Application of information Communication Technology in academic libraries in Nigeria

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Abstract

This paper looked at the information communication technology (ICT) and it application in academic libraries. It equally looked into the various areas in the libraries that the ICT is relevant and its adaptability to the libraries operations such as cataloguing, serials, acquisition, and circulation routines in the libraries. The paper also focused on the advantages that ICT has on libraries, some of the various types of soft ware available in the libraries. Also it talked about the network tools, problems and prospects of ICT application in our libraries. Hence, necessary suggestions were prescribed.

Introduction:

Today, it is very obvious that, the use of information communication technology system in all areas of human endeavour is now known and widely acceptable. This is because its application to the day to day activities of such organization is (growing exponentially which calls for the need of ICT for efficiency and effectiveness) very efficient and effective.

In library set up, information communication technology application is one the where computer systems are used to manage one or several library routine systems such as acquisition, serial control, cataloguing and classification and the on-line public access catalogue (OPAC). This encompasses the notion of the application of technologies to information handling (generation,

storage, processing, and retrieval dissemination). In general terms technology is the tool and technique used for utilization and gathering of information. It includes physical devices like papers, pencils, biros, computers, etc.

The information technology application in libraries can be divided into three categories: computer, storage media and telecommunications. A computer performs processing operations on data and is used to store and retrieve information process transaction (charging and discharging), sort, data, etc. Since the central processing unit (CPU) or the computer has a definitive amount of data capacity; it requires additional storage media, such as magnetic disk and tape, and audio tape. A disk is the most common auxiliary storage device. Telecommunications facilitates the transfer or communication of data and information technology in the libraries.

Basically, information technology provides for full organizational structure (i.e. to provide enhanced users satisfaction. cost effectiveness, integration, faster, and simpler programmes, rapid responses, and operational procedures).

Background information

When exploring the history of library automation, it is possible to return to past centuries when visionaries, before the computer age, created device to assist with their book lending system. Even far back as 1588, the invention of French "Book Wheel" allows scholars to rotate between books by stepping on the pedal that turns a book table. Another interesting example was the book indicator developed by Albert Cotgreave in 1863 which housed miniature books to represent books in the library's collection. The miniature book was part of a design that made it possible if a book was in and out or overdue. These and many more examples of early ingenuity in library system exist. However, this paper will focus on the more recent computer automation beginning in the early century. Library automation development began in the 1930s when punch card equipment was implemented for use in library circulation and acquisition. During the 30s and 40s, progress on computer system was slow which is not surprising, given the depression and World War II 1945. Vanneval Bush envisioned an automated system that would store information; include books, personal records and articles. Bush (1945) wrote about hypothetical "memex" system which he described as a mechanical library that would allow a user to view and store information from several different accesses points and looks at several items simultaneously.

The library automation first appeared at MIT, in 1957, with the development of COMT managing linguistic computation, natural language and the ability to search for a particular string of information. Librarians then moved beyond a visions or idea for the use of computer. With the advent of technology they were able to make great advance in the use of computer for library system. This now led to the explosion of library automation in the 60s and 70s.

The advancement of technology in 1960 and 1980 led to increase in the use of computer in libraries. The new potential for computer use guided one librarian to develop a new indexing technique. HP Luhn, in 1961, use a computer to produce the "key word in context" or KWIC index for article appearing in Chemical computer as it was discovered that librarian had the ability to put control language index term on the computer. By the mid 60s, computer was being used for the production of 'machine readable catalogue record by the library of congress between 19654 and 1968. LOC began the MARC I project, followed quickly by MARC II which was designed as a way of "tagging" bibliographic record using 3 digit numbers to identify field. For example, a tag may

indicate International Standard Book Number (ISBN) while another tag indicates 'publication date' and yet another indicates 'library of congress subject headings' and so on.

In 1974, the MARC II format became the basis of standard incorporated in National Information Standard Organization (NISO). This was a significant development because the standard created meant that a bibliographic record could be read and transferred by the computer between different library systems. Bibliographic automation of Large Library Operation in the late 1970s was one of the first and later became the foundation for the Research Library Information Network (RLIN). BALLOTS was designed to integrate closely with the technical processing function of the library and contained for main files: (1) MARC record from LOC; (2) an in-process file containing information on item in the processing stage; (3) a catalogue data file containing an on-line record for each item; and (4) A reference file. It also contained a wide search retrieval capability with the ability to search on truncated words, keywords, and LC subject headings. For example OCLC, the on-line computer library centre which began in 1967 and chartered in the state of Ohio. This significant project facilitated technical processing in the library system when it started its first cooperative cataloguing venture in 1970. It went on-line in 1971. Since that time, it has grown considerably, providing research and wider range of connectivity for library users.

