ICT for Library and Information Professionals:
A Training Package for Developing Countries

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McGill University, Canada

Module 3

Information Seeking in an Electronic Environment

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UNESCO Bangkok
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1. Information storage and retrieval. 2. Human-computer interaction. 3. World Wide Web (Information retrieval systems). I. Title.

Teacher's Guide

Module 3. Information Seeking in an Electronic Environment

Introductory note

This is Module 3 of the *ICT for Library and Information Professionals (ICTLIP) Training Package for Developing Countries*. This Package is intended to provide the knowledge and skills required to deal with the application of ICT to library and information services. It is meant for library and information personnel who may become trainers in the area. The Package has been developed by the UNESCO Asia & Pacific Regional Office with funding from the Japanese Fund in Trust for Communication and Information. It contains six modules:

Module 1 - Introduction to Information and Communication Technologies
Module 2 - Introduction to Integrated Library Systems
Module 3 - Information Seeking in an Electronic Environment
Module 4 - Database Design, and Information Storage and Retrieval
Module 5 - The Internet as an Information Resource
Module 6 - Web Page Concept and Design: Getting a Web Page Up and Running

All the modules have a Teacher's Guide and a Student's Guide. The Student's Guide may be copied by the students in electronic format. The Teacher's Guide should not be distributed to the students.

The Teacher's Guide includes the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - General guidelines for teachers
  - Course outline
  - Learning environment
  - Duration
  - Course content and schedule
  - Course evaluation
  - Selection criteria for participants
  - Typographical conventions
- Lessons
  - PowerPoint slides
  - Teaching tips
  - Activities
  - References and recommended further readings
- Glossary
- Evaluation forms

The Student's Guide contains the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - Course outline
  - Duration
  - Course content and schedule
  - Typographical conventions
- Handouts: Lessons 1-3
- Glossary
- Activities
- List of references

Learning outcomes

Module 3 is designed for participants to acquire knowledge and skills that will help them train other information professionals to look for information in an electronic environment.

By the end of the Module, students should be able to:

- Appreciate the impact of ICT on the information industry, services and professionals
- Understand the information- seeking behavior of users in an electronic environment
- Know how to search and browse using a range of information systems (OPACs, CD-ROMs, Web)
- Know how to apply a variety of search techniques
- Understand the importance of interface design
- Search using both controlled and natural languages (as appropriate)
- Know how to support users' information-seeking needs

Note: The content of Module 1 must be understood by all students (either by students first finishing Module 1, or as a result of prior knowledge of ICT) before they proceed with the remaining five modules in the *ICTLIP Training Package*.

General guidelines

1. Speak slowly and clearly to ensure that students can follow you – this is especially important if some or all the students do not have as their first language the language in which you are instructing.
2. Do not read your lecture noted verbatim – this is a sure way of losing your students' attention.
3. Always show an interest in what you are teaching – if you do not seem interested in the content, why should the students be interested.
4. The Modules have been carefully planned, with exercises and discussions as well as lectures. Try to follow the schedule as set out in the Module.

5. Try to use examples as often as possible to explain concepts. If the examples are taken from the students' own countries or regions, so much the better.
6. Try to keep within the daily timetable recommended for the Module – if you get behind in one lesson it may be difficult to make up time in a later lesson. Avoid extending the class beyond the time period allotted.
7. Be prepared to use back-up materials if for any reason the computer will not function during a lesson.
8. Try to answer all questions from students positively – never make students feel stupid for having asked a question, or they may never ask another question again. But if you do not know the answer to a question, it is better to admit it than to try and bluff.
9. Make sure that all equipment needed for a lesson is working properly before the lesson begins – things can often go wrong!
10. Be ready to stay behind for a few minutes after each lesson to answer questions that students may have but that they did not wish to ask in class.
11. The evaluation of the Module by the students is meant to help you improve your teaching and should be seen in this light rather than as a criticism of yourself. Make use of it to do an even better job next time.

Course Outline

Lesson 1. How has ICT Affected the Information-Seeking Behavior of Users?

Scope

- Impact of ICT on the information industry and services
  - Format of information resources
  - Information searching tools
- Impact of ICT on the user
  - Information needs
  - Information- seeking behavior
- Methods to support user's information seeking needs
- Impact of ICT on librarians and other information professionals
  - New Knowledge
  - New Skills

Learning outcomes

By the end of the lesson, students will be able to:

- Appreciate the impact of ICT on the information industry and services
- Know about the different formats of information resources
- Know new ways of representing information in an electronic environment
- Understand the information-seeking behavior of users in an electronic environment
- Appreciate the impact of ICT on the librarian and other information professionals

Lesson 2. What principles and skills are needed in searching information systems (OPACs, CD-ROMs, Web, etc.)?

Scope

- Principles of searching information systems
- Using a variety of search techniques
- Formulating search strategies/queries
- Using selected information systems (OPACs, CD-ROMs, Web, etc.)
- Impact of interface design

Learning outcomes

By the end of the lesson, students will be able to:

- Apply the principles of searching information systems
- Use a variety of search techniques
- Formulate search strategies/queries using both controlled and natural language as appropriate
- Use a range of information systems
  - OPACs
  - The Web: Cataloguing resources (Web OPACs), abstracts and indexes, full-text and multimedia documents and journals, dictionaries and encyclopedias
  - CD-ROMs: Cataloguing resources, abstracts and indexes, full-text and multimedia documents, dictionaries and encyclopedias
- Appreciate the importance of interface design

Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Scope

- Trends and issues in using both controlled and natural languages (as appropriate)
- Trends and issues in information systems
- Trends and issues in collection development and management
- Trends and issues in methods of supporting users' information- seeking needs

Learning outcomes

By the end of the lesson students will be familiar with the trends and issues in:

- Using both controlled and natural languages (as appropriate) for developing tools for information seeking
- Developing information systems
- Collection development and management
- Methods to support information needs and the information- seeking behaviors of users

Learning Environment

The training room must have the facilities and technical support required to carry out the Module. It should have computers with CD-ROM drives and online access to the Internet and other resources such as OPACs and CD-ROM databases. The Module should be conducted by a teacher who is knowledgeable and skilled in using computers, the Internet, CD-ROMs and a variety of electronic resources, and who is skilled in teaching courses of this nature.

Duration

The Module is designed for a one-week course of 40 hours: eight hours per day for five days.

Course content and schedule.

Day	Lessons
Day 1	Lesson 1. How has ICT Affected the Information-Seeking Behavior of Users?
Days 2-4	Lesson 2. What principles and skills are needed in searching available information systems (OPACs, CD-ROMs, Web, etc.)?
Day 5	Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Selection criteria for participants (participants profile)

Participants should be working in a library or information center, or in a school of library and information science. Participants with a degree in library and information science are preferred. Participants should normally have:

- A degree in library and information science or at least two years' experience working in a library
- A working knowledge of English
- A working knowledge of using computers in a Windows environment

Course evaluation

At the end of the course, ask your students to evaluate the course. The evaluation forms are included in this guide.

Typographical conventions

Note

General note to the teacher and additional information

Tip

Teaching tips and supplemental materials

Activity

Activity for the students

Reference

Reference and further reading materials

Glossary

Glossary of terms used in the module

Lesson 1

How has ICT Affected the Information-Seeking Behavior of Users?

Teacher's Guide

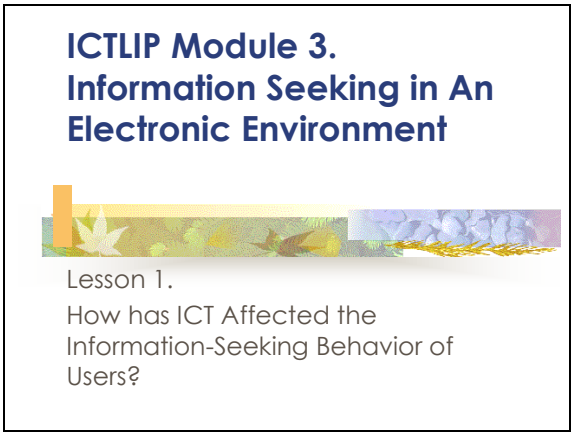
Module 3. Information Seeking in an Electronic Environment

Lesson 1. How has ICT Affected the Information-Seeking Behavior of Users?

Note

The teacher's guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

Slide 1



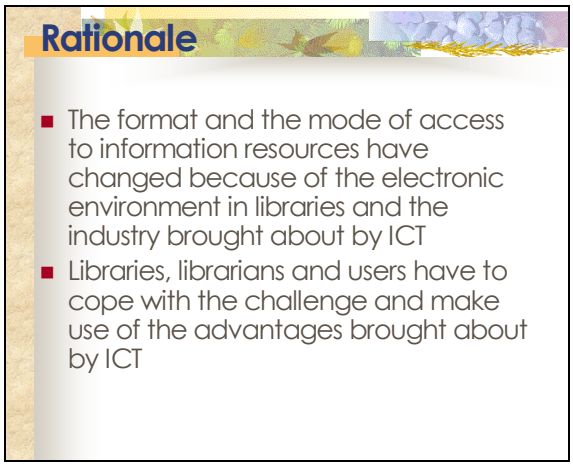
Tip

This is the title slide. Establish rapport with participants by asking the students what they understand by an electronic environment and how ICT has affected the information-seeking behavior of users. This will serve as a motivation activity by letting them know that you are interested in what they know and that you give importance to what they have to say. This would also encourage them to actively participate in the lecture / discussion. Their answers in turn, no matter how brief, will help you gauge their understanding of the subject matter. There is no need to discuss their answers at this point.

Rationale

This Module will provide experience and skill to the trainees to help them cope with the challenges and opportunities brought about by ICT in the area of information seeking and gathering. The Module is also intended to give the trainees sufficient knowledge for them in turn to train other library and information personnel in their workplace or even throughout the region.

Slide 2

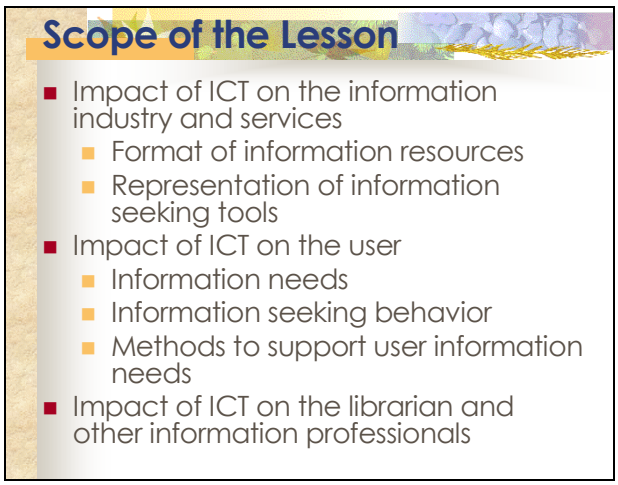


The information society has brought about developments in the way information is created, consolidated and accessed. ICT has produced larger volumes of information, new ways of packaging information and new tools for managing information. These developments require new knowledge and skills of librarians and other information workers to meet the demands of the global economy for information resources and services.

Note

This slide will provide justification for the lesson. You can also use it to ask the students about their own training and experiences with regard to the application of ICT to libraries.

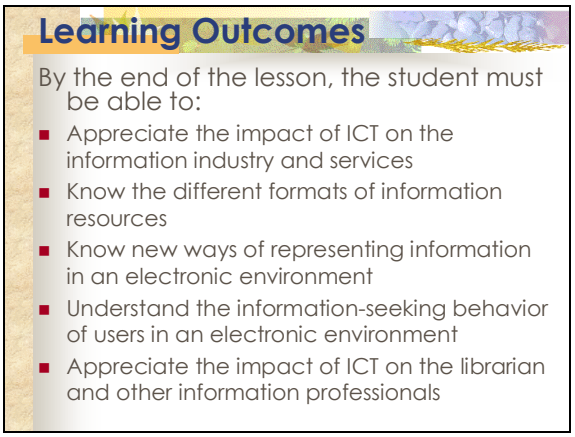
Slide 3



Tip

Inform the students about the scope of the lesson. There is no need for discussion at this point.

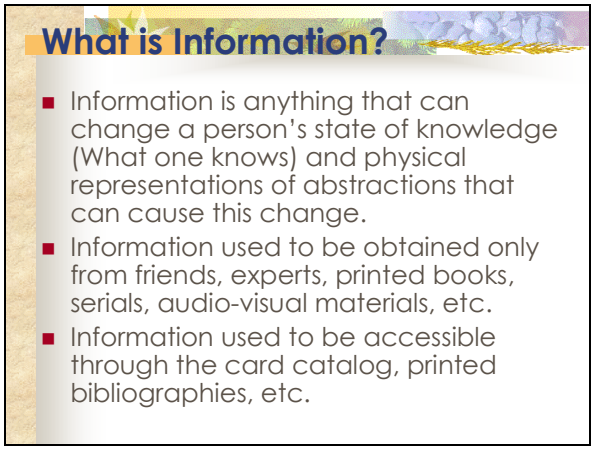
Slide 4



Tip

Inform the students about the learning outcomes for the lesson. There is no need for discussion at this point.

Slide 5

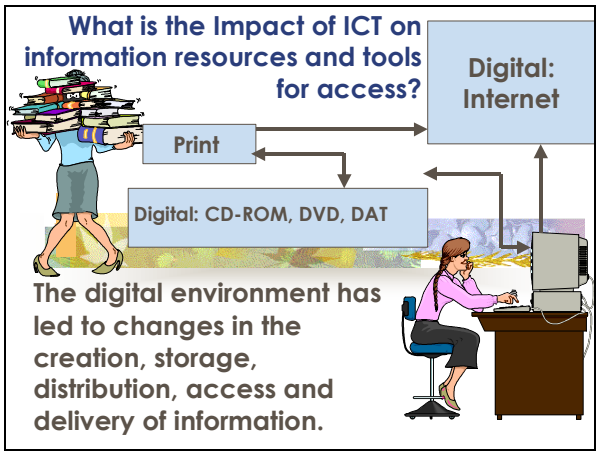


Tip

This definition of information provides a reason for information seeking. Provide examples where learning occurs because of new information.

Information is the physical representation of abstractions that can cause a change in a person's state of knowledge. It can be a word, a printed page, a museum object, a diagram, or a whole book, article or audio-visual material. . It is useful in decision-making.

Slide 6

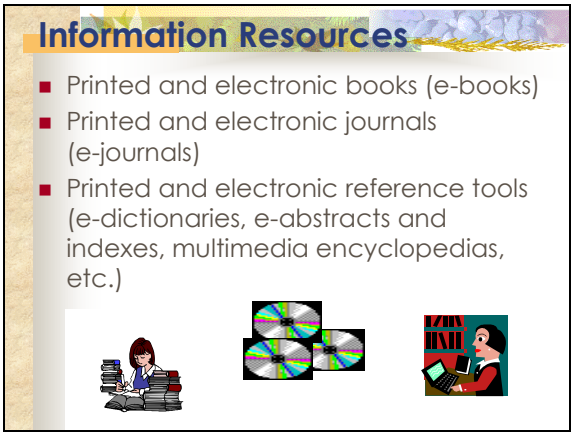


ICT has affected the way libraries operate and provide services. Materials acquired are now combinations of print, digital and multimedia. Catalogs are now online as OPACs or WebPACs. It has also changed the way librarians manage information.

Tip

Before proceeding to the discussion of information seeking, discuss the meaning of a digital information environment by giving examples. For example. You can point out that abstracts and indexes are no longer in print but on CD-ROM, online or via the Internet. Show the OPAC of the library of Congress to demonstrate an online catalog. (URL: http://catalog.loc.gov/)

Slide 7



ICT has caused changes in the representation of knowledge—from analog to digital. The shift has led to**:**

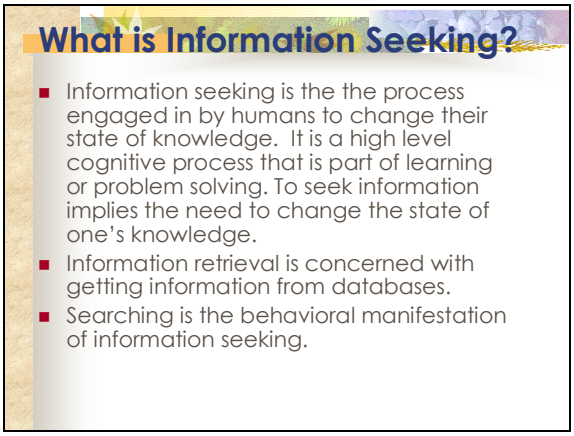
- New information formats: Multimedia information can be created, stored and distributed in digital format as CD-ROM or on hard disks and other digital storage media.

- New ways of distributing and accessing information: Tools to access information, full-text and multimedia information can be accessed from remote sites via telecommunications facilities.
- New information services: Tools to access information can be used even from remote sites via LANs and WANs
- New knowledge and skills required of librarians.

Activity 1-1

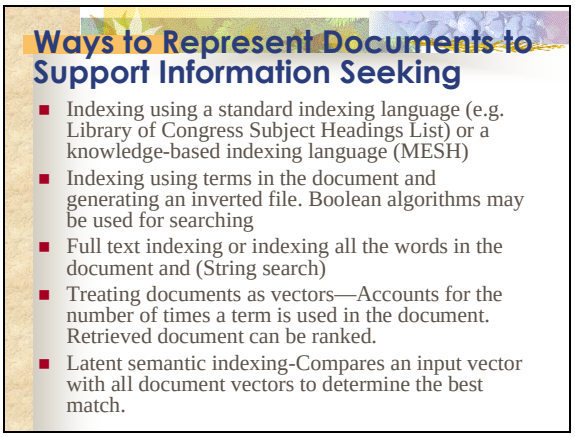
Ask the students to access encyclopedias and dictionaries, full-text e-journals, e-books, etc. on the Internet using the following URLs.
Merriam-Webster Online URL: http://www.m-w.com/cgi-bin/dictionary
e-journal URL: http://www.library.ucsb.edu/istl/
e-books URL: http://promo.net/pg/

Slide 8



Information seeking is a directed purposeful activity. It is different from information retrieval, because retrieval implies that the information has previously been stored. Searching is the behavioral manifestation of information seeking. Strategies can be formal (analytical strategies that require planning) or informal (browse strategies that proceed as cues arise during the search process).

