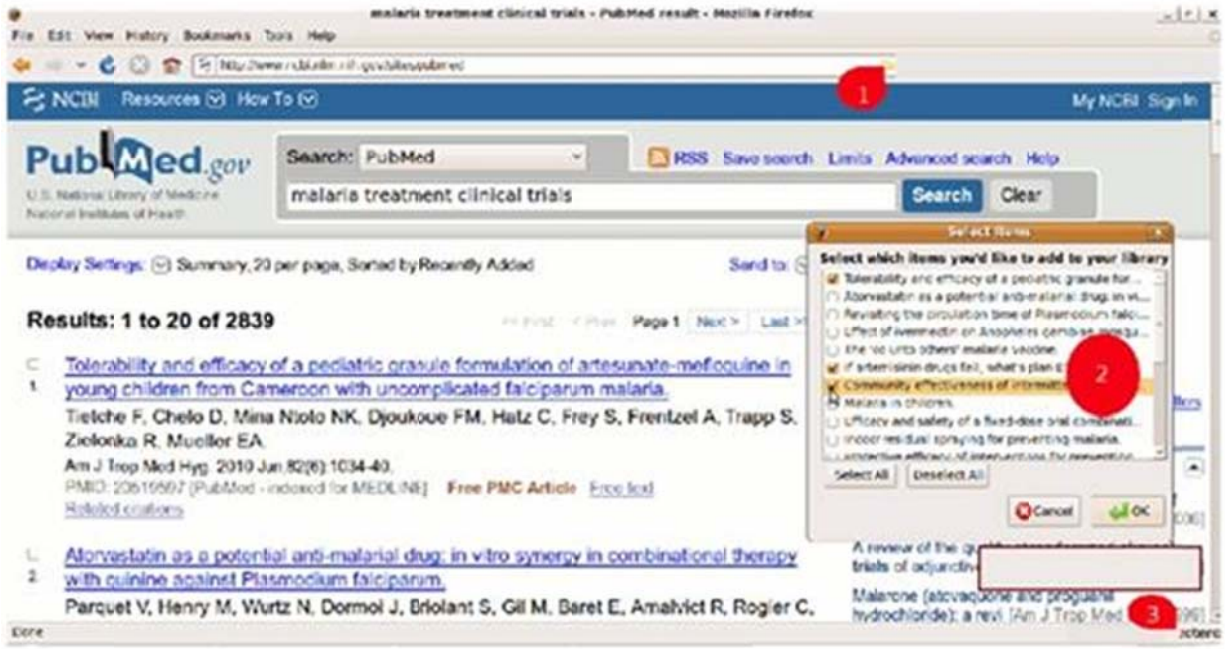
- Launch Zotero when a Firefox window is active,
- Open your collection
- click on the new element icon,
- choose the type of document you want to describe,
- Enter descriptive elements.

Illustration 1: Importing PubMed citations into zotero

The small icon (circle 1) on the address bar indicates the presence of records that can be imported into Zotero. After clicking on the icon, the list of available records is displayed in box (circle 2). The User can select the citations he wants to store in his Zotero library. An icon (circle 3) is displayed on the status bar to reminds the users that Zotero is enabled for this computer.

- **Storing bibliographic records**

It is now common to store citations in reference management software. Reference management systems store data on local drives, online, or both. Each of these storage modes has its advantages and
limitations.



Storage mode	Advantages	Limitations
• Local	• are fast* • does not require access to the Internet, • stored information is private, • integrate well with office suites	• risk of destruction in case of problems with the PC (viral infection or hard drive failure for examples), • inaccessible if the computers is broken, • usually not shared, • accessible on one computer, thus reducing the user's mobility.
• online	• easy to share, helps collaboration, • available from multiple locations, • can be accessed by multiple users.	• Requires Internet connectivity • not integrated with office suites

* the speed depends on the characteristics of user PC.
Some tools like Zotero can store information both locally and online. A collection built on a user desktop can be synchronized with a copy on a remote server. This feature combines the advantages of the two storage modes: the collection become available from different locations and the duplication reduces the risk of losing data.

Organizing References
In reference management software, citations are grouped into collections. A collection or library is the equivalent of a folder into which references are stored according to some shared characteristics. A
collection can be related to a topic, a project, an assignment, etc. Within collections, references are assigned keywords whose primary function is to list the topics discussed in a document. To be useful, the choice of keywords must be consistent by using nouns, avoiding synonyms and avoiding abbreviations.
In addition to collections and keywords, it is a good idea to add to each record information about the its “status” (users' relation to the document). Attaching tags like “to be read”, “relevant to chapter one”, “order a print copy”, “forward to Mr Joe”, etc helps the collection owner to know what he's been doing with documents.

Using bibliographic references
Citations stored in a reference management system can be used in different ways. They can be searched, commented and annotated, cited, shared and included in bibliographies. Retrieving References: A reference management system has a search functionality that can be used to easily retrieve citations matching a certain criteria: authors, keywords, publication dates, etc.

Taking notes: Stored citations can be edited to add personal comments and notes. This feature is a convenient way for a user to keep track of what parts in the document are relevant and also to remember what the overall opinion about the document or how the information in the document will be used. Citing: One of the great features of a reference management system is the capability to generate and format lists of references. When installed on a workstation some reference management systems add new functionalities to the word-processing software like Open Office writer or Microsoft word. Usually the new functionalities are materialized buttons on the toolbar of the authoring software. Clicking on a button while writing allows the user to retrieve a citation from the reference management system collection and insert it in the document being edited. Another button is available to generate and format the list of references at the end of a document and format the reference according to different citation styles.

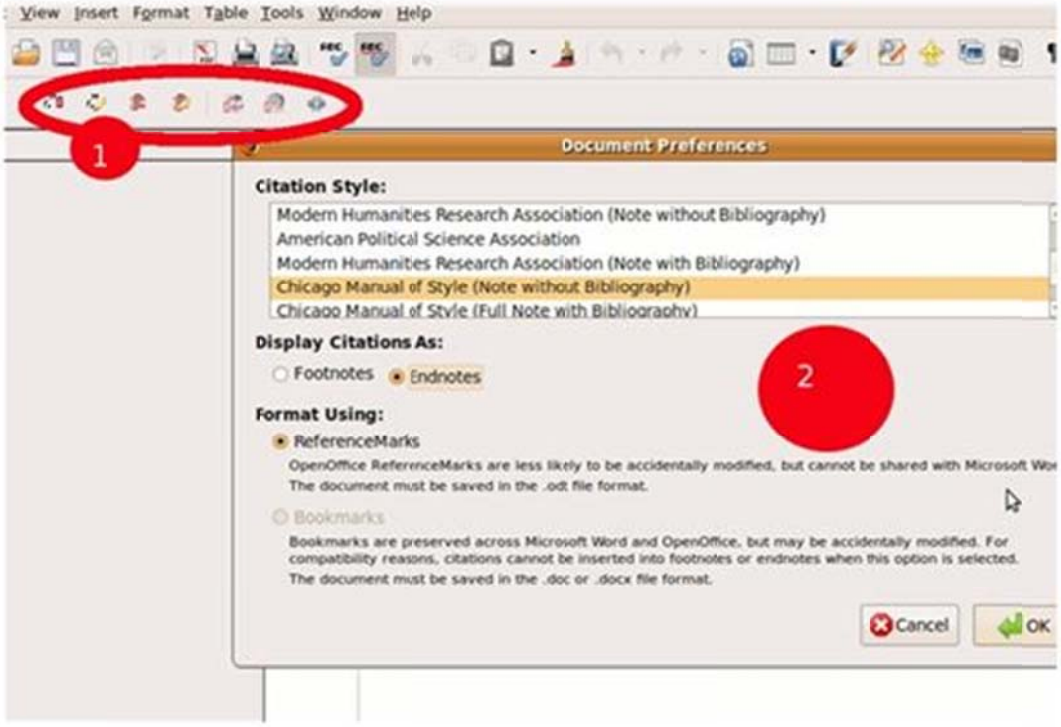


Illustration 2: Zotero and OpenOffice integration

While writing document users can cite documents and generate list of reference. The Zotero extension for OpenOffice.org add new buttons on the toolbar (circle 1). Clicking on the insert button for the first time prompts a list of citation styles user can choose from (circle 2). Citation style: is the way the reference is presented in a list of references. A citation style defines what

elements must be included in the citation, the position of each element in the citation, its appearance and what punctuation marks precede and follow it. There are many citation styles. In the biomedical and health sciences field the "Uniform requirements for manuscripts submitted to biomedical journals" (1) and the "the National Library of Medicine (NLM) style guide for authors, editors, and publishers" (2) are widely used. When writing a journal article it is recommended to refer to the instructions for authors to know what citation style is accepted by the journal you plan to submit the article to for publication.