Review of related literatures

It is the consensus that we are now in an information age. Information is a national resource that enhances national development. It is used to locate, communicate and make decisions. Societies that depend on it and to its exploitation are known as information societies. ICT is used to create, manipulate and manage information. But the rapid growth of information does not depend solely on the development of ICT to process and transmit it. Information is the result of data processing so that they (data) become useful, usually for some decision-making activity in library management, Sam, E. Ifidon and Elizabeth, I Ifidon (2007). Also, Samuel, Avemari U. E. (2011) describes library automation as the use of computers and general/ customized software designed in line with the library and information services procedures that are meant to be used to carry out specified lines of information services delivery library automation is also defined by Bierman (1980) as the use of computers and associated technology to exactly what has been done in the libraries with the justifications of reduced cost and or increased performance. And on the other hand, as the use o0f computers and associated technology to revolutionaries the meaning of libraries and to redefine their existence.

Telecommunications refers to the electronic transmission of signals for communications, including such means as telephone, radio, and television. Telecommunications has the potential to create profound changes in business because it lessens the barriers of time and distance. According to Ronald Thompson and William Cats-Banil (2003) described telecommunication as the transmission of a message across a distance. They went further to assert that; telecommunication can be used to facilitate communications between organizational members, or between organizational members and external parties such as customers and suppliers.

Data communications, is a specialized subset of telecommunications, this refers to the electronic collection, processing, and distribution of data, typically between computer system hardware devices.

Information technology is a term which encompasses the notion of the application of technologies to information handling (generation, storage, processing, retrieval, dissemination of information). In general terms information technology is the tool and technique use for utilization and gathering of information. It includes physical devices like papers, pencils, biros (ball pens), computer, etc. This is also referred to the transfer of data (*communications*) from a transmitter-also called a sender or source-to receiver-also called sink- a cross a distance (*tele*, from ancient Greek, meaning "far off") Sarah, e. HutChinson and Tracey, C. sawyer (2000).

Fatoki (2004) also put it into perspective the significance of, and the necessity for ICT availability in the university libraries and the necessity to ICT skills for librarians when he said that in addition to the challenges they offer, they will ensure qualitative research work for the library users, with the concomitant production of highly skilled manpower for the labour market.

The use of ICT in libraries.

The use of information communication technology in the library is simply meant, carrying out the manual activities and services in the library electronically with the help of computer networking. This makes it easier for the handling of information generation, processing and dissemination in the libraries.

The information technology application in the libraries can be divided into three categories namely: computer, storage media, and telecommunications. A computer performs processing operations on data and is used to store and receive information, process transactions, sort data, etc. since the central processing unit (CPU) has a definite amount of data capacity, it requires additional storage media, such as magnetic disk and tape, and audio tape. A disk is the most common auxiliary storage device. Telecommunication facilitates the transfer or communication of data and information technology in the libraries.

Oketunji (2000) remarked that ICT is used in the libraries to automate technical services such as cataloguing information, classification process. This is to bring about efficient reference and information services. It is usually used to network operations, such as cataloguing, circulation activities and authority list. It is also used to control project. If the applications are properly annexed, ICT helps the growths and development of libraries in different directions.

The usefulness of ICT in our libraries can be summarized as follows:

 a. It allows easy integration of various activities;
 b. It facilitates cooperation and formation of library network;
 c. It helps to avoid duplication of effort within a library and between libraries in a network;
 d. It eliminates some uninteresting and repetitive work;
 e. It helps to increase the range of services offered;
 f. It provides marketing opportunities of its services;
 g. It ultimately may save and/or generate money;
 h. It increases efficiency
 i. It provides more up to date information;
 j. It provides unlimited information from different sources;

k. It provides for users round the clock access to information sought by individual according to requirements
l. It provides accurate results
m. It provides the ability to search and combine data in many different ways etc.