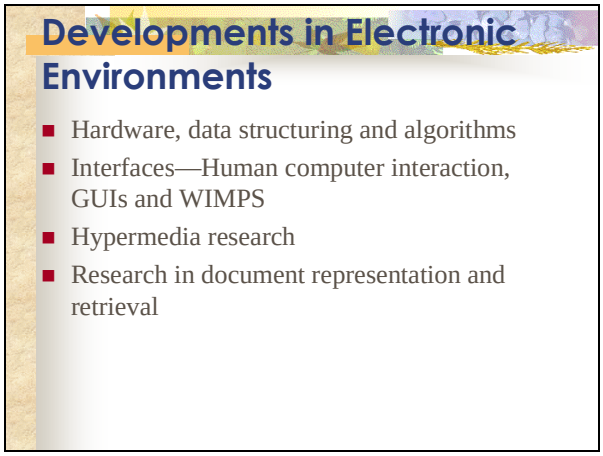
Slide 9



Tip

ICT has also brought about the creation of new access tools. Demonstrate the new tools by accessing the following site: http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/FindInfo.html

Slide 10



Developments in hardware made computers affordable and useful to librarians and users of information. Developments in software and user interfaces made computer systems user friendly. Digitization led to new information formats and new modes of information distribution. To improve efficiency of operations and services, libraries have become automated, electronic and networked for purposes of resource sharing.

Activity 1-2

Ask the students to say something about their libraries. Ask questions such as: Is your library automated? Do you have Internet access? If any of the participants have a Web OPAC, ask them to show it to the class.

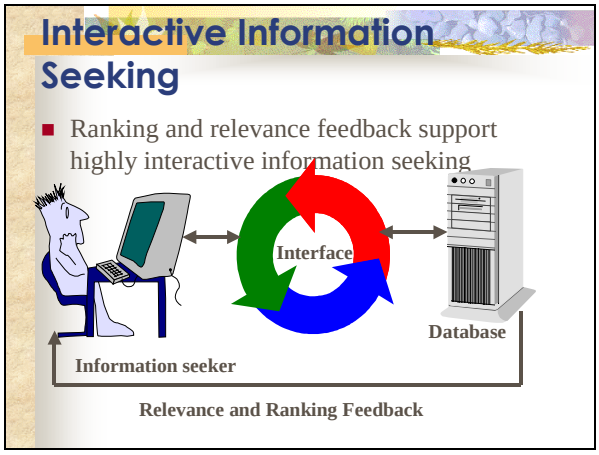
Slide 11

The digital information environment has led to changes in the tools used to identify and access information. The tools include OPACs, Web OPACs, search engines, the World Wide Web, etc.

Activity 1-3

Demonstrate the use of search engines, online databases on the Internet, etc. Ask the students if they have online indexes. Ask them to access these indexes so that students can search them.

Slide 12

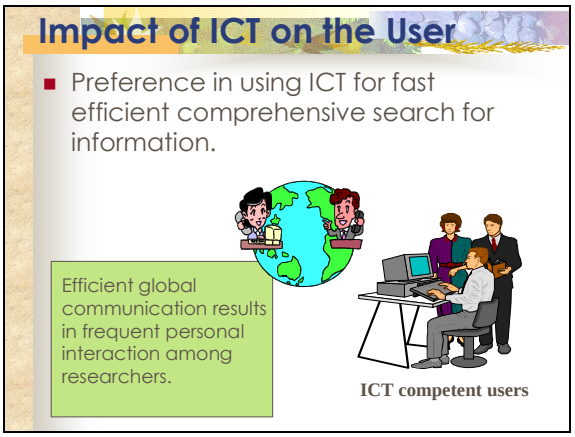


Ranking and relevance feedback are both very useful facilities found in many retrieval systems. Internet search engines provide ranking and relevance information for searches. User satisfaction can be improved by finding information within and outside the library. Recent and emerging developments in computing, telecommunications, networking and resource sharing have made access to information anytime, anywhere possible. Users' need studies are usually conducted by libraries and information centers to determine the information requirements of their users.

Activity 1-4

Demonstrate ranking and relevance by searching the Internet using different search engines. Demonstrate the importance of interface design by accessing different OPACs

Slide 13

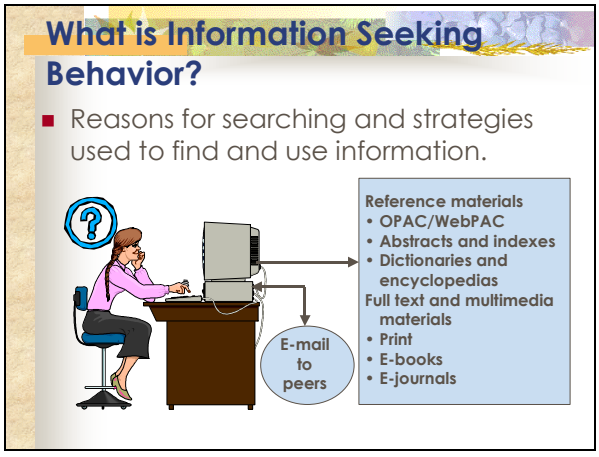


Because of the new formats of information resources and new information tools, users often prefer digital information and ICT to access and organize that information. The shift from print to digital information had an impact on libraries, information centers and other institutions directly involved in processing information as well as on the user. Users had to acquire new knowledge and skill in information searching.

Tip

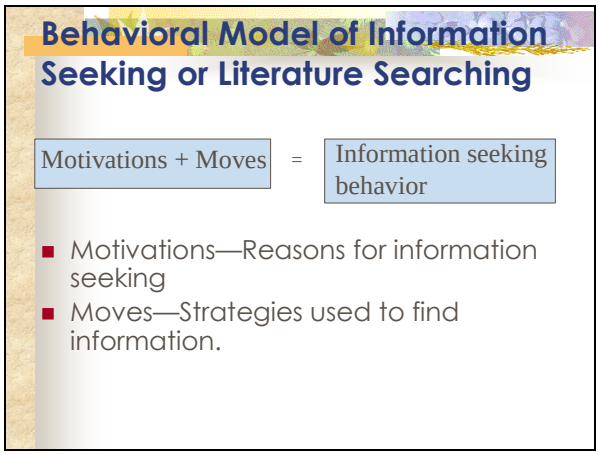
Use slide 13 to emphasize the new information services found in an electronic library such as downloading of information, document delivery via e-mail, accessing full text journals, etc.

Slide 14



Information- seeking behavior refers to the series of activities that a user performs when seeking for information. It is dependent on the reasons for seeking information and the starting knowledge of the individual.

Slide 15

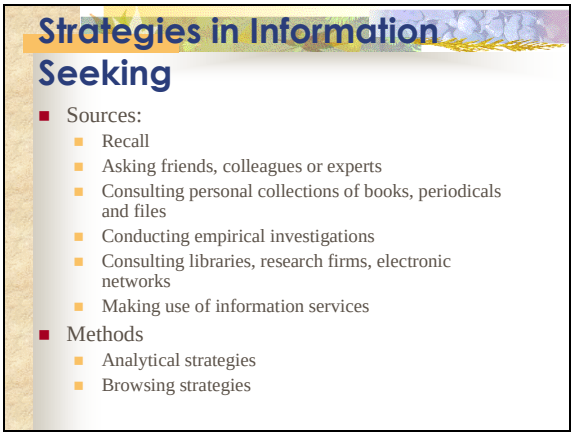


Information-seeking behavior includes the motivations or reasons for searching and the steps taken to acquire new knowledge about the subject matter or topic. A behavior model by Chun Wei Choo, Brian Detlor, and Don Turnbull, indicates that motivations (strategies and reasons for viewing and searching) and moves (tactics used to find and use information) may be helpful in analyzing web information seeking. The model was constructed by distinguishing between modes of organizational scanning and generic moves of information seeking. *("A behavioral model of information seeking on the Web-Preliminary Study of How Managers and Information Specialists Use the Web." 1998 ASIS Annual Meeting Contributed Paper*).

Activity 1-5

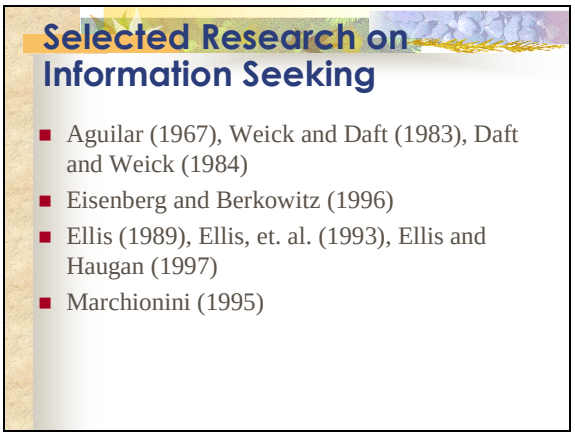
Ask the students to think of a topic they would like to know more about and why. Tell them to write this down and restate the topic as a question.

Slide 16



Information-seeking strategies can be examined in terms of Sources and Methods. Sources refer to the locations while Method refers to the manner of the information is being sought. Information might be recalled from the seeker's own memory, gathered informally from friends or colleagues, or from personal formal sources of information such as books, journals and files. The seeker may also conduct a planned investigation to identify the sought information in libraries, via electronic networks or by using a variety of information services. Information-seeking methods can be categorized into analytical strategies and browsing strategies. Slides 17 to 22 discuss some research findings about information seeking.

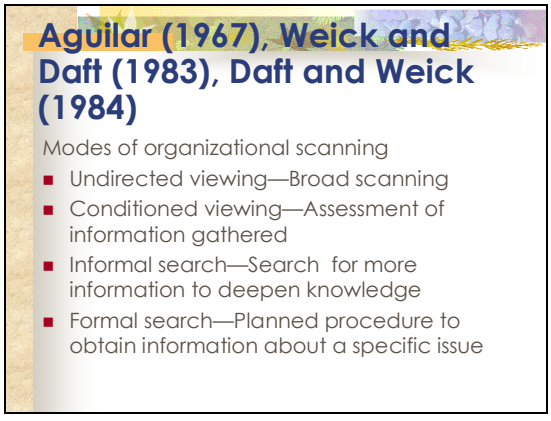
Slide 17



Tip

This slide lists some research work on information seeking and strategies for information searching. There is no need to discuss the slide at this point as the research will be discussed in subsequent slides.

Slide 18



Tip

Information- seeking behavior depends on the present status of the knowledge of the individual and on the information need. Discuss the modes of organizational scanning in terms of these parameters.

Undirected viewing refers to the use of the Internet to broadly scan resources without a specific topic in mind. The objective is to browse available information. The tactic is called "visioning," an attempt to find something interesting that can be pursued further. The specific information need is thus identified after a number of resources have been browsed.

In conditioned viewing, the user already has a topic in mind but would like to learn more about it. He therefore becomes more discriminating in searching and identifying useful information.

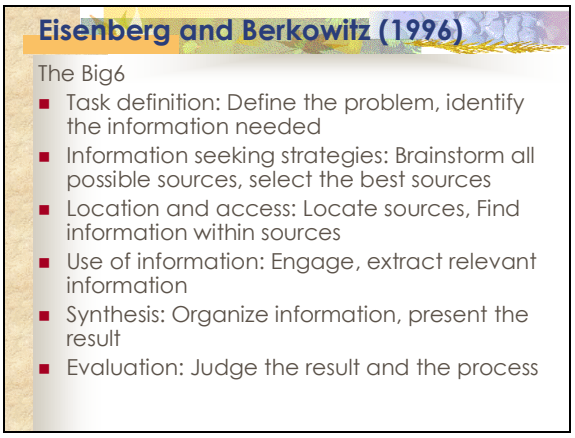
When the user is already focused on a topic, his information- searching behavior becomes more directed. He becomes selective in his search and is able to formulate queries to obtain satisfactory results. This step is called an informal search.

As the search narrows down to a set of resources, the user executes a formal search and retrieves relevant information on the specific topic in mind. As the need becomes more specific, the moves or tactics become more formal. Information searching moves from browsing to retrieving as the need becomes more specific.

Activity 1-6

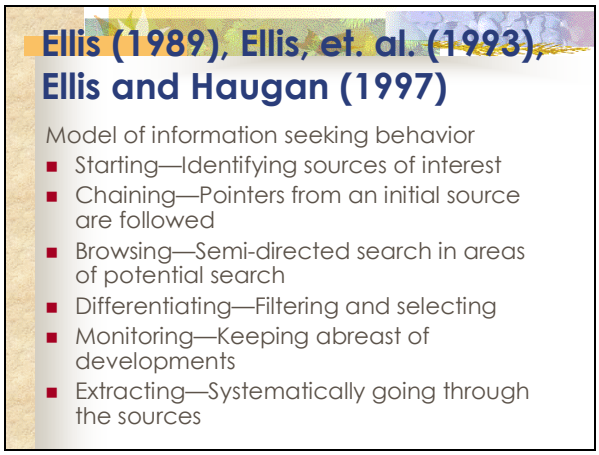
Ask the students to conduct an informal search for information on their topic and to write down the steps they undertook to prepare for a formal search.

Slide 19



Slide 19 illustrates another model of information- seeking behavior. It is a very popular model for teaching K-12 users about information seeking. It is based on the problem-solving process. The model develops the critical thinking skills of students rather than skill in using specific databases. The Big6 is thoroughly discussed in http://vrd.org/training/guide.htm

Slide 20



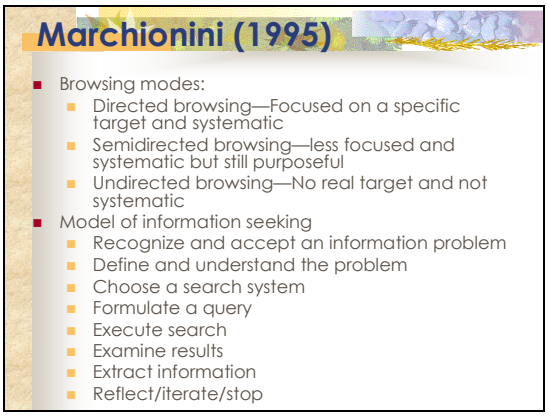
The model of Ellis begins with a broad scanning followed by systematically searching for information from available resources. The steps in the model are:

- Starting: Possible sources of relevant information
  - OPAC
  - Web OPAC
  - Abstracts and indexes on CD-ROM/Internet
  - Internet, using search engines
- Chaining: Follow up leads
  - Cited references
  - Possible subject headings
  - Listed sources (Located by search engines)
- Browsing: Scanning relevant documents
  - Retrieving and evaluating relevant documents
- Differentiating: Selecting documents
  - Selecting from among relevant documents by bookmarking, copying, etc.
- Monitoring: Keeping abreast of developments
  - Regular scanning of possible sources of relevant documents
  - Receiving site updates through push technology, SDI profiles, etc.
- Extracting: Reading a particular source and selecting information from it.

Activity 1-7

Another model of information- seeking behavior is described in slide 20. Ask the students to search for information and retrieve documents on their topics using this model. Ask them to record their work.

Slide 21



Marchionini describes browsing modes as directed, semi-directed and undirected. In directed browsing, the searcher has a specific topic in mind and searching behavior follows a predetermined path. In semi-directed browsing, the searcher has a vague idea about the topic and searches for information to gather information that will enable him/her to become more focused. In undirected browsing, the searcher has some interest on the topic and searches the resources to get a better view of the topic or to find another topic.

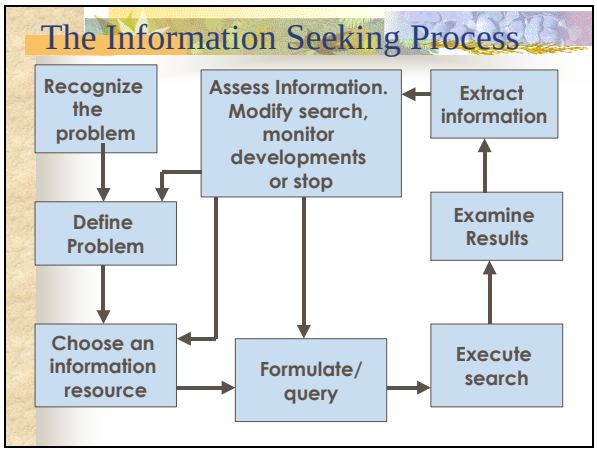
Marchionini's information- seeking model follows the following steps:

- Recognition and acceptance of a problem
- Definition and understanding of the problem
- Choice of a search system
- Formulation of the query
- Execution of the search
- Examination of results
- Extraction of useful information
- Reflection and iteration as necessary or conclusion of the search

Activity 1-8

Ask the students to use the Marchionini model to search for information on the topic that they had identified in the last activity. Ask them to document each step.

Slide 22

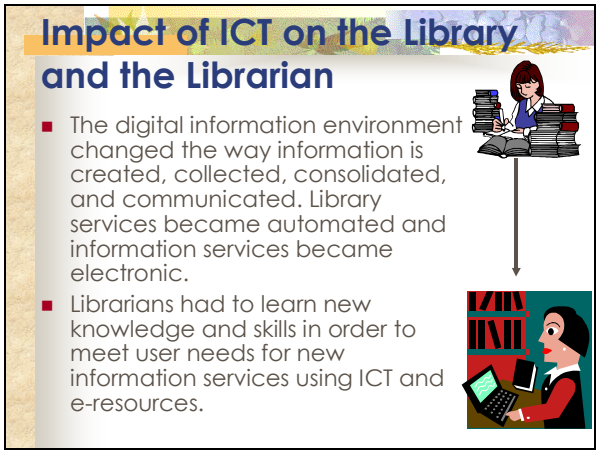


Slide 22 is an illustration of the steps in information seeking. The model is similar to the Big6 (but has eight steps instead of six) and to Marchionini's model (but there is less iteration). Brief descriptions of selected information- seeking models are found in the article by Don Turnbull entitled "Augmenting information seeking on the World Wide Web Using Collaborative Filtering Techniques. "

Activity 1-9

Ask the students to use the information seeking model in slide 22 to answer a reference query. Group the students in twos and assign one as the researcher and the other as the librarian. The researcher should ask the question and the librarian should conduct the reference interview and the search.