Sharing Citations

There are several methods of sharing bibliographic references. These depend on the tools being used and people involved in the sharing. Citations can be shared as a list of references, as a computer file that can be imported in reference management software, or online. Most reference management tools allow users to generate a list of selected references. The list can then be printed and handed to students and colleagues, attached to an email or published on a website

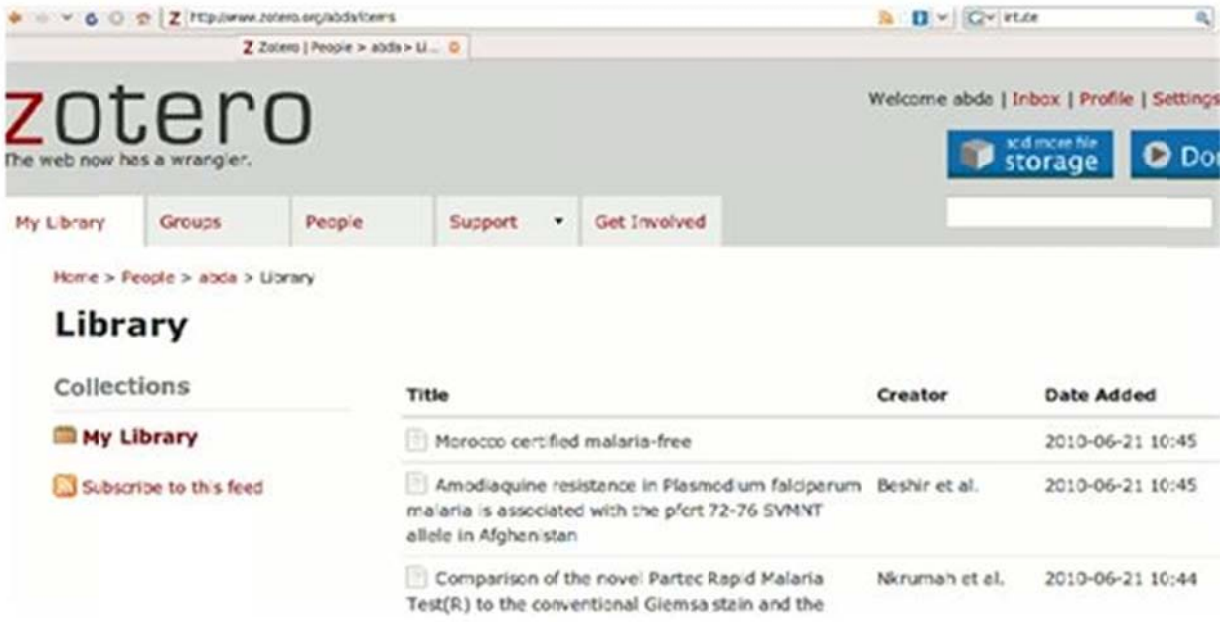


Illustration 3: Online copy of a collection of bibliographic citations created with Zotero

Many reference management softwares are able to export records to or import them from a computer file. There are different file formats used to exchange citations: RIS, EndNote, BibTex. When sharing citations, it is important to choose a file format that can be understood by the tools used by the people who are sharing the citations.

Most online tools allow users to share and collaborate. With Connotea a user can share an entire collection or a set of references online. With Zotero, several people can collaborate and maintain a group library (collection of references). Members of a research team or students in a class may maintain a group library to share their findings.

Recommended Techniques

Computerized Bibliography Management Tools

Here are a few recommendations on how to use a reference management software efficiently:

- Use reference management software to store citations,
- Create different collections (libraries) for different tasks and topics,
- Use consistent keywords to describe the content of documents,
- Add your notes and comments to citations,
- Centralize your citations in a single location,
- When working on different workstations find a way to have identical copies of your data on each computer,
- Delete citations you don't need any more,
- Indicate the location of document.

Paper Based Management Tools

- Store citations in a single place,
- Have a consistent approach in grouping citations,
- Write one citation per page. The space left on the page may be used for notes and comments,
- Tag citation with keywords,
- Use different colors for different information when annotating and commenting on documents.

Management of Bookmarks

Traditionally a bookmark is a piece of paper, textile, wood or some other material readers insert in a book to indicate pages they want to read or refer to again. In the context of the Internet a bookmark is a reminder of location of a web resource. Bookmarks are stored locally on a user's desktop. Nowadays bookmarks can also be stored online.

Bookmark Management Tools

Bookmarks can be managed within the browser or using an external tool. Most browsers have bookmarking feature: in Mozilla Firefox, that feature is called bookmarks (3) while Internet Explorer calls it “Favorites”.

In addition to the browsers bookmarking feature, there are online tools offering bookmarking functionalities. Most of these online tools allow users to create an account login, add web address, organize and retrieve them.

Bookmark Management Techniques

Managing bookmarks consists of the following activities: creating, organizing and using them. The following are the techniques used in bookmarking:

With a Web Browser

While you are browsing the Internet, when you come across a resource you desire to revisit later on,
add it to t your bookmarks. In Firefox you do this by clicking the Bookmarks/Bookmark this page.
Give a name to the page. This is usually automatically created by the browser, but users can change the name to something more meaningful to them and easier to remember.

Select the folder in which you want to store the new URL. If it does not exist, you can create it.
Organize your bookmarks into folders: Even though browsers allow users to have their bookmarks in a flat list, it is better to group them into folders. You may create folders by topic, type of resources or intended use etc. Bookmarks are organized using a bookmark manager which is available under bookmarks/Manage Menu.
Add description: Description is a small portion of text describing what the resource is about. It's a kind of a short abstract. Description can be added at the moment of creation or later on.
Bookmark manager allows the user to reorganize the bookmarks by:

- Moving them across folders,
- Editing , deleting and sorting them,
- Tagging with keywords,

Firefox bookmarking capabilities can be extended with the help of many extensions and add-ons.

Illustration 4: Firefox bookmark management function

Firefox bookmark management feature allows users to group bookmarks in folders (circle 1) , copy, move or delete bookmarks (circle 2), edit bookmarks (circles 3 & 4).

Online Bookmarking

Online bookmark management tools are websites that allow users to store URLs. They act like the bookmark functionality of your browser. These are also called social bookmarking. Online bookmarking is popular for mobility reasons and the ease of sharing and collaboration. There are many online tools such as Delicious, Digg, Yahoo and Google in addition to free email accounts offered by online bookmarking tools.

Online bookmark management systems have the following advantages:

- They are available from almost any computer with internet access. Therefore users are not tied to one workstation*
- They make sharing and collaboration easier,

- They allow accessing bookmarks created by other users and may be used as discovery tools.

However online bookmarking requires internet access for both storing and retrieving bookmarks. One can argue that it is a waste of bandwidth, a precious and scarce resource in Africa. Online bookmarking tools are run by companies that can change owners or usage policy frequently, therefore reducing the stability of the tool.
Almost all of them work the same way. They require the user to have an account to be able to log in and add new bookmarks. To use delicious for instance, a user needs to create an account (register). After registration he/she will receive a username and password. To store bookmarks users have to:
- Login into an existing account,
- hit “save a new link”,
- describe the web page by giving its url, title, description, tags.

In “delicious” bookmarks are organized using tags, one word keywords are used to describe the content of bookmarked resources.

*Most online bookmarking sites are categorized as “social websites” and are sometimes blocked by firewalls.
“Delicious” buttons are available for different browsers. These buttons integrate the browser toolbar and allow users to store and manage bookmarks into “delicious”.

Box 4 : Online bookmarking toolsHere is short list of online / social bookmarking websites
- Delicious http://delicious.com/
- Digg http://digg.com/
- Yahoo! Bookmarks http://bookmarks.yahoo.com/
- Google Bookmarks : http://bookmarks.google.com/

In “Delicious” a visitor can access their own and other people's bookmarks. There is no need to login to access public bookmarks created by other users. Bookmarks can be retrieved either by browsing or by searching. They are usually browsed by username, tag and can be searched using keywords.

Note: Users with Yahoo and Gmail email address can use their account for bookmarking. Yahoo! Bookmarks and Google Bookmarks have few advantages: the reduction of usernames and passwords the user will have to manage, the possibility to login once for the email and bookmarking service and the centralization of user's data under one username.