To sum it all ICT is a tool, which provides opportunity for full organizational restructure (i.e. to provide enhanced users satisfaction. Cost effectiveness, integration, faster and simpler programmes, rapid responses and easier operational procedures).

Procedures for automation

It is important to take a look at some of the procedures that are necessary for automation. Basically, we will look at the five sets of requirements in which automation have a role to play. They are as follows:

Repetitive routines

Data processing is full of repetitive routines. Those are routines which accept different data values each time they run, but which carry out some processes on the data. Some repetitive routines can use the values of the data they encounter to modify the processes they are performing.

Templates

It means a pattern that specifies some physical characteristics of a structure. It also means a skeleton of boxes, lines and possibly prompts which can be brought up on to a user's screen to help the input process.

Calculations

Most applications have calculations built into their programs, but a user may want to introduce extra calculations, perhaps to derive statistics which are not normally part of the output.

File management activities

Some pathways and command sequences that have to be presented to an operating system are long and not intuitively clear. Whatever such input has to be used frequently there could be advantage in automating it. Similarly, procedures for saving information or moving files that occur frequently could be automated.

User menus

Most users are familiar with the drop-down and pop-up menus offered by windows. Some applications provide similar facilities. Toolbars and function bars are also menus. Users can make their selections directly from these menus, or they can write automated procedure to make regularly wanted selection for them.

Specific areas ICT application to library

The application of computers to library and information activities has been more of a dream than reality in spite of the good intentions which attend the experimental will in an era when the information arena the world over is witnessing a revolution occasioned by the continuous impact and challenges posed by new technologies.

There are many functions in the libraries that computer can be made to handle effectively.

These may be grouped into three categories:

1. Housekeeping functions, which encompass four sub-systems as follows-cataloguing, acquisition, serials and circulation;
2. Information storage and retrieval i.e. SDI (Selective Dissemination of Information) services;
3. Management functions.

Jones and kesner (1984) warned that it is very important to do a system analysis before embarking on the automation programme. They both summarized the following consideration of system analysis. Operation involved, Equipment required, Documentation that would be necessary, Work flow with the system, Relationship and cost involved.

Cataloguing procedure of the library

One of the earliest applications of computer to library task is for the production of library catalogues in book form. The advantages of book catalogue over the conventional card catalogue particularly in a large library system are well known. Apart from saving the space, a book catalogue makes the resources of the library more widely and easily known to the library users in several locations throughout the world. This method has always been problematic and the chief problem here is updating. Ola, (2002) encourages cataloguers to be more result-oriented and focused on networking so as to ease the sharing of bibliographic records through the electronic form. He advocates for Online National Bibliographic Network (ONBN). This problem is easily solved by the use of computers. A computerized catalogue offers so many possibilities that the initial high cost of setting it up should not be a deterrent. In addition to guaranteeing speed, accuracy, and regular updating, automation makes it possible to create as many records and generate as many forms of information as are needed from one input actively.

The following could be obtained from a computerized catalogue file:

a. A dictionary catalogue of all holdings in the library system;
b. Author or main catalogue;
c. Title catalogue plus supplements;
d. Subject catalogue plus supplements;
e. Classified catalogue plus supplement;
f. Faculty and departmental libraries;
g. Accession list of new arrival;
h. Periodical list etc.

With the help of information technology, a computer can also be programmed to produce catalogue cards, spine labels, processing and transaction slips. It also assists in reference work because it permits the production of special purpose bibliographic and reading list and makes it possible to answer several questions pertaining to the library stock within a reasonable period in some cases, in a matter of seconds particularly in an on-line system. In order to simplify cataloguing in individual libraries, several computers based projects have been designed, for example the British and American MARC projects are already making it possible even to select items on a routine basis.

Computer IT can perform these with utmost speed, regularity accuracy are printing order slips making automatic claim, preparing automatic cancellation notice and reminder slips, and most important of all producing fund reports and statistics of all type of specified intervals. It can also produce accession register, and processing slips which accompany the books to the cataloguing section and supply various types of information at short notice.

Serials control

Serial is another problem area to which IT can assist. A computer assisted serials system can be a simple one which merely provides printout of a title and holding information with locations and call numbers or it can be very comprehensive. The latter may include, among others, "a means of check-in of programme which use the receipt data to automatically update holding information, display holdings automatic or assist claiming of individual serial issues which are over-due, notify volume (and their respective titles) which are ready for binding: prepare bindery notice and claims forms; maintain funds accounting, subscribe payment, and renew records. Such a system can function in either an on-line or batch mode of processing".

