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Establishing a library portal for Ibrahim Babangida Library at Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria

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This study proposes the establishment of a dedicated library portal for easy access by students and academics in the Ibrahim Babangida Library at Modibbo Adama University of Technology, Yola (MAUTech). The study was motivated by the Nigerian vision 20:2020 and the trend in 21st century academic libraries to offer electronic resources and services to meet users' demands and use of technology. Mixed methods, in particular a combination of the sequential transformative, concurrent triangulation, and concurrent transformative approaches, were used. A case study approach was employed. The Technology Acceptance Model (TAM) and Diffusion of Innovation (DoI) theories framed the study. Based on these, a conceptual framework was formulated. To achieve triangulation, questionnaires and interviews were used to gather both quantitative and qualitative data. Academics, students, academic librarians, and information and communication technology experts acted as participants. Findings included low use of the Ibrahim Babangida Library, insufficient and unreliable Internet access on campus, need for digitisation of library resources and the need for a dedicated library portal. The study recommends, amongst others, subscription to full-text databases, provision of sufficient and free Internet access and e-resources. The outcome of the study was a designed, established and functioning library portal based on the input of all the stakeholders of the MAUTech community.

Keywords: Library portal, e-resource, ICT, academic library, students, MAUTech, Ibrahim Babangida Library, institutional repository.

INTRODUCTION

The study was purported to the design and implementation of a library portal access for the Modibbo

Adama University of Technology (MAUTech). The need for a computerized system is accentuated in the central Ibrahim Babangida Library in assisting academics, researchers and students of the university to increasingly utilize e-resources. Currently the library resources are in disarray without a dedicated access point or portal. This study aimed at making the Ibrahim Babangida Library an Information and Communications Technology (ICT)-driven library capable of managing and disseminating electronic resources to its esteemed clientele more efficiently.

Woody, Daniel and Baker (2010: 947) have suggested that more research is needed to determine the suitability of e-resources as learning tools. On this premise, this research aims at designing a library portal to integrate e-resources by exploring ways of making e-resources more available at MAUTech. When users have access to a variety of resources, it enhances their potential and adds value to the higher institution of learning (Rao & Mulloth 2017: 12).

Mallaiah, Kumbar and Mudhol (2008: 154) have opined that university libraries play a primary role in teaching and research. Adetimirin (2007) has reiterated that it is the responsibility of the library to acquire, organize and make accessible both print and e-resources to its clients. Olajide and Folayan (2014: 1) have noted that user satisfaction with the library collection is a measure of the library's effectiveness. Their argument supports that of Nwalo (2001: 44) who explained that periodic measuring of user satisfaction should be explored to determine how well library objectives, policies and operations meet the needs of the users.

Brief background of MAUTech

MAUTECH is situated in the capital city Yola, in one of the 21 local government areas called Girei, in the Adamawa State. According to City Population (2017), the state's projected population, consisting of 80 different ethnic groups, is 4 248 400. Apart from colleges and polytechnics, the state has three universities, namely the privately owned American University of Nigeria, the state-owned Adamawa State University, Mubi, and the federal-owned MAUTECH. The National Universities Commission, a body under the Federal Ministry of Education, supervises the Nigerian university system. MAUTech is among the accredited Nigerian universities (National Universities Commission 2015).

MAUTech has been established by the Federal Government of Nigeria in 1981 and is one of the few technological universities in the country. As the university's vision is to become a world-class university in science and technology, most of the programmes of the university are science-based. On campus, a cybercafé, computer centres, a geo-informatics unit, an Ericsson GSM training centre and an ICT unit with ICT equipment are found. Internet access on campus is available via Wi-Fi. Both students and academics pay an hourly rate of N100 (R5,50) for Wi-Fi access. The university has a website and a portal for student registration (Modibbo Adama University of Technology Website 2015).

Brief background of Ibrahim Babangida Library

The main university library of MAUTECH is called the Ibrahim Babangida Library. According to the Library Guide: Ibrahim Babangida Library (2006), the library began in a temporary building until October 1990 when it moved to the completed new building. The library can conveniently accommodate more than 50 000 volumes of books and 100 titles of journals, 750 readers and offices for 50 staff members. The library has 39 staff members consisting of the acting university librarian, nine academic librarians, 26 supporting staff members and four administrative support members. The library has six divisions namely Administrative, Collection Development, Technical Services, Reader's Services, Serials Services and Cybercafé. These divisions have computers, but lack interconnectivity or LAN access and Internet access resulting in all library operations being conducted manual.

The library currently has a collection of 35 651 books and subscribes to 12 630 journal titles of which 9 713 are foreign and 2 917 are local journals. The reference unit provides printed reference sources like indexes, dictionaries, encyclopaedias, bibliographies and yearbooks. Printed theses and undergraduate research reports are housed in a separate room.

Although the Collection Development Division aims to have 40% of the collection in electronic format, at the time of this study, the collection contained no databases, e-theses, e-newspapers, e-books or e-journals. Limited e-books on CD ROMs were kept at the Cybercafé. In the past, the MAUTech library management has subscribed to the full text databases ScienceDirect and EbscoHost, but these were accessible only on a few computers at the Cybercafé. Library users had to ask for usernames and passwords every time they wanted to access the databases. Because of low utilization due to unawareness and difficult accessibility, the subscriptions were cancelled. Since 2014, students were required to submit both a printed and electronic copy of theses. Printed copies are shelved while the Cybercafé archives electronic versions.

OBJECTIVES OF THE STUDY

The objectives of this study are to investigate the need for and establishment of an integrated library portal to provide an efficient information service to the university

community as well as to contribute to creating an ICT-driven library. Specifically, the study sought to determine:

a) the need for a library portal;
b) what users would like in a library portal;
c) the requirements of a library portal;
d) techniques of designing and establishing an integrated customized library portal with databases, subscribed e-resources and open-access sources.

RESEARCH DESIGN, METHODOLOGY AND SAMPLE OF THE STUDY

This study has used more than one research design method, namely a combination of the concurrent triangulation (using more than one method to authenticate collection within a study) and concurrent transformative (via the use of theoretical perspective) approaches. Research methodology refers to the steps taken in gathering and analysing data. Creswell (2014: 45) describes research methodology as a means by which it "involves the forms of data collection, analysis, and interpretation that researchers propose for their studies." Babbie and Mouton (2008: 74) maintain that research methodology is the researcher's general approach to carrying out the research project. This study has adopted questionnaires and interviews to gather data. A research population is a collection of objects noted to have similar characteristics, traits and binding. The current study on library portal access in MAUTech is a cogent example. This study has used two major data-gathering instruments; hence, the need for two populations. For administration of questionnaires, this study used as target population the MAUTech academic staff and registered students for the 2016 academic year consisting of 617 academics, 872 postgraduate and 11 351 undergraduate students. The total population was therefore 12 840. The interview sessions was dedicated to four academic librarians and two IT experts.

