

# **School Librarians on the Internet: an introduction to a Web- Based Reference Service**

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“Tell me and I'll forget. Show me and I may not remember. Involve me, and I'll understand.”

Chinese proverb

## **1- Introduction**

The Internet is one of the popular hot buzzwords that took place recently. This paper intends to detail and highlight the concept of Internet as a reference service which is changing the role of reference librarians to access engineers for the benefit of enhancing the overall educational process in a given school in which the library is considered to be the heart of the school.

School libraries are, or should be, an integral part of the educational program in order to serve as a force for educational excellence. As other aspects of life's development and change, libraries and information services - as one of the developing sciences - are affected by change. Change as a major factor in librarians across time and space. Librarians - as information specialists - are asked and forced to take decisions about today's technology with a forward - looking view to the future. As such, the researcher sees that librarians - as information specialists - should have their own self-image of responding sensitively to technological innovations, side by side with developing an excellent understanding and awareness of aspects and features of these technological innovations concerning the convergence of hardware, software, and networking technologies that resulted in what is called the Internet. This convergence has provided everyone with an access to a vast wealth of information.

Librarians should have, take, and determine their place in this rapidly changing world. They can't just stay behind the dust of technology nor can they bypass the information literacy or digital literacy, in a world that has always some iron in the fire.

Given the fact that involving school library media programs in teaching and learning program has forced the school librarian role to change from passive spectator to active participant in the educational process, it is essential to have a close look over the librarian as a media specialist.

## **2- School Librarian Across the Curriculum - the Librarian**

**Teaching Role:** School librarian as a media specialist should carry on and perform the following three roles and responsibilities in order to insure an efficient and effective service for students and staff: information specialist, teacher, and educational consultant.

School librarian should have his own self - image of acting sensitively to the total curriculum of the school side by side with an excellent understanding of the broader range of materials in order to relate library services - with its possible usage patterns - to the overall teaching plan. The quality of school librarian is considered to be a teacher in service and significance when he assists implementing an educational program by adopting teaching techniques and methods, understanding of how learning takes place, and building a knowledge of curricular design and subject content. So, it is recommended that school librarians should coordinate with teachers and other educationalists to support and facilitate the overall educational program by maximizing the effective use of education - oriented resources used by teachers and students regarding their individual differences.

It is important to state that the librarian teaching role cited above derives from an educational necessities in schools. Some of those educational necessities or educational reasons are:

- \* A wider use of learning resources is vital to meet the nature of change in curriculum.
- \* Students and teachers do need the librarian help and guidance in locating and using resources effectively.
- \* A cross - curricular coordination is a need in order to provide a cost effective and equitable distribution and use of resources for different abilities and ages and to facilitate learning.
- \* The need for resources of information from outside school requires linking the school with other information agencies such as national and international networks.
- \* Education is a continuous process that needs learning skills, information skills and library skills.
- \* Modern trends in education ensure that education policy must cope with the age necessities including those predicted futuristic ones.

Related to this, curriculums no more concentrate on the quantity of information given to the learner, whereas it concentrates on the learner individual activity in obtaining information from its different sources in the "information explosion" age.

\* The continuous education and individual learning principles - which represent guidelines for education development and newness and education renewal principles - include that education policy should concentrate on the continuation of the educational process through the life time of the individual.

Therefore, the illiterate person of tomorrow will not be that person who does not know reading and writing but that person who did not learn how to learn. As a result, the goals of developing education policy, which depends on the education renewal, can't be accomplished without a developing library service of a high qualified librarian providing an effective and oriented use of library resources for the interest of the education process itself.

### 3- The Medium is the Message

When the school library media center functions as a **multimedia learning laboratory** to meet the rapid changes in **teaching methods**, it is in the right trend that supports a wider use of **multimedia learning resources**, in all forms, used by students and teachers.

Since school library is, or should be, directly involved in the **educational program**, it is the responsibility of the librarian to extend his role beyond organizing and distributing materials to encompass the ultimate efficient and effective use of those materials.

School libraries should not ignore **modern trends in education** such as:

- a) Individual learning principle that emphasis respecting and considering student's need for continuous - learning skills rather than emphasizing the teacher role in the education process. The individual learning attitude respects the students' individual differences.
- b) The shift in education from teaching approach to learning approach, and from teacher - oriented trend to student - oriented one.

