

**Assessment of the Management of Public Access Computers
in Academic Libraries in Kaduna State, Nigeria**

BY

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DECLARATION

I declare that this thesis titled “Assessment of the Management of Public Access Computers in Academic Libraries in Kaduna State, Nigeria.” was carried out by me in the Department of Library and Information Science. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other institution.

Usman Ahmed Adam

Signature

Date

CERTIFICATION

This is to certify that this thesis entitled “Assessment of the Management of Public Access Computers in Academic Libraries in Kaduna State, Nigeria.” by Usman Ahmed Adam meets the regulations governing the award of the degree of Masters in Information Science (MSc.) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to Allah the Almighty for His divine knowledge and understanding, to my mother Hajiya Hashiya Ahmad for her support, encouragement and prayers, my late father Alhaji Ahmad Adam and my beloved Family.

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List of Abbreviations

ABU:	-	Ahmadu Bello University
NDA:	-	Nigerian Defence Academy
KASU:	-	Kaduna State university
FCE:	-	Federal College of Education
CE:	-	College of Education
IKL:	-	Isah Kaita Library
AYAL:	-	Ambassodeor Yahaya Aliyu Library
PACs:	-	Public Access Computers
LIS:	-	Library Integrated System
OPAC:	-	Online Public Access Catalogue
ALA:	-	American Libraries Association
ICT:	-	Information and Communication Technology
IT:	-	Information Technology
LAN:	-	Local Area Network
MSC:	-	Masters of Science
NUC:	-	National University Commission
PC:	-	Personal Computer
TETFUND:	-	Tertiary Education Trust Fund
UNESCO:	-	United Nations Educational, Scientific and Cultural Organization
US:	-	United State
RAM:	-	Random Access Memory
CPU:	-	Central Processing Unit
CD:	-	Compact Disk
WAN:	-	Wide Area Network

Abstract

The study investigated the management of Public Access Computers (PACs) in academic libraries in Kaduna State, Nigeria. The Objectives of this study include among others identifying strategies deployed in managing Public Access Computers (PACs). Five research questions were formulated to find out the purposes of providing PACs, strategies deployed in managing PACs and the level of skills and competencies of staff managing PACs in Academic Libraries in Kaduna State. Qualitative research approach was adopted, semi-constructed interview and Observation constituted the instruments for data collection, while descriptive method was used to analyze the collected data. Fifty two (52) staff consisting of System librarians, System analysts and e-library Assistance from seven (7) academic libraries in Kaduna State were selected as sample of the study. The findings of the study showed that access to the internet, electronic resources, library catalogue and training were the major purpose of providing PACs in the academic libraries studied. It was also revealed that there are inadequate public computers and majority of the staff managing PACs are librarians with high level qualifications in library science but of low level qualification in IT and computer management. The study recommended among others that the academic libraries in Kaduna State should acquire more public computers to be able to cater for the need of their users and give them equal opportunity to have access to the available computers, the academic libraries in Kaduna State should always apply some relevant PACs maintenance strategies and computers should be provided for access to all services of PACs to ensure standard, adequate and quality service which satisfy the need of users.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Controlling what users can do and what they can access on the computers is a challenge. Public Access Computers (PACs) Management is not intended to turn the librarian into a networking guru but its sole purpose is to provide him with necessary knowledge and skills to keep library's computers up and running properly, sustain its growth, and ensure its viability. Poor management of PACs can result to huge financial lost as well as waste of hundreds of precious man efforts in constant daily maintenance routines of the Computers. This study assessed the current status and practices of managing Public Access Computers (PACs) in academic libraries in Kaduna State, Nigeria.

The popularity and necessity of computers have made many organizations, especially library, community and telecenter, internet café, etc. to provide multiple computers for multiple usages. These computers are usually kept in different locations. However, in some organization, the location may be centralized. Because the computers are open to the public for limited or unlimited access, the arrangement is called Public Access Computers (PACs).

Therefore, Public Access Computers (PACs) are the computers made available for access by the public within a specific community to provide users with an increasing diversity of information and services. (Charles, 1989)

Technically, the Bill and Melinda Gates Foundation, (2005) defined a Public Access Computer (PAC) from three different perspectives. According to the foundation, the computers in the public access venue must:

1. be available for access by the public at no cost and without intervention by staff.
2. provide access to external information resources (e.g. the Internet and bibliographic databases); and
3. be able to access personal productivity or reference software (e.g., word processing, presentation, spreadsheet, electronic encyclopedia software, or other educational software).