To determine the participants receiving the questionnaire, the researcher adopted the simple random sampling type of sampling and in particular probability sampling. The probability sampling techniques provide all the individuals in the population the equal chances of being selected. Each respondent has the probability of being chosen and with the appropriate technique one is assured of representative and this sometimes deduces errors within the sampling process. This case study included a large total population where the sample is of different layers but having the same uniformity (Neuman 2006: 241-245). Random sampling technique was used for the large population of students and academics from the six different schools to ensure that every participant in the population had equal chance of being included in the sample.

According to the Raosoft sample size calculator, for a population size of 12 223 with a 5% margin of error and a 95% confidence level, a sample size of 377 is needed. To allow for questionnaires not being returned, a bigger representative sample, accuracy and efficiency (Neuman 2006: 241), 1 223 questionnaires were distributed to students in all six schools. As at the time of study, MAUTech, has the following schools: School of Agriculture and Agricultural Technology (SAAT), School of Engineering and Engineering Technology (SEET), School of Environmental Sciences (SES), School of Management and Information Technology (SMIT), School of Pure and Applied Sciences (SPAS), and School of Technology and Science Education (STSE).

For the population of 617 academics with a 5% margin of error and a 95% confidence level, a sample size of 237 is needed. To allow for non-responses, 479 questionnaires were distributed to academics in all six schools. As the populations of the academic librarians as well as the ICT staff were small, no sampling was done and e-mail interviews were sent to everybody identified as population.

REVIEW OF RELATED LITERATURE

Library portal

A library portal, also called the library homepage, is a gateway to access library resources and services via a single interface. Das and Saha (2015: 111-112) explained web portals as tools used to support and enhance accessibility to e-resources, and defined a library portal as an entry or access point to the world of resources designed to save the users' time and cost in gaining access to multiple resources of the library. The portal incorporated the integrated library management system to ensure interaction between different sections like acquisitions, cataloguing, circulation and the OPAC of the library. It provided a platform for effective access to library resources, information retrieval as well as awareness and marketing of library resources and services. Madhusudhan (2011: 3) defined a library portal as the "virtual public face, the quasi-equivalent of the front door, signage, pathfinders, collections or surrogates to collections, services and to an extent, its users". It can be referred to as a repository of information earmarked for dissemination.

Features and technical requirements of a library portal

Jones and Thorpe (2014: 2, 4, 20) stressed that a library homepage was a critical portal to library resources, even
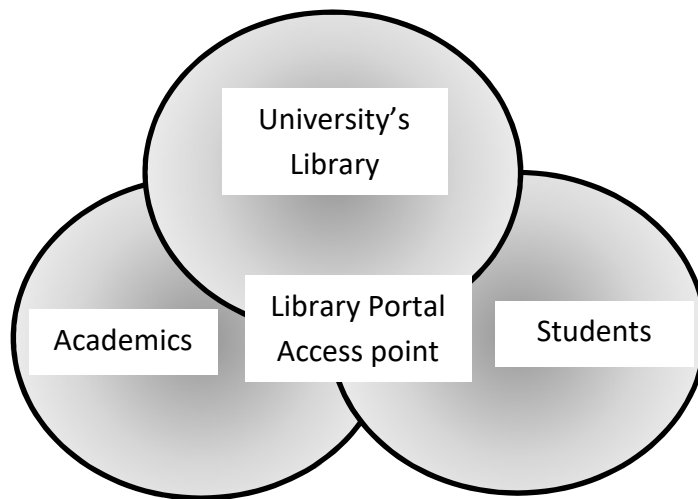
Figure 1: Library portal synergy between academics and students (Joshua 2017).

though there were alternative portals such as course management systems and Google sites. They maintained that an academic library homepage served as one access portal to many library services and that student increasingly relied on library Web services to fulfil part of their academic library needs.

The library profession strongly supports the use of ICTs to automate cataloguing, circulation and acquisition services to provide e-resources, online retrieval and library services efficiently (Emezie & Nwaohiri 2014: 2), but some level of education to enable proficient management of library resources and core knowledge, skills and attributes are required (Australian Library and Information Association, 2014). Emezie and Nwaohiri (2014) posited that academic libraries are challenged to innovatively meet the needs and demands of the parent institutions and users, and suggest that "if academic libraries are to meet their objectives and effectively provide information, traditional methods and processes will have to evolve into electronic modes of service delivery. This can only be achieved with modern technologies in a computer-driven environment" (Emezie & Nwaohiri, 2014: 2). King (2007: 7, 178) asserted that ICTs facilitate, for example, more than one retrieval tool to find journal articles.

Koutropoulos (2014: 65-66) as well as Pandey and Sukula (2017) propagate the adaption of Library Portal 2.0 to address the expectations of current patrons by supplying "Google-like" experiences. Libraries should move away from static library portals and adopt portals integrating the library catalogue, resources to which the library has access, interlibrary loans, databases, staff directory, event calendars, social media and intellectual subject content in the information managing and distribution environment.

Libraries have been known to be repositories and depositories of information, having a centralized place where patrons locate resources to meet their needs, but the present dispensation of librarianship has changed. Libraries are now repositioned to be gateways of knowledge, capable of disseminating information far beyond their physical locations. E-resourcing is a tool used to go beyond the physical library either with free access or by subscription to e-resources.

Supporting this assertion, Mane and Panage (2015: 110) have stressed that a "web portal is one approach to organise information resources and services in a way that supports the students' needs." Afferent to this, the university has the driving force to ensure the full implementation of portal access in its domain to foster information gathering and sharing among students and academics. This will help in resuscitating or advancing the university's resources regionally, continentally and globally. Importantly, the synergy between the university's library, the academics and students should be maintained, and the extent of their collaborations will be based on the effective utilization of the portal framework and design architecture. The Figure 1 shows the tide between them.

Previously, access to university libraries was majorly mono directional in nature due to their conventional and operational functions, and being that, the resources then were mostly in physical formats. But the 21st century library portal added value to library resources with online accessibility via gateways without visiting the physical library. In some cases, a library portal in a particular university might link users to other library portals for enriched information available via interlibrary loans.

Das and Saha (2015: 111-112) have emphasized that a library portal is also a launch pad for a host of Web-based services such as e-mails, asks the librarian, news and social media. In some cases, the library portal also provides a platform for interlibrary loans, WorldCat, management of references, workspaces in cloud computing and sharing of information in a secure environment through e-mail messages, publication channels and posting.