Slide 23



The new role of librarians includes the use and management of ICT resources and systems for:

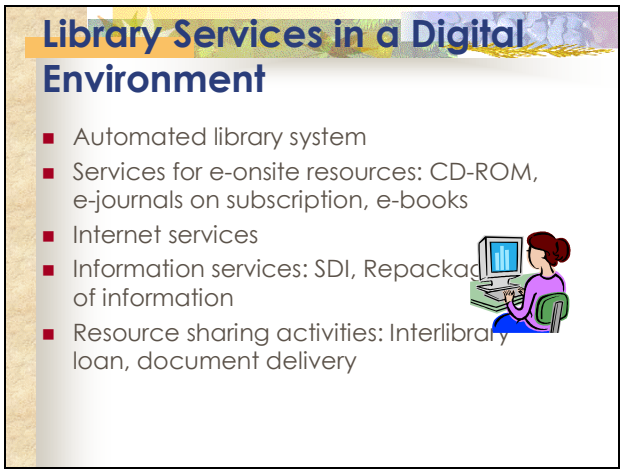
- Information creation—OPAC, Abstracts and indexes in CD-ROM or online, Web pages, bibliographies, etc.
- Information collection—Online selection and acquisition of information

- Information communication—E-mail, push technology
- Information consolidation– Online bibliographies, packaging of information

Activity 1-10

Ask the students to access Internet sites with Web OPACs, Full text journals, Home pages of libraries, book jobbers, to be able to experience different user interfaces and their impact on the information- seeking process. Ask them to start from the site: http://ipl.sils.umich.edu/ref/websearching.html. For a discussion of search strategies suitable for the Web ask them to access the site http://www.sc.edu.beaufort/library/lesson6.html

Slide 24

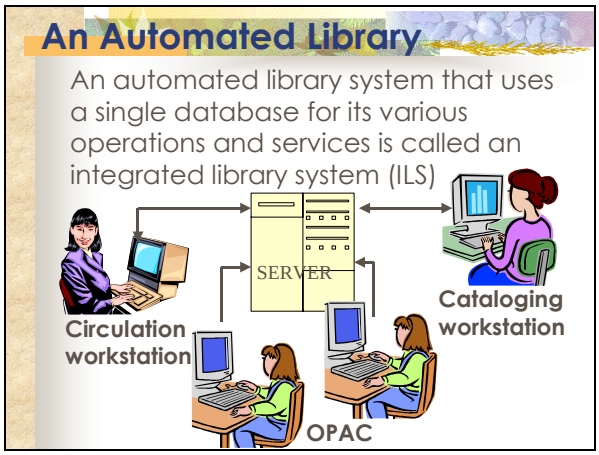


Libraries have evolved from paper-based institutions to electronic libraries with digital collections and access to digital collections outside their libraries.

Tip

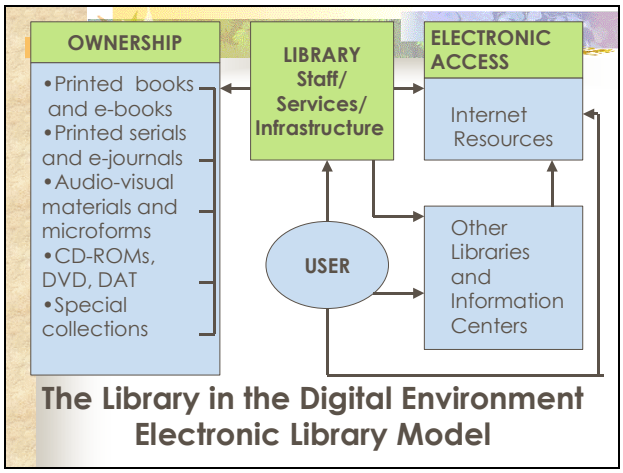
Use the slides below to briefly differentiate between an automated library and an electronic library.

Slide 25



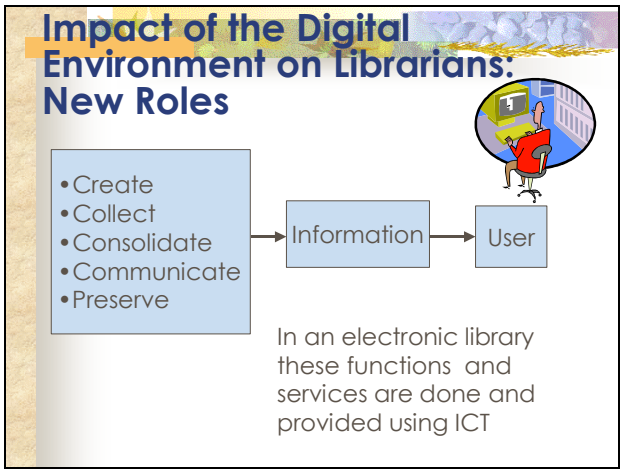
In an automated library, the library owns and houses all collections in the building. It may or may not have an integrated library system. It may or may not have digital collections. It may or may not have access to the Internet.

Slide 26



In an electronic library, the collection is a mix of print, audio-visual, digital, multimedia, and online resources. There are also services that make use of ICT in accessing and delivering electronic information.

Slide 27

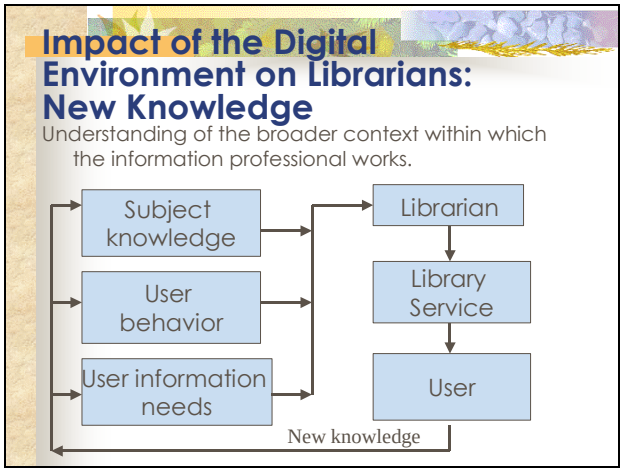


The role of librarians has been greatly affected by ICT. The traditional roles remain but the tools have changed. Librarians now use computers and the Internet to create, collect, consolidate, communicate and preserve information.

Activity 1-11

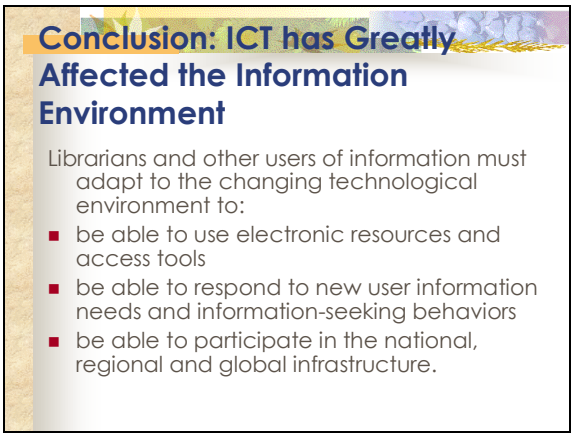
Ask the students to describe their roles and responsibilities in their respective libraries and the role played by ICT in carrying out these roles.

Slide 28



Because of the new roles of librarians, they need new knowledge specifically about information needs and information- seeking behavior as well as subject knowledge, since information- seeking behavior is dependent on the existing knowledge base of the searcher. In an electronic or digital environment, librarians can be referred to as information specialists. Librarians as information experts match users to resources to satisfy specific information needs. Reference service in libraries has evolved into digital reference service because of ICT.

Slide 29



ICT has greatly affected libraries, librarians and information seekers. The behavior of users depends greatly on the existing knowledge base of the searcher. This is also true of librarians who assist users in their search. In certain cases, the librarian conducts the search and also repackages the information for the user. New knowledge and new skills are required of librarians and information seekers to enable them to use the new information formats and tools in searching for and repackaging information. Librarians must be able to analyze a reference query in order to respond appropriately and determine the best resources that will provide the answer to the query.

References

1. Aguilar, Francis J. 1967. *Scanning the Business Environment.* New York: Macmillan Co.
2. Daft, Richard L. and Karl E. Weick. 1984. Toward a Model of Organizations as Interpretation Systems. *Academy of Management Review*, 9 (2): 284-295.
3. Ellis, David. 1989. A Behavioral Approach to Information Retrieval Systems Design. *Journal of Documentation*, 45 (3).
4. Ellis, David and Merete Haugan. 1997. Modelling Information Seeking Patterns of Engineers and Research Scientists in an Industrial Environment. *Journal of Documentation*, 53 (4): 384-403.
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7. Marchionini, Gary. 1995. *Information seeking in electronic environments.* Cambridge: Cambridge University Press. (*Cambridge Series on Human-Computer Interaction*, vol. 9*)*
8. Weick, Karl E. and Richard L. Daft. 1983. The Effectiveness of Interpretation Systems. (In: *Organizational Effectiveness: a Comparison of Multiple Models* edited by Kim S. Cameron and David A. Whetten, pp.71-93, New York: Academic Press.)

Lesson 2

What principles and skills are needed in searching available information systems?

Teacher's Guide

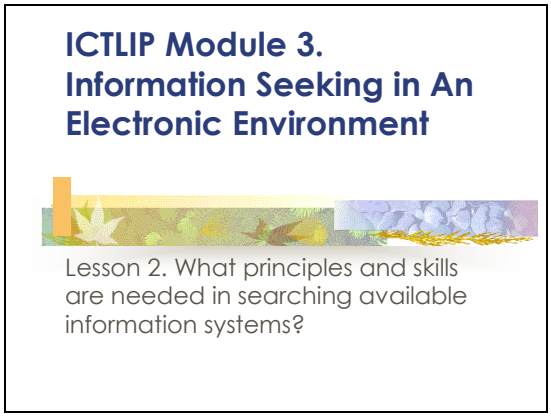
Module 3. Information Seeking in an Electronic Environment

Lesson 2. What principles and skills are needed in searching available information systems?

Note

The teacher's guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

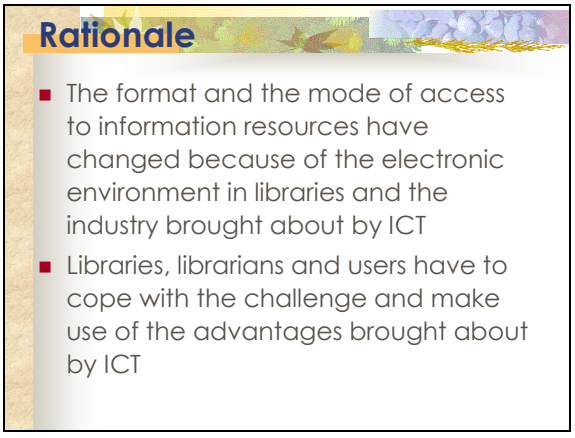
Slide 1



Tip

Establish rapport with participants by asking the students to answer the question on the title slide. This will serve as a motivation activity by letting them know that you are interested in what they know and that you give importance to what they have to say. This would also encourage them to actively participate in the lecture / discussion. Their answers in turn,, no matter how brief, will help you gauge their understanding of the subject matter. There is no need to discuss their answers at this point.

Slide 2



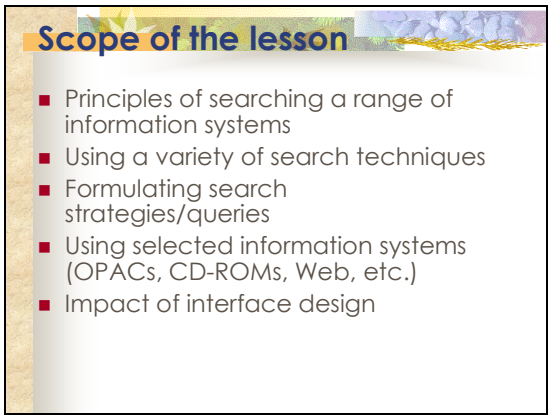
Rationale

In Asia, many librarians have not obtained adequate training in ICT due to a lack of expertise among their ranks and in most library schools in the region. This Module will attempt to provide adequate ICT knowledge and skill to students to help them cope with the challenges and take advantage of the changes brought about by ICT in their work. The Module also provides enough knowledge to enable them to train other library and information personnel in their workplace or even throughout the region.

Note

This slide will provide justification for the lesson. You can also use it to hear about their own training and experiences with regards to the application of ICT in libraries.

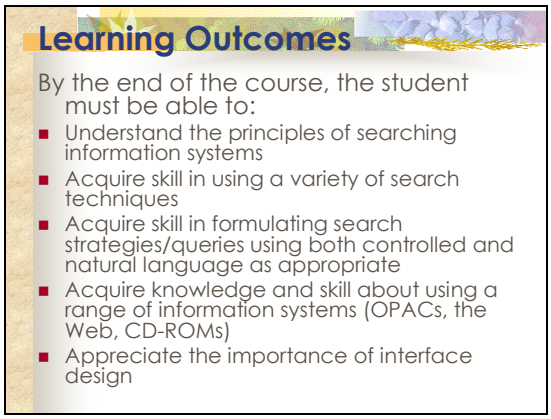
Slide 3



Scope

This slide will provide the students with an overview of what to expect from the lesson.

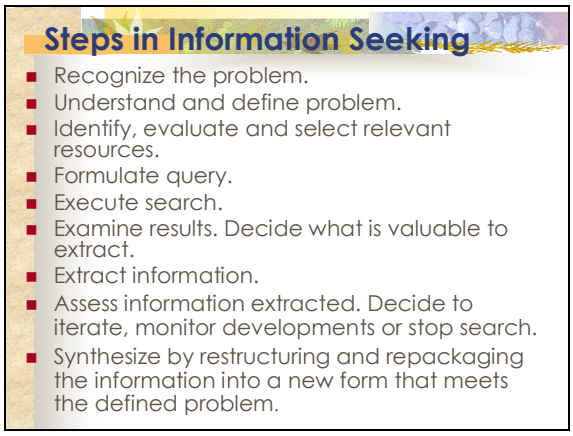
Slide 4



Learning Outcomes

This slide will provide the students with an overview of what to expect to learn from the lesson.

Slide 5

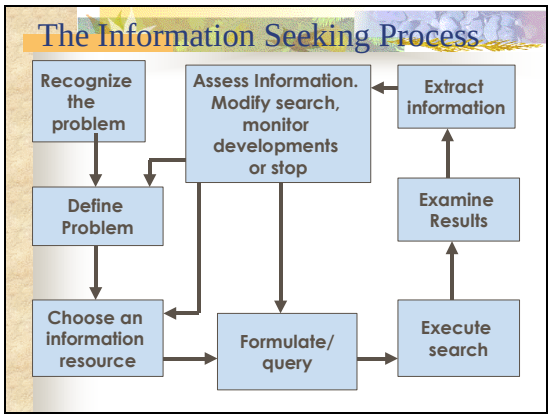


The steps in information seeking learned in lesson one are reviewed.

Tip

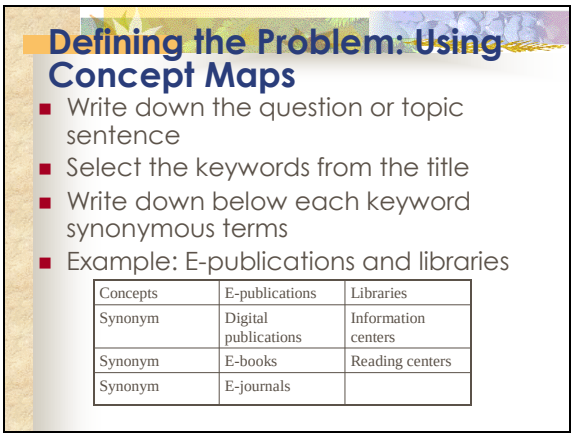
Go over the steps carefully. Ask some questions to recall and reinforce the information and concepts taught in lesson 1.

Slide 6



This is just an illustration of the steps in the information- seeking process. Point out the feedback mechanism to the three boxes: Define the problem. Choose an information resource and Formulate a query.

Slide 7



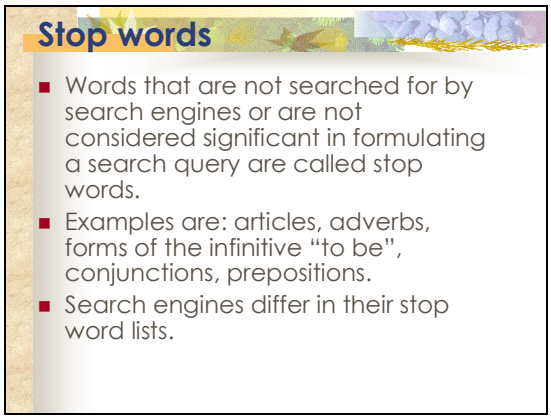
Activity 2-1

Ask each student to prepare a concept map for one of the following queries:

1. What is library automation?
2. Why are there different colors in a rainbow?
3. How are candles made?
4. Where is the Pasig River?
5. Who invented the sewing machine?
6. When was gold first discovered?

Ask each student to state the objective in preparing a concept map. For example, is it for a class in philosophy, science, etc. Is it to write a report? Is it for a news item? This objective will shed light on the scope of the search and therefore the nature of the keywords or descriptors to be identified.