Moreover, (\*) the school librarian is, or should be, forced to build an excellent understanding of the new technologies enhancing curricular initiatives, taking in consideration that it is in the efficient and effective use of library resources that the library becomes an educational agent; whereas the availability of resources does not make the library educationally significant. In other words, the medium in the message.

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(\*) "The American association of school librarians has clearly defined for its membership the necessity of the school librarian's preparation to serve both as a teacher and as a media specialist." Davis, Ruth. The school library: a force for educational excellence. [s.l.]: Bowker, 19?. p 26.

This means that school librarian should deal with resources as **ideas** not as **things**. He is asked to respect media as **ideas** not as **things** since resource value lies in the heart of its knowledge - extending, its knowledge - building and its knowledge - imploding potential. So, school librarian must build the library media collection, with all types and kinds of appropriate information regardless of format to meet and fulfill the pupils' personal and educational needs and the school's curricular support needs.

Given these facts, it is important for school librarian to be aware of the idea of Internet with all its dimensions, since he/she (librarian) is considered to be as a part of the educational task farce he/she serves as a media specialist matching library resources to learning and teaching support needs.

#### **4- Skills of digital literacy: a farewell to literacy!**

Students seem to spend more time obtaining information in other ways such as watching the oral-visual medium. the way of obtaining information has changed and, in fact, a different concept of information itself existed ` listening to and watching information by means of audio-visyal representation is preferable.

In other works, a radical shift happend in the way of obtaining information and representing information - the "multimedia text", a new format that blends works works with images and recorded sounds. The word processor, fax, television, compact laser disk, telephone, audiocassets, modems, and other electronic applications are replacing the old print world and sweeping it away behind the dust of new technologies.

Here arises a frewll to literacy - the ability to read and write - and a welcome to a digital age in which literacy - digital literacy - means the ability to handle and understand information in its multimedia presentation - a multimedisis literacy that couples fixity and novelty in information. A digital age in which information is in a digital form that has the aspects of an efficient production, analysis and consumption of information, A digital age, in which a digital literacy skills requires an ability to handle complex images and sounds, hypertexts and hypermedia, and syntactical subtleties of words, along with the ability to suit the medium both to the information being offered and to the audience (users) which will result in a more efficient, and at the same time, more fun communication. It is a skill of "information about information"

The funbamental difference between the old literacy and the digital one lies in the multiple facets and aspects of the digital signal represented in the media. The idea and its expres-

sion - the meaning - take the form of words (virtually one) which means that meaning is generated by words, whereas in the digital literacy, the digital code can express words and numbers, as well as it can generate images and sounds - a role that could never be played in print. Moreover, data in books, when kept in a digital form, becomes more easy to be moved, carried, compared, edited and consumed. It is in the digital form that information achieves its democratic for the benefit of a citizen in an information society.

As such, libraries with the Internet (on the information superhighway), would be an on - line full - text database, in which the user can access - anywhere at any time - to a vast wealth of information that occupies on place, elaborately indexed and available of command. The library that will need in the age of "digital world" a highly digital skilled librarian - information specialist.

Moreover, from a psychological viewpoint, three factors seem to stand behind supporting CAL (computer-assisted learning) program and make it effective:-

- a) **Active participation:-** the Learner interacts with the curriculum materials practicing, responding, and being tested at each step.
- b) **The information feedback** the learner provided with while learning:- the learner has the chance to check his response whether it is correct; as an advantage, he can correct an error directly and immediately.
- c) **Individualization of instruction:-** the learner take advantage of the high degree of individualization to proceed and progress at his own rate - speedrapidly or slowly following a path designed to meet his abilities and aptitudesan sdjustment to individual differences.

## **5- The Global Internet**

### **5-1 Introduction :-**

The internet is a term describes a global network consists of thousands of interconnect-ed computer networks of millions of users communicate andshare information by means of logging on to their on to their local access provider - which may be a commercial on-line service - that, in turn, access to the internet. This may appear confusing, but, ler it be clarified in this way: the internet is a universal network - an electronic highway - that connects networks around the world (more than 80 countries have networkds and host computers that are connected to the internet). It is, simoly, a cost - effective way for individuals, companies,, libraries, educational institutions, and other, to communcate globally. It is a huge

electronic spider web; it is truly an "information superhighway". Internet evolution goes back to the 70s, when it started as a group of government networks called ART Anet (Advanced Research Projects Agency Network), and then, step by step, other agencies and systems such as the National Science Foundation, schools, local libraries, businesses, and even the White House connected themselves to the internet.