- **Xmarks, a Mixed Solution**

Formally called Foxmarks, Xmarks (4) is an online bookmarking solution that relies on browsers bookmarking feature. It is acts like a remote backup of locally created bookmarks. Xmarks has the following advantages:
Users can access bookmarks when away from their usual workstation,

- Bookmarks created on different computers can be centralized and replicated. People working and accessing Internet on different computers (the office desktop, the desktop at home, laptop) usually have their bookmarks fragmented and dispersed. At the end of the day they become difficult to retrieve. Using Xmarks to synchronize contributes to building one collection of bookmarks.
- Duplication reduces the chances of losing one's bookmarks in case of a computer crash or other problems. Using Xmarks to synchronize bookmarks created on different computers or browsers will create a copy of a person's bookmarks on each workstation and online,
- Coherence: Xmarks help maintain the same organizational structure of bookmarks irrespective
  of the user's location.

To use Xmarks one need to create an account, download an extension to his browser, and synchronize his bookmarks on a regular basis. Xmarks extensions are available for different browsers: Firefox, Internet Explorer, Google Chrome and others.

Illustration 5: Bookmarks saved online using Xmarks
On this illustration the username (circle 1) is provided, the bookmarks are group in folders (circle 2), bookmarks can be move across folders (circle 3)

Definition of Terms

Abstract	is a brief summary or description of the content of a document.
Bibliographic record	is information elements that given together describe a document in such a way that it can be identified. Examples of such elements are author name, title, date of publication, etc.
Bookmark	is used to designate a record of the information indicating where a document is available online
Bookmark Management System	is web browser feature, desktop application or a website that allows users to keep track of the web pages interesting to them. Citation: is reference to a document used as source of information. Sometimes a citation is used as the synonym of bibliographic record.
Citation Management Software	see reference management software
Keyword	is a term consisting of one or more words used to name a subject or topic discussed in a document.
PubMed	is an online database of bibliographic records describing journal articles published in the biomedical field. PubMed is produced and updated by the US National Library of Medicine
Reference Management Software	allows a user to collect, organize, retrieve information describing documents as books, articles, and Web sites, etc. Some Reference management softwares can work with word-processing software to cite documents while authoring a paper and generate a list of references as footnotes or at the end of the paper.
Tag	see Keyword
URL (Uniform Resource Locator)	is a set of elements that indicates where an identified resource is located. The term URL is widely used to indicate the address of a document on the internet.

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Uniform requirements for manuscripts submitted to biomedical journals. International Committee of Medical Journal Editors. CMAJ [Internet]. 1994 Jan 15 [cité 2010 Mai 15]; 150(2):147-154, 159-167. Available from: http://www.ncbi.nlm.nih.gov/pubmed/8287338
Xmarks | Bookmark Sync and Search [Internet]. [cité 2010 Mai 19];Available from: http://www.xmarks.com/

Module Six - Evaluating Electronic Resources

Introduction

“Is this story true ?”, “I am skeptic about the information provided in that report”, “The results reported in that study are interesting but I need to cross check”. These are common attitudes people have about things they hear, read, see or learn. These attitudes are the results of the process of analyzing the information, evaluating its quality. Conscientiously or unconscientiously people judge what they learn from friends or colleagues, hear on the radio, see on TV, and read in books, newspapers or internet. Their judgment determines the degree of trust they give to that information and how they are going to behave with that information. Information is a crucial component of any decision making process. In the medical field decisions based on wrong information can lead to life threatening and fatal consequences. It is therefore important to evaluate the information needed for the purpose of decision making. The need to evaluate information becomes more important in the context of plethora of online resources. This need arises because the Internet does not have an editorial board that controls and validates its content. This module discusses the criteria and process of evaluation of online information.

Learning Objectives

In this module we’ll:

- discuss the importance of evaluating information,
- presentation criteria for evaluating information,
- describe how to evaluate different sources of information
- Evaluate sample web pages.

Learning Outcomes

At the end of the module, you should

- understand the importance of evaluating information sources,
- develop the habit of evaluating any information before using it,
- list some evaluation criteria,
- find in a document key elements useful for evaluation,
- Evaluate information resources found on the internet.

	Content	Methods	Mode of Assessment
5.2.1	Definition and importance of evaluating information sources	Brainstorming Discussion	Pre and post Question and Answer
5.2.2	Evaluation processes	AS Above	AS Above
5.2.3	Criteria for evaluating information sources	Brainstorming Discussion	Practical exercises
5.2.4	How to evaluate information on the Internet	Lecture Demonstration	Quizz Practical exercises

Pre-Evaluation: Assessing the Quality of Document

1) Look at the following three documents:

    1. Malaria. Available at http://www.who.int/mediacentre/factsheets/fs094/en/
    2. The economic burden of Malaria. http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=mal1&part=pg85
    3. Symptoms and Natural Remedy for Malaria. http://hubpages.com/hub/Symptoms-and-Natural-Remedy-for-Malaria

2) How would you rank the quality: poor, acceptable, good?
3) Justify your decision.

Definition and Importance of Evaluating Information Sources

For Merriam-Webster's Collegiate Dictionary (1) “evaluate” means “to determine the significance, worth, or condition of usually by careful appraisal and study”. The evaluation of information is the process of critically analyzing a document, or information in order to establish its quality or value and decide the credit to give to it. The analysis is done by applying judgment criteria to establish its reliability, authenticity, credibility of the source, the reliability, the validity of the information. Be it in daily life, in a professional context; in scientific literature, most people are cautious about any new information. In everyday life, we know that not everything being said is true. We were taught that media are not neutral and information being

reported by media might be distorted or biased for different reasons. There are many reasons why we should be cautious about new information and the need for evaluation:

1. The amount of Available documents is huge; it is impossible to read all published Documents. Thus it is important to select the ones that give the most comprehensive understanding about a subject or topic.
2. Researchers and Scientists are Under Pressure: They need to publish scientific documents (journal Articles, book chapters, communication at conferences) in order to be promoted in their career. Thus, not all published documents bring something new or are relevant to information needs in a given situation.
3. Some information is false, erroneous, incomplete or misleading: Scientific literature is usually peer reviewed in order to reduce errors. However, there many cases of erroneous documents being published in top level journals. MEDLINE, the premier bibliographic database in the biomedical field, contains many retractions, errata or corrections to articles published in scientific peer reviewed journals. The likelihood of falsehoods becomes greater in documents that are not peer reviewed such as web sites.
4. Information affects our decisions. We base our decisions on information that is gathered from different sources. It is more important in the health and medical fields because wrong information can lead to decision that will result in dramatic consequences; which may sometimes lead to perpetual disabilities or death). Evaluating information therefore becomes more important and crucial in the context of the Internet for many reasons. For the authors of the “An Educators' Guide to Credibility and Web Evaluation”(2) the lack of guidelines, the lack of monitoring, the mobility of information, the lack of representation and potential bias are some of the justifications of the need to evaluate information found on the web. In addition, the Internet does not have an editorial board which controls and validates its content. It is an uncontrolled landscape that can be looked at like a jungle where anyone can create, edit and delete content about any topic and publish that content easily.

Evaluation Criteria

There are many guidelines and tools dealing with the evaluation of the information found on the Internet. Some of them are general while others focus on health information. The guidelines and tools provided try to define criteria of quality and raise the questions the reader should try to answer while dealing with any source of information.

HonCode, published by The Health on the Net Foundation (3), is a code of conduct for website producers. It consists of 8 principles which are: authoritative, complementarity, privacy, attribution, justifiability, transparency, financial disclosure and advertising policy. A Website that complies with these guidelines is accredited by HON. Even though the target audience of the HonCode are content producers, it can be used by an Internet user to assess the information he's consuming.
The NetScoring (4) lists the following criteria: credibility, content, links, design, interactivity, quantitative aspects, deontology and accessibility.

The desire handbook (5) lists the following groups of criteria:

- Content criteria which are validity, authority and reputation of the source, accuracy, comprehensiveness, uniqueness, composition and organization, currency and adequacy of maintenance,
- Form criteria which refer to ease of navigation, provision of user support, use of recognized standards, aesthetics,
- Process criteria is related to information integrity, site integrity, system integrity.

Some documents use acronyms to make it easier to remember evaluation related concepts. Karen M. Christensson(6) uses RADCAB acronym for relevancy, appropriateness, detail, currency, authority, bias. Dr Mohamed Taher talks about The "Six A's"(7) : authority, accuracy, approach, age, audience, accessibility.
Even though different tools and guidelines sometimes use different terminology, their content is almost the same. They point out the questions a reader or Internet user should find answer to in order to evaluate the information. These questions may be:

- about the relevance of the information to the reader and his needs,
- about the provenance of the information, for instance who is the author ?, where was the information published ?
- about the information production process : is there any conflict of interest? what's the author's motivation ? Was the document checked and corrected by another person or a third party body?
- about the content : what is the degree of reliability, accuracy, truth, completeness ? What is the age of the document?
- about the form :its layout, organization, presentation, language.