Slide 8

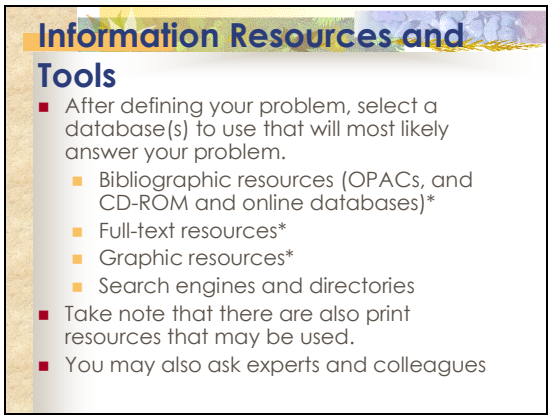


Tip

Inform the students about words that are not necessary in making concept maps because they are not searched/indexed by the search engines and the subject editors. Inform them also about variations in stop word lists among

search engines and subject directories. Give examples of when the words may be used. For example, when searching for titles with words like "To Be or not to Be." Have them take note of the parentheses.

Slide 9

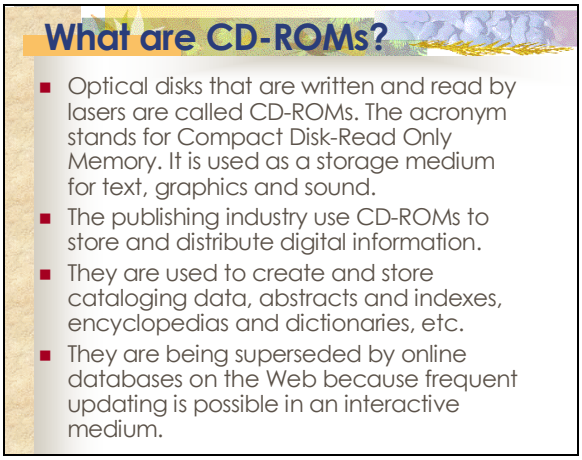


The success of a search depends on the database search and the purpose of the search. For example: If the searcher needs a book, the best resource is the library catalog. If the searcher needs an article, the best resource is the periodicals index.

Tip

Remind students of the use of different search tools such as library catalogs, indexes, dictionaries, bibliographies, etc.

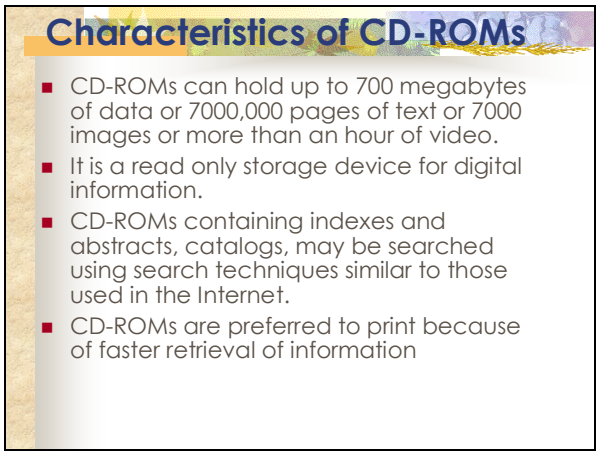
Slide 10



When CD-ROMs were first used in libraries they immediately became popular. They offered multimedia displays for encyclopedias and dictionaries while at the same time providing fast storage and retrieval of information. They were used to store abstracts and indexes to the world's literature. Today they are also being used for e-books for children. With the development of the Internet, however, the CD-ROM versions of abstracts and indexes, full -

text journals and books, and catalogues are being superseded by databases on the Internet. For developing countries with very slow Internet access, the CD-ROM still plays an important role.

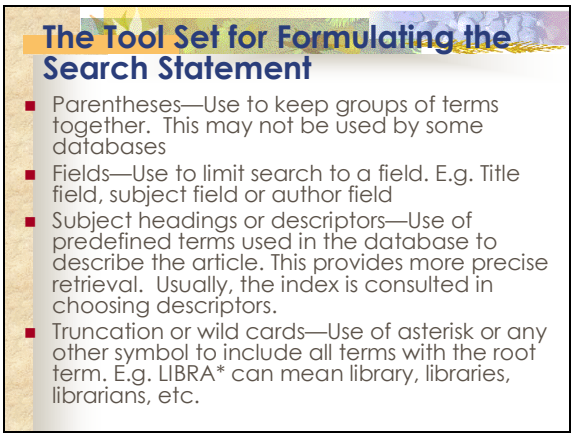
Slide 11



Tip

Discuss slides 10 and 11 simultaneously. Mention the shift to DVD and VCD. Emphasize that CD-ROM is not an effective preservation medium because of its dependence on hardware and software developments. You can also ask the students if they are still using CD-ROMs and if they are ready to shift to Internet access for the same databases. Ask them to describe some of these CD-ROMs and how information is retrieved from them.

Slide 12

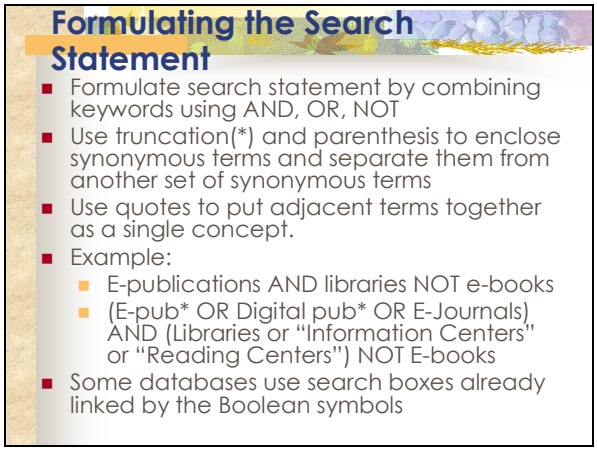


After the concept map has been prepared, the searcher is now ready to formulate the query statement. The query will contain the concepts and the operators recognized by the specific search tool. In general, Boolean operators are used. Some databases, however, have interfaces that provide boxes where the concept can be entered and buttons to select the individual operators.

Tip

Take note of the tool set available in formulating the query. Take note also that variations occur among databases.

Slide 13



Activity 2-2

Ask each student to prepare search statements for the concept map in the previous activity.

Tip

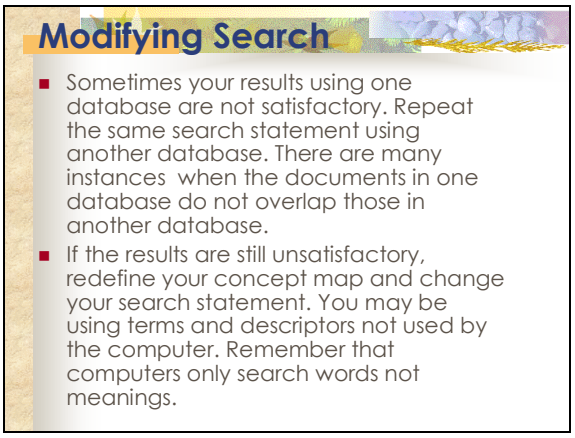
Provide the following example. For the query: How are paper flowers made?
Concepts:

Flowers	Paper	Manufacture
Blooms	Papier	Design
Roses	Artificial	Hobbies

Query statement: (Flowers OR Roses OR Blooms) AND (Paper OR Papier OR Artificial) AND (Manufacture OR Design OR Hobbies)

Before concluding the activity, ask some questions to recall and reinforce the information and concepts taught in the lesson.

Slide 14



Sometimes the search statement will not provide the needed answer. Modification of the search statement, concept map or a change in database might be necessary.

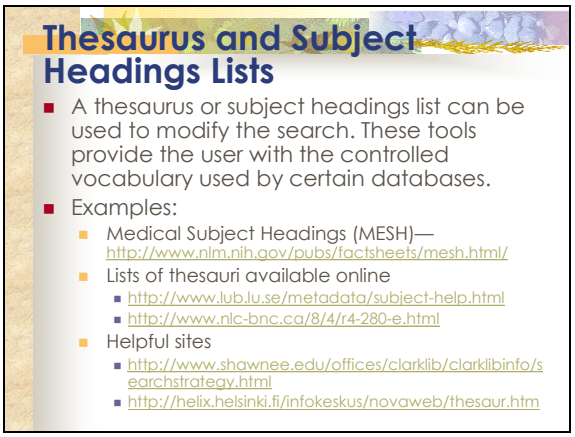
Activity 2-3

Ask the students to execute their search statements and modify them as necessary. Have them use the search engine or the resource that they prefer. Make sure that no two students make use of the same resource or engine so that they will be able to obtain different answers.

Tip

Before concluding the activity, ask some questions to recall and reinforce the information and concepts taught in the lesson.

Slide 15

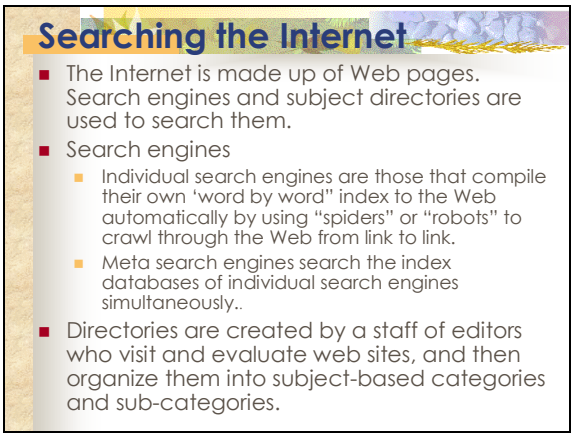


Sometimes the search will not be satisfactory because the terms used are not recognized by the access tools. Theasuri and subject heading lists may be consulted for structured vocabulary lists.

Activity 2-4

Ask the students to formulate a search query for: "What is Rheumatoid arthritis?" and to use WebMD to execute their search. Ask them to search for the applicable thesaurus in making their concept map.

Slide 16

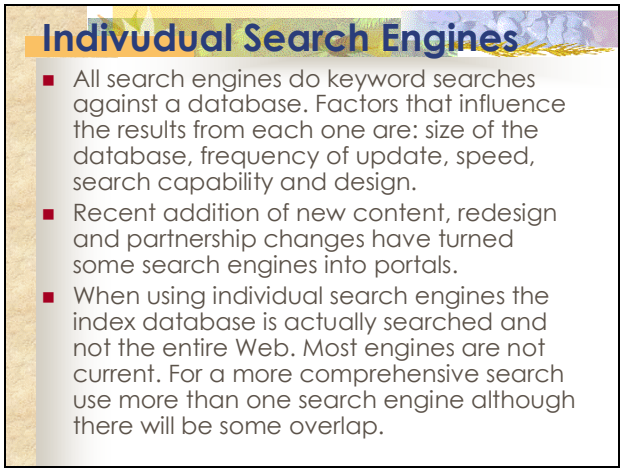


The Internet is made up of millions of Web pages. It is not possible to find information on the Internet without the help of search engines, subject directories, vortals, and portals.

Tip

Differentiate between search engines and Web directories in terms of how each one is made. Differentiate Meta search engines from individual search engines.

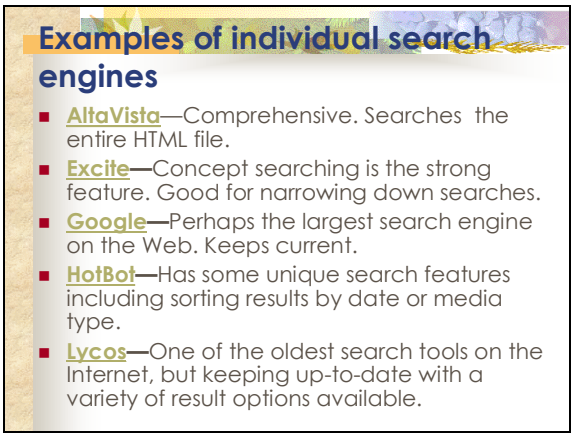
Slide17



Tip

Emphasize the method by which search engines are created and what they really are. Note the overlap in some search engines and emphasize the fact that a search engine creates and uses an index of the Web that has been prepared automatically by robots and spiders. Therefore when one uses a search engine, the index is searched rather than the actual Web pages themselves.

Slide 18



There are hundreds of search engines on the Web. The following are some examples of search engines with a general coverage. To view them use the URL http://www.nameofthesearchengine.com

Some search engines

- **All the Web**—Indexes more than 600 million pages. Allows word filtering and searching by language. It is not cluttered by advertisements
- **Altavista**—Indexes more than 500 million pages. Has various search options in addition to the main search box. It allows Boolean searching when using the advanced search. It is comprehensive because it searches the entire html file.
- **Excite**— Does concept searching and is good for narrowing searches. It indexes more than 250 million pages. It displays the most relevant sites first.
- **Google**—The pages with the most links are given top priority in the display. It indexes 1.6 million pages
- **Hot Bot**—Part of the Lycos network. Can search by date, media type, language and location. It also uses Direct Hit results.
- **Lycos**—Presents results in four categories beginning with the most popular sites first, then the Web sites, then the Web pages and then the news and shopping sites. It also uses Direct Hit results.
- **MSN Search** –Uses the Inktomi search engine also used by Lycos
- **Web Crawler**—Indexes two million web pages. Owned by Excite.
- **Wise Nut**—Indexes 1.4 million web pages. Results may be grouped into categories.

Other search engines have special features. Examples are:

- **Direct Hit**—Analyses the results of previous searches for a search term and displays those results that other searchers have found useful for the term. It is partnered with other search engines, namely Lycos, Hot Bot and Infoseek . These search engines also display Direct Hit results.
- **Overture**— Used to search sites whose owners pay to be included in the top listings.

Search engines provide a means of searching the Web. Each one has its own special feature. The search strategy is important in using search engines because thousand of results will be displayed if the statement is not precise. Search engines rank Web pages according to different categories such as the frequency of keywords in the document or sometimes in the HTML META tags.

Activity 2-5

Ask the students to formulate a search query for: "What is Ganoderma and its uses?" Then ask them to search the Web using different search engines. Assign a different one per student. Discuss the results after 15 minutes.

Slide 19

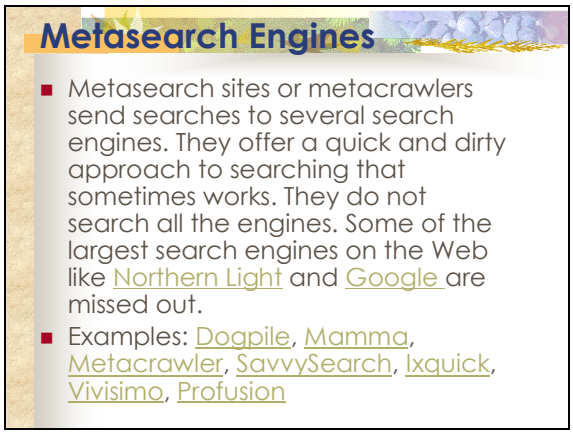
Tip

Discuss the difference between a search engine and a Web directory

Activity 2-6

Repeat the above activity but this time have them use Web directories. Have them compare results.

Slide 20



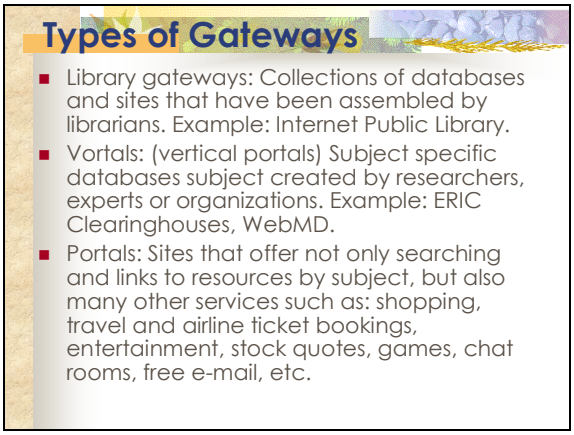
Tip

Discuss the difference between a search engine, a Web directory, and a Meta searcher

Activity 2-7

Repeat the above activity but this time use Meta search engines. Have the students compare results between Metasearch engines on the one hand, and an individual search engine, a Web directory and a Metasearch engine on the other hand.

Slide 21



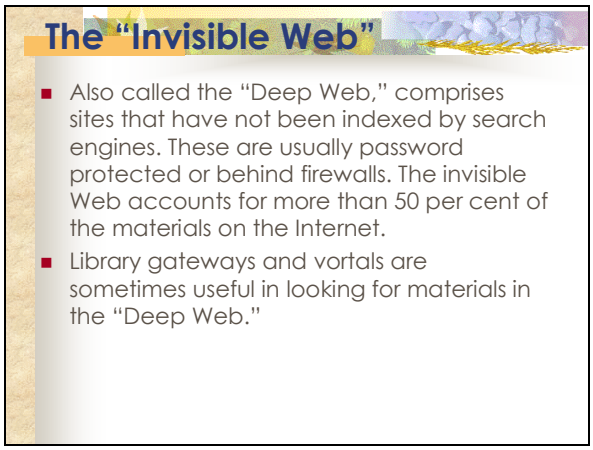
Tip

Discuss the difference between a library gateway, a vortal and a portal. Search for other vortals and gateways on the Web. Discuss the difference between vortal and portal.

Activity 2-8

Ask the students to looks for vortals, portals and library gateways by means of search engines, Web directories and Meta search engines. Have them compare results.

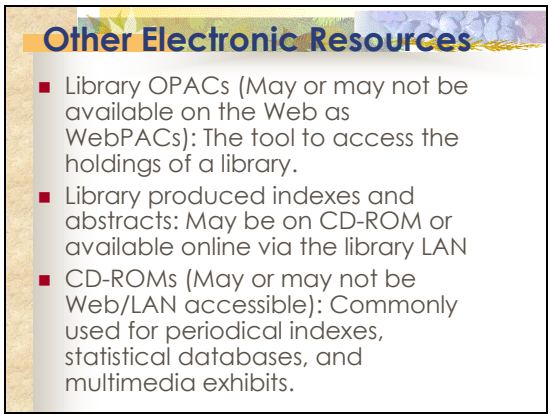
Slide 22



Tip

Review the discussion about library gateways, vortals and portals.