Geetha, Mamatha and Farhana (2013: 510-511) surveyed the use of the Kuvempu University library portal by research schools and faculty members to reveal that the library portal was used by 85% of the researchers and faculty members. It was accessed by 73.33% of the respondents on a daily basis and used by the majority (70%) of respondents for research activities like downloading full-text articles. Both research scholars and faculty members informed the effect of the library portal starting from efficient access to all library services and resources, improving customization of research tools, giving them more and better convenient access to e-resources. Considering the challenges facing the library portal accessibility, 45.83% of respondents stressed that navigating the web pages and downloading resources were difficult. The study opined that more training and orientations would be needed on the use of the library portal.

An earlier study by Fatima, Ahmad and Ahmad (2011: 170-171) assessed the use of the Aligarh Muslim University library portal by students from the Engineering and Technology Faculty. The findings indicated that 61.76% of undergraduate and 68.75% of postgraduate students were aware of the library portal. The portal was frequently used by 61.76% and 68.75% of under- and postgraduate students respectively. Slightly more than half of undergraduate (58.91%) and postgraduate (56.25%) students were positive about the relevance of the different resources available on the library portal. The minority of students valued the library portal very highly. The researchers discovered reasons for low access to the library portal were due to inadequate awareness, training and library orientation. They encouraged information literacy programmes to stimulate effective use of the portal.

Dudley (2013: 3-4) examines the consistent maintenance of the library web portal at Bryant and Stratton College in Cleveland downtown campus, Ohio, USA. Continued examinations of content modules are done on a weekly basis to ensure that the library portal is optimally updated. Various searches are continuously done to help update descriptive metadata (Dudley 2013: 3). This culture of portal maintenance helps them to archive electronic information resources no longer needed and subsequently replacing them with editions that are more current. The library, in cooperation with the ICT centre, ensures that the web portal page template is

user-friendly and is easily updated without going through the rigorous process of programming or coding. This approach should be encouraged to institutionalize a less stringent website maintenance policy.

As it is predicted that the library digital content and resources will determine the quality of a university, the Kenyatta University Repository Policy (Agosti, Crivellary, Di Numzio & Gabrielli 2010: 2-10) has been designed to advance the university's profile in ensuring that its research output is made available online both within the university and globally. The repository, part of the library portal, was designed to complement the traditional resource management in which researchers, academics and students have centralized e-resources placed on a permanent storage system. The Kenyatta University open access institutional repository policy covers open access, repository content, submission, metadata, research data management, preservation, selection, retention, replacement and withdrawal, intellectual property right, quality control, compliance and monitoring and compliance with publisher as well as funder policies. The university and library management ensure effective utilization of the portal and faster information sharing and communication.

Mane and Panage (2015: 109) explained the establishment, development and design features of the Jayakar library portal in India. The e-resources portal encapsulated information regarding online local and joint catalogues, free resources, open9access journals and archives. The library subscribed to databases and serial publications as well as discipline orientated e-resources. Only the subscribed databases required access authorization using the proxy server. To accommodate the needs of students, the developers of the portal considered Google-like features like user-friendly terminology, attractive screen design, easy navigation, support in the form of help menus and personalization. The library established guidelines and had policies in place for the effective use of the portal.

Chen and Smith (2015) investigated elements influencing undergraduate students' use of a university library portal by using a credit-bearing course instilled with information literacy components. Framed by the Technology Acceptance (TAM) and Information Systems success models, the study observed direct influences of user satisfaction, willingness and competing resources on portal use as well as relationships among present use, user satisfaction and continued usage. The findings revealed the positive outcome of user satisfaction on the use of web portal as well as the negative impact of unwillingness to use the web portal. Chen and Smith (2015: 42-43) and Ukwoma and Dike (2017: 17) identified that the purposes of using the library web portals were to find research papers and projects, locate journals and articles, browse the library's online catalogue for monographs, locate quality scholarly sources, retrieve

electronic reserves and find citations.

An important factor to be considered with a library portal is its extensive inclusiveness interfaces, which in most situations, incorporate repositories and links.

Ukwoma and Dike (2017) have confirmed that academics download scholarly publications of their associates from institutional repositories from which they review the literature to identify new findings or gaps in knowledge. This is one of the cardinal functions of a library portal, namely to provide useful information to users for research and collaboration.

Clarke, Hui and Li (2013: 140, 147) investigated three digital platforms (Internet, television and mobile phones) aimed at providing access to as many as possible users of the Hangzbou Public Library. The portal implemented many functions with access to the OPAC and numerous tools for searching, renewal, reservation online, current awareness and live chat with reference librarians. The content of the library portal was extensive, reflecting most of the themes and activities of the library.

Negi (2014: 2-4) maintains that a library portal is used for dedicated content management systems to affect efficient information access and sharing, mount and manage electronic collections, and deliver integrated services. This gives the library monopoly over the network to customize and operationalize its features as well as provide institutionalized resources, capable of web services linking to other portals. The major elements of library portals aside from access to the library catalogue and users' records are, according to Koutropoulous (2014), meta-searching tools, interfaces for browsing, online referencing, full-text articles links, web pages, access to interlibrary loan and user preference services along with citation management software applications. Koutropoulous (2014) is of the opinion that there is no fixed standard for library portal design. Libraries base their design on customization and on the need of their users. The standards found in the literature are generically meant for searching and retrieving purposes, Web scripting to use, library resources to be incorporated into the portal, licences agreement of e-resources, subscription dilemmas, expertise involvement and institutional research data policy and guidance, among others. With these premises in mind, proactive steps should be taken to address the expectations of patrons in the design architecture of the library portal. It should be Google-like, responsive, versatile and user-friendly. It must not have complex interfaces, dead links or complex typology (Koutropoulous 2014). It should, therefore, allow customization and flexibility in what features and services are offered. Areas of consideration should be content, user experience, flexibility, features and capabilities, infrastructure and security, and search and discovery tools and services.

Yeates and Cox (2003: 157-159) identified portal

requirements as follows: tools for resource discovery, cross-searching, common interface, linking and support through to document delivery, authentication/authorization, profiling of users, interoperation, statistics and management information, look and feel, communication/real-time support and core technology. In support of the above, Peng and Jin (2009: 538) stated the requirements for a portal interface in three dimensions, namely resource-relevant, service-relevant or both. A portal with appealing design features will improve interface clarity and appeal, and will encourage the use thereof (Agosti, Crivellori, Di Nunzio & Gabrielli 2010: 233).