Relevance to User's Needs

Information needs is defined by several factors: who the user is, what he intends to use the information for, what the topic he is interest in, in which settings, etc. The relevance of information to the users is contextual. The same information does not have the same value for different people or for the same person in different settings. Thus the same person won't use the same information for writing articles and for treating a patient. Likewise the same documents may not be suitable for a doctor and a patient.

In the first place, the reader (Internet user) should appreciate how relevant the information is for him. In other words, is the document about the topic one is looking for, is he a member of the target audience? To define the relevance, users need to answer the following questions "Is the information about topic he is interested in? Is this document suitable for him?
Answering these questions helps the readers select documents and information he will be doing further work on.

Authority
The authority is referred to designate on one hand people responsible for the content, and on the

other hand the sources of information used to produce the current content. The authority helps establish the credibility and, validity of information.
Guidelines state that a credible document gives enough information about the authors to help the reader know his identity, qualifications, credentials and his degree of knowledge of the topic one is writing about. The same recommendations apply to organizations the authors are affiliated with or organization that took part in production process. The purpose of requiring such information is to relate the author/producer to the topic and determine if he has sufficient qualifications and expertise to write in this topic. Is he a specialist, amateur or professional on the topic? The second aspect of authority refers to sources of information used to produce the document being read. Source of information should be clearly cited, identifiable and dated. Any fact being reported or any statement should be supported by a reference to qualified sources of information and evidence.

The Document Production Environment and Process
The context of production can influence the quality of the information. Hence HonCode recommends that content producer should provide information about sponsorship and advertising. Scientific journals ask authors to state any possible conflict of interest. The purpose and the target audience of the document should be also indicated. Scientific literature (journals, books) are generally peer reviewed, but not all websites undergo such a process. While evaluating information source, readers are invited to seek information on how the information was created, corrected and validated. Website producers are also encouraged to inform visitors about the information production and validation procedures. When evaluating an information source it is good to establish the evidence of quality control during the production process.

Content Related Criteria Quality
When it comes to content itself, its quality depends on several factors such as the nature of the document, the intended audience and the purpose as well as the topic. An editorial, a clinical trial and patient education pamphlet won't have the same content even if they deal with the same topic. No matter what the differences are, they should provide information that helps the objectives of the work.
It is admitted that good quality information sources are accurate, factual, comprehensive and objective.
Accurate documents and reports carry objective, correct, factual and comprehensive information. Being objective means that the author does his best to avoid bias or informs the reader about possible biases when he cannot avoid them. Correct information gives the whole truth and avoids hiding known facts about the topic. Comprehensiveness ensures different points of views are taken into account and important facts are not ignored.
Good quality documents should be written in such a way that the reader can differentiate between facts and the author’s point of view. It should be presented in a consistent and logical way that makes it easy to read and understand.

Presentation Related Criteria
Presentation related criteria deals with both the physical and intellectual presentation of the information. The physical presentation refers to the quality of the design, the choice of colors, the graphics and pictures and the layout. Intellectual presentation refers to content organization and the language used. From the physical presentation point of view, it is expected that quality

documents use recognized standards, make an appropriate use of technology , are easy to navigate, and pleasant to view or read. The content should be well structured and organized and written in a language that is appropriate for the audience and the topic.

Evaluation Process

Evaluation is not an independent process. It occurs at the same time with other activities. Evaluation is done while searching, reading and after reading. Evaluating information means:

- asking questions, looking for answers,
- using criteria while giving answers,
- rating the information,
- deciding about the information.

Before Reading
Use selective sources of information and search tools to retrieve information that was evaluated and selected by third party bodies. Libraries, web portals, web directories, information gateways, accredited web sites are good places to start searching for information. Libraries have a long tradition of evaluating, rating and selecting documents for the development of their collection. Web portals, information gateways, web directories also adopt almost the same principles of selection as libraries. Use Meta information, e.g. information that describes, condenses or discusses other documents. Meta information can be divided into three categories: descriptive, summary and evaluative information.

The descriptive information, usually in the form of bibliographic record (citation), contains key elements that help identify the document. It provides the reader with such information as: the author, the type of document, the title of the document, and the age of the information. The summary information is usually in forms of abstracts and table of contents. It allows the user to quickly learn what the document is about without reading the entire content. Evaluative information is in forms of reviews, ratings, recommendations and gives judgment, critical points of view and ratings of the information. Records in library catalogs, bibliographic databases, information gateways are good places where to find that information about documents. These records usually provide: the authors, title, publication date, publishing organization. Library records can list the topics of the document, bibliographic databases sometimes include abstracts. Search engines provide portions of text extracted from the document.

While Reading
When working with a document, try to identify the Meta information. For a book, look at the cover page, back of the book, the table of contents, and the introductory materials. For a journal article look at the first page, identify section titles, look at the last page. For a web page look at the URL, the top and bottom for the page follow links “about us”, “contact”. These parts usually give information about the author, the organization responsible for the document production or publication, the dates of publication or revision and an overview of the content. Sometimes the information about the target audience, the purpose and sponsorship are provided in the above mentioned sections of documents.

While reading the documents, pay attention to the facts and data and how they are being reported, analyzed and interpreted. Identify authors' statements, judgments, position, points of view and determine how objective and balanced they are. It is also useful to pay attention to the language being used: clarity, simplicity, correctness and balanced tone as these are signs of a good quality document. Look for mistakes, errors and misspellings. Good quality documents tend to have less of them.

After Reading

Try to do a summary about the document. In your summary, point out the strength and weakness of the document; raise questions that require further investigation. Rate the document by giving it an overall appreciation.

Do further investigations by comparing the document to other documents on the same topic, comparing your opinion about the document with other people's opinion, finding answers to questions generated by reading the document

Demonstration of the Web Content Evaluation Techniques

For the purpose of illustrating how to evaluate web resources, information about “cholesterol” was searched using a search engine. The following web pages were picked from results and rated by looking at different parts of the documents and using different evaluation criteria.

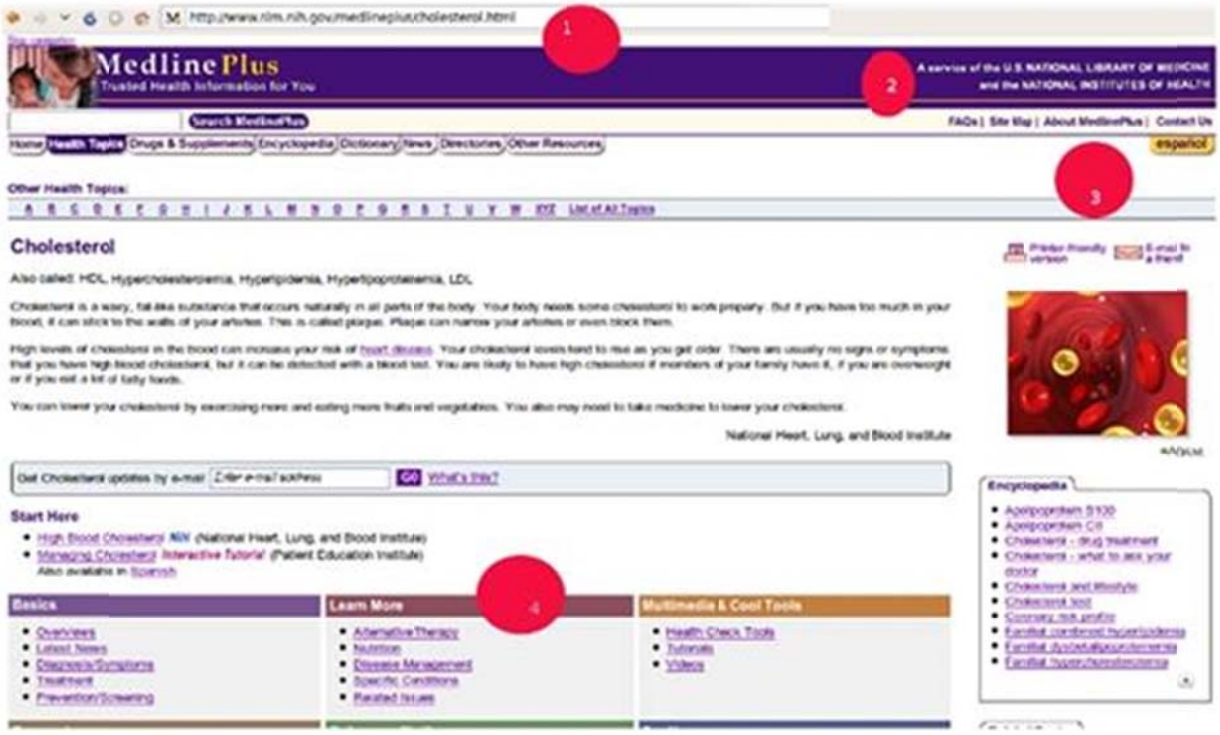


Illustration 6: Cholesterol. Available from http://www.nlm.nih.gov/medlineplus/cholesterol.html. Last visited : june 25, 2010

To quickly evaluate this resource the following elements will be taken into account : 1)the URL, 2) the banner at the top of the page, 3) the “about ...” link, 4) the table of content, our own previous experience with the website.

