

Developing Countries and the Need for Virtual Libraries: Problems and Prospects

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ABSTRACT The paper examines the poor state of library facilities in developing countries' educational system and concludes that standard libraries are either non-existent or are in a deplorable state. This has resulted in the poor quality of graduates of developing countries' universities, and the competencies demonstrated by university graduates are "lowering at an alarming rate". The poor state of academic libraries was implicated as a major cause. The plan to implement a national digital library for developing countries' higher institutions is as timely as significant. The concept and necessity for virtual (digital) library and its advantages are carefully examined. The paper points out that this type of electronic library resources can be shared by all institutions at a fraction of the total cost required to support all the physical libraries within the higher education system in the country. The problems to be faced by the introduction of virtual libraries in our institutions were enumerated and solutions proffered. In conclusion, the paper suggests some measures to be taken by various governments in developing countries like Nigeria for successful execution of virtual (digital) libraries.

INTRODUCTION

As Carlos Victor Penna (former UNESCO Librarian) has put it, "scholarship and culture represent a precious source of national wealth. This is why in every development plan as well as all educational planning, to keep the individual well informed is an important means of encouraging economic and social development. In order to be educated and cultured, one need among other things, an efficient system of education, and an effective system of education is hardly conceived without a cultivated and systematic habit of reading. Reading presupposes the availability of books and consequently a library is needed. Without libraries, there can be no good primary schools, no efficient secondary schools and no productive universities. In the absence of libraries, it is not possible either to encourage and maintain a permanent education for adults...." From the above statement, the three main roles played by libraries, i.e. educational, cultural and informational are clearly illustrated. Ng'anga (1982) also pointed out that libraries are principal centres for the dissemination of knowledge and culture and play a significant role in life-long education. At this juncture, one can

then ask whether the traditional libraries in developing countries are fulfilling these roles or not. Unfortunately, it must be realized that at all levels of the developing countries' educational system, standard libraries are either non-existent or in a deplorable state. This is not necessarily in terms of physical infrastructure where a good number of our higher educational institutions have passable buildings and library furniture, but in terms of books and journals – the essential core of a library is absent. As asserted by Aguolu (1996) the proliferation of universities in Nigeria for instance, despite the economic recession in the country since 1980s, has increased the problems of the universities and their libraries so much that now their future seems uncertain.

Taking Nigeria as a case study, the UNESCO (1999) national surveys showed that less than one percent of the libraries in Nigeria – 41 Universities, 41 Polytechnics and 62 Colleges of Education – carry current journals, book titles and abstracts in at least 80% of the programmes and disciplines, which they offered. As Daniel (2002) has revealed, poor quality library resources have depressed the quality of teaching, learning and research. Obsolete and out-dated library books and journals beget lecture notes with stale

contents. Research is hampered by lack of awareness of the current state of knowledge in the field and the use of out-dated research paradigms and methodologies. The reality that no single library can be self-sufficient in terms of its resources and services has given birth to library development in two complimentary directions. First is the networking of the libraries, which ensures that network members make up for shortfalls from the strength of others. Collections that are not available in a library can be accessed from another library having such collections within the framework of a network. In unity they stand and in division they fall in offering good quality library services.

The second direction is the building of a virtual library. The pooled resources are made available electronically to each library site using Information and Communication Technology (ICT). Thus such libraries have the potential for providing the latest and comprehensive resources and delivering it instantaneously to users. The recent trend in academic library development is towards the establishment of virtual libraries. Daniel (2002) pointed out that as of today there are over 150,000 national and institutional virtual libraries worldwide. This should now be the thinking and direction of developing countries through their various Ministries of Education and, their Universities and Polytechnics should be the first beneficiaries. The plan to implement a national digital library for developing countries' higher institutions is as timely as it is significant. This is because of dwindling funds in the face of rising costs for the acquisition of foreign databases central to teaching and research in their universities and polytechnics. It is also because few developing countries' scholarly publications are accessible to other developing countries' scholars, not to mention other scholars worldwide.

It is the objective of this paper to stress the importance and necessity for virtual (digital) libraries in developing countries. The paper points out that developing countries should not lag behind as far as virtual library is concerned through the provision of ICTs. The paper emphasizes that virtual library should exist in developing countries like Nigeria in order to advance library services for all and enhance:

- Sharing group purchasing power for licensing digital resources
- Sharing commitment to provide the

framework for strengthening resources, and expertise,

- Sharing library resources;
- Sharing staff expertise
- Providing information for national development
- Availing the nation access to global information and
- Fulfilling the concepts of Universal Availability of Publications (UAP) through resource sharing.