Designing a library portal demands programming skills and the application of high-level computer languages (Das & Saha 2015). Task teams with representatives from the library, ICT and computer centres should make decisions regarding the aspects like the design, coding, customization and integration of the portal into the university website. To design a library portal, various technical systems requirements and tools are needed. Specifications, detailed portal requirements as well as server operating systems and configurations are captured in Appendix A (Beal 2017; Das and Saha 2015; Madhusudhan 2011; System Requirements Lab 2018; The Ubuntu Story 2017).

Dempsey (2003: 10-11) described library portal approach as a means of providing intermediate stratum between users, learners and resources. Figure 2 reflects how this approach ultimately assists in the bundling of coordinated interfaces for users' interest instead of fragmentation of the resources, and thus provides library services to targeted patrons.
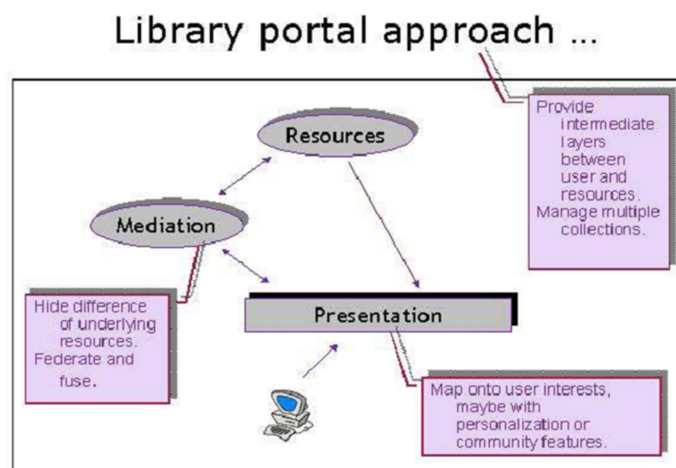
Figure 2: Dempsey library portal approach (Dempsey 2003).

Wada (2014: 168-169) proposed a model known as the Portal Development and Deployment Model (PDDM) (Figure 3) aimed at helping academic institutions,
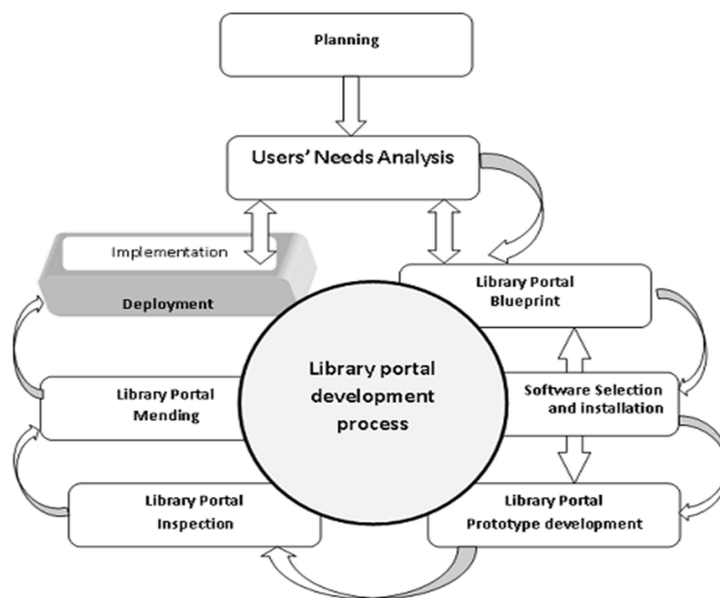
Figure 3: PDDM (Wada 2014).

librarians and information scientists in the design of portals. The PDDM contains steps and procedures in aiding the information needs and demands of users as well as its support for the adoption of web-based applications. The model encourages the use of free open-source software, reducing the rigour of programming and facilitating easy library portal design and implementation processes.

THEORETICAL FRAMEWORK

The theoretical and conceptual framework of this research used elements from the Technology Acceptance Model (TAM) and Diffusion of Innovation (DoI) theory. In order to overcome any weaknesses as well as blending the functions of e-resources and the library portal, a strategic emphasis on the discourse of the theories has been established. The TAM has been used to assist students and academics appreciate and utilise e-resources seamlessly with the use of technology, while the DoI theory has been applied to encourage academics and students to accept a new concept being introduced - in this case, the library portal.

The associating components of the theoretical or conceptual framework are input, process and output levels. As input level, the study has determined the perceived usefulness and perceived ease of use of e-resources by academics and students. For the process level, willingness to use e-resources as well as a library portal and actual utilisation of e-resources has been determined to result in findings of a positive attitude. The output level relating to the behavioural intention of using and adopting the system reflected that, in general,

stakeholders will be adopting the use of e-resources and the library portal if it was available. The library portal has been designed to incorporate features and functions to accommodate requirements of applicability, compatibility, productivity, marketability and dependability.

DISCUSSION OF FINDINGS

This article reports on findings part of a bigger doctoral study. Motivation for the establishment of a library portal is based on findings due to 45% of students at MAUTech not using the library, 42% and 55% of students and academics respectively dissatisfied with the library collection, the cybercafé being rated as poor or very poor and the majority of both students and academics being familiar with most e-resources.

Need for implementing a library portal

To determine attitudes towards a possible library portal being implemented, respondents had to choose strongly disagree, disagree, undecided, agree and strongly agree. All four academic librarians responded affirmatively to the need for a dedicated library portal. Figures 4 and 5 reflect the ratings of students and academics.
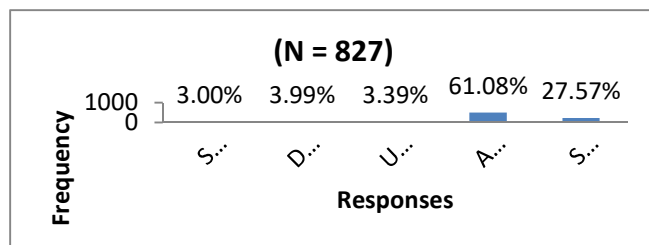

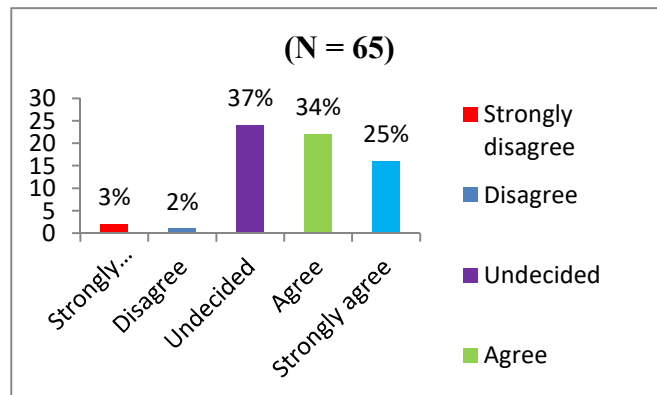**Figure 4:** Implementing a library portal (students)