Circulation control

Circulation control is another area of library that has been extremely automated. In the majority of cases, the computer- circulation system is operated in an offline mode but this has several disadvantages hence on-line system are being developed at a rapid rate. The major disadvantages of off-line method are that, there is always a term-tag between transaction and actual input into the computer file with the result that the information available to the library staff on transactions hardly ever up-to-date. Nigerians will still however have to contend with off-line system. A computer-based circulation system can eliminate manual files maintenance, provide accurate, and up-to-date statistics concerning the use of library materials. It also relieves the professional staff from clerical chores. Statistics information can be obtained from the system to include total number of book borrowed, subject by subject and number. The system can equally print overdue notice, and books available on new arrival to the library.

There is hardly any area of library operations that computer I T has not been applied. Computerization has become so popular that commercial ventures have been established to provide for an effective use of the new ideas and techniques of automation and related fields. Some of these ventures have offered the latest information science research and development techniques, such as system analysis, management planning and operation research. Other services include Selective Dissemination Information (SDI) Services, indexing and abstracting activities, mechanized acquisition and cataloguing card production system.

Tools for ICT

CD-ROM searching: This is an IT tool with great potential, for libraries in general. CD-ROM is an acronym for the phrase compact-Disk Read Only Memory. Compton (1994) gave six reasons why CD-ROM technology can be a requirement to libraries.

The first is storage capacity. A CD-ROM disk can store up to 660 megabytes of data. These 660 megabytes would fill more than 1800 floppy disk or store the amount of text that fills 330,000 pages of papers. The second reason is its durability. Is it low mailing cost? It equally requires no special handling or packaging. The fourth reason is that no telecommunication is needed. Access to computer data based by telephone link can range from impossible to prohibitive expensive in many countries. CD-ROM disk can simply be accessed directly by the computer. The fifth reason is that it has an easy and accurate budgeting. You subscribe to a CD-ROM database on an annual basis which gives you ultimate access to that database. The last reason is that it is friendlier than online system software.

Telefascimile (fax)

This is another IT tool that has been fully embraced by most Nigerian libraries. It is therefore paramount for its inclusion in our libraries because fax communication should not be under estimated since it has proved itself to be one of the fastest methods of transmitting information. The use of fax has grown due to availability, and relatively restorable cost. Library should as a matter of urgency embrace the use of fax machine on a large scale for their day to day operation and services. This will bring about better, faster, and improved services to library users.

Telecommunication (Network) (IT)

A network is a system of physically separate computers with telecommunication links, following the resources of each participating instruction to be shared. Each of the other libraries network applications are resources sharing, communication and data exchange. Egberongbe, (2003) sees the technical service workstation as "evolving technology primarily concerned with networking of computers capable of advanced editing, inputting, with features customized for technical services and to able to access and manipulate data in online catalogues and other pertinent resources file both local and remote". With effective networking in place, cataloguers can move in and out of various operations, thereby providing ease of access to the computed information resources of that particular Local Area Network (LAN) and Wide Area Network (WAN). Since libraries have identical functions, structure, and operate on similar pattern, it goes to say that the urge to introduce element of telecommunications (Network) should be considered. This development will bring in place a dial-up communication network that will connect libraries and information centers. This arrangement will make available full text sharing capabilities.

Types of network

There are different of networks:

    i.   Local Area Network (LAN);

ii   Metropolitan Area Network (MAN);

iii   Wide Area Network (WAN).

i. Local Area Network: these are network used to interconnect computers in a single

room, or building on one site.

ii. Metropolitan Area Network (MAN): this simply means "city network" and is the network that spans several kilometers within a city. This includes one or more LANS in a city or smaller region. Example is the network across the Benin City or local Government area.

iii. Wide Area Network (WAN): these are networks used to interconnect on larger   are of space that is much wider than LAN and MAN. WAN consists of two or more LAN/WAN connected together across cities and countries.

Advantages of using networks

1. It brings about the sharing of resources and information;
2. It provides for local facilities without the loss of central control;
3. It brings about the distribution of work, processing of wads;
4. It improves communication facilities.