Slide 23



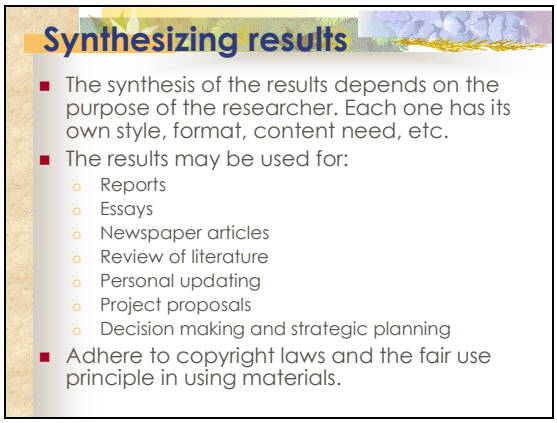
Tip

Discuss CD-ROMs, reference materials, full-text journals, etc

Activity 2-9

Ask the students to access library catalogs on the Web and to look for titles on CD-ROMs. Ask them to look for Library homepages and access the instructions for using CD-ROMs. Some CD-ROMs may not be available on the Web so ask them to keep on looking.

Slide 24



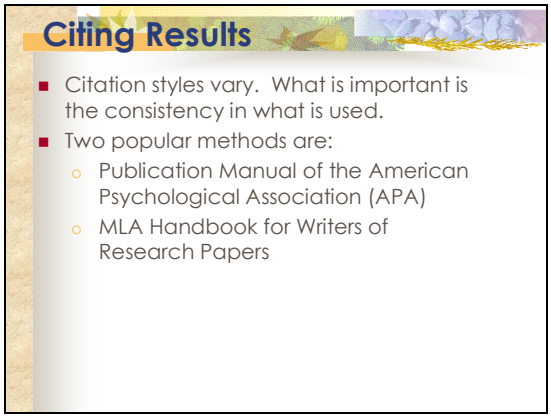
Tip

Emphasize the importance of adhering to the provisions of the Copyright Law.

Activity 2-10

Ask the students to search for the text of the copyright law in their respective countries.

Slide 25



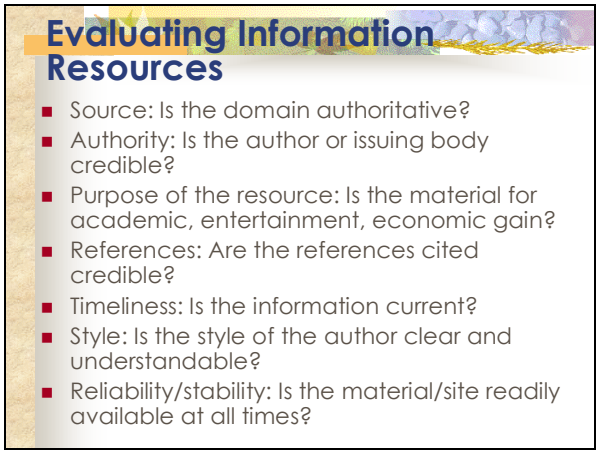
Tip

Emphasize the importance of citing sources.

Activity 2-11

Ask the students to access the sites for the APA Manual and the MLA Manual. Ask them to specifically look at how Internet pages are cited. Ask them to use these methods in citing the pages that they have gathered.

Slide 26

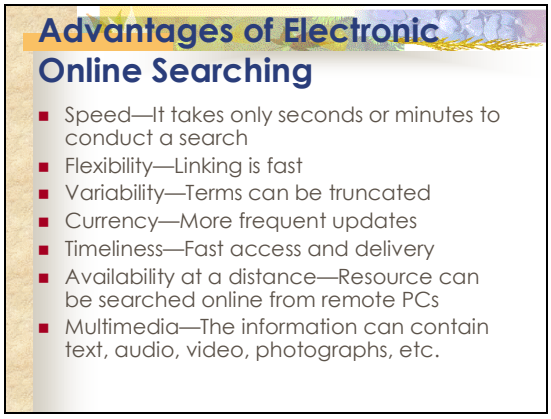


As pages of information are displayed, the searcher must evaluate them so that only those that are authoritative are gathered. Discuss each criterion.

Tip

Domain refers to the domain name of the site. Emphasize the purpose of the search in evaluating the nature of the site. E.g. Is the purpose for formal research, entertainment or for general knowledge? Inform the students that it is also possible to do a domain search.

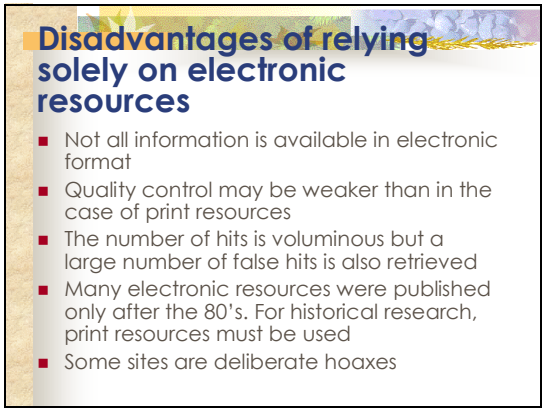
Slide 27



Tip

Compare with the advantages of manual searching.

Slide 28



The Internet is a huge depository of information. No one person or group has the authority or capacity to index all the information in it. Knowledge representation is the key to building intelligent access to information.

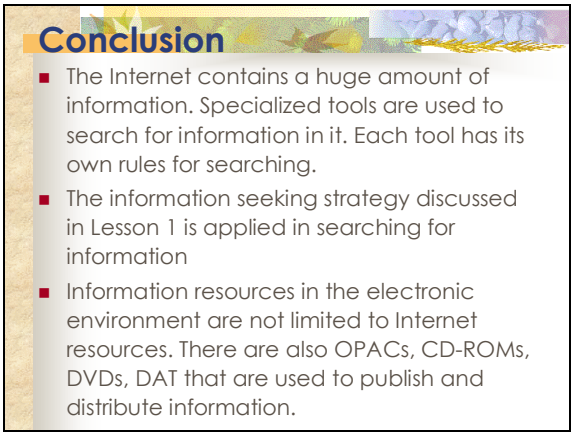
Tip

Compare with the disadvantages of manual searching. Recall the advantages of searching electronic databases in previous slide.

Activity 2-12

Ask the students to access the ontology server at the site http://www-ksl-svc.stanford.edu:5915/. This site can be used to access, create, edit and browse ontologies.

Slide 29



Reference

The following sites may be used for a more extensive discussion of the concepts introduced in the lesson.

1. APA style manual. http://www.apastyle.org/
2. MLA style manual. http://www.mla.org/
3. CD-ROM guides. http://www.cdrom-guide.com/
4. Tutorial on information seeking skills and tools.
   http://www.lib.monash.edu.au/vl/howind.htm
5. Glossary of terms.
   http://www.sims.berkeley.edu/~hearst/irbook/glossary.html
   http://www.asis.org/Publications/Thesaurus/isframe.htm
6. Web resources directory.
   http://www.albany.edu/faculty/tangr/isp602/f01/sources.htm
7. Search engine terms.
   http://www.cadenza.org/search_engine_terms/index.htm

Lesson 3

What are the trends and issues in information seeking and behavior in an electronic environment?

Teacher's Guide

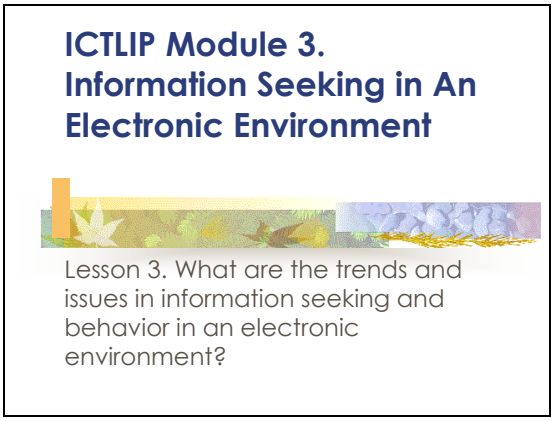
Module 3. Information Seeking in an Electronic Environment

Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Note

The teacher's guide provides notes and tips for the PowerPoint presentation that you will use in conducting the course.

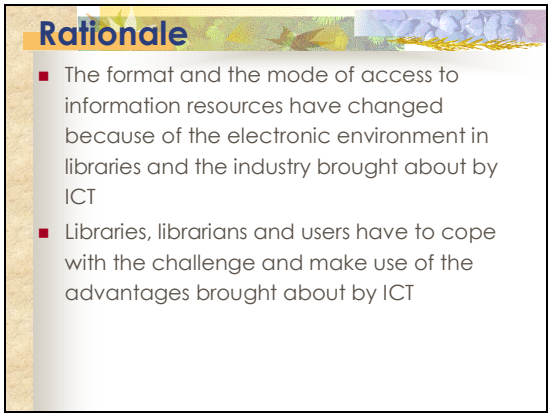
Slide 1



Tip

Establish rapport with participants by asking the students to answer the question on the title slide. This will serve as a motivation activity by letting them know that you are interested in what they know and that you give importance to what they have to say. This will also encourage them to actively participate in the lecture / discussion. Their answers in turn, no matter how brief, will help you gauge their understanding of the subject matter. There is no need to discuss their answers at this point.

Slide 2



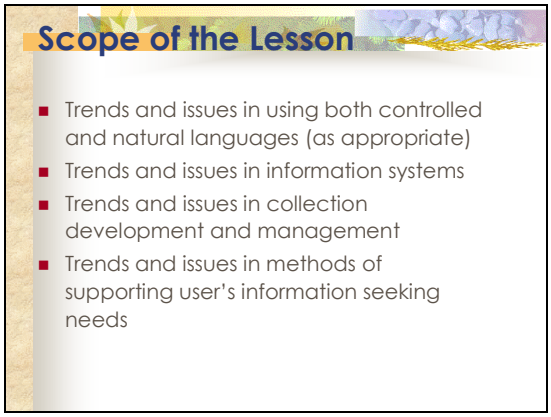
Rationale

This Module will provide the students with information about trends and issues in information seeking. The students will gain enough information to encourage them to continue updating themselves about trends and issues in information seeking in an electronic environment.

Note

Slide 2 will provide justification for the lesson. You can also at this point ask the students to recount their own training and other experiences with regards to information seeking in an electronic environment.

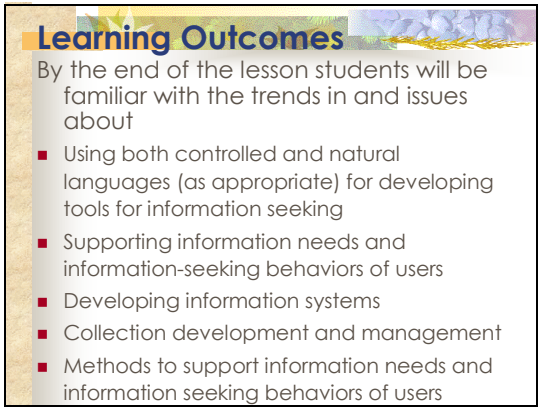
Slide 3



Tip

Mention the scope of the lesson and then ask the students if there are other issues and trends that they would like to discuss.

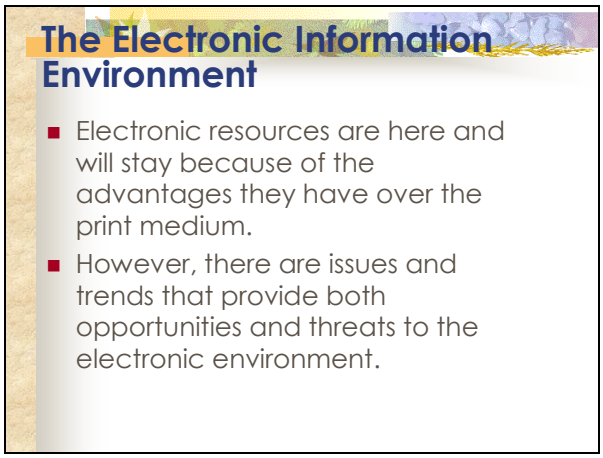
Slide 4



Tip

Just mention the outcomes. There is no need to discuss the slide.

Slide 5



Tip

Before beginning the lesson, mention that the electronic environment is dynamic and that changes occur regularly.

Slide 6

The issues and trends in information seeking in an electronic environment can be grouped into technological, economic, human (user and staff), socio-political, organizational, and legal as well as relating to the structure of the information environment itself.

Tip

Ask some questions to help the students recall some ICT concepts about hardware and software.

Slide 7

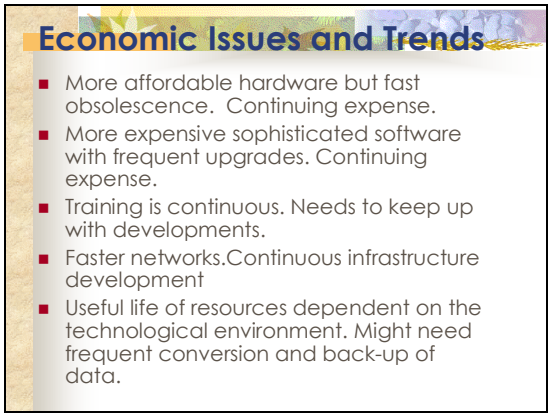
Tip

Discuss developments in hardware, software, networks, security and emerging technologies, and how they affect the electronic environment.

Activity 3-1

Ask the students to discuss some effects of hardware and software changes in their libraries.

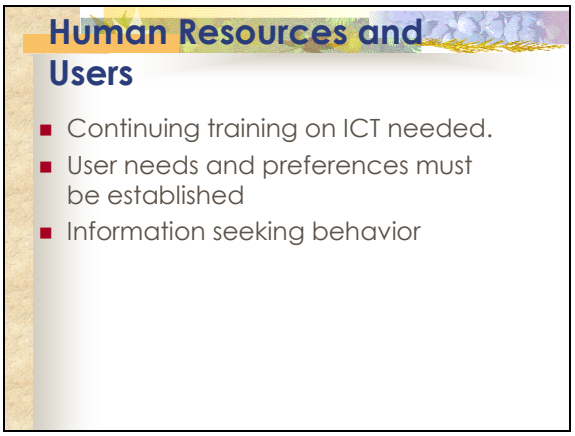
Slide 8



Tip

There is no need to discuss this slide except perhaps to mention that although, electronic systems are expensive, they are more affordable now than they were 10 years ago.

Slide 9



Tip

Briefly explain the impact of technological changes on staff knowledge and skill and user needs, preferences and information-seeking behavior.

Activity 3-2

Ask the students to access sites on the Internet that discuss the new roles and new knowledge and skills required of librarians. Give them 30 minutes to look for information. Discuss their findings.

Slide 10

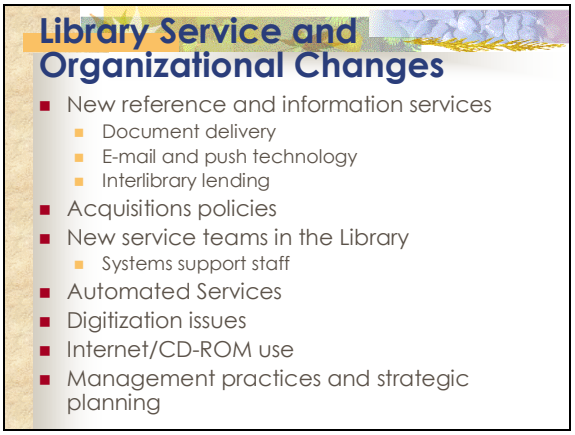
There are a number of socio-political issues that affect information- seeking behavior. Some governments limit Web access to specific groups within the population. Other governments filter out unwanted sites because of ethical issues. Individuals have personal preferences about the contents and interfaces of sites. Some use only one search engine.

Because of the ease of downloading and copying, Intellectual Property Rights of authors are sometimes disregarded. The laws of copyright and the Fair Use Principle apply not only to print resources but also to digital resources.

Activity3-3

Ask the students to access sites on the Internet that discuss Intellectual Property Rights (IPR), copyright and Fair Use Principles as applied to electronic resources. Give them 30 minutes to look for information. Discuss their findings.

Slide 11

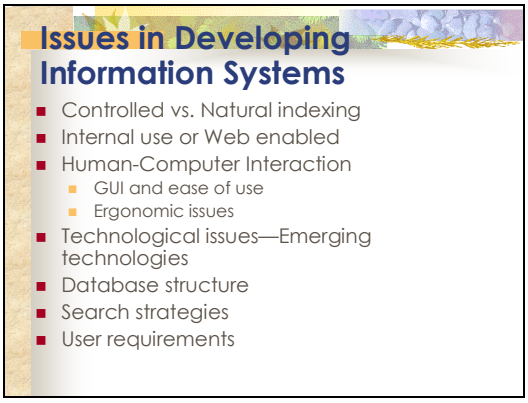


Library services have been greatly affected by the shift from print to digital resources. The acquisitions section had to develop new policies about acquiring materials. The reference service had to purchase and make available electronic databases of abstracts and indexes as well as full- text journals, encyclopedias and other reference materials. Even the delivery of information to the user has changed. Digital information can be sent directly to the user's desktop. Librarians have to learn how to use ICT to be able to provide adequate service. Digitization of information materials and their indexes is also being done in-house.

Tip

Briefly discuss the other services affected by the shift from print to electronic and how information- seeking behavior is changing in the process.