## **5-2- How does an internet work ?**

In the process of connection to the internet, the user contacts a local service provider and connects to his computer - by dialing the service provider number - using a modem. The service provider's computer, in turn, is connected to the internet and by this, the user can connect to other servers on the internet - such as a local library main computer.

Once the connection is done, the user can do any thing (download a file, upload a message, connect to a newsgroup, list files, search databases of a library, and chat on-line).

## **5-3- Accessing the Internet :-**

Several methods of access to the internet are available. The method the user chooses depends on what he wants to do and how much he wants to spend. The speed is one issue; and option of connecting is another. Regarding the speed, the speeds of moving through the internet range from 1200 bps (bits per second) to 56 (kilo byte per second). The speed here represents the data transfer rate. On the other hand, the method of connecting would include a connecting with a PC as an internet host, or through commercial on-line services, bulletin boards, or freenets.

Options for connecting to the internet would include dial-in and direct access, e-mail, mail lists, and internet addresses. Before going through these methods of connecting to the internet, it is useful to explain something about communications and "communications protocols" :

Simply put, exchanging data between two distant PCs can occur through using a modem, a telephone line, a communications software. The communications software job is to handle the method of data transmission, with using a specific protocol. Therefore, the communications protocol represents a set of rules or standards that determines how computers communicate with each other. In other words, it determines the way of sending - transmitting - each bit (1 or 0) and how to identify and discover errors in transmission. However, the transmission of data between two PCs requires that they use the same protocol. In the case of the internet communications, computers communicate by using a set of protocols called

**TCP/IP (Transmission Control Protocol and Internet Protocol).** Whereas the internet protocol (IP) is responsible for delivering messages between systems without guaranteeing the receipt or delivery of the messages (connectionless communication), the (TCP) is responsible for reliable delivery of messages (a connection-oriented protocol).

By and large, TCP/IP act as the language of the internet that a computer must either have (speak) or link to another computer that does (service provider's computer) in order to access the internet.

#### **5-4- Internet addresses (an explanation) :-**

People and computers on the internet have specific addresses. Each address of a host computer is represented by a "plain-English" name and a numerical sequence. The method used to represent the address is known as the Domain Name System (DNS). This (DNS) is divided into three-part hierarchy :

username @ host. subdomain. First level domain  
 1            2            3

Part no. 1 is for the user's name. Part no. 2 is the @. Part no. 3 represents the host address where the person (or his mailbox) is located. In the U.S, the first level domain in the hierarchy may be one of six possibilities:

Code	Organization type
gov	governments, non-military
edu	educational or research institution
mil	military
net	a network support company
com	commercial entity
org	other organizations

The IP protocol handles these addresses.

#### **5-5- Electronic Mail on the Internet :-**

Beside its applications for PCs and local area networks, E-mail has also its application on the internet. There are two applications: in the first, the user uses a program known as "user interface mail" that helps him arrange, read and handle the mail. The second application is the "mail delivery program" which takes the message from the user agent application

and hands it over to the remote computer. "Mail delivery program" are part of the operating system of the User's host and the remote computer, therefore, the user never interacts with it.

To make things look more obvious, it is important to give a simple definition for what is called "interface". An interface functions as a gobetween that allows things to communicate. For example, the interface in the DOS is a command-driven which means that the computer displays a prompt and the program is ready for the user to type a command. In other cases like the Windows the interface is a menu-driven that allows the user to select from a list of commands displayed on a menu.

Back to the e-mail on the internet again; Pine and Elm are two popular e-mail interfaces which are menu-based and therefore provide text editors to help the user write and edit his messages along with a facility to forward, archive, and download mail messages.

In its journey the local host computer into the network, the message changes from an ASCII text file into a TCP packets, and then into IP packets when finally it goes (moves) into the network.



ASCII stands for American Standard Code for Information Interchange, which represents and controls the character set used in all PCs.

If the user uses SLIP or PPP connection, the mail packets get into a message at his computer. Otherwise, if he uses a dial-in account, his internet host reassembles the message for him and stores it until he logs on.

### **5-6- E- Mail Lists on the Internet :-**

E- mail lists represent a way of distributing messages to many people simultaneously (at the same time). A mail list on the internet (internet mail list) is simply an electronic database consists of addresses for the purpose of group distribution of messages (information) - for those people who share common interests. By this way, a mail list subscriber - who might be a library - can receive copies of the messages sent to the list, and can also send messages (information) to every subscriber on the mail list.