1. The URL “.gov” extension indicates that the web site belongs to a US governmental organization.

Indeed URL might provide information about the type of organization operating the web site: “.gov” is used by US administrations, “.edu” is used by academic institutions, “.ac.uk” is characteristic of UK based academic institutions, “.org” is often used by professional organizations, associations and non for profit organizations, “.com” generally denotes commercial orientation of the site or its owner. Content from web sites operated by governmental organizations, academic institutions and professional organizations is usually curated and trustworthy. In addition the domain name can help identify the owner. In this

example the domain name nlm.nih.gov is probably owned by the National Library of Medicine (NLM) which is part of the National Institutes of Health (NIH).

1. The banner on the the top of the page gives a brief descriptive of the content and indicates the organization responsible for it. It states that Medline Plus is a service run by the "US National Library of Medicine" and provides “trusted health information”.
2. “About Medline Plus” is a link to a another page that provides detailed information about Medline Plus website: what it is, who are the contributors, how the content is selected for inclusion, etc.
3. The list of sections on this page shows how well content is structured.

In addition by noting the authority, content production procedures, intellectual presentation, one may also pay attention to the simplicity and clarity of the language used to deliver the content, the professional and pleasant design of the web site. From our previous experience with Medline Plus we learned that it is directory of good quality carefully selected web resources providing consumer health information. In conclusion, this web page about “cholesterol” web page provides content that is very likely to be of good quality.

Illustration 7: Lowering your cholesterol. Available from http://www.medicinenet.com/cholesterol/article.htm. Last visited: June 21, 2010

To rate this page, attention will be paid to the following elements: 1) the URL, 2) the advertisement, 3) the design, 4) the authors, 5) the content structuration.

1. The URL ".com" indicates commercial orientation: the content is either commercialized or the website is operated by a commercial company.
2. At the top of the page is advertisement. However, the advertisement is clearly labeled as such. The presence of advertisement confirms the commercial orientation of the site. The commercial connotation and the presence of advertising may create conflicts of interest when advertising is a source of revenue. One should check the advertising policy for this website and the existence of conflict of interest that may influence the quality of the content.
3. The site is well-designed, colors are carefully chosen, blank spaces around blocks and content make the page easy to read. The facility to increase the font size denotes that the site owners made an effort to make the site accessible to people with vision problems.
4. The authors and their qualifications are indicated. Links are provided to pages that give more information about the authors. There is more than more than one person involved in the production of this document.
5. The content is web structured and references to additional sources of information about the topic are provided

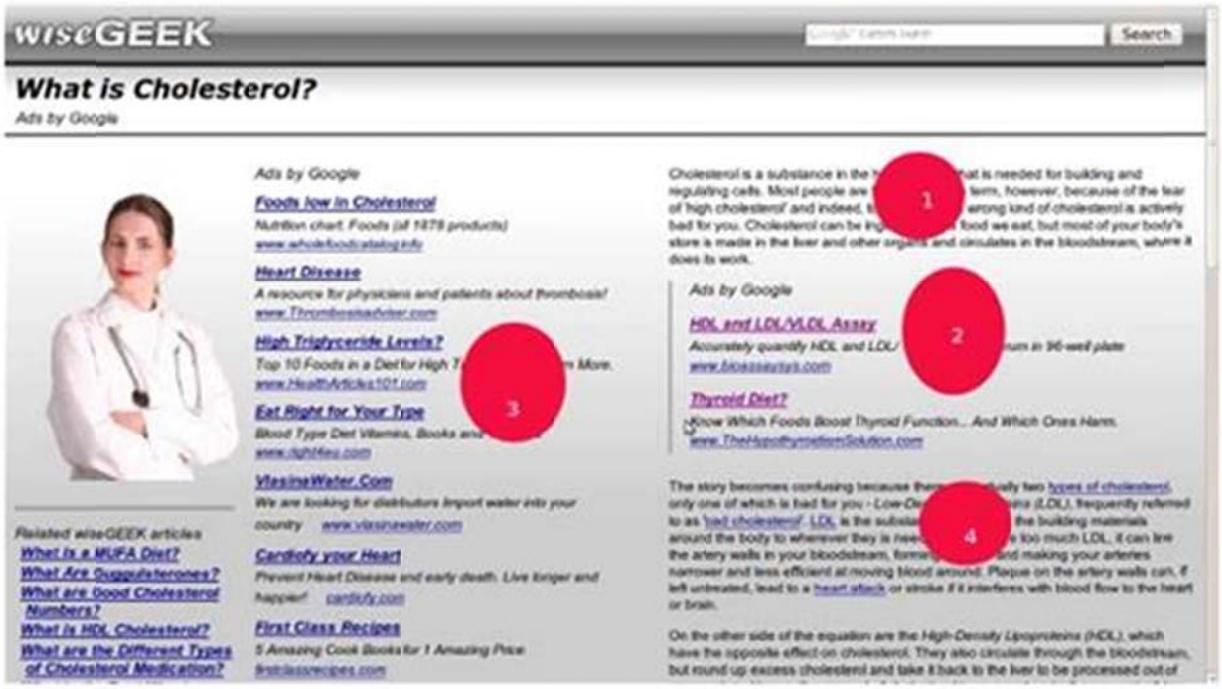
At the bottom of the page (not visible here) there are additional elements relevant to the purpose of evaluation : link to "about us" page, the HonCode logo. In the "About us", it is said that Medicinenet website is owned and operated by WebMD which is known for delivering respectable health information for the general public. The HonCode logo is evidence of the site compliance the Health on the Net Foundation code of conduct for medical and health web sites. Even though the site has a commercial connotation and displays advertising, authors' qualifications, the professional design, the good content structuration, the accreditation by a third body encourage users to consider the content provided on this page as being of good quality.

Illustration 8: Cholesterol myths. Available from http://www.ravnskov.nu/cholesterolhtm. Last visited: June 25, 2010

Cholesterol myths aims to provide an alternative point of view to the widespread idea about the negative effects of cholesterol on health. The author seems to be Dr. Ravnskov who has published several scientific articles and books about the topic. For evaluation purposes the following elements can be considered 1) the author, 2) the content plus the URL and the design.

1. Dr. Uffe Ravnskov, the author of the content, is a doctor who had clinical and research activities and has published number of books and journal articles.
2. The content of this page however seems to be a promotional material for Dr Ravnskov books and an invitation to buy them. It can be look at as disguised advertising.

The domain ravnskov.nu is derivated from the author's name. A fact that suggests that this site is the author's personal website or a website dedicated to him. The design is not very well-crafted; the color scheme is not uniform across pages. There are few indications that other people participated in the production of the content.



In conclusion, the web page is likely from a personal website whose purpose is to advertise a book written by site owner. A personal web page emphasizing on one point of view, presented in a poor design plus an unclear production process are not signs of content one should trust.

Illustration 9: What is cholesterol? Available at http://www.wisegeek.com/what-is-cholesterol.htm . Last visited: June 25, 2010.

“What is cholesterol” is a web page from WiseGeek, a general purpose website which focuses on giving answers to commonly asked questions. At the date of last visit, answers to thousands questions were available in form of articles.

Even though this particular page tries to provide different points of view about cholesterol, the highlighted content elements (circles 1 and 4) and advertising (circles 2 and 3) are mixed. An non experienced user may not be able to differentiate the actual content from advertisement.

The name of the author of the page is provided at the bottom of the page but there is no further information about him and his qualifications. The website provides information about its goal, staff and editorial procedures, but Wise Geek covers a wide range of topics and there is no clear indication that the author of this page has expertise in health or related fields of knowledge. In conclusion, this is a document written by an author with uncertain credentials about a health topic and published in a general purpose website. It is not trustworthy.