Figure 5: Implementing a library portal (academics)

Results from the figures indicated that of the 827 students the majority strongly agreed (27.57%) or agreed

Table 1: Requirements of a library portal (students)

Theme	Responses
Academic resources	Updated textbooks More journals All the necessary materials should be there, so as to make an appropriate e-library portal Text books and materials from different departments, magazine, reference materials A lot of e-resources Books relevant to my discipline and many others associated to my academic pursuit I will like to see any e-resources that are supposed to be seen there All departments e-books including mine Everything starting from the history background through all research conducted by staff and students to the very least Free and open access to e-books and materials Accountancy relevant books A good and easy access to books Newspapers and research data Engineering mathematics books Strength of material text books All engineering text books and it relevant Browse different sorts of academic relevant information Academic materials should be provided for researchers and authors I want to see the products (portal access and e-resources) whom the university has produced since its establishment
Teaching information	Students Industrial Work Experience Scheme (SIWES) guidelines Course outlines and relevant textbooks for the course taking by me Project samples Project site
General library information	Welcome to MAUTech e-library MAUTech email address and their password for login The list of all the necessary things (e-resources) in the library The progress of MAUTech
Training & orientation	Orientation on how to use the resources
Results	I will like to see my result and other updated information To check result of external exams
Access	Internet services should be standardized There should be constant electricity to boost access to portal There should be Free WIFI on campus to access portal Free and open access to e-books and materials Availability of Internet to access portal

(61.08%) that a library portal would provide enhanced sharing and dissemination of resources to the university. Similarly the majority of academics were positive about the envisaged design and implementation of a library portal by either strongly agreeing (25%) or agreeing (34%). This corresponds with Geetha, Mamatha and Farhana (2013: 510-511) who explained that 85% of students, researchers and faculty members at the Kuvempu University preferred and used the library portal often. It could be deduced that a conglomerate gateway that provided access to variant resources and services for library users was desired by the respondents. However, a large percentage (37%) of academics were doubtful or undecided about the idea of a library portal. The reasons might be, as can be seen from requirements mentioned later, unreliable electricity supply and Internet access.

Content requirements of a library portal

An open-ended question was asked requiring the respondents to state if a library portal was established, what content should be added to the portal design interfaces. Table 1 summarises the 35 responses received from students into the following themes: academic resources, teaching information, general library information, training and orientation, results and access.

It is evident that students wanted access to books, journals, newspapers, general library information, information on training, academic information and results

Table 2: Requirements of library portal (academics)

Theme	Responses
Integrated platform for research	*Yes. I do agree for research* *Research forum* *Anything to enhance research* *Improved service in all respect* *Access to most databases to enhance research in the university community* *Many things like research* *Space and time for research* *Whatever is available for any work*
Resources to facilitate teaching and research	*Information that will improve teaching, research and other relevant academic information to staff students and researchers* *The necessary facilities for all departments to enhanced effective teaching and learning* *Card catalogues of physical resources* *Yes, because it will enhance the level of my access to information that will make me effective teacher* *Guide and demonstration of access to journals, abstract, theses, dissertations but what will happen with the epileptic energy supply* *The portal should contain relevant materials to enhance teaching and research, community service* *Everything of information required of teaching, research* *Anything contribution to knowledge made by its staff and any other achievement intellectually so as to compete with the world* *To see educating things and public publications* *All the possible available resources*
Current resources	*Newspapers* *Innovations* *Current and relevant academic resources* *Relevant, current and related materials* *Current text and journals* *Up dated research journals, especially in the field of educational research*
E-resources	*E-books, e-journal, e-newspapers, e-magazine* *E-books readers* *E-journals and research publications* *All the items [e-resources] listed in above* *All that ones [e-resources] mentioned above*
Internet access	*Local area networking that can be accessible in offices on campus* *Improvement and sustainability of services provision* *Efficient easy access and un-interrupted service* *Prompt information retrieval* *Cyber and 24 hours services*
Adequate power supply, equipment	*There should be no epileptic power supply* *Adequate service and uninterrupted power supply* *Enough systems connected to the Internet, fast*

via the envisaged library portal.

The 38 responses received from academics are reflected in Table 2 under the following themes: an integrated platform for research, resources to facilitate teaching and research, current resources, e-resources, Internet access as well as adequate power supply and equipment.

Table 2 indicates that the majority of the academics indicated the need for current and relevant resources to facilitate teaching and research. They suggested an integrated platform for research as well as different e-resources. It is important to note that both students and academics indicated that for a library portal to be efficient, sufficient Internet access, enough equipment and stable electricity supply will be needed.

Reasons for implementing a library portal

A question was asked to capture academics' perceptions on the rationale behind the design and implementation of

Table 3: Reasons for implementing a library portal

Theme	Responses
Enhanced access to e-resources	*The basic thing in e-library is accessibility, it accessibility is adequate no doubt the utilisation will be high* *People/staff/students can then access materials /e-resources from anywhere on campus without migrating to the computer centre where one may often times find the best occasional network services* *Enhanced utilization will be subject to provision of efficient Internet services* *It will be easier to access the materials on net* *Efficiency is necessary* *Network problem will be reduced, accessibility will be enhanced, and less money will be spent on the net due to efficient and effective network* *Yes, because when that is done accessing information on different area will be made easy and will attract users.* *Many people will access the library.* *Must students usually complained about lack of access to several database (online) due to subscription restriction.* *It will enhance quick access to learning resources* *Integration enhanced accessibility to resources* *One can get what he/she want* *An integrated library portal will work in the university intranet, with efficient and dedicated library staff operating the system may help to minimize stress for all library users* *Enhance Internet browsing with regular power supply*
Benefit the university community	*Strongly agree but after a conduct of the usage and orientation across the university staff and students* *It will be beneficial to the university community* *It will contain a lot* *Definitely people will utilise* *Yes, it has happened in private universities in Nigeria* *The world has become electronically driven and to keep pace with time we need e-resources* *Provided there is constant power supply and modification inhuman resources*
Improve research collaborations and teaching	*The world is becoming a global village* *We are in an IT World. MAUTech shouldn't be exempted* *We have capable researcher who want access to expensive journals but finance is a major constraints* *Because I will have access to all the information that I will be in need to teach my students effectively* *Yes, it will make easy access to materials and information for teaching and research and it will motivate people use it* *It will improve the work and the students will also benefits from it*
Increase morale	*Confidence will be made.*

the envisaged library portal. Being an open-ended question, 30 respondents reacted to this question, but only 29 were found logical and used for the analysis. The responses were categorised into the following themes: enhanced access to e-resources, benefit the university community, improve research collaborations and teaching and improve morale. Table 3 provides the actual responses.