THE CONCEPT AND NECESSITY FOR VIRTUAL LIBRARY

Towards the late '60s and early '70s the concept of a paperless society dominated intellectual discourse. The potential of what can be achieved in information generation, acquisition, collection, processing, display and dissemination was very exciting and intoxicating, and resulted in futuristic dreams. Even though paper has not disappeared nor will it disappear, advances in the fields of telecommunications, computer technology, and satellite communications have revolutionized information delivery services in advanced countries. As asserted by Akpan (2001), information can be delivered across countries into houses and offices instantly. Such sharing of information has given rise to the concept of the global village. But it must be realized that the sharing, however, has been uneven across the globe. Countries with advanced technology are years ahead of countries with developing economy. Within developing economies, some have moved further ahead, than others. Nigeria, in this respect, is outside the league.

The expression 'virtual library' is relatively new: being a little above a decade. One of the writers who coined it is Nancy Schiller who defined it in 1992, simply as "libraries in which computer and telecommunication technologies make access to a wide range of information resources possible". It is often referred to as 'digital library' or 'electronic library', 'community network', or simply, 'library without wall'. It is called 'virtual' because in a good electronic wide area networked library, the user enjoys the euphoria of being able to access collections in distant libraries, and yet he has not physically moved. It is an experience of 'virtual reality'. One of its features is that it emphasizes access

and *ownership* of collections believing that the whole global information superhighway is a human resource and heritage which all who have the necessary infrastructure capabilities, can tap for their own development.

The virtual library can be regarded as a child of necessity arising from need to use technologies in accessing the world information overload, or information explosion, for human survival and development. It is necessary for developing countries to embrace it. Information is power, and how a nation accesses and uses this power, will soon become more important than how it uses its coal, oil, gas and other natural resources. The need for a virtual library system has therefore become a most urgent necessity in the developing countries' tertiary education system. We can then take the virtual (digital) library to be a computerized library system which provides multiple accesses to the entire collections of a library by means of electronic media. According to Irokwe (2001), a digital library is a library that harnesses digital technologies as infrastructure to search, collect, organize, store and distribute cultural, historical and scientific information whether it is text, visual images or sound. Digital libraries make it possible for electronic books and journals to be accessible to an unlimited audience at the same time, anytime and anywhere. This requires that all operations of the library are computerized. Such operations include selection and acquisition, cataloguing and classification. This unified access system is necessary because of the desire of the libraries to provide maximum library and information services to its users.

A traditional library is simply a place (building or room) where books and related resources are kept and used for promoting learning. The "place" can be "real" (non-virtual) or "virtual". The concept of "real" and "virtual" are used more in a scientific rather than in the literal sense. "Real" means tangible and capable of being felt while "virtual" denotes a representation of reality. This has given rise to the concept of virtual reality to which the virtual library idea subscribes. Thus, the real word of the library is perceived in virtual space. Comparatively, as pointed out by Daniel (2002), a purpose-built physical building with library furniture, hard print copies of books, journals and other library resources give the traditional concept of a "real" library. In other words, walking from shelf to shelf in the imposing buildings of the main library of a standard

university library, and picking up books to read gives a sense of being in a "real library". Fortunately, however, information and communication technology (ICT) today, provide the possibility of the same user walking through aisles of these libraries and picking up the books from his or her desk virtually, using Information Telecommunication Technology as tools. This is the concept of "virtual reality".

A virtual library can therefore be defined as a collection of library resources in electronic / digital format at various locations, which can be accessed and used with great ease using computer Information and Communication Technologies for the purpose of teaching, study, research, learning, leisure and decision-making. A virtual library is based on a set of data-bases of information from library resources. Virtual library systems depend upon a rapidly maturing area of technology known as virtual reality or 'VR' for their existence. VR has often been described as the 'ultimate multimedia experience' – the simplest form of which is known as telepresence. Such experiences depend upon the ability of a computer (and its associated interaction peripherals) to create highly realistic simulations and subrogations in which users can become 'totally immersed'. VR technology has been used in many successful ways to create virtual landscapes, cities, buildings and offices. The technology has also been applied to the fabrication of virtual classrooms, laboratories and instrumentation. Currently, there is much interest in the development of virtual libraries.