Conclusion

In conclusion “We must be careful and check our sources, and
compare them with other sources, before believing the data the author is presenting or selling.”(2).
The Internet has become a major source of information. However one needs to be cautious while searching and using online information sources, because:

- “Anyone can put something on the Internet - an amateur or an expert
- From anywhere in the World - be it the United Kingdom or Uruguay
- They can say anything they like - be it true or false
- And leave it there as long as they like - even if it goes out of date
- Or change it without warning - perhaps even remove it completely”(8).

Good quality information sources are accurate, updated, factual, comprehensive, cites good sources that are objective, balanced, correctly written, well-presented, are transparent about authorship, sponsorship and purpose. Poor quality information sources are unreliable, invalid, inaccurate, out-of-date, lacking in authority or credibility and usually don't cite references. . The presence of unfounded statements, unbalanced judgment, mistakes and misspellings, inappropriate presentation are also considered as signs of poor quality.

Post-Course Evaluation

Each learner will tell the group his opinion about the document he assessed and report his judgment criteria. While one participant is reporting aloud another learner will write key points into the following table

Why is it good? Why is it bad What characteristic did you	Why is it bad?	What characteristics did you consider?

List of references

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Dictionary and Thesaurus - Merriam-Webster Online [Internet]. [cité 2010 Mai 20];Available from: http://www.merriam-webster.com/dictionary.htm

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University of Illinois Urbana Champaign. An Educators' Guide to Credibility and Web Evaluation [Internet]. [cité 2010 Mai 20];Available from: http://www.ed.uiuc.edu/wp/credibility/index.html

Module Seven - Scholarly Communication

Introduction

Scholarly communication is the creation, transformation, dissemination and preservation of knowledge related to teaching and research (1). It is also the system scholars and researchers employ to create, distribute, use and preserve their work.

Academic writing fulfills one or more of the following conditions:
An objective reporting of controlled research, conducted voluntarily or at the request of an organization. A term paper meant for submission in partial fulfillment of an award; a thesis, dissertation or project meant for submission for an award; a research paper meant for scholarly conference or seminar; an article meant for publication in a professional and referred academic journal.

Learning Objectives

At the end of this module, one should be able to:

1. Construct an outline,
2. List the components of a research article,
3. Know the best practices for plagiarism and apply them to any written work
4. Publication
5. Define what an academic journal article is,
6. Identify the three parts of a presentation,
7. Apply the tips for an effective presentation and a PowerPoint presentation.

Learning Outcomes

At the end of the module, one should be able to:

1. Write a term paper,
2. Appreciate the consequences of plagiarism and how it can be avoided,
3. Write a journal article,
4. Learn how to communicate effectively.

Summary of Content

No.	Content	Methods	Mode of Assessment
1.	Writing of A)Term paper • Choosing a topic • Finding information • Gathering notes • Making a tentative outline • Organising notes • Writing a draft copy • Revising and editing draft • Typing the final paper	Lectures Discussions	Question and Answer
2.	B) Plagiarism • Definition • Consequences • How it can be avoided	Lectures Discussions	Question and Answer
3.	C) Journal article • Introduction • Prose • Style	Lectures Discussions	Question and Answer Practical exercises
4.	D) Communication skills a) Aspects of effective communication • Introduction • Body • Conclusion b) Tips to good oral communication c) Tips to power point presentation	Lectures Brainstorming	Practical exercises

Term Paper

A term paper is a research paper written by students over an academic term or semester which accounts for a large amount of a grade and makes up much of the course. It is generally intended to describe
events, concepts, or argue points. It is a written original work discussing a topic in detail, usually several typed pages in length and is often due at the end of a semester.

Process of Preparing a Term Paper

Step 1: Components of a research paper
Step 2: Choose a topic
Step 3: Find information
Step 4: Gather information
Step 5: Make a tentative outline
Step 6: Organize notes
Step 7: Write the first draft
Step 8: Revise and edit the draft
Step 9: Type final paper

Step 1: Components of a Research Article
Title: It should be concise, informative and clearly indicate the research approach used. It should attract readers interested in this field of study.
Author(s): The purpose is to specify the individuals responsible for the research presented in the paper.
Abstract: Provides a brief summary of the paper. It contains the following information:

- Introduction: a few sentences to provide background information on the **problem investigated.**
- Methods: techniques used
- Results: the major results presented in the paper; provide quantitative information when possible.
- Discussion: the authors' interpretation of the results presented.
- Final summary: - the major conclusions and "big picture" implications.

Introduction: Provides the reader with background on the research described in the paper. The problem should be clearly identified, significance/justification for the study must be stated and the limitations.
Literature Review: must be up-to-date and clearly identify the gaps in previous studies to justify the need for the proposed research. The review must present a balanced evaluation of literature both supporting and challenging the position being proposed. The important concepts should be identified, stated and references should be included.
Methodology/Methods: This sections serves two functions: (1) to enable readers to evaluate the work performed (e.g., did the authors use the most appropriate and accurate techniques for the work?), and (2) to permit readers to replicate the study if they desire to do so.
Discussion: The purpose is to provide the reader with a plausible interpretation of the date

reported and to relate these findings to what other investigators have found.
Conclusion: It should be supported by the results obtained and the implications of the study must be identified.
References: To provide the full citation for article referenced in the text. A complete reference includes all of the authors' names, the title of the article, the journal name, the volume number, page numbers, and the year of publication (2).

Step 2: Choose a Topic
Most good papers are built around questions. Topics can be found in any textbook. Simply take some part of the text that is of interest and examine it carefully. Ask yourself the following things about it to see if you can locate a question to answer in the paper. Does it tell you all you might wish to learn about the subject? Are you sure it is accurate? Does the author make any assumptions that need examining? Can two of the more interesting sections in the text be shown to be interrelated in some useful way? The paper is an attempt to write a well-organized answer to whatever question decided upon.
The most common error made by students in deciding a subject for a term paper is to choose one that is too general. Focus on a limited aspect, e.g. narrow it down from "Neoplasms" to "Spinal Cord Neoplasms". Obtain teacher approval for your topic before embarking on a full-scale research. If you are uncertain as to what is expected of you in completing the assignment or project, re-read your assignment sheet carefully or ASK your teacher.
Select a subject you can manage. Avoid subjects that are too technical, learned or specialized. Avoid topics that have only a very narrow range of source materials. The most specific subject will always have enough aspects to furnish a long paper, if you think about it for a while.

Step 3: Find Information

- Begin by making a list of subject-headings under which you might expect the subject to be listed.
- Start a card file using the following forms

a) Book and magazine article

- Subject
- Author
- Title
- Facts of publication
- Library call number

b) Periodicals

- Author
- Title
- Name of periodical
- Volume and page number
- Month and year

Sort these cards into (a) books and (b) each volume of periodicals.
c) Consult the card catalog or one can use Online Public Access Catalog (OPAC) in the library to locate books - record author, title, publisher, date of publication and call number.

Surf the Net

For general or background information, check out web based information services, special resource materials on CDs and online resources e.g. National Library of Medicine (NLM) Resources [www.nlm.nih.gov], Health Internetwork Access to Research Initiative (HINARI) [www.who.int/hinari] and other search tools as a starting point.
Pay attention to domain extensions, e.g. edu (educational institution), gov (government), or .org (nonprofit organization). These sites represent institutions and tend to be more reliable, but be watchful of possible political bias in some government sites. Read and evaluate. Bookmark the favorite Internet sites, printout, photocopy, and make note of relevant information.

Step 4: Gathering Notes
Skim through the sources, locating the useful material, then make good notes of it, including quotes of information for footnotes. Make these notes on separate cards for each author - identifying them by author.

Take care in note-taking; be accurate and honest. Do not distort the author's meaning. Remember that you do not want to collect only those things that will support the thesis, ignoring other facts or opinions. The reader wants to know other sides of the question.
Get the right kind of material; get facts, not just opinions. Compare the facts with author's conclusion. In research studies, notice the methods and procedures, and do not be afraid to criticise them. If the information is not quantitative, in a study, point out the need for objective, quantified, well-controlled research.

Step 5: Make a Tentative Outline
All points must relate to the same major topic that was first mentioned in choosing the subject. The purpose of an outline is to help one think through the topic carefully and organize it logically before writing starts. A good outline is the most important step in writing a good paper. Check the outline to make sure that the points covered flow logically from one to the other. Include in the outline an INTRODUCTION, a BODY, and a CONCLUSON. Make the first outline tentative.

Example of an outline:

Introduction - (Brief comment leading into the subject matter)
If it is a thesis, state clearly the purpose of the research.. What is the main reason for writing the paper?
State also how you plan to approach the topic. Is this a factual report, a book review, a comparison, or an analysis of a problem? Explain briefly the major points to cover in the paper and why readers should be interested in the topic.
Example: Thesis statement on "Health maintenance and promotion".
Body - This is where one presents the arguments to support the thesis statement. Begin with a

strong argument, then use a stronger one, and end with the strongest argument for the final point. Conclusion - Restate or reword the thesis. Summarise the arguments. Explain why you have come to this particular conclusion.