From Table 3 it can be seen that the majority of the respondents were of the opinion that the implementation of a library portal would facilitate access to e-resources and should enhance research and teaching, not only in the university community but also beyond the borders of the university.

Librarians' roles in the library portal design

In this information age, librarians are expected to manage and market library resources to ensure the utilization thereof. A library portal will supply an effective platform. Kahn and Underwood (2013) indicate that library operations have changed considerably and call for a paradigm shift by librarians to accept innovations and change as well. Librarians were asked how they as

professional librarians will add value in the design of a library portal. Their responses are captured below:

> *Librarian (1): We design all possible procedures that may lead to our clientele to have direct access to our available resources efficiently and effectively.*
> *Librarian (2): In audit and supervision to make sure it meets the standard requirements of an E-Library.*
> *Librarian (3): Through marketing of the library services and resources for prospective clientele, current awareness service, selective dissemination of information to target audience and extension services.*
> *Librarian (4): Through Selective Dissemination of Information (SDI).*

From the responses of the librarians, a responsive library portal is expected, a standardised e-library will be needed, marketing of library products and tools, and resources being used to keep library users informed should be utilised.

Support for the library portal and automated collection

According to Johnson et al. (2012) there should be a proactive support system for e-resources access, maintaining the library web page, authorisation process to users, archival policy, perpetual access and institutional archives. With this in mind, a Digital Communications Librarian was asked about technical support.

> *Digital Communications Librarian: Install local Virtual Server; Install appropriate software;*
> *Design Layout; Consultation on Design; Transfer web content to Web Hosting Service Provider.*

Establishing a library portal at the Ibrahim Babangida Library

The Ibrahim Babandiga Library has been offering modulated services without supplying ICTs, stable electricity supply or sufficient Internet access and provided a collection rated as qualitatively and quantitatively insufficient resulting in library users not visiting the library. Students, academics, librarians and ICT staff members confirmed the need for a responsive and robust library portal, as it would support research, teaching and academic activities, enhance access to e-resources, increase morale, facilitate online accessing of resources without physically going to the library, keep pace with development elsewhere as well as instigate being part of the global village and the IT world.

This coincided with the studies done by Adepoju 2015; Boateng, Agyemang and Dzandu 2014; Leeder, 2013; Lippincott 2015: 284; Patil 2013 and Singh 2015 who emphasised that academic libraries needed library automation and networking in order to enhance their services, to deliver quality e-resources, and fulfil the expectations and demands of their users. Research also showed that when academics and students had access to a variety of library resources through a portal, it tended to add value to the institution (Rao & Mulloth 2017: 12). For MAUTech especially there is a need to have a dedicated library portal to gather and combine all the e-resources subscribed to but currently scattered throughout the university. Recognising the need for a library portal and willingness to utilise it when established is again proof of the acceptance of an innovation and therefore, the DoI theory (Chen, Kirkley & Raible 2008; Rogers 2003).

Effective library portal designs are dynamic, robust and responsive. Static library portals are boring and hardly used because their designed interfaces are either complex or difficult to navigate. Das and Saha (2015) have confirmed that portals support and enhance accessibility to e-resources. Scholars like Mane and Panage (2015) described the features of the Jayakar Library portal in India as having online local and joint catalogues, free resources, open-access journals, archives, subscribed databases and serial publications as well as discipline-oriented e-resources. Considering the needs of students, Google-like features, namely user-friendly terminology, screen design, easy navigation, support (help menus) and personalisation have been added.

The researcher used the knowledge gained by reviewing relevant literature, analysing the requirements of MAUTech students, academics and librarians, scanning the library portals of other libraries and interviewing experienced IT staff members, a Digital Communications Librarian and other IT specialists to establish a library portal for the Ibrahim Babandiga Library. In line with the steps of the PDDM, library portal requirements recommended by students, academics, librarians and IT experts as well as combining these with trends, similarities and any contradictory data from the relevant literature and functioning portals were incorporated. A portal was designed and implemented, but still needs further input, assessment and refining.

Hosting company

A web-hosting company to provide the live streaming of the websites or pages for people to search, use and interact with is needed. The ten top website providers in Nigeria are Whogohost, SmartWeb, QServers, HostNowNow, Domain King, Utiware.net, GlobalHosting 247, Syskay Systems, Main One and PhilmoreHost. After

careful assessment and consultation, Whogohost was selected, as it is one of the leading hosting companies in Nigeria and have 21 products in the domain, shared hosting, reseller hosting and cloud web design under the platform Linux and Windows OS. It allows for a complete company description, address location, phone and fax details, Twitter/Facebook/Google+ forum, blogs, announcements and a knowledge-based Frequently Asked Questions.

Domain name

A domain is a network address that indicates a unique name on IP addresses for easy identification and access. The domain name www.mautechlibrary.com implying the name has been registered and set up in the domain name system server.

Features

About us

As main menu "About us", the Ibrahim Babangida Library is introduced. In order to reflect the services and structure of the library, the following submenus are linked: Mission and vision, Remarks from the vice-chancellor, Acting Librarian, library divisions, academic librarians, non-academic staff may be show cased. It also has tabs for Contact us, Library guide and Opening hours.

Online newspapers

A substantial part of the library budget is used for subscribing to physical serial publications. To reduce costs and to satisfy the demand for e-newspapers by especially students, it was decided to incorporate online newspapers. Three categories of online newspapers, namely local newspapers, international newspapers and MAUTECH news, were added. Forty-seven local Nigerian newspapers and twenty international newspapers were embedded in the portal. For current awareness, MAUTECH News, previously available only in printed copies, was incorporated to ensure wider than campus access.

E-resources

The e-resources menu has two submenus, namely free e-resources and subscribed e-resources. Incorporated under free e-resources are a number of online resources aiding teaching, learning, research and collaboration. Currently it consists of six categories, namely databases, e-books, e-journals, dictionaries, online encyclopaedias, and dissertations and theses. More resources may be added in future. The category "subscribed e-resources" presents some proprietary resources to be accessed only

by registered students and academics through authentication verification. As the library does not subscribe to e-resources yet, access to databases like the American Association of Petroleum Geologists, African Journal Archive, Access Pharmacy, Emerald e-Journals might be added in future.