Slide 12

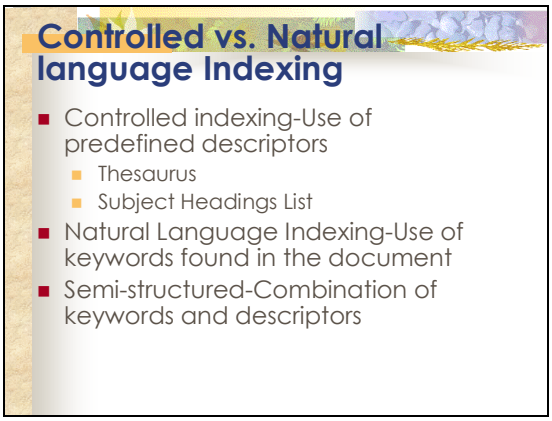


To enable librarians and researchers to access electronic resources, information systems had to be developed. Knowledge representation is the key to access, but no individual or group can become an authority in representing all of knowledge.

Tip

Ask the students to explain what they understand about human- computer interaction. There is no need to discuss in detail all of the above issues and trends

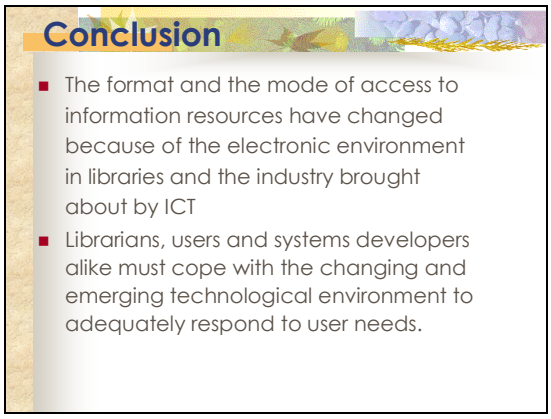
Slide 13



Controlled indexing makes use of descriptors that have been assigned by human indexers. These descriptors are listed in a thesaurus or in a subject headings list. In producing the concept map for the document, the thesaurus and the subject headings list are consulted for possible descriptors. The controlled vocabulary is advantageous to use because all documents fall into a predefined set of descriptors. Synonyms can be replaced by just one term that will always be used to describe a particular concept. Retrieval is fast and the index is not cluttered with unwanted terms. It is disadvantageous in that sometimes new terms are already in use but the thesaurus or subject headings list have not been updated. It is also expensive to index documents using a list of controlled terms and it can be difficult in practice to do this challenging task accurately and consistently from document to document, and indexer to indexer.

In natural language indexing, keywords found in the document are used to describe the document. This kind of indexing can be done by a computer. It is fast but it produces a lot of unwanted, meaningless terms. It is advantageous because it uses words naturally occurring in the document and currently in use. It also provides many more search terms than a small number of controlled indexing terms. This type of indexing is dynamic.

Slide 14



Since libraries are acquiring digital information and have access to the Internet, librarians must keep abreast of developments to be able to provide clients with the right information at the right time.

In the future, the library will not only be networked, stocked with a core collection that is multimedia, have access to global information, and be digital or virtual, but it will also be a focal point for information services that make use of electronic resources. Librarians must acquire skill in using ICT and in dealing with requests from remote telephones or computers.

Tip

Before concluding the lesson, ask some questions to recall and reinforce the information and concepts taught in the lesson.

Glossary of terms used in Module 3

- **Access.** Refers to the ability of the user to connect to a database, or Internet service.
- **Boolean logic.** A method of formulating a query that allows search terms to be combined using the operators AND, OR, NOT. A common method of document retrieval based on classic set theory.
- **Browsing.** Interactive task in which the user explores the document collection rather than retrieving documents which satisfy a specific information need.
- **CD-ROM.** Compact Disk Read Only Memory, a type of laser disk used for storing and distributing text, images, video, animation and/or sound clips.
- **Cluster.** A grouping of documents sharing similar properties.
- **Collection.** In libraries the term represents all the materials selected according to a collection management plan.
- **Communications network.** Group of interconnected computers and communications devices that can send data back and forth. Examples are local area networks (LANs) and wide area networks (WANs).
- **Content-Based Filtering.** The process of selecting relevant documents by filtering or extracting features from the text of the documents to determine their relevance. Also called "cognitive filtering".
- **Data retrieval.** The retrieval of documents whose contents satisfy the conditions specified in a user query.
- **Database.** A collection of data organized in such a way that discrete data elements can be retrieved quickly on demand.
- **Database producers.** The organizations that create databases of various kinds including electronic abstracting and indexing tools as well as other reference and full-text databases.
- **Database vendors.** The organizations that license databases from their producers and provide search software and a user interface for consumer access to the information contained in the database.
- **Digital.** Refers to information and/or communications signals represented in two states or in binary format—0 and 1, or on and off.
- **Directory.** A hierarchical categorization of concepts in a domain of knowledge.
- **Document.** A unified item of information the user may want to retrieve. This could be a Web page, a newsgroup posting, a picture, an article or a whole book.
- **E-mail or Electronic mail.** A communications tool used to send messages to and from computers, or the messages themselves.
- **Electronic library.** A library that makes use of ICT to create, collect, consolidate and communicate digital information. May also be called a digital library.
- **Electronic resources.** Any information material that is stored in digital format in any of the secondary storage devices such as hard disk, floppy disk, CD-ROM, etc.
- **HTML.** Hypertext markup language of the Web, based on SGML.
- **Hardware.** The physical devices that make up a computer system.

- **Human Computer Interaction (HCI).** The study of interface design principles in relation to particular user groups.**ICT.** Information and communications technologies
- **Index.** A data structure describing a database's content whose task is to provide rapid access to that content.
- **Index term (or keyword).** A pre-selected term which has been assigned to a document to describe its content. The index term may be chosen by a human indexer or automatically identified by indexing software. In the former case, typically only a few index terms are assigned to any one document; in the latter case typically all words in the document are assigned as index terms except for any stop words.
- **Indexing.** The process of assigning index terms to a document so that it can be easily and quickly retrieved. Can also be used to mean the process of analyzing the subject content of a document and assigning several index terms that encapsulate the subject content of the document.
- **Information.** Data that has been organized so as to give it meaning; that which causes a change in one's knowledge status.
- **Information Extraction.** An attempt to identify discrete and relevant information content from a document.
- **Information Filtering.** The process of retrieving information that the user wants and leaving behind information that the user does not want.
- **Information Need.** What the user really wants to know.
- **Information Retrieval (IR)** The study of systems for representing, searching and finding information. A part of information science that studies the retrieval of information from a collection of documents.
- **Information society**. A society that is very dependent on information. A society in which information generation, processing and dissemination plays a major role in the economy .
- **Information system.** Generally a computer based system for storing, organizing and retrieving data and/or information.
- **Intellectual property rights**. Authors' rights to the intellectual content of their published work.
- **Interactive.** Pertaining to online where there is an immediate interaction between user and the computer.
- **Internet.** The collection of computer and information systems sharing a common communications protocol and linked together to allow global transfer of information.
- **Intranet.** An Internet- type network built for use within an organization, which may or may not be connected to the Internet itself
- **Inverted File.** A kind of index that typically comprises three separate files (Index, Postings and Print) and which is commonly found in information retrieval systems.
- **Keyword.** See **Index term.**
- **LAN.** An abbreviation for Local Area Network - a system of computers located within a small area and linked together by a communication network to share resources.
- **Metadata. Data about data. A template according to which documents (usually a web-based documents) can be described consistently in terms of particular**

attributes such as author, subject content, or format. A well-known we-based example is the Dublin Core.

- **Metasearch.** A search technique common on the World Wide Web where a single point of entry is provided to multiple heterogeneous search engines, whose individual search results are combined into a single, unified hit-list for the user.
- **Multimedia.** I Information represented in more than one medium such as text, graphics, animation, video, sound, etc.
- **Online or on-line.** Refers to the connectivity of a computer to a network.
- **Online access.** Pertaining to the interactive access of a computer during the information processing cycle as differentiated from non-interactive off-line access.
- **OPAC. (**Online Public Access Catalog) An electronic version of a library's collection catalogue, accessible to the public via a PC or terminal. Software that provides user access to information contained in a library collection.
- **Online Public Access Catalogue.** See **OPAC.**
- **Precision.** A standard measure of Information Retrieval performance, precision is defined as the number of relevant documents retrieved divided by the total number of documents retrieved in a search. See also recall.
- **Query.** A string of words that is used to represent the information need of a searcher. . The expression of the user's information need as input to an information retrieval system. The query may be expressed as a natural language sentence, or as one or more keywords.
- **Recall. A standard measure of information retrieval performance, r**ecall **i**is defined as the number of relevant documents retrieved divided by the total number of relevant documents in the collection. See also precision.
- **Relevance.** An abstract measure of how well a retrieved document satisfies the user's information need.
- **Relevance Feedback.** A process of refining the results of an information search by automatically feeding back into a new query search terms identified from documents already retrieved by an earlier query and judged relevant. Typically it is the user who makes that initial relevance judgement. .
- **Robot.** See spider.
- **Search history.** A mechanism for tracking the history of a user session or of a collection of user sessions by listing the queries entered to the information retrieval system by a user.
- **Semi-structured data**. Data whose structure may only partially match, the structure prescribed by the data schema.
- **Spider.** Also called a robot, a program that scans the web in order to index its content.
- **Stopword.** A word such as a preposition or article that has little semantic content and therefore is not included when an index is generated. It also refers to words that have a high frequency across a collection and therefore are not considered significant for indexing purposes. **Term .** A single word or concept that occurs in a a document, query or index. See also keyword.
- **Term Frequency** (TF) The number of times a term occurs in a given document, database or query.

- **Thesaurus. A tool intended to simplify information retrieval by exerting a control over the indexing language used.** A data structure representing knowledge in a particular subject domain and used to index and search databases. The thesaurus controls synonyms by specifying for any synonyms just one term that must always be used. It also typically organizes these terms in hierarchical structures of broader, related and narrower terms to help users with term selection.
- **User.** The individual providing input or using output from the computer – may be an information professional acting on behalf of a client, or the actual client (also called an end user).
- **User friendly.** An interface that is easy to lean and use. It enables the inexperienced user to interact successfully with the computer
- **User information need.** A natural language declaration of the informational need of a user. The need must be converted into a query to search for it on an information retrieval system.
- **WAN.** (Wide area network). A network of computer systems that is not confined to a single location.
- **Web page.** A page in the World Wide Web.

Evaluation Form

To help us enhance the quality and effectiveness of this module, complete and return this evaluation form.

Module: _____
Date: _____
Teacher: _____

Please rate the module on the following categories using the scales below by drawing a circle around the appropriate number.

5=Strongly Agree [SA] 4=Agree [A] 3=Neutral [N] 4=Disagree [D] 1=Strongly Disagree [SD]

Objectives and Content	SA	A	N	D	SD
Were the course objectives clearly stated?	5	4	3	2	1
Were the objectives achieved?	5	4	3	2	1
Were the topics presented relevant to your work?	5	4	3	2	1
Was the course structured in a logical way?	5	4	3	2	1
Were the activities appropriate to the content of this course?	5	4	3	2	1
Was the course easy to follow?	5	4	3	2	1
Was the course interesting and enjoyable?	5	4	3	2	1
Were your expectations met?	5	4	3	2	1

Presentation	SA	A	N	D	SD
Were the concepts and techniques explained clearly?	5	4	3	2	1
Were you encouraged to actively participate during the course?	5	4	3	2	1
Were your individual questions/problems discussed to your satisfaction?	5	4	3	2	1
Was the course well paced?	5	4	3	2	1
Were the lessons presented in a clear and well organized manner?	5	4	3	2	1

Teacher	SA	A	N	D	SD
Was the teacher knowledgeable in the subject matter?	5	4	3	2	1
Did the teacher present the material effectively?	5	4	3	2	1
Did the teacher show interest in and enthusiasm for the subject?	5	4	3	2	1
Was the teacher effective in answering questions clearly and constructively?	5	4	3	2	1

Learning Environment	SA	A	N	D	SD
Are the course materials easy to read?	5	4	3	2	1
Were the manual and the other handouts useful?	5	4	3	2	1
Were the visual aids useful?	5	4	3	2	1
Was the venue suitable for the course?	5	4	3	2	1
Was the time frame appropriate for the course?	5	4	3	2	1

The Training in General

Before the training began, how experienced were you with the subject of training?
1 (Novice) 2 (Intermediate) 3 (Advanced) 4 (Expert)

How useful was the training for your level of experience?
1 (Not Useful) 2 (Fairly Useful) 3 (Useful) 4 (Very Useful)

Do you feel you have gained new skills and knowledge? Yes No

What is the most important concept or skill conveyed in this training?

_____

_____

What is the least important concept or skill conveyed in this training?

_____

_____

What additional information should be included in the training?

_____

_____

What did you like most about the training materials?

_____

_____

What did you like least about the training materials?

_____

_____

Other comments or suggestions:

_____

_____

_____

THANK YOU!

Student's Guide

Module 3. Information Seeking in an Electronic Environment

Introductory note

This is Module 3 of the *ICT for Library and Information Professionals (ICTLIP) Training Package for Developing Countries*. This Package is intended to provide the knowledge and skills required to deal with the application of ICT to library and information services. It is meant for library and information personnel who may become trainers in the area. The package has been developed by the UNESCO Asia & Pacific Regional Office with funding from the Japanese Fund in Trust for Communication and Information. It contains six modules:

Module 1 - Introduction to Information and Communication Technologies
Module 2 - Introduction to Integrated Library Systems
Module 3 - Information Seeking in an Electronic Environment
Module 4 - Database Design, and Information Storage and Retrieval
Module 5 - The Internet as an Information Resource
Module 6 - Web Page Concept and Design: Getting a Web Page Up and Running

The Student's Guide contains the following:

- Module Introduction
  - Introductory note
  - Learning outcomes
  - Course outline
  - Duration
  - Course content and schedule
  - Typographical conventions
- Handouts: Lessons 1-3
- Glossary
- Activities
- List of references

Learning outcomes

Module 3 is designed for participants to acquire knowledge and skills that will help them train other information professionals to look for information in an electronic environment.

- Appreciate the impact of ICT on the information industry, services and professionals
- Understand the information- seeking behavior of users in an electronic environment
- Know how to search and browse using a range of information systems (OPACs, CD-ROMs, Web)
- Know how to apply a variety of search techniques
- Understand the importance of interface design
- Search using both controlled and natural languages (as appropriate)
- Know how to support users' information-seeking needs

Note: The content of Module 1 must be understood by all students (either by students first finishing Module 1, or as a result of prior knowledge of ICT) before they proceed with the remaining five modules in the *ICTLIP Training Package*. **Course Outline**

Lesson 1. How has ICT Affected the Information-Seeking Behavior of Users?
Scope

- Impact of ICT on the information industry and services
  - Format of information resources
  - Information searching tools
- Impact of ICT on the user
  - Information needs
  - Information- seeking behavior
- Methods to support users' information- seeking needs
- Impact of ICT on the librarian and other information professionals
  - New Knowledge
  - New Skills

Learning outcomes

By the end of the Module , students will be able to:

- Appreciate the impact of ICT on the information industry and services
- Know about the different formats of information resources
- Know new ways of representing information in an electronic environment
- Understand the information-seeking behavior of users in an electronic environment
- Appreciate the impact of ICT on librarians and other information professionals

Lesson 2. What principles and skills are needed in searching available information systems (OPACs, CD-ROMs, Web, etc.)?

Scope

- Principles of searching information systems
- Using a variety of search techniques
- Formulating search strategies/queries
- Using selected information systems (OPACs, CD-ROMs, Web, etc.)

- Impact of interface design

Learning outcomes

By the end of the Module , students will be able to:

- Understand the principles of searching information systems
- Use a variety of search techniques
- Formulate search strategies/queries using both controlled and natural language as appropriate
- Use a range of information systems
  - OPACs
  - The Web: Cataloguing resources (Web OPACs), abstracts and indexes, full-text and multimedia documents and journals, dictionaries and encyclopedias
  - CD-ROMs: Cataloguing resources, abstracts and indexes, full-text and multimedia documents, dictionaries and encyclopedias
- Appreciate the importance of interface design

Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Scope

- Trends and issues in using both controlled and natural languages (as appropriate)
- Trends and issues in information systems
- Trends and issues in collection development and management
- Trends and issues in methods of supporting users' information- seeking needs

Learning outcomes

By the end of the Module, students will know about the trends and issues in:

- Using both controlled and natural languages (as appropriate) for developing tools for information seeking
- Developing information systems
- Collection development and management
- Methods to support information needs and information- seeking behaviors of users

Duration

The Module is designed for a one-week course of 40 hours: eight hours per day for five days.

Course content and schedule.

Day	Lessons

Day 1	Lesson 1. How has ICT Affected the Information-Seeking Behavior of Users?
Days 2-4	Lesson 2. What principles and skills are needed in searching available information systems (OPACs, CD-ROMs, Web, etc.)?
Day 5	Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Selection criteria for participants (participants profile)

Participants should be working in a library or information center, or in a school of library and information science. Participants with a degree in library and information science are preferred. Participants should normally have:

- A degree in library and information science or at least two years' experience working in a library
- A working knowledge of English
- A working knowledge of using computers in a Windows environment

Typographical conventions

Activity

Activity for the students

Reference

Reference and further reading materials

Glossary

Glossary of terms used in the module

Lesson 1

How has ICT Affected the Information-Seeking Behavior of Users?

ICTLIP Module 3. Information Seeking in An Electronic Environment

Lesson 1.

How has ICT Affected the Information-Seeking Behavior of Users?

Rationale

- The format and the mode of access to information resources have changed because of the electronic environment in libraries and the industry brought about by ICT
- Libraries, librarians and users have to cope with the challenge and make use of the advantages brought about by ICT

Scope of the Lesson

- Impact of ICT on the information industry and services
  - Format of information resources
  - Representation of information seeking tools
- Impact of ICT on the user
  - Information needs
  - Information seeking behavior
  - Methods to support user information needs
- Impact of ICT on the librarian and other information professionals

Learning Outcomes

By the end of the lesson, the student must be able to:

- Appreciate the impact of ICT on the information industry and services
- Know the different formats of information resources
- Know new ways of representing information in an electronic environment
- Understand the information-seeking behavior of users in an electronic environment
- Appreciate the impact of ICT on the librarian and other information professionals

What is Information?

