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The Impact of Information Technology in Relation to Academic Librarianship *A Philosophical Analysis*

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Abstract- The world as a global village has witnessed quantum leap in areas of science and technology. With great impacts in travel, communication, information and media, industrialization and mechanization, man has found it very easy to achieve great task within a limited scope of time. This has given man a big relief as task that formally took man months and years to achieve are being met within a short period of time. With improvements in information technology, globalization has increased. The world is brought closer, and the world's economy is quickly becoming a single interdependent system. Information can be shared quickly and easily from all over the globe, and barriers of linguistic and geographic boundaries can be torn down as people share ideas and information with each other. Communication has become an easier, cheaper, and faster system with the help of information technology. Using the internet, people can speak to each other all over the world using video conferencing. With these great impacts made in the area of information and its corresponding ills, it becomes necessary to evaluate the concept of information technology as it affects our learning system.

Keywords: *technology and ICT.*

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The Impact of Information Technology in Relation to Academic Librarianship *A Philosophical Analysis*

Dr. Onuoha Jude A [α] & Obialor Doris Chinyere [σ]

Abstract- The world as a global village has witnessed quantum leap in areas of science and technology. With great impacts in travel, communication, information and media, industrialization and mechanization, man has found it very easy to achieve great task within a limited scope of time. This has given man a big relief as task that formally took man months and years to achieve are being met within a short period of time. With improvements in information technology, globalization has increased. The world is brought closer, and the world's economy is quickly becoming a single interdependent system. Information can be shared quickly and easily from all over the globe, and barriers of linguistic and geographic boundaries can be torn down as people share ideas and information with each other. Communication has become an easier, cheaper, and faster system with the help of information technology. Using the internet, people can speak to each other all over the world using video conferencing. With these great impacts made in the area of information and its corresponding ills, it becomes necessary to evaluate the concept of information technology as it affects our learning system. This articles centers on the importance of information technology, however it pays particular attention to the relation that exists between ICT and Academic Libraries. This approaches thus, exposes the positive and negative impacts of the ICT to learning process and goes on to suggest ways to enhancing a better understanding and use of the ICT in our academic libraries.

Keywords: technology and ICT.

I. Introduction

Information technology has transformed the whole world into a global village with a global economy, which is increasingly dependent on the creative management and distribution of information. Over the past decades the world has been experiencing significant changes in which the need to acquire, utilize and share knowledge has become increasingly essential. Now, in the 21st century, the age of knowledge and information is in its higher gear. This is an age when invisible knowledge and information take the role of prime movers leading all sector. The World Bank has used metaphor "knowledge is development". Lack of knowledge is largely responsible for underdevelopment. In a knowledge and information-oriented society, creative brains become leaders of economy and knowledge workers are in great demand. If knowledge can be equated with development, then the wider the knowledge gap, the broader the development gap.

With the invention of Information and Communication Technology, libraries now use various types of technologies to aid the services they render. Everyday new technological advances affect the way information is handled in libraries and information centers. The impacts of new technologies are felt by libraries in every aspect. Computing technology, communication technology and mass storage technology are some of the areas of continuous development that reshape the way that libraries access, retrieve, store, manipulate and disseminate information to users. The academic library has been from its inception an integral part of institutions of higher learning, rather than an appendix or adjunct.

a) Technology

The word Technology is a fusion of two greek words ''techne'' which means skill, art, talent, ability, handwork etc. and ''logos, logia'' which means 'study' technique or the art of using one's skill, thus, technology would mean the collection of techniques, skills and methods. It refers to the processes used in the production of goods or services as the case may be. It so to say refers to the knowledge one acquires in knowing the ways and methods for which a particular task is achieved. Man in prehistoric times or during the Stone Age learnt to perform and solve his problems his own ways, he developed ways of doing things, like to hunt animals for food, he made sharp tools out of trees. Thus, he does a lot of things crudely. With the inception of science man developed better ways of solving his problems at a given time. Thus, the birth of science gave birth to technology, where ways of doing things took a systemized and definitive form. Thus, works that initially took man years and hours where done in matters of minutes, man could travel a long distance in short period of time, communication thus became very easy. The word *technology* has changed its meaning several times since it came into use in Europe during the 17th century. In the most general terms it can be defined as the application of knowledge about nature to practical aims of human endeavour. If this definition is accepted it