Hence, PACs are the combination of computer systems, local network, with Internet connectivity to offer various services for especially those that do not have access to computer and internet at home. This definition has clearly grouped PACs into two broad overlapping categories:

Hardware; PACs hardware can include, desktop or laptop computers (Workstations), printers, scanners, and a range of other devices and networking technologies which include a range of hardware to enable a range of networks to run (e.g., routers, hubs, switches, etc.).

Software; PACs Software can include operating system software (e.g., Microsoft Windows, Mac OS, and Linux), application software (e.g., Microsoft Office, OpenOffice, graphics software, audio software, e-book readers, assistive software, library automation software and others), functional and security software (e.g., Web browsers, online databases, and digital reference, Antivirus Software, Anti-Spyware Software and others), networking software (e.g., integrity maintenance software, time management software, print management software, other networking protocols etc.)

PACs are networked to attain security, flexibility, stability, central administration, integrity and cost effectiveness. Security is very central to any PACs system because unlike

personal computer used by a single user, who can customize the machine's behavior to his preferences, PAC is used by many different untrusted individuals. The computers must therefore be locked down and secure against both intentional and unintentional abuse, and users should not have the authority to install software or change settings. Therefore users have to be authenticated and authorized to ensure that users are identified and grant access to the only applications or the files they should have access to. Networked PACs are flexible by the way that they allow users to log in to their profiles from any computer connected to the network, and have access to the authorized resources anywhere on the network. Stability on the other hand makes the privilege of the users stable anywhere on the network by the way that the chances of malfunctions are significantly reduced.

Similarly all PACs provide central administration platform that gives the network administrator ability to manage the whole networked resources on one single computer. Closely related to the issue of central administration is integrity. This ensures that all the computers, users, systems, application, and networked devices are communicating to each other in harmony. Finally the running of PACs is cost effective. A library may have over hundred computers/users that need to access local databases, library application and so on. Rather than purchasing and installing the same application hundred or more time, library can purchase one application and share it through a single computer on the network so that all the users can get to it.

Therefore, the overall objectives of PACs according to Van Dijk, (2006) are: universality and usability. Universality means that all human beings are entitled to access information, and usability is the potential of a device or service to be utilized to meet users' needs. These objectives ensure the provision of enhanced and expanded information services, broader visibility and improved reputation in the community and greater job satisfaction.

Provision of Public Access Computers (PACs) in Library

The automation derive experienced by libraries and the emergence of internet and electronic resources coupled with the desire of libraries to provide unlimited access to information made many libraries to provide PACs. Most libraries now have recognized that PACs are essential to providing excellent service to patrons. This led libraries and their international networks issued manifestos and statements highlighting the need to adopt and adapt PACs to their work. For instance, the 2002 Internet manifesto of the International Federation of Library Association (IFLA) proclaims freedom of access to information via the internet in libraries and the IFLA/UNESCO Guidelines on the Internet (2006), provides recommendations for developing policies and priorities of action applicable to Internet services under the needs of various types of communities. Additionally the guidelines and statements by international networks of libraries, as well as the work of the national network of libraries with the support of government officials and academics led to the approval of the landmark of the Unites States National Libraries Law 1379 of 2010. The National Libraries Law establishes the fundamental rights of expression and access to information and aims to ensure access to the Internet as a basic public service. It also mandates libraries to address the challenge of improving digital literacy and offering locally relevant information services. (Beagle, 2010)

It is in line with the above, that libraries provide PACs to facilitate the access to not only information but to both hardware devices, like printers, scanners, storages devices and software, like Library Integrated Systems (LIS), library applications, network based applications, open and Microsoft Office facilities and so on. Therefore, it is quite clear that the backbone services of PACs are provision of access to information, sharing of internet connection, electronic resources and Online Public Access Catalogue (OPAC) among others.

Perhaps in any discussion of application of modern technology in the library, as revealed by Ukoh (1984), the first thing that comes to mind is the computer. Because of the nature of information services provided in academic libraries and the sophistication of users, academic libraries also have since adopted the use of PACs. Now PACs have been widely accepted as a primary service in academic libraries, as it became the vibrant means for access to networked information resources. Beagle (2011) reported that Atkins Library at the University of North Carolina-Charlotte (UNCC) had a bank of PACs since before 1999. Almost all academic libraries in Nigeria have computers available for the use of patrons, for access to internet and electronic resources, library software and OPAC.

With PACs, some libraries give users limited time to allow others to get turns and keep the library less crowded. And often allowed them to print documents extracted from the computers free of charge or ask to pay less amount of money compared to the outside environment. Abubakar (2010) reported the availability of computers, internet and CD-Roms for the use of patron in six Nigerian university libraries. Similarly Iwu and Yusuf (2010) reported that 61.9% of students at Covenant University use OPACs to locate materials on the shelves. Krubu and Osawaru's (2011) findings also identified ICT resources and the use of the resources available at John Harris and Benson Idahosa University libraries as computers, CD-Rom, Online database and internet. Kamba (2008) also discovered the problems of IT especially internet use in Nigeria libraries to include inadequate and poor information infrastructure.