Purposes of mail lists may vary. for example, A. Word. A. Day represents a mail list for subscribers who need to enhance their vocabulary. Similarly, a library and information services can make use of the e-mail list for current awareness or/and S.D.I purposes.

Technically, human or computer administrators (list servers) manages the e-mail lists that reside on computers. These computer administrators (list servers) do have addresses to contact.

## 6- Getting Around on the Internet :-

Before examining the places the user can access to - such as space information, the past and the present history, national libraries, and more database services - by using Telnet (a program that provides the user with an access to other computers on the internet), it is recommended to have an idea about how data moves through the network (remote login and file transfer), the destinations that exist, and the means by which the user can travel through the internet :-

TCP/IP Protocols - the language of the internet - had solved the problem that exists between different types of networks, hardware, and software. In fact, these protocols enhance and support three essential applications - remote log-in (Telnet), electronic mail, and file transfer protocol (FTP).

Technically speaking, TCP/IP protocols do the following: it breaks files, documents, and messages down into packets (a packet is a group of data and control information to be sent over a network) in order to move rapidly and smoothly through the network.

Each packet here, - carries data of the addresses of the sender and receiver computers - move from one computer to another, by any route, independently of other packets.

In this journey, where packets travel through the network, there are some stations (nodes of direction) that need to be clarified with each playing its vital role :-

These are, namely; gateways, routers, bridges, repeaters, and hubs. All these act as tools of direction for information to be directed from one computer network to another. A **bridge** is a network device that connects two similar networks (of the same type) together - such as two LANs. A **gateway** (protocol converter) is a device that connects and translates data (exchanging information by interfacing dissimilar networking protocols) that moves between two different types of local area networks. **Routers** determine and pick the best pathway (route) for packets - when there are different ones - considering the traffic and the distance to the next computer in order to send the information efficiently to its destination. **Repeaters** expand and enlarge weak signals. Last but not least, a **hub** is a network device represents a group of computers linked together in an academic or business campus.

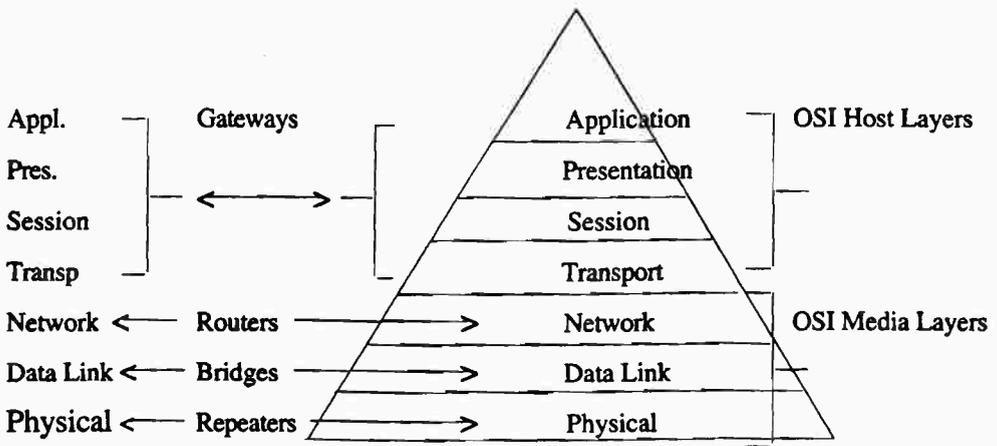
After examining these tools of direction, there is a need to see and examine what is called OSI Model (Open System Interconnection) in order to see how TCP/IP works?

### 6-1- The OSI model :-

The OSI (open system interconnection) model was approved in 1983 - represents the

result of the international standards organization (ISO) efforts to develop a worldwide communication architecture. OSI, therefore, is a standard for data communication that guarantees and ensures a communication between computer systems from different manufacturers. In other words, OSI model is the basis for data communication protocols from different manufacturers.

The OSI model, as it is shown here, is composed of layers that interface with adjacent layers. Each layer, in the model, has its role and functions in the network design separately from other layers, which allows the communication system to be divided.



### 6-1-1- OSI media layers :-

OSI media layers are represented by the lower three layers of the OSI model - physical, data link, and network. These three layers do the job of sending messages over the network, which means that they control the physical delivery of the information.