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follows that technological development occurred at least as early as first scientific study: Stone-age humans realized that flintstone produces better cutting tools than sandstone. They made that discovery and used their new knowledge well before someone found the scientific explanation for the phenomenon. Technology is inclusive, as it looks into the various strides achieved in the cause of history-travel, communication, media, computing etc.

b) ICT

However, this work concerns itself with the Information and communication Technology [ICT] as it affects our academic libraries. Information and communications technology - or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries. ICT is one of the economic development pillars to gain national competitive advantage. It can improve the quality of human life because it can be used as learning and education media, the mass communication media in promoting and campaigning practical and important issues, such as the health and social area. It provides wider knowledge and can help in gaining and accessing information Contextually, this work sets out to situate the relationship between ICT and Academic libraries. It points out the different contributions made by ICT, the improvement it makes as well as the difficulties faced in the library sectors of an academic setting, while not failing to proffer solutions to the different challenges facing the library sectors.

II. ICT and Academic Libraries: Impacts

Oyedun (2007) defines academic libraries as those libraries that are mainly found in tertiary institutions, they are established to support learning, teaching and research processes. Over the past twenty seven years, academic libraries have been affected by changes in information and communication technology. The rate of changes is still accelerating in this area. The introduction of various information technology (ICT) trends has lead to reorganization, change in work patterns, and demand for new skills, job retraining and reclassification positions. Technological advancement of the past twenty five years, such as the electronic database, online services, CD-ROMs and introduction of internet has radically transformed access to information. Rana (2009) opines that ICT holds the key to the success of modernizing information services. Applications of ICT are numerous but mainly it is used in converting the existing paper-print records in the entire process of storage, retrieval and dissemination.

ICT has impacted on every sphere of academic library activity especially in the form of the library collection development strategies, library building and consortia. ICT presents an opportunity to provide value-added information services and access to a wide variety of digital based information resources to their clients. Furthermore, academic libraries are also using modern ICTs to automate their core functions, implement efficient and effective library cooperation and resource sharing networks, implement management information systems, develop institutional repositories of digital local contents, and digital libraries: and initiate ICT based capacity building programmes for library users.

Information and Communication Technology (ICT) has brought unprecedented changes and transformation to academic library and information services, conventional LIS such as OPAC, users services, reference services, bibliographic services, current awareness services, Document delivery, interlibrary loan, Audio visual services and customer relations can be provided more efficiently and effectively using ICT, as they offer convenient time, place, cost effectiveness, faster and most-up-to-date dissemination and end users involvement in the library and information services process. The impact of ICT characterized on information services by changes in format, contents and method of production and contents and method of production and delivery of information products. Emergence of internet as the largest repository of information and knowledge, changed role of library and information science professionals from intermediary to facilitator, new tools for dissemination of information and shift from physical to virtual services environment and extinction of some conventional information services and emergence of new and innovational web based.

Libraries and information centres play an essential role in meeting society's information needs. Information Technology (IT) in libraries is having a remarkable impact worldwide. It has become a phenomenon that is so pervasive that nearly all academic libraries in Nigeria have begun applying IT. Omekwu (2004) observes that:

> Information Technology has brought about varieties of form of libraries and mode of disseminating information. There are now available such libraries as Automated Library, Polymedia Libraries, Electronic Libraries, Virtual Libraries and Digital Libraries. Each of these forms of IT induced Library System has its own specific features, requirements, service mode, and associated problems.

Nwalo (2000) observes the application of IT to library services has brought about tremendous improvement and makes possible more services. Mosuro (2000) reiterates the relevance of IT to library functions and services:

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Over the years, advances in the area of IT have offered Library and Information Centres more efficient ways of acquiring, organizing, storing and disseminating information. New Information Technologies are becoming an integral component of and have the potential of changing the status quo of libraries and librarianship. Computers as well as other information technology have come to play prominent roles in information management. It is unthinkable that any academic library can function effectively without the appropriate use IT.