E-theses and dissertations

This section of the portal is part of the institutional repository and designed to provide an electronic version of all master's dissertations and Ph.D. theses. The printed theses of the university are grossly underutilized due to lack of awareness and not being arranged professionally. A database of theses with author, title and faculty indexes embedded in the portal makes them searchable and accessible with easy navigation and the option of downloading them free of charge. Omeka, an open-source code used to create custom computer-based exhibits like building features or templates, has been used to create the repository. It has a large memory capacity for archiving purposes (Omeka, 2017). It is envisaged that the repository will improve access to research as well as the research status and ranking of MAUTech globally.

Past examination papers

The aim of this link is for students to familiarize themselves with past examination paper formats and questions in order to increase their chances of passing examinations and for academics to use as revision tools. To facilitate this development, a section was created to upload past examination papers from the schools and departments in the university.

Online catalogue

As the library still needs to develop an online catalogue, a link to WorldCat (a union catalogue) has been created, providing access to catalogue records of over 72 000 international libraries. If the Ibrahim Babangida catalogue is to be developed, it would be possible to incorporate it in the portal.

Upcoming events

This link is meant to showcase upcoming activities like orientations, seminars and information literacy training initiatives, and announcements from the library. The pop-up menu includes the submenus events calendar, events, submit an event and let's hear from you. The first is a calendar platform where consistent announcements will be posted with users free to respond to announcements.

Chat with a librarian

An interactive function where users are allowed to speak to or ask librarian's questions was also activated. A reference librarian would be required to log in to the chatting tool in order to answer enquiries that might arise from users - particularly those off campus. The difference between an interactive tool and "let's hear from you" is that the latter is not synchronised whereas the first is designed to work in synchronised mode, happening live between the librarian and a user.

Social media tools

For now three social media tools Facebook, Twitter and Instagram were incorporated into the library portal to market the activities of Ibrahim Babangida Library and encourage socialisation. These tools now become the voice of the library and serves to reach both the registered as well as potential library user.

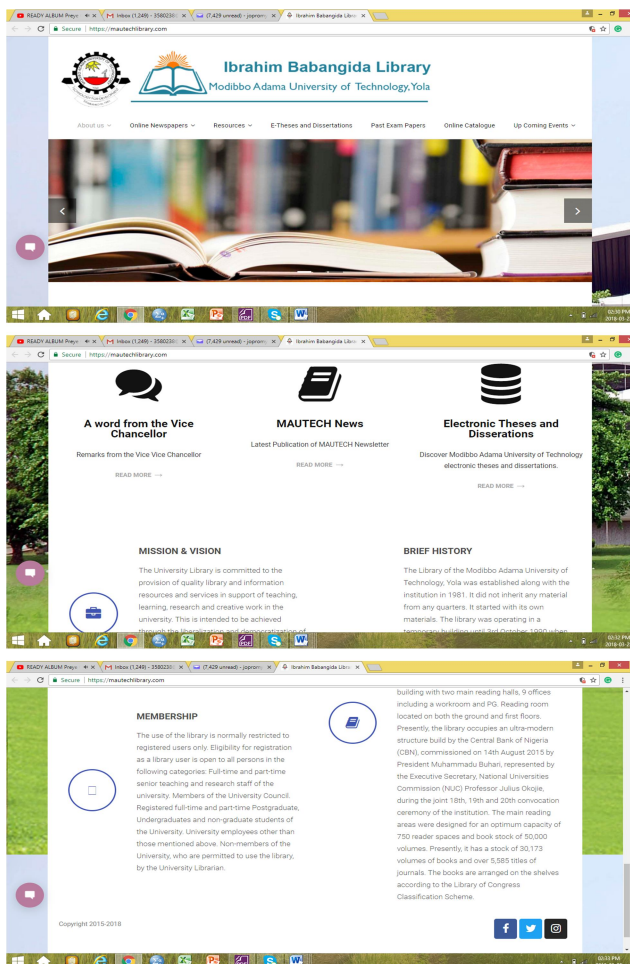The steps (Figure 6) taken resulted in a functional library portal accessible through the URL https://mautechlibrary.com

Figure 6

RECOMMENDATIONS

Based on the findings this study recommends the following to improve the information services of the Ibrahim Babangida Library further:

1.   Special training in the use of the library portal should be provided to the library staff first, and then rolled out to students and academics.
2.   Findings indicated that the least used resources were undergraduate projects, master's dissertations and doctoral theses currently arranged unprofessionally and stored in a locked room in the thesis unit of the Readers' Services Division. A designated area where these projects are arranged for easy accessibility and use is suggested. It is also suggested that these theses and dissertations are digitized for future online access.
3.   The established library portal should provide access to all open-access e-resources as well as those subscribed to in future in order to avoid past problems of unawareness and inaccessibility.
4.   The Collection Development Division should develop an acquisition policy to ensure the purchase and subscription of relevant and current e-resources covering all disciplines of the curriculum. Students should also be involved in the selection process.
5.   Students' utilization of e-newspapers and e-textbooks should be supplemented with e-journals, e-theses and e-dissertations as well as indexing and abstracting databases with full-test journal articles from accredited journals. Science-based databases like American Association of Petroleum Geologists, American Chemical Society, African Journal Archive, Access Pharmacy, BioMed Central, and Premier should be considered for subscription.
6.   Stable free Wi-Fi with fast response time should be provided on campus – including residences - 24/7 to facilitate searching for information resources without costs. The library portal will endure online off-campus access.
7.   As many students are using smartphones and other mobile devices for Internet access, the library portal should provide mobile applications to allow easy access.
8.   An internal Library Portal Committee, chaired by the University Librarian, should be instituted to facilitate the development of an e-resources policy concerning e-resources, subscription and licensing agreements with vendors as well as developing guidelines and policy concerning technical issues regarding the portal.

9.   To develop the institutional repository further, students and academics should be requested to provide research publications as well as dissertations and theses for digitization and consequent archiving and cloud storing.

10. The MAUTech management should support the acquisition of e-resources financially, especially proprietary e-resources, to meet the needs of the university community by covering all science-based subject resources.

11. The library should use the established library portal for marketing and training purposes.

12. Past examination papers from the last three years should be uploaded to the library portal in order for students to familiarize themselves with different types and formats of examination questions to enhance academic performance.

13. The library should build a permanent server system as back-up for its digital content.

14. For current day-to-day needs, but especially if the library is automated, the MAUTech management should put mechanisms in place to ensure sufficient consistent electricity supply on campus.

15. The established library portal should be developed more to incorporate links reflecting all the library's resources and services. The dynamism of library portals is their ability to interpolate different interfaces or resources in one access point for user utilisation.