The physical layer is responsible for placing information on and removing it from actual wiring. It is the layer that is associated with connectors on the back of each computer, wire running through the walls, ...etc... Details handled here are such as the type of cabling medium used (coaxial, twisted, pair, or fiber optic), data bandwidth, and types of connector used.

Data link layer is used to organize information from the physical layer. Information from the physical layer is converted from the configuration of (1.0) into packets and frames (the actual message, and source and destination addresses). This layer - data link - strips off the information before sending data to the upper layer - network layer -, and adds specific control information before sending data to physical layer.

The network layer places information on the network. It is here where the routers determine the best pathway (route) for packets (messages) to travel in order to reach its destination. Then, the message is handed to the transport layer for further processing.

### 6-1-2- OSI host layers :-

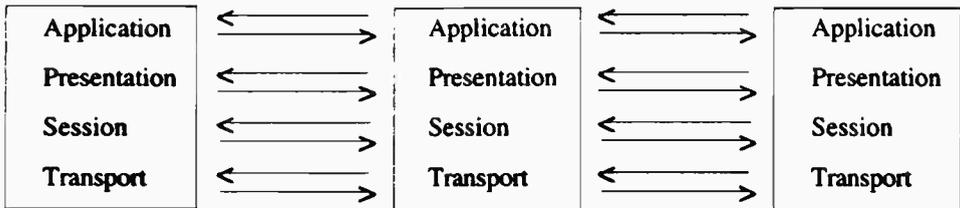
The OSI host layers consist of the application layer, presentation layer, session layer, and transport layer. These four layers are responsible for an accurate data delivery between computers. It is here, at these four layers, that gateways exchange information.

A reliable delivery of information is the responsibility of transport layer (network delivery service). This layer guarantees only the packets (data) delivery, but not that a message was delivered correctly. It is the responsibility of the presentation and session layers to determine if a message needs to be corrected and re-sent.

The session layer receives the data (packets) from the transport layer, corrects the error - if there is any -, and passes it to the presentation layer.

At the presentation layer, data will be formatted and translated from the session layer to the application layer. functions found here are such as data translation, data compression, and data encryption (a process of data security in which data is changed into a format that is unrecognizable by others).

Last but not least, the application layer is the layer where the user interfaces. Application programs interface with the user and the network at this layer. Examples of these programs are: Program Manager, Microsoft Windows, Word Processors, Lotus Notes, as well as electronic mail.



Gateway

Gateways exchange information at these four layers - between two different types of LANs.



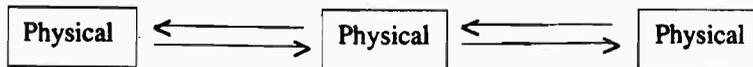
### Router

The router functions at the Network layer where it determines the best route for packets to travel to its destinations



### Bridge

The bridge connects two similar networks.



### Repeater

Repeaters functions at this layer to expand and enlarge weak signals.

## 6-2- How does TCP/IP work ?

Regarding to the OSI model layers and the tools of direction (routers, bridges, ...etc...), the data goes through its electronic journey in any utility of program that uses TCP/IP to transfer data. TCP/IP represent the language of the internet. As it was stated three essential applications: remote log-in (telnet), electronic mail, and file transfer protocol (FTP).

## 7- Search Utilities & Tools on the Internet :

Seeking out and finding information on the internet could be done through services - most of them - based on client-server model. Such services are like Gopher, WAIS, and the World Wide Web (WWW). Using Gopher or WWW, would need running a program called a WWW or Gopher client, would connect to and communicate with a server program called a WWW server or Gopher server. WWW or Gopher server receives a request - formulated by WWW or Gopher client -, performs its service, and finally sends the results to the WWW or Gopher client. This is applicable to all search utilities like Archie.

The Researcher would examine the World Wide Web as a distinct and most powerful client/server system which uses the hypermedia documents via the Internet. For further details regarding other client/server systems, the researcher recommends the reference "the Complete Internet companion for Librarians" as an invaluable resource.

## **7-1- Searching the Web :**

Currently, there are around 40 million web pages on the Internet. Web search systems on the Internet seem to fall into three main categories: web cataloges like Yahoo, web search engines like Altavista, and synergistic search sites like "search. Com".