Although some virtual library systems are available in the form of packaged CD-ROM products, the most advanced systems only exist within sophisticated computer systems that are supported by advanced telecommunication equipment to facilitate remote access and resource sharing. Using equipment of this sort makes it possible to enter a virtual library, browse around its rooms and shelves, use an index or catalogue, and select a book (by pointing to it and touching it), open it and then read it. Of course, the only place where the book really exists is in the computer and within the mind of its reader. It is a system for providing access to virtual indexes, catalogues, books and journals. It will be necessary for virtual library system to provide other types of experience such as surrogate travel, learning scenarios and, may be, access to 'virtual librarians' who could help them

to find the information and experiences to which they wish to gain access.

A survey of University libraries in developing countries of the world will show the deplorable conditions in almost all of them. Due to their inadequate funding in the face of acute inflation and the depreciation in the value of the national currency, these libraries have very few current books, journals, and other reading resources. There are wide scale duplications of few reading materials that are acquired. Many of them have no e-mail, fax, telephone and computer based services. Records of in-house operations are not available. Processing of acquired materials is extremely slow. There are no effective information services to users, and many libraries find it difficult to embark on meaningful bibliographic and current awareness services. As pointed out by Ikem (2001), there are staff shortages, deterioration of facilities, equipment and even library buildings, most of which do not provide conducive environment for reading. The libraries stand isolated from global information system – the Internet. Yet these libraries in the developing countries are expected to serve as information delivery centers to enable their universities to make development impacts on research, teaching, learning and public service. It must be realized that a university is as good as its library. There is therefore an urgent need to transform these conventional libraries into virtual libraries, which are cost effective and can empower their universities for effective teaching, research, learning and solving national problems and

preparing the developing countries adequately for the competitive world of the 21st Century. The advantages of virtual libraries over traditional libraries can never be over-empha-sized. These can be explained in the table 1 where both of them are compared.

For a digital library to be useful there must be a user community and a means for users to reach the library. Since the essence of the digital library is that all the material is machine held and manipulated, the digital library does not have a physical presence in the same way that a conventional library does. The important point is that a digital library has materials stored in a computer system in a form that allows it to be manipulated and delivered in ways that the conventional version of the material cannot be. It must be pointed out that an automated library is not necessarily a digital library, since a library consisting entirely of conventional physical material (such as only printed books) may be very highly automated. This automation does not make it ‘digital’ in the sense we are considering here. However, it is true that a digital library must be automated in its essential functions. Because the material is in digital (or computer readable) form, some new possibilities are opened to the digital library which are not present or possible in a conventional library, even one with the same material. A good example is the material delivery process. While this process involves removing a book from a shelf and checking it out in a conventional library, the book in the digital library can be copied to a user’s

Table 1: Typical virtual and traditional libraries compared

No.	Library Services	Traditional Library	Electronic Library
1	Opening Hours	Limited	Round-the-clock, all all-the-year round
2	Student	Not possible	Possible
3	Services to non-to traditional students	Grossly limited	Online delivery ents students
4	Access to resources	Limited shelf to search in physical locations	Instant/simultaneous and electronic
5	Search engines	Manual and tedious	Electronic, easy and and extensive
6	Time factor	Does not save not time, in fact waste time	Significant saving, no risk or travel time required.
7	Seating space and self shelf space	No savings	No seating ting space required
8	Manpower requirements	High	Low
9	Multiple access	Not flexible	Easy and cheap
10	Resource sharing	Inconvenient, slow turn turn around time	Convenient, fast fast turn - around jj
11	Migration	Limited	Use the Internet ess to access otherther libraries&materials and

computer for reading, still remain in the computer stacks and it can be loaned immediately to another user. This implies that holds (reservations) could become a thing of the past for a fully digital library, at the expense of a very much more complex usage tracking system. Its users will be connected to it for research and delivery via computers. The mission of virtual library in developing countries should be to provide, in an equitable, cooperative and cost effective manner, enhanced access to national and international library and information resources and for sharing locally-available resources with libraries all over the world using digital technology.

VIRTUAL LIBRARY AND ITS ADVANTAGES

Taking Nigeria as an example of one of the developing countries, the library is widely accepted as the heart of the education enterprise. Improving the quality of libraries in the Nigerian higher education system will no doubt translate in the short and long run to improving the quality of products of the system. In recent times and as attested to by the findings of a 2001 Nigerian Institute of Social and Economic Research / World Bank report on the quality of Nigerian universities, the competencies demonstrated by university graduates are "lowering at an alarming rate". The poor state of academic libraries was implicated as a major cause. The Nigerian virtual library project is therefore a justifiable venture for bolstering higher education quality. In another sense, the virtual library will enable Nigerian and other developing countries' scholars and students to profit more fully from electronic communications revolution by having access to databases critical for their research and teaching. Within the higher education system in Nigeria, libraries are far from being up-to-date. Books, journals, abstracts and other collections are not current. The typical setting is to have a few fairly recent titles and a fairly large collection of old titles. There are gaps in sequence which could be critical for knowledge generation and dissemination. As a result of the above lapses, the importance of virtual libraries in developing countries can never be overemphasized.