Step 6: Organize Notes

Organize all the information gathered according to the outline. Critically analyze the research data. Using the best available sources, check for accuracy and verify that the information is factual, up-to- date, and correct. Opposing views should also be noted if they help to support the thesis. This is the most important stage in writing a research paper. Analyze, synthesize, sort, and digest the information gathered and hopefully learn something about the topic which is the real purpose of doing a research paper in the first place. Communicate the thoughts, ideas, insights, and research findings to others through written words as in a report, an essay, a research or term paper, or through spoken words as in an oral or multimedia presentation with audio-visual aids. Do not include any information that is not relevant to the topic. Make sure the information that is noted is carefully recorded and in your own words if possible.
NOTE: Plagiarism is definitely out of the question. Document all ideas borrowed or quotes used very accurately.

Step 7: Write First Draft
Start with the first topic in the outline. Read all the relevant notes gathered and those that have been
marked. Write the paper around the outline, being sure that in the first part of the paper the purpose is indicated.

- Statement of purpose
- Main body of the paper
- Statement of summary and conclusion

About composition, traditionally, any headings or sub-headings included are nouns, not verbs or phrases. Keep things together that belong together. Do not change the subject in the middle of a paragraph, and make sure that everything under one heading in the outline is about the same general topic. Avoid short, bumpy sentences and long struggling sentences with more than one main idea.

Step 8: Revise outline and draft

- Read the paper for any content errors.
- Double-check the facts and figures.
- Arrange and rearrange ideas to follow the outline.
- Re-organize the outline if necessary, but always keep the purpose of the paper and the readers in mind. It is a good idea to do this a day or two after having written the first draft.
- Reading the paper aloud is a good way to be sure that the language is not awkward, and that it flows properly.

- Check for proper spelling, phrasing and sentence construction. Be sure that pronouns clearly refer to nouns.
- Check for proper form on footnotes, quotes, and punctuation.
  Check to see that quotations serve one of the following purposes:
  - Show evidence of what an author has said,
  - Avoid misrepresentation through restatement,
  - Save unnecessary writing when ideas have been well expressed by the original author.

Step 9: Type Final Paper
Read the assignment sheet again to be sure that everything that is expected is understood fully and that the paper meets the requirements as specified by the teacher. Know how the paper will be evaluated. Proofread final paper carefully for spelling, punctuation, missing or duplicated words. Make the effort to ensure that the final paper is clean, tidy, neat and attractive. Aim to have the final paper ready a day or two before the deadline. This gives one a peace of mind and a chance to double-check. Before handing in the assignment for marking ask yourself: "Is this the VERY BEST that I can do?"

Plagiarism

Plagiarism is the use or close imitation of the language and thoughts of another author a nd the presentation of them as one's own original work (3). Within academia, plagiarism by students, professors, or researchers is considered academic dishonesty or academic fraud and offenders are subject to academic censure, up to and including expulsion.
It may refer to the use of another's information, language or writing, when done without proper acknowledgement of the original source. Essential to an act of plagiarism is an element of dishonesty in attempting to pass off the plagiarised work as original. Plagiarism is not necessarily the same as copyright infringement, which occurs when one violates copyright law. Copyright infringement is a violation of the rights of a copyright holder, when material protected by copyright is used without consent. On the other hand, plagiarism is concerned with the unearned increment to the plagiarising author's reputation that is achieved through false claims of authorship. Like most terms from the area of intellectual property, plagiarism is a concept of modern age and not really applicable to medieval or ancient works.

Consequences of Plagiarism

Academia

In the academic world, plagiarism by students is a very serious offence that can result in punishment such as a failing grade on a particular assignment or for the course (typically at the college or university level). For cases of repeated plagiarism or for cases in which a student commits severe plagiarism such as submitting a copied piece of writing as his or her own work, a student may be suspended or expelled.
Many students feel pressured to complete papers well and quickly, and with the accessibility of

new technology (Internet) students can plagiarize by copying and pasting information from other sources.
This is often easily detected by teachers for several reasons. Students' choice of sources is frequently unoriginal; instructors may receive the same passage copied from a popular source by students, lectures may insist that submitted work is first submitted to an online plagiarism detector (4).
Charges of plagiarism against students and professors are typically heard by internal disci plinary committees, by which students and professors have agreed to be bound (5).

Online Plagiarism

Content scraping is a phenomenon of copying and pasting material from internet websites, affecting both established sites and blogs. Free online tools are becoming available to help identify plagiarism and there is a range of approaches that attempt to limit online copying, such as disabling right clicking and placing warning banners regarding copyrights on web pages.

Self-plagiarism

In academic field, self-plagiarism occurs when an author reuses portions of his or her own published and
copyrighted work in subsequent publications, but without attributing the previous publicati ons. Identifying self-plagiarism is often difficult because limited reuse of material is both legally accepted (as fair use) and ethically accepted (6).

Some recommended best practices for avoiding issues of self-plagiarism include;

- Provide full disclosure - mention in the introduction that the new or derivative work incorporates texts previously published.
- Ensure there is no violation of copyright; this may require licensing the previous materials from its copyright holder.
- Cite the old works in the references section of the new work. Give factors that justify reuse.

Famous Examples of Plagiarism

According to a Boston University investigation into academic misconduct, Martin Luther King plagiarized approximately one third of his doctoral thesis. He also appropriated others' text, without credit, for his famous speeches, including "I Have a Dream (7)".
Alex Haley was permitted to settle out-of-court for $650,000, having admitted that he copied large passages of his novel from The African by Harold Courlander (8).

Is this Paraphrase Acceptable?

Original:
It is imperative that the rehabilitation practitioner have a basic understanding of self-employment and the wide range of possibilities it offers, as well as the knowledge to assist

individuals in identifying the reasons they wish to be self-employed, how self employment would benefit them, and what kinds of support are necessary to be successful.

Paraphrase:
Rehabilitation practitioners must have a basic understanding of self-employment possibilities to assist clients in considering why they wish to be self-employed, how self-employment would benefit them, and what supports they need to be successful (9).

How to Avoid Accidental Plagiarism

- When taking notes, note the source and page number, and put quotation marks around wording from the source. Without quotation marks, you will forget which words were yours and which were not.
- Try paraphrasing as you take notes or use simple key word notes, rather than writing down wording from the original.
- Check all paraphrases against the original. Following the original sentence structure and substituting words here and there is unacceptable (10).

Journal Article

An academic journal is a peer-reviewed periodical in which scholarship relating to a particular academic discipline is published (11). Academic journals serve as forums for the introduction and presentation for scrutiny of new research, and the critique of existing research e.g. East African Medical Journal.

Introduction

Establish the context of the work being reported. This is accomplished by discussing the relevant primary research literature (with citations) and summarizing the current understanding of the problem being investigated.
The first task to accomplish as one begins the process of writing is to order and organise information to be presented. Some people work well from an outline, others do not. Some people write first to discover the points, and rearrange them using an after-the-fact-outline. Whatever process one uses, be aware that scientific writing requires special attention to order and organisation. The formats of journal articles vary, but many follow the general IMRAD scheme recommended by the International Committee of Medical Journal Editors (ICMJE). Such articles begin with an abstract, which is one-to-four paragraph summary of the paper. The introduction describes the background for the research including a discussion of similar research. The materials and methods or experimental section provides specific details of how the research was conducted. The results and discussion section describes the outcome and implications of the research, and the conclusion section places the research in context and describes avenues for further exploration (12).

Audience: Who will be reading the paper? Usually one will be writing to fellow peers.
Simple advice: Address the paper to another interested biology student, or laboratory group, in this course, and assume that they have at least the same knowledge and experience that you have. Knowing the audience helps to decide what information to include. One would write a very different article for a narrow, highly technical, disciplinary journal versus one that deals with a broad range of disciplines.

Prose

The writing should be in complete sentences and easily understood. It should conform to the conventions of standard written English (sentence form, grammar, spelling, etc.) The ideas will have little impact, no matter how well the research, if they are not communicated well. Choose words correctly and wisely.
It is important to write clearly and concisely. Make sure that every paragraph has a clear topic sentence and that the paragraph content supports the topic. The goal is to report the findings and conclusions clearly, and with as few words as necessary. The audience (other scientists usually) are not interested in flowery prose, they want to know the findings. The standards that a journal uses to determine the publication can vary widely. Some journals, such as Nature and Science have a reputation of publishing articles that mark a fundamental breakthrough in their respective fields.
Remember: Writing and thinking are closely linked enterprises - many people have noted that "fuzzy writing reflects fuzzy thinking". When people have difficulty translating their ideas into words, they generally do not know the material as much as they should.