Hence, libraries in a state or national level can then search, access and retrieve information stored in the network. This will improve bibliographic information about these libraries databases.

Internet connectivity

This is a worldwide collection of computer networks, made up of networks linked together by the international telephone system. Hearth cote, P.M. (2002) described it as a company-wide network run along the line of the World Wide Web, making it possible to share documents, data bases and application. They are mainly run by co-operation's, government and academic institutions. This high level of connectivity fosters an unparalleled degree of communication, collaboration, resources sharing and information access as have stated before.

To connect to internet you must have:

A computer;

A modem (Modulation and Demodulation);

The telephone line;

An Account with an Internet Service Provider (ISP);

Tropoly.

Impact of the ICT revolution on libraries

Omekwu (2002) discussed the challenges of information systems in modern libraries and observed that Hi-tech information system has perversely influenced all sphere of human endeavours. They are used in high speed of supersonic jet, war planes, industrial machine, whether forecasting, medical research, food processing, wire house control, space travel and military reconnaissance and network coordination. A major scientific break-through of the last millennium, Hi-tech information systems seems to control the present and will definitely shape the future, and certainly their impact on the library and communication centres can no longer be ignored.

Additionally, the new information environment provides libraries of all types and archival institutions with limitless access to global information at the pressing of the keyboard. The following are also the impact of ICT on libraries;

- Incredible platforms (e.g. CD-ROM) for storage;
- Easy integration of various activities;
- Cooperation and formation of network;
- Elimination of uninteresting and respective routine;
- Opportunities for information marketing. Means of income generation;
- Increased efficiency;
- Contact, cooperation and communication as the hall mark of professionalism;
- Strategic connecting of local global network thus making the world a global village.

For these, it is obvious that libraries of the future cannot be made up of books only. Therefore, librarians should be well prepared for the availability of the new equipment in technology.

Some of the software in use in Nigerian libraries, for easy connectivity:

Software is the term used, in contrast to hardware, to describe all programs that are used in a particular computer installation French, (1996). Therefore this research looked at the software in use in Nigerian libraries. There are quite number of software in Nigerian market amongst which are:

1. CDS/ISIS
2. TINLIB
3. INNOPAC
4. TECHLIB
5. DYNIX
6. X-LIB etc.

1. CDS/ISIS: This is the acronym for Computerized Document System/ Integrated set of Information System. The sole objective of CDS/ISIS software was to cater for the needs of small libraries in developing countries, thereby making it possible for them to be involved in computerized information processing technology through the use of inexpensive computer.

CDS/ISIS: - This is advanced non-numerical information storage and retrieval software developed by UNESCO (United Nations Educational Scientific and Cultural Organization). This was originally evolved as an adaptation of the mainframe computer of the earlier sixties.

However, with support from UNESCO, further development of the system continued until sometimes in 1985 when a Micro CDS/ISIS (UNESCO) was produced, as a non-numerical bibliographic information storage and retrieval software package i.e. an automated indexing tool. The package is obtained at no cost by institutions from UNESCO.

2. TINLIB: The acronym is for the Information Navigator Libraries Management. TINLIB is an integrated library and information system. It is easily run on a Personal Computer (PC), either a single PC, or one or several, linked together to form a local area network (LAN) or a Multi-User System.

 TINLIB to date is one of the suitable software packages for larger and complex collection-based libraries such as the university libraries. TINLIB consists of cataloguing, circulation, acquisitions, and serials control integrated modules. It carries out searching, editing, report compilation, creation and entry of new records.

 3. INNOPAC: - Innovative Interfaces Online Public Access Catalogue (INNOPAC). As special issue of the journal entitled Electronic Library showed that the International Rice Research Institute (IRRI) in the Philippines had adopted INNOPAC. It was however discovered that it is mini computer-based and quite expensive. Subsequently, it did not qualify for consideration because we were searching for a micro-computer-based system.

 4. TECHLIB: - this is an integrated solution for managing library resources and automating daily library operations. TECHLIB has qualities similar to BASIS. Thus; the conversion of IITA's database records for instance from BAASIS to the new system would have been easy. One of the options considered was TECHLIBplus on a 486PC running on UNIX SVR4 in a LAN environment.