A virtual library scheme will facilitate access to a vast collection of books and journal titles from as far as back in time as possible. A subscribing library in Nigeria and other

developing countries will be several times richer and current in its holding of books and journals than is presently the case. On the cost side, estimates by the WWW.virtuallibrary.com for 2001 showed that the installation and running cost of a virtual academic library in a university is a mere 0.015% of the cost of establishing a university "real" academic library and less than 2% of the running cost. All the higher institutions in Nigeria have physical facilities for their libraries which require a conservative estimate of about 1 billion Naira in capital, recurrent and maintenance costs annually. With Nigeria's current population growth rate out pacing the education sectoral growth rate, the qualitative expansions required annually is not only phenomenal but also arguably unjustifiable in the face of other pressing needs of the populace and government's commitment to total development of the nation. As a result an alternative system which is cost-effective, relatively cheap to maintain, and which provides access to current and latest materials needs to be found. This type of electronic library resources can be shared by all institutions at a fraction of the total cost required to support all the physical libraries within the higher education system in the country.

Furthermore, it is projected that 1,000 electronic databases / resources are equivalent to 30,000 volumes of printed materials. These will require 2,650m² of shelving space alone, which is saved if the library is electronic. Thus, minimal resources can be mobilized for maximum advantage in terms of library development in Nigeria and other developing countries. In recent times, post secondary educational institutions have been under tremendous pressure for change as a response to diminishing budget, need to reach students other than their traditional clientele, and adapt current development in information technology for their delivery of institution. As a result, many institutions of higher learning worldwide have turned towards electronic networking in academic services. The establishment of NUNet in Nigeria is an example of such changes. For maximum use of facilities and to take advantages of information technology, the establishment of an electronic library system across the country will greatly enhance the provision of an enabling environment for the establishment of a viral ICT-driven instructional and educational delivery system. In addition, it would help to promote the

use of information and communication technologies to deliver education to the doorstep of those who yearn for it. The virtual library also provides a platform for sharing knowledge. It is not a one-way flow from resource-rich to resource-poor countries. Instead, it is set up to be a forum for the interchange of ideas. Consequently, while universities in Nigeria and other developing countries will take advantage of downloading materials from the developed world, such universities will have the opportunity of uploading output of research in the form of books, dissertations / theses and journals to the global network of virtual libraries.

Also, different access to information technology and the ability to participate fully in global electronic information networks is in itself a measure of the unequal distribution of power in today's increasingly connected global economy and polity. In Nigeria, for instance, there are very few people with the advanced training that enables them to contribute to new knowledge about electronic information systems. It is precisely because of this situation of inequality that Nigeria and other developing countries should be included in developing new knowledge in these areas. Indeed, excluding Nigerians from the development of digital libraries would further exacerbate exclusion from this important arena. It must also be realized that many of the print materials held in collections in Nigerian Universities, particularly older historical manuscripts, are deteriorating rapidly. Some materials cannot even be consulted by researchers for fear of accelerating their decline. Many research institutes and libraries, have suffered from deep funding cuts since 1980s, and collections of all kinds have not been adequately maintained. Preservation is central to maintaining the quality, longevity, integrity, and accessibility of data. Digitalization within the framework of the virtual library project can be used to create a high-quality copy of an item, thus protect the original and ensuring that the information that it contains is both permanently preserved and made accessible.