Mohammed (2004) comments that, Electronic and computer technology have come in to remove most of the limitations of access and use of information resources and services. Instead of "written word", we now have "electronic word" existing as bits and bytes of computer memory.

a) More Good than Harm?

Modern information and communication technology have created a global village because of information revolution and the consequent computer based messaging system, and electronic networks for access to information and library services. ICT is a growing phenomenon in the society. Library is a dynamic and evolving enterprise in education. The trend now is information and communication technology, library and information have undergone various stages on transformation, storage and retrieval of information application in delivering library services. Such as oral tradition, letters, and figures on leaves and skins, while the librarians then were custodians. Ranganathan (1957) says in his five laws of librarianship which cut across all ages that "Library is a growing organism" Notably, Information and communication technology is an electronic means of capturing, processing, storing and disseminating information (Adeyemi, 2005; Marshall, 2000). For Okentunji (2000), information communication technology facilitates access to electronic information which has become invaluable in complementing traditional library resources. Several studies have adequately addressed the impact of ICT facilities in library operation and more have seen the need to use ICT facilities, especially in areas of creating digital libraries (be it in virtual format or on CD-ROM) in order to make access to information or document faster and easier for users at lesser cost than it used to be when using the traditional manual system.

Information and Communication Technology (ICT) has brought many revolutions in the human life. One very important, impressive and effective revolution is the enhancement in the speed and span of information production, sharing and recycling. It has changed the basic concepts of proprietorship into sharing and preservation into access. Library science is among the fields which have been influenced by this revolution up to a great deal. Library science has been transformed into information science or library and information science (LIS). Libraries have been transformed into information centers. Formal tools and techniques have been replaced by the modern technologies. Information and communication technology has become an integral part of the modern libraries. Databases are replacing the huge amounts of inventories. Resource sharing has become a necessary requirement and is easier through modern techniques. The previously required basic skills have also been of lesser primary requisites. Along with strong and in depth knowledge of cataloguing and classification skills, nowadays, knowhow of databases, copy catalogue and reaching the sources available online has also taken an important place. Lengthy and complex subject headings have been replaced by the keywords. It has also transformed the overall routines, activities and behaviours of the LIS professionals. At the time, there is no concept of an effective, efficient and impressive library service without the ICT aids. Advanced countries are no doubt, ahead in this area but the gap, known as *digital divide* that had been between advanced countries and developing countries is eliminating and being abridged with the passage of time.

Therefore, since Academic libraries are not exempted from these radical changes, as they are the most affected in terms of how information are packaged, preserved and disseminated. Academic libraries in Nigeria make use of ICT as tools to meet the information need of users who in this context are students and faculty staff. Academic libraries are established to support the objectives of their parent institutions which are to promote teaching, learning and research. Therefore, academic libraries are expected to serve the students, lecturers and other members of the academic community. To meet the information need of users, academic libraries provide various services such as user education (orientation/instruction services), inter-library loan/connection services, abstracting and indexing services, referral services and circulation services. Other services provided include library book loan, reference services, photocopying, online services, compilation of reading list and bibliographies, e-mail, internet connectivity, CD-Researching and publishing (Ifidon, 2006).

ICT in libraries has changed the mode of information storage and retrieval, acquisition, cataloguing and classification, circulation of materials, serials control, management statistics and administrative activities such as budgeting. This achieved the provision of more efficient information services to the users and the overall improvement in the performance of the libraries and other related information institution (Chisenga, 1999). Librarians, therefore, are encouraged to soil themselves with the challenges of grabbing this opportunity of learning the new skills to use the

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multimedia in information packaging, repackaging and delivery for optimal service delivery in the 21st century.

b) A Tool or a Revolution

A recent report issued by the Boston Library Consortium (BLC) (1986) points out an interesting dichotomy which has significance in the way that emerging technologies affect libraries and librarians. On the one hand there are those who regard information technologies only as a tool to assist in providing more information more rapidly and successfully to library users. These people undoubtedly look back to the invention of the typewriter and the electric light and perceive an evolution of library and information services over a period of time with the library embracing each new technology as it becomes available. Hugh Kenner (1986), scholar of Irish literature at Johns Hopkins, has said:

> People nervous about the future are by their own definition open to lessons from the past; andone lesson the past has to teach is that every new technology, when it applies for admission to a citadel of the intellect, has invariably received its first welcome from the librarian. Nearly a century ago, libraries were the first buildings to be getting incandescent lights; a half-century ago they were among the first buildings to be air-conditioned. When copying machines escaped from corporate offices, the first place they became accessible to the public was the library. (pp. 1-3)

His point is well taken; in an almost haphazard way libraries have incorporated the new into their buildings and procedures. CD-ROM, for example, has become a tool in the reference area with little fanfare and no organizational change. On the other hand, there are those who, as the BLC report says, see the advent of information technologies as an opportunity to totally restructure the work environment. Some view a blurring of the distinction between technical and public services as a necessary part of this organizational change, although studies to date have shown that alteration of organization charts along these lines simply has not happened (Busch 1986).

Probably more critical, for all types of libraries, are the changes which are taking place within the institution as a whole which in turn put pressure on the library to evolve to serve new structures. Many institutions are extending their services to adult learners and have determined that the establishment of remote sites or campuses is a positive way to reach this population. As a result, the library must identify the appropriate way to deliver information services to these remote sites; new information technologies such as telefacsimile, micro- wave, and satellite links can be used to achieve this objective. Often, new organizational structures within the library may be the only way to cope successfully with the change.

Who is right-the advocates of evolution or those of revolution? The answer cannot be framed as a simple response to such a dichotomy. Too many factors intrude in each circumstance to allow anyone to dictate either that technology is a tool, to be viewed precisely as such, or that it provides opportunity for full organizational review and restructure. Of course, both are true. Information technology is a tool. In addition, it provides opportunity for full organizational restructure. Rather than presenting a dichotomy for selection by the library man- ager, these two views represent the two ends of a continuum where, for every library, technology is at least a tool. The degree of movement toward one end of the continuum or the other depends on a variety of factors, including the nature of the institution, the characteristics of the library staff, the leanings of library management, reactions of the users, timing, and the resources available, to name only some. Experience shows that most libraries remain fairly close to the conservative end of the continuum; a few libraries have reorganized radically, among them the University of Illinois, Columbia University (about fourteen years ago), and the Library of Congress in the sense that it has deployed a matrix management structure.

c) Window of Opportunity

The introduction of technology into the operations of a library has the potential to provide a window of opportunity-a series of activities and decision points which can, if desired, frame organizational and functional plans and changes which might otherwise be politically, financially, or administratively extremely difficult to contemplate. For example, changes in staffing patterns in the technical services departments are common adjuncts to the introduction of computerized systems. Moving the bulk of copy cataloging to paraprofessional staff is an obvious step which can ultimately alter the personnel requirements for the library and allow it to reallocate funds. Another case for change, minor though it may be, is the circumstance in which the interlibrary loan staff is overburdened because of the success of its resource sharing with other institutions. An argument can thus be made for adding to the staff of that unit.

But this author believes that there is another, more fundamental, level of planning needed for libraries, whether or not they are heavily involved with information technologies. This level is the planning which identifies the direction of the library-i.e., what kind of institution it wishes to be in the future; how its users will relate to it; what strengths will be needed; and what level of funding will be required. Accomplishing this exercise will give the library administration and the institutional administration-a strong sense of the role of the library within the institution and the resources needed to move from here to there.

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The formulation of this kind of organizational concept need not have anything at all to do with automation and technology, while at the same time being fully responsive to the question of the future of the library. However, most would incorporate information technologies as a rather important part of the institution's future, but that is because enough is known about the information marketplace to recognize its own future relationship to technology. Basic to this premise is the belief that technology is a tool; that it is a means to an end and not an end in itself. In 1984 a program of the Association of Research Libraries (ARL) focused on the characteristics of libraries of the future and the resources and staff development required to become particular kinds of organizations. Several types of libraries were described; the suggested models ranged from the traditional library, with relatively little automation, to an organization which is highly automated and relies very little on human intellect to serve the needs of the users. This exercise was brought back to the author's library and administrative staff were asked to discuss the several models as they related to the library. A model was developed for the future which was a composite of two of the models used at ARL; the library will need more staff who are expert bibliographers and reference librarians, but also needed will be the technical capacity to provide access to many machine-readable databases which will serve as a link between the campus and remote computer-stored information.