Managing Public Access Computers (PACs)

Managing PACs entails as stipulated by Wayne (2004) setting up a customized computer configuration, using security, Integrity Maintenance, Browser Control, Antivirus, Anti-Spyware, Session Managers and Print Management Software to secure and control computers. Thus,

managing PACs according to Gundry (2005) remains one of the greatest challenges facing IT. Today patrons of these facilities have a wide variety of technical skills and use the computers for a variety of reasons. Some users might inadvertently delete important configuration files. Other more technically perceptive users might change system settings for their own personal preference, install untrusted software or visit untrusted web sites. These and many other reasons necessitate the management of PACs.

Therefore, deploying strategies for managing users, computers, storages, printers, scanners etc on PACs is very necessary. This will simplify daily maintenance routines which will at the end of the day reduce the cost implication for managing the PACs program. It is in the light of this that Madden (2004) provided six strategies for the management of PACs, which include:

- 1) Keeping Windows up-to-date
- 2) Installing anti-virus software and keep it up-to-date
- 3) Getting a firewall
- 4) Limiting user rights on the local machine
- 5) Keeping your applications up-to-date and change default passwords on hardware
- 6) Keeping spyware off the computers.

The skills and competences necessary for managing PACs can be grouped into systems administration skills and patron assistance skills. The public use of the systems introduces special requirements for networking, security and time management; these competencies assume and build upon knowledge of the Patron Assistance skills for hardware, operating systems and security. Competencies for configuring, administering and maintaining the computers and networks are listed under Technology Competencies for System Administration of PACs.

1.2 Statement of the Problem

In response to the changing information environment, the Nigerian society has fully adopted the use of PACs. Therefore today PACs are provided in many organization, especially in higher institution of learning, such as universities, polytechnics, collages of education etc. These PACs are supposed to be well managed with adequate planning, preceding their provision. Providing PACs also calls for proper organization which includes overall design of network topology, specific assortment of computer accessories, patterns of interaction, etc. Central to the managment of PACs is the issue of control. All computersare supposed to be adequately controlled and mornitored.

However, the major criticisms faced by PACs according Etta, (2002) Heeks, (2009)Thirumavalavan & Garforth, (2009) include, lack of project sustainability and scalability, poor management, and inadequate infrastructure. Public Access Computers (PACs) such as those deployed in Internet cafés, libraries and other shared Internet access points are susceptible to the same security vulnerabilities and weaknesses as privately used computers and servers. In fact, in such settings, the problem is even worse. When using PACs, users tend to download and install software indiscriminately, adjust the system settings to match their own preferences and be less cautious than when using their own computers. Consequently, as observed by Returnil (2014), these computers are in need of high-maintenance, a considerable amount of time to remove malware infections and restore the default system settings. Studies like Gundrey (2005) and Kamba (2008) show that most users often temper with the configuration or installed different software on PACs, thereby resulting to a breakdown or malfunction of the computers systems.

Based on the above observations several researches have been undertaken on PACs management in libraries in many countries in the World which includes those led by John Carlo

Bertot and his colleagues that revealed useful information on PACs in Libraries (Bertot et al. 2006; Bertot et al. 2007; Bertot, McClure, and Jaeger 2005), Walkinshaw (2007) Rutkauskiene (2008) and many others.

Preliminary study conducted by the researcher revealed that only few studies such as Kamba (2008) & Kasa (2012) have been conducted on PACs in Nigeria. Reviewing these studies shows that none of them attempted to assess the management of PACs in the dominant focus of their studies. Looking at the fact that PACs play an important role in bridging the digital divide between users and many PACs provided in academic libraries in Nigeria are more than one decade, calls for the need to undertake a study with the view to assessing their functionality.

1.3 Research Questions

The following questions were raised to assess the management of PACs in academic libraries in Kaduna State:

1. What are the considerations in acquiring Public Access Computers (PACs) in Academic Libraries in Kaduna State?
2. What are the purposes of providing Public Access Computers (PACs) in Academic Libraries in Kaduna State?
3. What types of hardware and software are configured and installed on Public Access Computers (PACs) in Academic Libraries in Kaduna State?
4. What are the strategies deployed in maintaining Public Access Computers (PACs) in Academic Libraries in Kaduna State?
5. What are the levels of skills and competencies of staff managing Public Access Computers in Academic Libraries in Kaduna State?