VIRTUAL LIBRARIES - PROBLEMS AND SOLUTIONS

Before transformation to the reality of virtual library can take place, there is much to be done; we need to create electronic information systems

that match individual patterns of thinking and learning in order to produce the kind of productivity expected. In addition, before the attainment of user self-sufficiency and enhanced productivity can be achieved, several problems associated with information creation and delivery must be addressed. Taking Nigeria as a model again, Nigerian telecommunication networks have been found to be inefficient and less reliable than networks in other regions of the world as a result of power cuts, inadequate telecommunication gadgets as well as the poor value system. It must also be noted that there are inadequate management and technical experts in developing countries like Nigeria compared with advanced countries of the world. The level of computer literacy and education is at very low ebb in developing countries leading to the problem of how to improve and / or impact information literacy. Furthermore, there are problems relating to

- how to enhance "ease of use" as well as the use of expertise in locating appropriate information and conversion of all paper materials into virtual documents;
- how to revise the concept of virtual library from that of a science fiction to a result-oriented and professional discipline;
- the role of the Librarian in a virtual library environment, i.e., transition a keeper of information to information expert; and
- the management of library from shelf access to electronic access of information.

For developing countries to overcome the above-enumerated problems, they need huge amount of money and management skill especially in computer education. For instance, there is the need for several phases of reorganization and restructuring of workflow and responsibilities in the transition between traditional library functions and technology-driven functions. There is the need to address the increasing demand on the flexibility of the skills, capability, and continuing education of library staff. The requirement of more technology and communication skill will necessitate constant training and development of library staff.

It must be realized that long-range planning by developing countries will become more flexible and technology-dependent. The constant change in technology will require constant reviews of the balance of budget items; more of the budget will be used to support access than acquisition

of technological power to produce hardware. The problems of copyright issues as related to authorship and publishing rights have to be overcome before meaningful virtual (digital) library project is finally achieved.

In several advanced countries, virtual library is already a reality. In Africa, only South Africa, Botswana and Egypt can boast of a substantial achievement in virtual library. However, more African countries are beginning to rise up to the emerging trend in Information Communication Technology. In South Africa and the US, laws approving dematerialization of paper is already on. In Nigeria, to facilitate the virtual library system or process, it requires that the technological, infrastructural and communication patterns we create are aligned with thought processes and learning styles of the Nigerian populace. That is, the pattern of our thought must be matched with the pattern of organization of knowledge. This may require some collaboration of computer scientists to design the hardware and software, neuroscientists to give input in to the mental mapping of users, and library scientists to give input into the organization of knowledge (Adelekan, 2001).

In many advanced countries, there have been experimentations, moving from venturing to processing and then to positioning. Nigeria must also make experimentations too. This is only achievable through the collaboration of all stakeholders. One expects that a formulation for that implementation will evolve from various efforts being made by Nigeria and other developing countries. It must be realized that the management of the virtual library takes its root from its operation, and it cannot be operated effectively if the challenges are not tackled, especially if solutions are not found to irregular electricity supply, inadequate telecommunication gadgets, maintenance culture and high cost of the computer hardware. Many of the components of a digital library can be bought or produced in-house. This applies to the creation of the digital materials from the originals as much as to the system software. In both cases, it is important to consider the economics of producing in-house versus buying a solution. It is very important to consider the issue of "proprietary solutions". Essentially a proprietary solution is one where the organization does the work itself, either using its own staff or commissioning a solution from external supplier. A proprietary solution has a

number of advantages as well as a number of negative points to be considered by any organization embarking on virtual (digital) library.

Globally, as publishing is presently between print and electronic ages, the management of our virtual library project should go along this line. Education is also very paramount to the management and sustainability of the virtual library. Both the public and the managers should be educated from time to time. Managers should have access to information from countries that have made substantial achievement in the running of the virtual library, especially the African countries in this category. Lastly, right from the conception of the implementation of the virtual library, the idea of commercialization should be incorporated so that the program can be sustained. Constant evaluation should also be carried out to measure effectiveness and progress.

Education should be made a top-priority by the government. This includes general literacy as well as computer literacy and of course a national commitment on a range of information awareness on the need for information communication skills in order to remain relevant. Also different consortia – librarians, academicians, private sector operators, commercial, government, etc. should come together to provide all manners of databases that will connect Nigeria or the developing country concerned to other countries of the world and the world to them. It is also very necessary to collaborate with the international community to fund or part-sponsored programs on awareness as well as reduce the cost of computer software and hardware and provides technical expertise. It is very important for the government to reduce telecommunication charges as well as commercializing library and information services. The private sector should be encouraged to bankroll some of the expenses of the program.

CONCLUSION

Most libraries today face the threat of technological obsolescence, unless they modernize. The university library in the past has been the hub of academic research and excellence. Nigerian universities for instance, need to embrace information technology and new library automation technology in order to maintain the central role and importance of library resources

in research. The trend is toward digital libraries as earlier defined in this paper. In outline, the current issues facing our libraries today are:

- Increasing their budgets to embrace digitalization
- Distribution and access to digital information
- User requirements and expectations
- The librarian changing role and
- New technologies for managing digital content.