III. Delivery and New Technologies of Information

Naturally, the goal of scrutinizing new technologies in the library environment is ultimately to improve the delivery of information to the user. The extent to which full text in computer-readable form will permeate the library is a controversial issue. Butler (1986) says: "It is important not to generalize about primary publishing from developments in the publishing of information databases. To do so creates an unrealistic expectation of the speed with which electronic publishing will become common among primary publishers" (p. 49). He believes that optical disc will be used for long runs of periodicals, but that these products will not generally cover the retrospective volumes. In other words, the economic impact of scanning and mastering will be perceived as excessive by publishers as well as by librarians.

Of course, more information will be made available online or on optical disc. However, the process of assimilating this technology into document delivery services is much slower than most expected. Librarians began talking about the potential of optical disc in the mid to late 1970s. Now it is the late 1980s, and very few products are yet available either on 12 inch optical disc or CD-ROM. Most of the products currently on the marketplace are information-locating tools-ie., indexes to periodicals and other literature.

Why hasn't the technology moved more rapidly? There are several obvious reasons:

- Cost. The impact of cost upon libraries and publishers has recently received much publicity; we must not disregard the impact upon users who may now be asked to pay in order to access an online database or to search an optical disc file and print out abstracts.
- Lack of standards. Until recently the hardware manufacturers used differing standards. Now the High Sierra standard seems to be making it easier for software publishers to deal with CD-ROM equipment, but standards remain to be developed in other areas such as telefacsimile.
- Lack of perceived market. Publishers do not perceive a library market for new products based upon new technologies. As an example, relatively few libraries and hardly any individuals own optical disc or CD-ROM drives for their PCs. The originators of Bibliofile sold the product with the drives, and this technique of selling hardware as well as software now has several imitators. It is still not a large market.
- Content of disc. Even a 5 inch CD-ROM contains more than 500 megabytes. That is a lot of information, and publishers are having some difficulty determining logical groupings of information to assemble on a disc.
- Graphics and color are only now beginning to be widely available.
- Users are not yet ready to move from the printed page exclusively to electronic data.
- Articles solely in electronic form are not yet perceived as valid contributions in the publish-or-perish cycle; these may not receive the same stringent scholarly review, and electronic articles are not yet trusted by scholars.
- Copyright. The 1976 copyright law did not address emerging information technologies, and the library and publishing communities are attempting, with only some degree of success, to effect a compromise between the interests of the two groups. The copyright issue will become even more intense as full-text documents become increasingly available in electronic form.

Colbert has outlined some of the difficulties of relying exclusively on online full-text information retrieval; that is, of going through a broker such as Dialog to gain access to full text. She cites the lack of ability to reproduce graphs, pictures, charts, and color; the need to have access to many different online services with the

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attendant subscription fees; the need to have the user keep up to date with the changes in search strategies in order to perform a competent search; and the limitations of using electronic databases to follow up page citations (Colbert 1988).

In a superb paper, Govan (1987) projects an expanded information base which will indeed incorporate increasing amounts of electronic data. He suggests that, as in years past, libraries and librarians will accommodate these new information technologies side by side with all the information-bearing technologies which are already supported to provide users with the documents they need (pp. 15-25). Together with other wise and experienced administrators such as Vartan Gregorian and Daniel Boorstin, he believes that libraries will gradually increase their access to electronic publications but not to the exclusion of print. They postulate that print collections will continue to grow but perhaps at a less rapid rate than has been the case in the past three decades.

a) Applications of ICT in Academic Libraries

Now a days there are several information communication technology for various housekeeping, management and administrative functions of the library, different electronic and digital media, computer aided electronic equipments, networks and internet has provided significant role in retrieval and dissemination of information and playing an vital role for modernization of libraries main of them are:

b) Library Automation

Library Automation is the concept of reducing the human intervention in all the library services so that any user can receive the desired information with the maximum comfort and at the lowest cost. Major areas of the automation can be classified into two-organization of all library database and all housekeeping operations of library.