Style Considerations

- Be clear and concise: Write briefly and to the point. Say what you mean clearly and avoid embellishment with unnecessary words or phrases. Brevity is very important. Use of the active voice shortens sentence length considerably. For example:

Active Voice: Health workers need to advise women in the antenatal period on diet especially on foods which are rich in vitamin C.
Passive Voice: There is need by the health workers to advise women in the antenatal period on diet especially on foods which are rich in vitamin C.

The former is simple and straightforward; the latter is wordy and clumsy. Occasionally you will have no choice but to use passive—for instance, when the subject of the sentence is unknown—but in most cases you should use the active voice.
Precise word use is critical. Scientific terminologies carry specific meanings; learn to use them appropriately and consistently. A critical function of technical terminology is to say a lot with a few words, i.e., economy. Direct the paper toward the average reader in the intended audience.

Things to Note
Abbreviations: Do not use abbreviations in the text except for units of measure. Always abbreviate these when using them with data (2mm; 10 min.).
Use Past Tense: Research papers reflect work that has been completed, therefore use the past

tense throughout the paper (including the introduction) when referring to the actual work done, including statements about the expectations or hypothesis. Use the past tense, as well, when referring to the work of others that may be cited.
First vs. Third Person: If there is only stylistic area where scientific disciplines and journals vary widely, it is the use of first vs. third person constructions. Some disciplines and their journals (e.g., organism biology and ecology) have moved away from a very strict adherence to the third person construction, and permit limited use of the first person in published papers. Limit use of first person construction (i.e., I or we) undertook this study…), usually it is most acceptable in the Introduction and Discussion sections, and then only to a limited extent. Use first person in the methods sparingly if at all, and avoid its use in the results
Use Active Verbs: Use active verbs whenever possible; writing that overly uses passive verbs (is, was, has, have) is not good to read and almost always results in more words than are necessary to say the same thing.

The clarity and effectiveness of writing will improve dramatically as one increase the use of active voice. For example:
Sample: According to the certification theory, there is no intrinsic relation between creativity and IQ. Revision: Certification theory posits no intrinsic relation between creativity and IQ.
References to the research findings of others are an integral component of any research paper. The usual practice is to summarise the findings or other information in one's own words and then cite the source. Any ideas or other information that are not one's own must be substantiated by a reference that is cited in the text. As a rule research papers, direct quotations and footnoting are not practiced - simply restate the author's ideas or findings in your own words and provide a citation.

Communication Skills

Communication is the ability to use language (receptive) and express (expressive) information or is a set of skills that enables a person to convey information so that it is received and understood. Effective presentation and public speaking skills are important in business, training, teaching, lecturing and generally entertaining an audience. Developing the confidence and capability to give presentations, and to stand up in front of an audience and speak well, are also extremely helpful competences for self-development. The presentation should have three parts; an introduction, body and conclusion.

Introduction
Introduce the topic, but also arouse interest of the audience in the topic. Get the attention of your audience by involving them in your topic. You can do this by asking a question, offering an interesting fact, using a quotation or telling a short story.

Preview the content of the presentation by offering a brief outline of what will be discussed. You may also want to include why you chose this topic.

The Body
The body of the presentation should support the introduction by offering facts, opinions, and

reasons to support the topic. It should contain at least three ideas with supporting details to illustrate the point.

The Conclusion
The conclusion should restate the main points without giving examples. Think of it as a brief summary which emphasizes what the audience should remember. Conclude with a recommendation, a personal thought, an observation, or a question. The closing statement (the last statement) should pull the presentation together.

Tips to Good Communication
Dos

- Try to create a positive impression right from the beginning - 'first impression, lasting impression'; first impression influences the audience's attitude to the presenter.
- Choose the right words and language - the American vs British spelling matter.
- Appearance - Dress appropriately for the occasion.
- Always introduce and conclude - put a head and tail on the body of your presentation.
- KISS (Keep it simple and short)
- Organise and clarify ideas in your mind before you attempt to communicate them. If you are feeling passionate about a topic, you may become garbled if you haven't already thought of some key points to stick to when communicating it.
- Think about setting the listener at ease before launching into the conversation or presentation. It can help sometimes to begin with an interesting anecdote. Not only does it help the listener identify you as someone like them, it can also help ease you into the conversation or presentation.
- Stay on topic. Once you start addressing your three main points, make sure all facts, stories, allusions, etc., add to the conversation.
- Look on the Internet for examples of great speakers in action. There are plenty of role models instantly accessible through videos online. Treat them as your "personal communication coaches".
- Use facial expressions consciously. Aim to reflect passion and generate empathy with the listener by using soft, gentle, and aware facial expressions. Avoid negative facial expressions such as frowns or raised eyebrows.
- Communicate eye to eye. Eye contact establishes rapport, helps to convince that you are trustworthy, and displays interest. During a presentation, it is important to look into the other person's eyes of possible and maintain contact for a reasonable amount of time (but don't overdo it; just as much as feels natural, about 2-4 seconds at a time).
- Use hand gestures carefully. Be conscious of what your hands are saying as you speak. Pay attention to the gestures as you make them; it also helps to watch other people's hand gestures to see how they come across to you.
- Remove distractions. Turn off the cell phone and put away the iPod. Do not allow external distractions to act as crutches that keep sidetracking your concentration.
- Thank the person or group for the time taken to listen and respond. No matter what the outcome of your communication, even if the response to your talk or discussion has been negative, it is good manners to end it politely and with respect for everyone's input and time.

Don’ts

- Avoid use of jargon and complex technical terms
- Avoid vague and general/sweeping statements
- Avoid mixing facts with opinions, views and perceptions
- Avoid offensive phrases such as; without wasting your time any further, I hope I am not boring you!

Introduction to Presentation Skills with a Focus on PPT
Research findings can be presented as power point (ppt) or as posters. Poor presentation negates the otherwise good research findings.
We all look forward to delivering a successful presentation.

Tips

- Use a template already provided in MS office.
- Avoid different styles, colours and slide designs in one presentation - you want the audience to focus on what you present, not the way you present it.
- Illustrations: - figures, tables, photos are good summary of research findings.
- Use proper animation.
- Use the slides only to convey the main points and in a summary form.
- Do not read the slides but present them; If all you are going to do is read from the slides or overheads, then just send the slides!
- Avoid reading full text as you present.
- Take some time to practice on memorizing what you want to say, and the examples to give, use the slides to keep yourself on track.
- Learn the simple key “enter” or clicking the mouse to avoid asking people to “enter” or “next” for you.
- Time is important so you must prepare well and time your presentation to avoid embarrassment.
- Avoid long sentences - remember it is “power point” not “power sentence”! Tips: Caps and Italics

Do not use all capital letters because they make text hard to read, conceal acronyms and deny their use for EMPHASIS.

Do not use italics except for “quotes”, highlighting thoughts or ideas, book, journal or magazine titles.

Tips: Colours
Colour can be a powerful tool for presenting information, but can also be distractive, reds and oranges are difficult to stay focused on; greens, blues and browns are better.
White on dark background should not be used if the audience is more than 20 feet away. It is harder to read the further away you get.
The recommended colour combination is a dark background with light colour text. The best option is to use the template.

Tips: Background vs. Templates

The easiest and best way is to use a template, which has ready-made colour combinations.
If you choose not to use a template, and prefer 'backgrounds' as a guideline, pick a background colour and use three additional colours of text for maximum impact.

Tips: Bullets

Keep each bullet to one line, two at the most (ideal!)
Limit number of bullets to six per screen, four if there is a large title, logo, etc. Crowded text looks busy and hard to read.

Tips: Font
Choose a font that is easy to read, e.g. Roman, Verdana, Tahoma. Stick to one or two types of font sizes.
Bulleted points should not be less than 28 points.
Titles/headings should not be less than 32 points.

Finally
Always have a back-up copy e.g. send it to your e-mail and carry at least two printed copies (note the difference in printing slides vs handouts, etc.).

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Definition of Terms

Scholarly communication - Standard ways of providing of information by authors for publications
Term paper - Students presentations of researched coursework or assignments at the end of a term
Plagiarism - Academic theft normally done by students who just copy and paste from Internet and copying without providing citations of print sources.
Journal - A publication which is periodically, if not regularly, issued and provides research reports by specialists in a particular field of knowledge.
Communication skills - Proper ways of talking to people in understandable manner especially in learning environment.