It must be realized that most libraries in the past had meagre budget to add a hundred to 1000 books per year. Now the entire library system of old is to be discarded and a new digital foundation laid. Library budget will now include provisions for servers, Internet access, wireless campus-wide network, structured cabling systems design of the campus, Intranet design and web site design to interface with the outside world. In addition to the library automation systems (hardware and software) that will make everything work, the management of developing countries' universities like the National Universities Commission (NUC) as it is the case with Nigeria, has a full task in planning and implementing such a system with the assistance of knowledgeable and proficient IT companies.

The distribution and access to digital information raises a number of issues such as copyrights management, web-enabled searching capabilities, data and meta-data definitions, security, pay-per-user options, increase user transactions and traffic on the computer system, and delivery of multi-media content. Many national and regional libraries are trying to achieve two things at the same time: getting their local library content on the web and accessing educational information from foreign sources. There is a need to recognize that the modern library will address the needs of off-campus users and that the services will have to be tailored to the needs of the customers / students of varying levels of sophistication. The past image of the librarian as a search expert will need to change in the world of digital library technologies. The librarian's role will now evolve to a co-coordinator of information channels and systems. His technical and IT know-how will need to be greatly enhanced as he may need to be as knowledgeable in IT as the head of the Computer Centre. In order words, the jobs may become indistinguishable in the new dispensation. He will need to know much about

computer-based training and distance learning as the central library takes a new coordinating role in the dispensation of knowledge.

It must also be realized that new technologies for the management of digital content are emerging and still evolving. These include video streaming technologies, copyright tracking and management, intelligent search and profiling agents, smart cards, object and image databases, and virtual reality technology. These evolving technologies and the demand for accessing digital content via the web are revolutionizing the field of library science and information dissemination. All the above points to the fact that the budgetary allocations to various libraries in Nigeria and other developing countries have to be doubled if we are to catch up with the information revolution taking place in the world. To achieve the above fits, it is advisable for the campus-wide library project to be implemented in phases, because of the enormity of the project and the costs involved. If properly executed, this campus-wide digital library project could become the biggest single budget in the whole university system. It is therefore recommended that the planning and implementation should be carried out in phases. The various departmental libraries could come online in phases as the new system is tested to find its weaknesses for correction. Also for effective and coordinated implementation, there is the need to set up a committee comprising the IT companies, university computer centres and Faculty Deans in the various universities concerned.

For the successful execution of digital virtual library in developing countries, there is need for capacity building for project administrators and other key staff to effectively man the virtual libraries. This could be in form of workshops and conferences for existing librarians and sustained staff development programme for additional staff to acquire the innovative technology. Furthermore, training has to be conducted for library users for them to be able to use the new facilities to be put in place. The ultimate functionality to be achieved by the virtual library project in developing countries' university libraries can only be sustainable if the necessary know-how abounds within and outside the university system. Developing and sustaining skilled manpower in the fields of Internet and especially virtual (digital) libraries is very important and should be given due consi-

deration. Project Administrators should have basic knowledge of networking, including Internet configurations, fibre optics technology, packet switching networks, etc. Provision for sustainability shall be included in the annual budget of our higher institutions. In order to implement and sustain the virtual (digital) libraries in our universities, the Education Tax Fund (ETF) in Nigeria for instance, could provide the critical funds but the various donor agencies could also be contacted for counter-part funding. Also, after the implementation of the project, services could be extended to the immediate communities for some token fees in order to sustain the project. Users (both staff and students) may also pay fees for access time and retrieval of some special documents.

Information, media, research findings and other aspects of knowledge are all in the virtual (digital) libraries. Our various university virtual libraries will offer the best educational services fit for students and lecturers in any university, and the collaboration with universities and polytechnic virtual libraries will become part of a global academic spectrum, available to all academia in Nigeria and other developing Countries. The basic information to be published on the web is the database of materials available in each university. Once the web pages are created and published, they are subject to periodic updating as new materials are added or outdated materials are deleted and placed in the archive. It will be an exciting challenge to ensure currency of information on the site as any piece of garbage

is viewed around the world. Enquiries and observations inundate your mailbox unsolicited. Incidentally, the service under this project is not revenue yielding. Rather, funds will be needed annually to renew registration with the Internet Service Provider (ISP) as well as pay for web site hosting, whichever applies. But we have a choice – the choice to optimize by sharing resources.

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