- Information is anything that can change a person's state of knowledge (What one knows) and physical representations of abstractions that can cause this change.
- Information used to be obtained only from friends, experts, printed books, serials, audio-visual materials, etc.
- Information used to be accessible through the card catalog, printed bibliographies, etc.

What is the Impact of ICT on information resources and tools for access?

Digital: Internet

Print

Digital: CD-ROM, DVD, DAT

The digital environment has led to changes in the creation, storage, distribution, access and delivery of information.

Information Resources

- Printed and electronic books (e-books)
- Printed and electronic journals (e-journals)
- Printed and electronic reference tools (e-dictionaries, e-abstracts and indexes, multimedia encyclopedias, etc.)



What is Information Seeking?

- Information seeking is the the process engaged in by humans to change their state of knowledge. It is a high level cognitive process that is part of learning or problem solving. To seek information implies the need to change the state of one's knowledge.
- Information retrieval is concerned with getting information from databases.
- Searching is the behavioral manifestation of information seeking.

Ways to Represent Documents to Support Information Seeking

- Indexing using a standard indexing language (e.g. Library of Congress Subject Headings List) or a knowledge-based indexing language (MESH)
- Indexing using terms in the document and generating an inverted file. Boolean algorithms may be used for searching
- Full text indexing or indexing all the words in the document and (String search)
- Treating documents as vectors—Accounts for the number of times a term is used in the document. Retrieved document can be ranked.
- Latent semantic indexing-Compares an input vector with all document vectors to determine the best match.

Developments in Electronic Environments

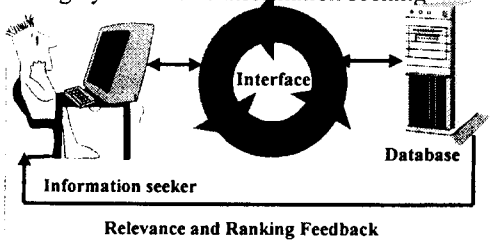
- Hardware, data structuring and algorithms
- Interfaces—Human computer interaction, GUIs and WIMPS
- Hypermedia research
- Research in document representation and retrieval

Information Searching Tools

- Printed tools (Card catalog, printed bibliographies, printed abstracts and indexes, etc.)
- e-tools for library collections(OPAC, Web OPAC, Online databases—abstracts and indexes)
- Search engines for the Web collection (Google, Alta Vista Advanced Search, AllTheWeb), Meta-Search Engines--most of which are not recommended, others)
- Subject Directories
- Invisible Web (Searchable databases)

Interactive Information Seeking

- Ranking and relevance feedback support highly interactive information seeking



Relevance and Ranking Feedback

Impact of ICT on the User

- Preference in using ICT for fast efficient comprehensive search for information.

Efficient global communication results in frequent personal interaction among researchers.

ICT competent users

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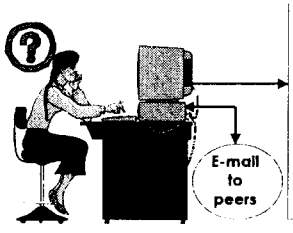
What is Information Seeking Behavior?

- Reasons for searching and strategies used to find and use information.



Reference materials
- **OPAC/WebPAC**
- **Abstracts and indexes**
- **Dictionaries and encyclopedias**

Full text and multimedia materials
- **Print**
- **E-books**
- **E-journals**

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Behavioral Model of Information Seeking or Literature Searching

Motivations + Moves	=	Information seeking behavior

- Motivations—Reasons for information seeking
- Moves—Strategies used to find information.

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Strategies in Information Seeking

- Sources:
  - Recall
  - Asking friends, colleagues or experts
  - Consulting personal collections of books, periodicals and files
  - Conducting empirical investigations
  - Consulting libraries, research firms, electronic networks
  - Making use of information services
- Methods
  - Analytical strategies
  - Browsing strategies

Selected Researches on Information Seeking

- Aguilar (1967), Weick and Daft (1983), Daft and Weick (1984)
- Eisenberg and Berkowitz (1996)
- Ellis (1989), Ellis, et. al. (1993), Ellis and Haugan (1997)
- Marchionini (1995)

Aguilar (1967), Weick and Daft (1983), Daft and Weick (1984)

Modes of organizational scanning

- Undirected viewing—Broad scanning
- Conditioned viewing—Assessment of information gathered
- Informal search—Search for more information to deepen knowledge
- Formal search—Planned procedure to obtain information about a specific issue

Eisenberg and Berkowitz (1996)

The Big6

- Task definition: Define the problem, identify the information needed
- Information seeking strategies: Brainstorm all possible sources, select the best sources
- Location and access: Locate sources, Find information within sources
- Use of information: Engage, extract relevant information
- Synthesis: Organize information, present the result
- Evaluation: Judge the result and the process

Ellis (1989), Ellis, et. al. (1993), Ellis and Haugan (1997)

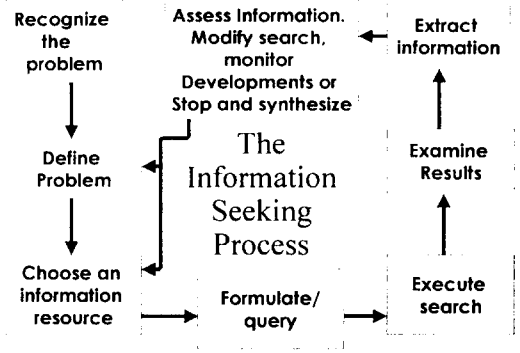
Model of information seeking behavior

- Starting—Identifying sources of interest
- Chaining—Pointers from an initial source are followed
- Browsing—Semi-directed search in areas of potential search
- Differentiating—Filtering and selecting
- Monitoring—Keeping abreast of developments
- Extracting—Systematically going through the sources

Marchionini (1995)

- Browsing modes:
  - Directed browsing—Focused on a specific target and systematic
  - Semidirected browsing—less focused and systematic but still purposeful
  - Undirected browsing—No real target and not systematic
- Model of information seeking
  - Recognize and accept an information problem
  - Define and understand the problem
  - Choose a search system
  - Formulate a query
  - Execute search
  - Examine results
  - Extract information
  - Reflect/iterate/stop

Steps in Information Seeking



Impact of ICT on the Library and the Librarian

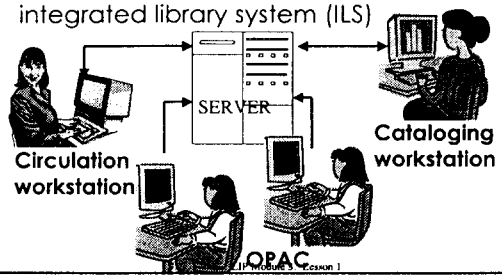
- The digital information environment changed the way information is created, collected, consolidated, and communicated. Library services became automated and information services became electronic.
- Librarians had to learn new knowledge and skills in order to meet user needs for new information services using ICT and e-resources.

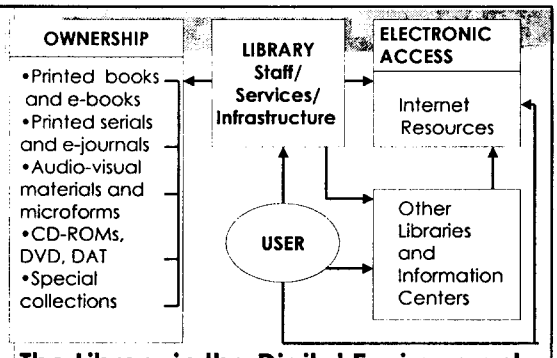
Library Services in a Digital Environment

- Automated library system
- Services for e-onsite resources: CD-ROM, e-journals on subscription, e-books
- Internet services
- Information services: SDI, Repackaging of information
- Resource sharing activities: Interlibrary loan, document delivery

An Automated Library

An automated library system that uses a single database for its various operations and services is called an integrated library system (ILS)





The Library in the Digital Environment
Electronic Library Model

Impact of the Digital Environment on Librarians: New Roles

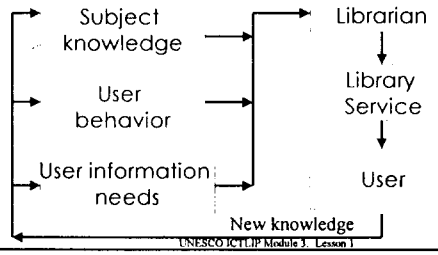
- Create
- Collect
- Consolidate
- Communicate
- Preserve

→ Information → User

In an electronic library these functions and services are done and provided using ICT

Impact of the Digital Environment on Librarians: New Knowledge

Understanding of the broader context within which the information professional works.



Conclusion: ICT has Greatly Affected the Information Environment

Librarians and other users of information must adapt to the changing technological environment to:

- be able to use electronic resources and access tools
- be able to respond to new user information needs and information-seeking behaviors
- be able to participate in the national, regional and global infrastructure.

Lesson 2

What principles and skills are needed in searching available information systems?

ICTLIP Module 3. Information Seeking in An Electronic Environment

Lesson 2. What principles and skills are needed in searching available information systems?

Rationale

- The format and the mode of access to information resources have changed because of the electronic environment in libraries and the industry brought about by ICT
- Libraries, librarians and users have to cope with the challenge and make use of the advantages brought about by ICT

Scope of the lesson

- Principles of searching a range of information systems
- Using a variety of search techniques
- Formulating search strategies/queries
- Using selected information systems (OPACs, CD-ROMs, Web, etc.)
- Impact of interface design

Learning Outcomes

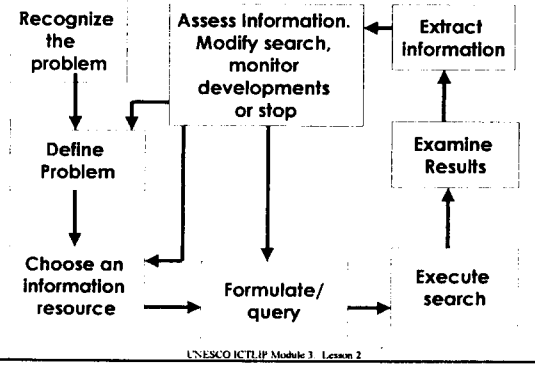
By the end of the course, the student must be able to:

- Understand the principles of searching information systems
- Acquire skill in using a variety of search techniques
- Acquire skill in formulating search strategies/queries using both controlled and natural language as appropriate
- Acquire knowledge and skill about using a range of information systems (OPACs, the Web, CD-ROMs)
- Appreciate the importance of interface design

Steps in Information Seeking

- Recognize the problem.
- Understand and define problem.
- Identify, evaluate and select relevant resources.
- Formulate query.
- Execute search.
- Examine results. Decide what is valuable to extract.
- Extract information.
- Assess information extracted. Decide to iterate, monitor developments or stop search.
- Synthesize by restructuring and repackaging the information into a new form that meets the defined problem.

The Information Seeking Process



Defining the Problem: Using Concept Maps

- Write down the question or topic sentence
- Select the keywords from the title
- Write down below each keyword synonymous terms
- Example: E-publications and libraries

Concepts	E-publications	Libraries
Synonym	Digital publications	Information centers
Synonym	E-books	Reading centers
Synonym	E-journals	

Stop words

- Words that are not searched for by search engines or are not considered significant in formulating a search query are called stop words.
- Examples are: articles, adverbs, forms of the infinitive "to be", conjunctions, prepositions.
- Search engines differ in their stop word lists.

Information Resources and Tools

- After defining your problem, select a database(s) to use that will most likely answer your problem.
  - Bibliographic resources (OPACs, and CD-ROM and online databases)*
  - Full-text resources*
  - Graphic resources*
  - Search engines and directories
- Take note that there are also print resources that may be used
- You may also ask experts and colleagues

What are CD-ROMs?

- Optical disks that are written and read by lasers are called CD-ROMs. The acronym stands for Compact Disk-Read Only Memory. It is used as a storage medium for text, graphics and sound.
- The publishing industry use CD-ROMs to store and distribute digital information.
- They are used to create and store cataloging data, abstracts and indexes, encyclopedias and dictionaries, etc.
- They are being superseded by online databases on the Web because frequent updating is possible in an interactive medium.

Characteristics of CD-ROMs

- CD-ROMs can hold up to 700 megabytes of data or 7000,000 pages of text or 7000 images or more than an hour of video.
- It is a read only storage device for digital information.
- CD-ROMs containing indexes and abstracts, catalogs, may be searched using search techniques similar to those used in the Internet.
- CD-ROMs are preferred to print because of faster retrieval of information

The Tool Set for Formulating the Search Statement

- Parentheses—Use to keep groups of terms together. This may not be used by some databases
- Fields—Use to limit search to a field. E.g. Title field, subject field or author field
- Subject headings or descriptors—Use of predefined terms used in the database to describe the article. This provides more precise retrieval. Usually, the index is consulted in choosing descriptors.
- Truncation or wild cards—Use of asterisk or any other symbol to include all terms with the root term. E.g. LIBRA* can mean library, libraries, librarians, etc.

Formulating the Search Statement

- Formulate search statement by combining keywords using AND, OR, NOT
- Use truncation(*) and parenthesis to enclose synonymous terms and separate them from another set of synonymous terms
- Use quotes to put adjacent terms together as a single concept.
- Example:
  - E-publications AND libraries NOT e-books
  - (E-pub* OR Digital pub* OR E-Journals) AND (Libraries or "Information Centers" or "Reading Centers") NOT E-books
- Some databases use search boxes already linked by the Boolean symbols

Modifying Search

- Sometimes your results using one database are not satisfactory. Repeat the same search statement using another database. There are many instances when the documents in one database do not overlap those in another database.
- If the results are still unsatisfactory, redefine your concept map and change your search statement. You may be using terms and descriptors not used by the computer. Remember that computers only search words not meanings.

Thesaurus and Subject Headings Lists

- A thesaurus or subject headings list can be used to modify the search. These tools provide the user with the controlled vocabulary used by certain databases.
- Examples:
  - Medical Subject Headings (MESH)— http://www.nlm.nih.gov/pubs/factsheets/mesh.html/
  - Lists of thesauri available online
    - http://www.lub.lu.se/metadata/subject-help.html
    - http://www.nlc-bnc.ca/8/4/r4-280-e.html
  - Helpful sites
    - http://www.shawnee.edu/offices/clarklib/clarklibinfo/searchstrategy.html
    - http://helix.helsinki.fi/infokeskus/novaweb/thesaur.htm

Searching the Internet

- The Internet is made up of Web pages. Search engines and subject directories are used to search them.
- Search engines
  - Individual search engines are those that compile their own 'word by word" index to the Web automatically by using "spiders" or "robots" to crawl through the Web from link to link.
  - Meta search engines search the index databases of individual search engines simultaneously..
- Directories are created by a staff of editors who visit and evaluate web sites, and then organize them into subject-based categories and sub-categories.

Individual Search Engines

- All search engines do keyword searches against a database. Factors that influence the results from each one are: size of the database, frequency of update, speed, search capability and design.
- Recent addition of new content, redesign and partnership changes have turned some search engines into portals.
- When using individual search engines the index database is actually searched and not the entire Web. Most engines are not current. For a more comprehensive search use more than one search engine although there will be some overlap.

Examples of individual search engines

- **AltaVista**—Comprehensive. Searches the entire HTML file.
- **Excite**—Concept searching is the strong feature. Good for narrowing down searches.
- **Google**—Perhaps the largest search engine on the Web. Keeps current.
- **HotBot**—Has some unique search features including sorting results by date or media type.
- **Lycos**—One of the oldest search tools on the Internet, but keeping up-to-date with a variety of result options available.

Subject/Web Directories

- One key difference between a search engine and a directory is that a directory has a structure that can be browsed and it is created by human editors who decide where to list each site within the subject based directory structure.
- Examples of subject directories: Yahoo, Snap, LookSmart, Excite, and Magellan
- To use Yahoo! Directory, click your way through its many categories and sub-categories created by its editors (Arts & Humanities, Business & Economy, Computers & Internet, Education, Entertainment, Government, Health, News & Media, Recreation & Sports, Reference, Regional, Science, Social Science, Society & Culture).

Metasearch Engines

- Metasearch sites or metacrawlers send searches to several search engines. They offer a quick and dirty approach to searching that sometimes works. They do not search all the engines. Some of the largest search engines on the Web like Northern Light and Google are missed out.
- Examples: Dogpile, Mamma, Metacrawler, SavvySearch, Ixquick, Vivisimo, Profusion

Types of Gateways

- Library gateways: Collections of databases and sites that have been assembled by librarians. Example: Internet Public Library.
- Vortals: (vertical portals) Subject specific databases subject created by researchers, experts or organizations. Example: ERIC Clearinghouses, WebMD.
- Portals: Sites that offer not only searching and links to resources by subject, but also many other services such as: shopping, travel and airline ticket bookings, entertainment, stock quotes, games, chat rooms, free e-mail, etc.

The "Invisible Web"

- Also called the "Deep Web," comprises sites that have not been indexed by search engines. These are usually password protected or behind firewalls. The invisible Web accounts for more than 50 per cent of the materials on the Internet.
- Library gateways and vortals are sometimes useful in looking for materials in the "Deep Web."

Other Electronic Resources

- Library OPACs (May or may not be available on the Web as WebPACs): The tool to access the holdings of a library.
- Library produced indexes and abstracts: May be on CD-ROM or available online via the library LAN
- CD-ROMs (May or may not be Web/LAN accessible): Commonly used for periodical indexes, statistical databases, and multimedia exhibits.

Synthesizing results

- The synthesis of the results depends on the purpose of the researcher. Each one has its own style, format, content need, etc.
- The results may be used for:
  - Reports
  - Essays
  - Newspaper articles
  - Review of literature
  - Personal updating
  - Project proposals
  - Decision making and strategic planning
- Adhere to copyright laws and the fair use principle in using materials.