16. An integrated library management system like Koha or preferably Worldshare should be considered to deploy a complete acquisition circulation and online public access catalogue system for Ibrahim Babangida Library.

CONCLUSION

The study main objective was to determine the techniques of designing and establishing an integrated customised library portal for Ibrahim Babangida Library at Modibbo Adama University of Technology, Yola. Findings reflected a need for digitization of library resources as well as a need for a dedicated library portal. The majority of students agreed to the establishment of a dedicated library portal; there is a strong indication that academics are positive toward the implementation of a library portal. Librarians and IT experts accented the practicability of establishing a library portal as well.

The study recommends, among others, subscription to full-text databases, provision of sufficient and free Internet access, e-resource and e-services policies. The outcome of the study was the design and establishment of a functional and responsive library portal based on the input from stakeholders of the MAUTech community, scholarly views found in relevant literature and expertise

from other libraries.

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APPENDIX A - Technical requirements of a library portal

S/N	TOOLS AND SPECIFICATIONS
1.	Library software A: Customization design • Software developers within an institution, for example, the Computer Centre and ICT units of MAUTECH, Yola • They work hand in hand with library professionals and Library Committee to design the portal access • They might link the portal site to the University website. B: Reputed company design • Recognised company with good track record to be contacted for the portal design. • Work with library professionals and Library Committee • Install/design the portal considering the features of the library • Train all library staff on how to use the library portal • Maintain the portal access within the term of agreement. C: Free Library design • The library may try free library software • After testing the prototype, the library may then decide to customise it usage
2.	Example of library Software/Portal: (These are either company designed or free library software/portal access points) LibGuides (CMS) Access-It Library Mandarin ResourceMate Jumbla
3.	Portal Policies/Guidelines Library and ICT committee will have the responsibility of drafting the policy and guidelines.
4.	Internet connection specifications: Request For Comments (RFC) Name Resolution & Type Standards (URI, URL z39.50, URN, URC, DNS etc.) Transport Standards (IP, UDP, TCP, TCP/IX, FTP, etc.) Plugins and Parts (Java, NCAPI, ActiveX, CGI, ILU etc.) Document Markup Languages (SGML, HTML, RFC 1563, CSS, RTF) Internet file and protocol Standards. Portable/Interpretive Programming Languages (Java & JavaScript, PERL, Python, TCL) 3D Specifications (OpenGL, VRML, DXF etc.) Compression (CS, AS, FAQ) Multimedia File Formats (PDF, PNG, GIF, JEP/GIF/PNG etc.) Multi-User Interfaces (Multi-user Domain, IRC-REC1459, UnixTalk, ANSI) Security Protocols and Specifications (Internet security) Other References (ISO, NIST, ANSI, W3C, RTP etc.)
5.	Upgrading a computer server Dell Power Edge T110II SMB Server HP ProLiant MicroServer Gen8 Lenovo ThinkServer R515 Asus Server TS500-E6/P4 Windows server 2012 Portal system requirements (minimum)

APPENDIX A - Continuation

6.	Computer system to connect to server: Processor - dual core 2.4 GHz+ (i5 or i7 series Intel processor or equivalent AMD) RAM - 8 GB Hard Drive - 128 GB or larger solid state hard drive Graphics Card - any with DVI support Wireless (WPA2 support required) Monitor - 23" widescreen LCD with DVI support Operating System - Windows 7/8 Home Premium or Professional with Service Pack 1 The processor speed of the system should be at least 3.0 GHz (gigahertz of speed clock i.e. 3,000,000,000 clock cycles per second) Pentium 4 series with a Dual-core (i.e. a dualcore processor chip having two processors on one chip) of 2.0 minimum or Athlon (microprocessor from AMD) 44x2 minimum. The Random Access Memory (RAM) should be between 1GB XP or 2 GB Vista & 7. It should be compactable with XP and Vista/7 operating systems. The Operating System should either be windows version 7, Vista, XP, 2000 or Linus because these OSs are suitable for network configurations and access to the web. For video streaming and webcam, the video card should be a minimum of 128MB with compatibility for pixel shader for graphics resolution and sound interfaces. The Hard Disk of the computer system should be a minimum of 7.6GB of free space to accommodate enough data. And the software application may be any kind of web publishing language. CPU: 1.7 GHz Processor CPU SPEED: 1.7 GHz, RAM: 512 MB, OS: Windows 7 (32/64-bit)/Vista/XP, VIDEO CARD: NVIDIA GeForce3+ / ATI Radeon 8500+,SOUND CARD, FREE DISK SPACE, Portal Recommended Requirements CPU: Pentium 4, CPU SPEED, RAM: 1 GB, OS: Windows 7 (32/64-bit)/Vista/XP, VIDEO CARD: DirectX 9 level Graphics Card (GeForce FX 5500/Radeon 9500), SOUND CARD. FREE DISK SPACE
7.	Knowledge on software application required. The library website is powered by Drupal and is written in PHP which utilizes MySQL database. They were able to install the following modules or elements: cTools, Entity, Google Analytics, jQuery Update, LDAP, Views, Web form, Weblinks, and Wysiwyg. The portal used "Professional Theme" with some customization in the layout. As a dynamic portal access, the library's Facebook and Tweeter accounts are all incorporated into the website. There are different links to the library e-resources and local databases. The content of the portal is managed by the General Reference section of the library in Diliman. Design concept may start from a simple to interactive mode. These features are to be considered under design stage like the content to be made available, audience, content format and processing, structuring and navigation, the layout of a home page and branch pages, site search support and feedback and help. Required standards according to Ultimate guide to programming languages (2017; Das & Saha 2015; Shiotsu 2014). These Content Management Systems are recommended by (Beal 2017; The Ubuntu story 2017 & Madhusudhan 2011).

APPENDIX A - Continuation

8.	Printer: MS 810N LaserPrinter Monochrome 1200 x 1200dp Officejet Pro 251DW Injet Printer-colour 1200
9	Scanners: HP Scanjet 8270 document flatbed scanner (L1975A) Epson Perfection V600 photo scanner Flatbed colour image scanner colour Epson MatricCCD LineSensor, 6400x9600dpi, 48-bits per pixel internal/external 16-bits per pixel internal/external, 3.4Dmax
10.	Digital Cameras: Sony Alpha 7s 12.20 Megapixel *Samsung Galaxy NX 20.30 Megapixel
11.	Other Accessories: Backup Device - External hard drive, USB Flash Drive and/or DVD+/-RW drive APC Back-UPS,400 Watts /650 VA, Input 230V /Output 230V, Interface Port Optional Simple Signalling RS232 cable, USB, CDs and flash drives, Cables, Stabilizers, Extension wires etc.