 5.DYNIX:- automated library system which allows users to access the library catalogue, community information, CD_ROM applications, and a myriad of library-defined, web-based resources with easy-to-use text, web interfaces. It is an integrated system which is compatible with micro-computers in a LAN environment. However, it is now obvious that most of the libraries in Nigeria had not adopted it.

6. X-LIB: - this software was completed in 1996 and installed on the network of the Raw Materials Research and Development Council Nigeria's Network. This nis field structured and it has four modules (Acquisition, Catalogue, Circulation and Enquiries/Reports). It is user-friendly. It has provision for photographs and sound recordings.

PROBLEMS AND PROSPECTS OF ICT APPLICATION IN OUR LIBRARIES

Problems

The major problems that can face libraries as they become progressively involved with the use of technologies may be summarized as follows:

- General inadequacy in the level of relevant infrastructure particularly telecommunication facilities and power supply;

- A large exploitative computer market and unsatisfactory after sales maintenance and support;
- Inadequate relevant technical staff and problem recruitment and retention;
- The potential of library staff resistance to the introduction of computer technology;
- The potential of the resistance of users and failure to adapt to the use of online information;
- The data base conversion problems;
- Frequent change in technology.

Prospects

Despite the problems highlighted above against the application of ICT to our libraries, it is obvious that the environment in which these libraries operate is open to rapid changes; hence, introduction of new technologies can accelerate almost all the sphere of human endeavours. Information management is now vital not only to progress but even to survival. Nigerian libraries need the technology to develop. The earlier it is understood by the populace the better as this stands to remove the barriers of free flow of information. It is quite possible to succeed after a false start provided the right lessons are learnt and there is a will to make a success of it all. The prospects of application of information telecommunication technology in the libraries are very bright if there is a strong institutional support for the project and regular finance provisions. Added to this is the contribution of a committed and dedicated staff who are prepared to work and take instruction.

CONCLUTION AND SUGGESTIONS

To conclude this paper it is better to draw the attention of all professionals to the world libraries and information congress at the 69th IFLA (International Federation Library Association) general conferences council held in Berlin in August, 2003 where it warned that "Africa is at the crossroads and threshold of one of the greatest revolutions of the world in information revolution.

The printing revolution provided man with recorded and written information in great mass, the agrarian revolution provided food for mankind: it also allowed the existence of surpluses and created new landed of landed gentry, while the industrial revolution, driven by the surpluses of landed gentry, created international capitalist through the profits made from sales to goods and machineries. At the end of the mentioned century and the dawn of the twenty-first century, a new revolution has just begun to shape the context of human civilization. It is called information revolution. In other vein, information revolution, of which is our age, provides avenue for all other sections to move faster because of explosion of competition in the industrial age. Everybody needs information to succeed; this can be accelerated with the advent and evolution of Information Technology.

It must be understood, that revolution impact on all human facets of human existence and experiences and Libraries and nation building are by no means exceptions.

The cataclysmic of new trends in the world of information order on libraries and nation building must be clearly understood in the context of relational linkage between information, libraries and nation building as a system. The relationship can best be described as symbiotic. Information technology is the source with which development is transmitted from one generation to another. The

library is the bus stop where that vehicle (information) with its luggage (development) is safely kept in custody.

Suggestions

- It is therefore, suggested that Libraries and Librarians as providers of information on all aspects of human development must redefine their roles and professional responsibilities to meet the challenges posed by the changing information world order.
- Librarians in these countries must be forward-looking and making strategic orientation of ICT overshadows the support orientation.
- The new manner of information handling requires that the librarians can no longer sit on the fence on professional spectatorship if he/she must meet the challenges of the changing environment. Therefore, there must be incessant training for the librarians in the area of ICT.
- Librarian must understand the changing in information environment in its totality to include, information access, dissemination and consequently contribution to the nation
- For the designed transformation to happen there must be recognition of the need to access information by the users.
- When the choice of software is to be made, it is advisable that a library pays visit to neighbouring libraries which use similar software to study its operations for a period of time in order to have thorough knowledge of the intricacies of the software.
- It suggested that in-house training be carried out for all levels of staff to get them acquainted with new software. Consultant or other experts in the field can be hired to organize training programme.
- Finally, libraries need to form user's groups an avenue for solving their technical problems. This strategy should be employed to complement internal arrangements and the use of outside consultants

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