c) Library Networking

Library networking means a group of Libraries and Information Centers are interconnected for some common pattern or design for information exchange and communication with a view to improve efficiency.

d) Library Management

Library Management includes the following activities which will certainly be geared up by the use of these fast ICT developments, Classification, Cataloging, Indexing, Database creation, Database Indexing.

e) Digital Library

A digital library is an assembled of digital computing, storage and communication machinery together with the content and software needed to reproduce, emulate and extend the services provided by conventional libraries based on paper and other material means of colleting, cataloging, finding and disseminating information. A full service digital library must accomplish all essential services of traditional libraries and also exploit the well-known advantage of digital storage, searching and communication. It provides access to part of or all its collection, such as plain texts, images, graphics, audio and video materials and other library items that have been electronically converted, via the internet and www.

f) Technical Communication

Technical Communication consisting of technical writing, editing, publishing, DTP systems etc.

g) Impact of ICT on Libraries and Librarians

Computer has brought in a new impact to the library and information usage. In libraries, information technology has assisted library professionals to provide value added quality information service and give more remote access to the internationally available information resources. Today's highly sophisticated information technology to facilitate the storage of huge amounts of data or information in a very compact space. Information technologies promise fast retrieval of stored information and revolutionize our concept of the functions of a traditional library and a modern information center. Recently technological developments have dramatically changed the mode of library operations and services

Modern ICT is impacting on various aspects of libraries and the information profession. Advancements in ICT and the wide spread use of ICT is resulting in digital information sources and digital media replacing and becoming the dominant form of information storage and retrieval. ICT also survives and makes true rules of Library Science 'Every reader his/her book/information', 'Save the time of the reader', 'Library is a growing organism'. ICT with its tremendous information sources, rapid transmission speed and easy access ensures the satisfaction of the user with complex demand, break down the distance barrier and shortened the time required and ensure the right information to the right reader at the right time. It also increases and solves the library's demand of collection development. It is really an excellent tool for the Library information centers.

h) Electronic Library Vs traditional Library

The following points illustrate the potential differences, between traditional and electronic libraries:

- Traditional libraries are based upon centralized control and relatively few access locations; electronic libraries can be distributed and ubiquitous
- Traditional libraries support one way, loosely coupled interaction; electronic libraries support two-way communication with tight, fast interaction.
- Traditional libraries are based upon a model of one-way search: a consumer looking for an object;

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electronic libraries support systematic search: consumer looking for an object and the producer of the object looking for a consumer.

- In traditional libraries structured text queries are used to aid intellectual access; in electronic libraries complex interactions of query, navigation/browsing, and social filtering can be used.
- Only a librarian may add to the collection of a conventional library, because of the discipline and search restrictions to authorized data can be automatically enforced.

IV. Conclusion

In conclusion, it must be observed that Information and communication technology (ICT) has fulfilled its promise in academic libraries; there is high percentage in the use of ICT. It has tremendously changed the way information is stored and disseminated. It has threatened the traditional approaches to the academic libraries and its services. Use of ICT has also led to the speed on library operations services such as cataloguing and classification, acquisition, processing storage, retrieval and dissemination operations. More so, the discussions on the state of ICT infrastructural facilities in Nigeria in relations to the requirements for the library service delivery in this electronic age, several benefits derivable from ICT impact on compliant librarians on library services delivery as well as the problems inhibiting easy implementation of academic library services have been highlighted. It is obvious that academic libraries and librarians in Nigeria will be required to do a lot more for them to adequately bring the benefit of library services to their clientele. Government lukewarm attitude at both the federal and state levels to the funding and provision of ICT infrastructure and facilities in Nigerian libraries should change and be more supportive. The training and re-training of librarians in the necessary ICT skills is a necessity for the benefits of library services to be impacted on academic libraries and their users in Nigeria. Some of the academic libraries are now ICT driven. This is the only way librarians can retain a place of relevance in the challenging world of information services delivery or else they become obsolete. Therefore, academic libraries in this era will be assessed more on their ability to satisfy their currents user needs for information and their ability to link their users to electronic databases scattered worldwide and not necessarily on their ability to buy or subscribe to information materials on paper formats.

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