### **Web Cataloges :**

Web cataloges are Web sites provide the user with lists of other sites on the Internet. Those lists are usually arranged and organized by topic categories and subcategories. Some of those cataloges can be searched by keywords. Some of those cataloges are :

Yahoo ([http:// www. yahoo. com/](http://www.yahoo.com/)), Galaxy ([http:// www. einet. net/ galaxy. html](http://www.einet.net/galaxy.html)), and Xplore ([http:// www. xplore. com/ xplore 500/ medium/ menu. html](http://www.xplore.com/xplore500/medium/menu.html)).

### **Search Engines :**

Web search engines represent another way that a user can use to get access to Web pages. Search engines allow the user to use several "Boolean" contrds like OR, AND, NOT, NEAR, Quotation marks, and Substrings and wildcards. The user needs to use the site's help and tips pages in order to be familiar with search capabilities since they differ from one search engine to another. One of the best search engines on the Web is Altavista ([http:// www. altavista. digital. com/](http://www.altavista.digital.com/)). It gives access to 30 million pages. Other examples of search engines would include Hotbot ([http:// www. hotbot. com/](http://www.hotbot.com/)) and Web Crawler ([http:// www. webcrawler. com/](http://www.webcrawler.com/)).

### **Synergistic Search Systems :**

Those are sites that has the ability to combine search engine and catalog systems at one site, or provide access to many search engines and/ or catalogue. "Search. com" ([http:// www. search. com/](http://www.search.com/)) represents one of them. "Savvy Search" ([http:// savvy. cs. colostate. edu: 2000/](http://savvy.cs.colostate.edu:2000/)) is another exmple.

## **8- The impact on the reference service (librarians on the Internet):**

The Internet as a revolution in communication is adding new opportunities for reference services and instruction delivery, providing a user-friendly hyperlinking way that enable a document to access other documents. Moreover, web browsers supported display of images, videos, audio, and animation.

In essence, the World Wide Web has three educational values that are vital to the instructional designer; multimedia presentation, hyertext, and interactivity.

## **Attributes of the Web**

"Web appears to be distinctive in the following five respects:

- 1- It provides economical access to people and multiformat information in ways unmatched by any other combination of media.
- 2- Much content on the Web cannot be found in any other format, except the authors' originals.
- 3- The Web permits the work of individuals such as teachers and students to be shared with the world.
- 4- It is a powerful, flexible resource, in some ways (e.g., global hypermedia links) unlike any others, that students are likely to encounter and rely on in the workplace.
- 5- Students approach the Web with eager anticipation and awe, knowing that it is at the cutting edge of technology used by their most progressive peers and by successful adults<sup>(1)</sup>.

By and large, regardless of the library type (school library, pubrary, etc), it is stated that reasons stand behind integrating the Internet with other library services are:

- 1- Access to more information, where the Internet improves the library services by providing users with more resources.
- 2- Access to new services like electronic publishing, on-line journals, LISTERV discussion lists and USENET Newsgroups.
- 3- Location and time are irrelevant on the Internet when Limitotins of geographic location and time are deminishing - accessibility and availability of inf. exisy anytime and anywhere.

### **Evaluation criteria of quality for internet resources :**

It is a fact that there is a large amount of useless information on the WWW. Serious researchers show their doubtness towards the completeness and accuracy of information on the Internet. An analysis of a randomly Selected 1140 Web sites shwoed that 21.93% of those wose were public relations whereas 20.70% were advertising.

Some criteria that would help evaluating Web sites would include :

- 1- Site access and usability : .... ease of connection and downloding, identification of the site, access restrictions

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(1) Stere Hackbarth. **Integrating web - based learning activities into School curriculums.** Educational Technology. May-June 1997, P. 60-61.

- 2- **Resource identification and documentation:** .... the title and URL address of the document, as well as descriptions of its content, its purpose, and its Intermded audiences.
- 3- **Author Identification**....
- 4- **Authorty of author**....
- 5- **Information structure and design :** ..... information structure and design deals with how the document is structured and indicates whether the document follows accepted instructional design standards, such as stating its purpose, describing its scope, incorporating interactivity, or providing a variety of formats to meet differnt learning styles....
- 6- **Relevance and scope of content :** ..... relevance and scope of content deals with the information in the document and whether it meets the user's needs in terms of type and depth of the material provided, whether it complements other information available or leaves gaps, and whether it fito the broader field of knowledge....
- 9- **Navigation within the docment :** .... navigation within the document deals with how easily documents are explored and is concerned with organizational structures, menu design, indexes, table of content, search functions, and online "help" .....
- 11- **Aesthetic and affective aspects :**..... aesthetic and aafective aspects deals with how well the document in designed in terms of graphics, readability, and the use of cretive elements".