Citing Results

- Citation styles vary. What is important is the consistency in what is used.
- Two popular methods are:
  - Publication Manual of the American Psychological Association (APA)
  - MLA Handbook for Writers of Research Papers

Evaluating Information Resources

- Source: Is the domain authoritative?
- Authority: Is the author or issuing body credible?
- Purpose of the resource: Is the material for academic, entertainment, economic gain?
- References: Are the references cited credible?
- Timeliness: Is the information current?
- Style: Is the style of the author clear and understandable?
- Reliability/stability: Is the material/site readily available at all times?

Advantages of Electronic Online Searching

- Speed—It takes only seconds or minutes to conduct a search
- Flexibility—Linking is fast
- Variability—Terms can be truncated
- Currency—More frequent updates
- Timeliness—Fast access and delivery
- Availability at a distance—Resource can be searched online from remote PCs
- Multimedia—The information can contain text, audio, video, photographs, etc.

Disadvantages of relying solely on electronic resources

- Not all information is available in electronic format
- Quality control may be weaker than in the case of print resources
- The number of hits is voluminous but a large number of false hits is also retrieved
- Many electronic resources were published only after the 80's. For historical research, print resources must be used
- Some sites are deliberate hoaxes

Conclusion

- The Internet contains a huge amount of information. Specialized tools are used to search for information in it. Each tool has its own rules for searching.
- The information seeking strategy discussed in Lesson 1 is applied in searching for information
- Information resources in the electronic environment are not limited to Internet resources. There are also OPACs, CD-ROMs, DVDs, DAT that are used to publish and distribute information.

Lesson 3

What are the trends and issues in information seeking and behavior in an electronic environment?

ICTLIP Module 3. Information Seeking in An Electronic Environment

Lesson 3. What are the trends and issues in information seeking and behavior in an electronic environment?

Rationale

- The format and the mode of access to information resources have changed because of the electronic environment in libraries and the industry brought about by ICT
- Libraries, librarians and users have to cope with the challenge and make use of the advantages brought about by ICT

Scope of the Lesson

- Trends and issues in using both controlled and natural languages (as appropriate)
- Trends and issues in information systems
- Trends and issues in collection development and management
- Trends and issues in methods of supporting user's information seeking needs

Learning Outcomes

By the end of the lesson students will be familiar with the trends in and issues about

- Using both controlled and natural languages (as appropriate) for developing tools for information seeking
- Supporting information needs and information-seeking behaviors of users
- Developing information systems
- Collection development and management
- Methods to support information needs and information seeking behaviors of users

The Electronic Information Environment

- Electronic resources are here and will stay because of the advantages they have over the print medium.
- However, there are issues and trends that provide both opportunities and threats to the electronic environment.

Issues and Trends in Information Systems in an Electronic Environment

- Technological
- Economic
- Human resources and users
- Socio-political
- Library service and Organizational Changes
- Structured and unstructured information environment
- Legal

Technological Issues and Trends

- Hardware—Faster, bigger capacity; Fast development and obsolescence
- Software—More powerful; Fast development and obsolescence
- Networks—Faster, more powerful, more difficult to monitor
- Reliability of system
  - Security of data
  - Upgrades to new technological environment
  - System support

Economic Issues and Trends

- More affordable hardware but fast obsolescence. Continuing expense.
- More expensive sophisticated software with frequent upgrades. Continuing expense.
- Training is continuous. Needs to keep up with developments.
- Faster networks.Continuous infrastructure development
- Useful life of resources dependent on the technological environment. Might need frequent conversion and back-up of data.

Human Resources and Users

- Continuing training on ICT needed.
- User needs and preferences must be established
- Information seeking behavior

Socio-political and Legal Issues

- Political preferences
- Social preferences
- Intellectual Property Rights
- Copyright and Fair Use
- Ethical Issues

Library Service and Organizational Changes

- New reference and information services
  - Document delivery
  - E-mail and push technology
  - Interlibrary lending
- Acquisitions policies
- New service teams in the Library
  - Systems support staff
- Automated Services
- Digitization issues
- Internet/CD-ROM use
- Management practices and strategic planning

Issues in Developing Information Systems

- Controlled vs. Natural indexing
- Internal use or Web enabled
- Human-Computer Interaction
  - GUI and ease of use
  - Ergonomic issues
- Technological issues—Emerging technologies
- Database structure
- Search strategies
- User requirements

Controlled vs. Natural language Indexing

- Controlled indexing-Use of predefined descriptors
  - Thesaurus
  - Subject Headings List
- Natural Language Indexing-Use of keywords found in the document
- Semi-structured-Combination of keywords and descriptors

Conclusion

- The format and the mode of access to information resources have changed because of the electronic environment in libraries and the industry brought about by ICT
- Librarians, users and systems developers alike must cope with the changing and emerging technological environment to adequately respond to user needs.

Glossary of terms used in Module 3

- **Access.** Refers to the ability of the user to connect to a database, or Internet service.
- **Boolean logic.** A method of formulating a query that allows search terms to be combined using the operators AND, OR, NOT. A common method of document retrieval based on classic set theory.
- **Browsing.** Interactive task in which the user explores the document collection rather than retrieving documents which satisfy a specific information need.
- **CD-ROM.** Compact Disk Read Only Memory, a type of laser disk used for storing and distributing text, images, video, animation and/or sound clips.
- **Cluster.** A grouping of documents sharing similar properties.
- **Collection.** In libraries the term represents all the materials selected according to a collection management plan.
- **Communications network.** Group of interconnected computers and communications devices that can send data back and forth. Examples are local area networks (LANs) and wide area networks (WANs).
- **Content-Based Filtering.** The process of selecting relevant documents by filtering or extracting features from the text of the documents to determine their relevance. Also called "cognitive filtering".
- **Data retrieval.** The retrieval of documents whose contents satisfy the conditions specified in a user query.
- **Database.** A collection of data organized in such a way that discrete data elements can be retrieved quickly on demand.
- **Database producers.** The organizations that create databases of various kinds including electronic abstracting and indexing tools as well as other reference and full-text databases.
- **Database vendors.** The organizations that license databases from their producers and provide search software and a user interface for consumer access to the information contained in the database.
- **Digital.** Refers to information and/or communications signals represented in two states or in binary format—0 and 1, or on and off.
- **Directory.** A hierarchical categorization of concepts in a domain of knowledge.
- **Document.** A unified item of information the user may want to retrieve. This could be a Web page, a newsgroup posting, a picture, an article or a whole book.
- **E-mail or Electronic mail.** A communications tool used to send messages to and from computers, or the messages themselves.
- **Electronic library.** A library that makes use of ICT to create, collect, consolidate and communicate digital information. May also be called a digital library.
- **Electronic resources.** Any information material that is stored in digital format in any of the secondary storage devices such as hard disk, floppy disk, CD-ROM, etc.
- **HTML.** Hypertext markup language of the Web, based on SGML.
- **Hardware.** The physical devices that make up a computer system.

- **Human Computer Interaction (HCI).** The study of interface design principles in relation to particular user groups.**ICT.** Information and communications technologies
- **Index.** A data structure describing a database's content whose task is to provide rapid access to that content.
- **Index term (or keyword).** A pre-selected term which has been assigned to a document to describe its content. The index term may be chosen by a human indexer or automatically identified by indexing software. In the former case, typically only a few index terms are assigned to any one document; in the latter case typically all words in the document are assigned as index terms except for any stop words.
- **Indexing.** The process of assigning index terms to a document so that it can be easily and quickly retrieved. Can also be used to mean the process of analyzing the subject content of a document and assigning several index terms that encapsulate the subject content of the document.
- **Information.** Data that has been organized so as to give it meaning; that which causes a change in one's knowledge status.
- **Information Extraction.** An attempt to identify discrete and relevant information content from a document.
- **Information Filtering.** The process of retrieving information that the user wants and leaving behind information that the user does not want.
- **Information Need.** What the user really wants to know.
- **Information Retrieval (IR)** The study of systems for representing, searching and finding information. A part of information science that studies the retrieval of information from a collection of documents.
- **Information society**. A society that is very dependent on information. A society in which information generation, processing and dissemination plays a major role in the economy .
- **Information system.** Generally a computer based system for storing, organizing and retrieving data and/or information.
- **Intellectual property rights**. Authors' rights to the intellectual content of their published work.
- **Interactive.** Pertaining to online where there is an immediate interaction between user and the computer.
- **Internet.** The collection of computer and information systems sharing a common communications protocol and linked together to allow global transfer of information.
- **Intranet.** An Internet- type network built for use within an organization, which may or may not be connected to the Internet itself
- **Inverted File.** A kind of index that typically comprises three separate files (Index, Postings and Print) and which is commonly found in information retrieval systems.
- **Keyword.** See **Index term.**
- **LAN.** An abbreviation for Local Area Network - a system of computers located within a small area and linked together by a communication network to share resources.
- **Metadata. Data about data. A template according to which documents (usually a web-based documents) can be described consistently in terms of particular**

attributes such as author, subject content, or format. A well-known we-based example is the Dublin Core.

- **Metasearch.** A search technique common on the World Wide Web where a single point of entry is provided to multiple heterogeneous search engines, whose individual search results are combined into a single, unified hit-list for the user.
- **Multimedia.** I Information represented in more than one medium such as text, graphics, animation, video, sound, etc.
- **Online or on-line.** Refers to the connectivity of a computer to a network.
- **Online access.** Pertaining to the interactive access of a computer during the information processing cycle as differentiated from non-interactive off-line access.
- **OPAC. (**Online Public Access Catalog) An electronic version of a library's collection catalogue, accessible to the public via a PC or terminal. Software that provides user access to information contained in a library collection.
- **Online Public Access Catalogue.** See **OPAC.**
- **Precision.** A standard measure of Information Retrieval performance, precision is defined as the number of relevant documents retrieved divided by the total number of documents retrieved in a search. See also recall.
- **Query.** A string of words that is used to represent the information need of a searcher. . The expression of the user's information need as input to an information retrieval system. The query may be expressed as a natural language sentence, or as one or more keywords.
- **Recall. A standard measure of information retrieval performance, r**ecall **i**is defined as the number of relevant documents retrieved divided by the total number of relevant documents in the collection. See also precision.
- **Relevance.** An abstract measure of how well a retrieved document satisfies the user's information need.
- **Relevance Feedback.** A process of refining the results of an information search by automatically feeding back into a new query search terms identified from documents already retrieved by an earlier query and judged relevant. Typically it is the user who makes that initial relevance judgement. .
- **Robot.** See spider.
- **Search history.** A mechanism for tracking the history of a user session or of a collection of user sessions by listing the queries entered to the information retrieval system by a user.
- **Semi-structured data**. Data whose structure may only partially match, the structure prescribed by the data schema.
- **Spider.** Also called a robot, a program that scans the web in order to index its content.
- **Stopword.** A word such as a preposition or article that has little semantic content and therefore is not included when an index is generated. It also refers to words that have a high frequency across a collection and therefore are not considered significant for indexing purposes. **Term .** A single word or concept that occurs in a a document, query or index. See also keyword.
- **Term Frequency** (TF) The number of times a term occurs in a given document, database or query.

- **Thesaurus. A tool intended to simplify information retrieval by exerting a control over the indexing language used.** A data structure representing knowledge in a particular subject domain and used to index and search databases. The thesaurus controls synonyms by specifying for any synonyms just one term that must always be used. It also typically organizes these terms in hierarchical structures of broader, related and narrower terms to help users with term selection.
- **User.** The individual providing input or using output from the computer – may be an information professional acting on behalf of a client, or the actual client (also called an end user).
- **User friendly.** An interface that is easy to lean and use. It enables the inexperienced user to interact successfully with the computer
- **User information need.** A natural language declaration of the informational need of a user. The need must be converted into a query to search for it on an information retrieval system.
- **WAN.** (Wide area network). A network of computer systems that is not confined to a single location.
- **Web page.** A page in the World Wide Web.

Lesson 1

Activity 1-1

Ask the students to access encyclopedias and dictionaries, full-text e-journals, e-books, etc. on the Internet using the following URLs.
Merriam-Webster Online URL: http://www.m-w.com/cgi-bin/dictionary
e-journal URL: http://www.library.ucsb.edu/istl/
e-books URL: http://promo.net/pg/

Lesson 1

Activity 1-2

Ask the students to say something about their libraries. Ask questions such as: Is your library automated? Do you have Internet access? If any of the participants have a Web OPAC, ask them to show it to the class.

Lesson 1

Activity 1-3

Demonstrate the use of search engines, online databases on the Internet, etc. Ask the students if they have online indexes. Ask them to access these indexes so that students can search them.

Lesson 1

Activity 1-4

Demonstrate ranking and relevance by searching the Internet using different search engines. Demonstrate the importance of interface design by accessing different OPACs

Lesson 1

Activity 1-5

Ask the students to think of a topic they would like to know more about and why. Tell them to write this down and restate the topic as a question.

Lesson 1

Activity 1-6

Ask the students to conduct an informal search for information on their topic and to write down the steps they undertook to prepare for a formal search.

Lesson 1

Activity 1-7

Another model of information- seeking behavior is described in slide 20. Ask the students to search for information and retrieve documents on their topics using this model. Ask them to record their work.

Lesson 1

Activity 1-8

Ask the students to use the Marchionini model to search for information on the topic that they had identified in the last activity. Ask them to document each step.

Lesson 1

Activity 1-9

Ask the students to use the information seeking model in slide 22 to answer a reference query. Group the students in twos and assign one as the researcher and the other as the librarian. The researcher should ask the question and the librarian should conduct the reference interview and the search.

Lesson 1

Activity 1-10

Ask the students to access Internet sites with Web OPACs, Full text journals, Home pages of libraries, book jobbers, to be able to experience different user interfaces and their impact on the information- seeking process. Ask them to start from the site: http://ipl.sils.umich.edu/ref/websearching.html. For a discussion of search strategies suitable for the Web ask them to access the site http://www.sc.edu.beaufort/library/lesson6.html

Lesson 1

Activity 1-11

Ask the students to describe their roles and responsibilities in their respective libraries and the role played by ICT in carrying out these roles.

Lesson 2

Activity 2-1

Ask each student to prepare a concept map for one of the following queries:

1. What is library automation?
2. Why are there different colors in a rainbow?
3. How are candles made?
4. Where is the Pasig River?
5. Who invented the sewing machine?
6. When was gold first discovered?

Ask each student to state the objective in preparing a concept map. For example, is it for a class in philosophy, science, etc. Is it to write a report? Is it for a news item? This objective will shed light on the scope of the search and therefore the nature of the keywords or descriptors to be identified.

Lesson 2

Activity 2-2

Ask each student to prepare search statements for the concept map in the previous activity.

Lesson 2

Activity 2-3

Ask the students to execute their search statements and modify them as necessary. Have them use the search engine or the resource that they prefer. Make sure that no two students make use of the same resource or engine so that they will be able to obtain different answers.

Lesson 2

Activity 2-4

Ask the students to formulate a search query for: "What is Rheumatoid arthritis?" and to use WebMD to execute their search. Ask them to search for the applicable thesaurus in making their concept map.

Lesson 2

Activity 2-5

Ask the students to formulate a search query for: “What is Ganoderma and its uses?” Then ask them to search the Web using different search engines. Assign a different one per student. Discuss the results after 15 minutes.

Lesson 2

Activity 2-6

Repeat the above activity but this time have them use Web directories. Have them compare results.

Lesson 2

Activity 2-7

Repeat the above activity but this time use Meta search engines. Have the students compare results between Metasearch engines on the one hand, and an individual search engine, a Web directory and a Metasearch engine on the other hand.

Lesson 2

Activity 2-8

Ask the students to looks for vortals, portals and library gateways by means of search engines, Web directories and Meta search engines. Have them compare results.

Lesson 2

Activity 2-9

Ask the students to access library catalogs on the Web and to look for titles on CD-ROMs. Ask them to look for Library homepages and access the instructions for using CD-ROMs. Some CD-ROMs may not be available on the Web so ask them to keep on looking.

Lesson 2

Activity 2-10

Ask the students to search for the text of the copyright law in their respective countries.

Lesson 2

Activity 2-11

Ask the students to access the sites for the APA Manual and the MLA Manual. Ask them to specifically look at how Internet pages are cited. Ask them to use these methods in citing the pages that they have gathered.

Lesson 2

Activity 2-12

Ask the students to access the ontology server at the site http://www-ksl-svc.stanford.edu:5915/. This site can be used to access, create, edit and browse ontologies.

Lesson 3

Activity 3-1

Ask the students to discuss some effects of hardware and software changes in their libraries.

Lesson 3

Activity 3-2

Ask the students to access sites on the Internet that discuss the new roles and new knowledge and skills required of librarians. Give them 30 minutes to look for information. Discuss their findings.

Lesson 3

Activity3-3

Ask the students to access sites on the Internet that discuss Intellectual Property Rights (IPR), copyright and Fair Use Principles as applied to electronic resources. Give them 30 minutes to look for information. Discuss their findings.

Lesson1

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8. Weick, Karl E. and Richard L. Daft. 1983. The Effectiveness of Interpretation Systems. (In: *Organizational Effectiveness: a Comparison of Multiple Models* edited by Kim S. Cameron and David A. Whetten, pp.71-93, New York: Academic Press.)

Lesson 2

References

The following sites may be used for a more extensive discussion of the concepts introduced in the lesson.

1. APA style manual. http://www.apastyle.org/
2. MLA style manual. http://www.mla.org/
3. CD-ROM guides. http://www.cdrom-guide.com/
4. Tutorial on information seeking skills and tools.
   http://www.lib.monash.edu.au/vl/howind.htm
5. Glossary of terms.
   http://www.sims.berkeley.edu/~hearst/irbook/glossary.html
   http://www.asis.org/Publications/Thesaurus/isframe.htm
6. Web resources directory.
   http://www.albany.edu/faculty/tangr/isp602/f01/sources.htm
7. Search engine terms.
   http://www.cadenza.org/search_engine_terms/index.htm