For more specific important details, pls. refer to the article "Evaluation criteria and indicators of quality for Internet resources"<sup>(1)</sup>.

## **9- Conclusions and Recommendations**

The researcher concludes that :

- 1- Librarians can't stay behind the dust of the technology bypassing and ignoring the new trends in information technology in a world that has always some irons in the fire.
- 2- It seems that taking a decision about technology in libraries is not a matter of tactical consideration, but a matter of strategy.
- 3- Schools library-as an integral parl part of the education program-has an important role in supporting the overall educational program of excellence by adopting means of modern trends in education.
- 4- **The medium is the message.**

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(1) Gene L. Wilkinson; Lisa T. Bennett; Kevin M. oliver. **Evaluation criteria and indicators of quality for internet resources.** Educational Techmology. May-June 1997, p. 54-58.

- 5- Information technology (the Internet is one of its applications) should be regarded as a means and not an end; given this fact does not make information technology unimportant.
- 6- There is a shift in the way of obtaining and representing information; a trend that can't be passed; a trend that had resulted in new kind of literacy.
- 7- A new literacy is taking place, it is a digital literacy in which there is a need to suit the medium both to the information being offered and to the users.
- 8- Libraries on the Internet would be an on-line resources in which the user can access - anywhere at anytime - to a vast wealth of information in a digital form that occupies no place, elaborately indexed and handled, and available on command.
- 9- Regarding the principle of "access instead of possession", libraries have the chance to take their role as information agents providing users with an access to a vast wealth of information on the Internet which represents the convergance of hardware, software, and networking technologies.

Regarding the conclusions cited here, the researcher recommends that :

- 1- Since change is a key factor for futuristic library systems, librarians are asked to take a decision concerning the information technology- the Internet represents its latest innovations.
- 2- Librarians should act rapidly and sensitively towards the new trends of the information age such as "digital literacy skills", "multimedia literacy skills" and "infrmation about information skills".
- 4- Librarians should bring to their awareness an exellent understanding of terms associated with the Intnret concept.
- 5- Libraries should accomodat and adjust their structure to encompass all the futuristic trends concerning the information technology.
- 6- School librarians should act as a part of the educational task force in a given school, and therefore they should proceed their role both as media specialists and teaching role.
- 7- School librarian should deal with library materials and ideas not as things-the medium is the message.
- 8- Since the medium is the message, school librarian should bring into his awareness new approaches in information technology such as the Internet.

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- 9- Steve Hackbarth. **Integrating web-based learning activivties into school curriculums**. Educational Technology. May-June 1997, pp. 59-66.

## Appendix

The following is a list of recommended web sites of interest primarily to K-12 educators:

1- CCC net: <http://www.ccc.net.com>.

An interactive online k-12 curriculum, and a show case for students projects.

2- Cyberkids (and cyberteens): <http://www.cyberkids.com> An online magazine with stories and articles by children....

3- Global School Net Foundation: <http://www.gsn.org> A Microsoft - sponsored provider of information about educational uses of the internet, and a host for school home pages...

4- History / Social Studies web site for k-12 teachers: <http://earth.execpc.com/dbals/k-12.html>,

Has lesson plans and links to other resources for teachers and parents...

5- Kids web: <http://www.npac.syr.edu/textbook/kidsweb> Links to web sites of interest to children, the arts, sciences, social studies, reference, etc...

6- The madellan Internet Guide: <http://www.mckinley.com/permits> limiting search to those web sites that have been "rated and evaluated".

7- Media Literacy Project: <http://interact.uoregon.edu/Media/HomePage>.

Describes resources that help develop critical thinking about media....

8- Possibilities! Science Education:

<http://Kendaco.telebyte.com/80/billband/Possibilities.html> Helps teachers integrate use of the Internet into the secondary science curriculum....

9- Web CATS: Library Catalogues on the World wide web: <http://library.usask.ca/hywebcat>.

Has links to "all" libraries with web-based online public-access catalogues<sup>(1)</sup>.

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(1) Steve Hackbarth. **Integrating web-based learning activities...** Educational Technology. May- June, 1997. p 69-70.