1.4 Objective of the Study

The general objective of the study is to assess the management of PACs in academic libraries in Kaduna State. In specific terms the study has the following objectives:

1. To identify the considerations in acquiring PACs in Academic Library in Kaduna State
2. To find out the purposes of providing PACs in Academic Libraries in Kaduna State
3. To determine the types of hardware and software configured and installed on PACs in Academic Libraries in Kaduna State
4. To determine the strategies employed in maintaining Public Access Computers (PACs) in Academic Libraries in Kaduna State
5. To determine the levels of skills and competencies of staff managing PACs in Academic Libraries in Kaduna State

1.5 Significance of the Study

In the past decades computers have significantly changed the working environment, simplifying and speeding up various tasks across many work areas. However, with these advances come some potential issues of managing computers which remain a challenge to librarians and IT staff. This study aims to equip systems librarians and IT staff with basic knowledge and skills necessary for managing PACs in library.

Therefore the result from this study will reveal some important findings, that will enable academic libraries under study managed and maintained their PACs efficiently and effectively with the available resources.

While identifying several problems associated with management of PACs, the study will also assist in providing proper solution to these problems and curtailing expenditure by

prescribing possible ways of reducing waste which will be of benefit to academic libraries in Kaduna State specifically and other libraries in general.

1.6 Assumptions of the Study

The study is based on the assumption that:

1. Proper configuration of both hardware and software infrastructures will simplify the maintenance processes and enhance accessibility of the equipment and resources
2. Deploying proper maintenance strategies will sustain the PACs in providing adequate and quality services.
3. The presence of qualified systems librarian / analyst will help in managing the PACs and providing adequate and quality service

1.7 Scope of the Study

The study covers PACs provided in academic libraries in Kaduna State. Although the study is on assessment, the scope of the assessment will only covers issue of systems requirements, uses, maintenance strategies and staff competency.

Operational Definition of Terms:

Computer Configuration: The technical specifications of either computer hardware, software, or the combination of both. And also mean a specific setting in specific software.

Management of Computer: includes the configuration, integration and coordination of the hardware, software, and control of the users' behavior on the computer to meet the real-time, operational performance, and Quality of Service requirements at a reasonable cost.

OPAC Unit: The unit where computers systems made available for Catalogue access-only in the library.

Print Management Systems: is software used for controlling printing across the network to reduce wasted paper and ink cartridges.

Public Access Computers (PACs): Computers made available for use by the public within a specific community.

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviewed literatures that are related to the area of this study. The review gave emphasis to the followings sub headings:

- 2.1 The concept of Public Access Computers (PACs)
- 2.2 Emergence of Public Access Computers (PACs) in academic libraries
- 2.3 Types of Hardware and software configured and installed on Public Access Computers (PACs) in academic libraries
- 2.4 Uses of Public Access Computers (PACs) in academic libraries
- 2.5 Management of Public Access Computers (PACs) in academic libraries
- 2.6 Skills and competences requirement for managing Public Access Computers in academic libraries
- 2.7 Summary of the Review

2.1 The concept of Public Access Computers (PACs)

The definition of Public Access Computers (PACs) differs from one scholar to another depending from which angle the scholar is looking at the PACs. Charles (1989) defined Public Access Computers (PACs) as the computer systems made available for access by the public within a specific community and often with minimal intervention by staff to provide users with

access to an increasing diversity of information and services. On the other hand, City of Stirling (2012) sees Public Access Computer (PAC) as any fixed (i.e. desktop computer), movable (i.e. laptop computer or mobile computer) device that is made available for use by members of the community that can access the Internet content and other computing services. However, a more comprehensive definition of PACs is the one given by the Bill and Melinda Gates Foundation (2005). The foundation defines Public Access Computer (PAC) from three different perspectives. According to the foundation, PACs must:

1. Be available for access by the public at no cost and without intervention by staff.
2. Provide access to external information resources (e.g. the Internet and Bibliographic databases); and
3. Be able to access personal productivity or reference software (e.g., word processing, presentation, spreadsheet software, electronic encyclopedia, or other educational software).

Therefore, the overall objectives of PACs according to Van Dijk, (2006) are: universality and usability. Universality means that all human beings are entitled to access information, and usability is the potential of a device or service to be utilized to meet users' needs. These objectives ensure the provision of enhanced and expanded information services; broader visibility and improved reputation in the community and greater job satisfaction.

The important role of Public Access Computers (PACs) in providing access to information, devices and expensive services cannot be over emphasized. According to Gordon (2012) Public access computing has opened the doors for many people who cannot afford computers. Without computers, people are living at a deficit in today's world. It's very important to have a place where computers can be accessible to everyone.

2.2 Emergence of Public Access Computers (PACs) in Academic Libraries

With the advent of information and Communication Technology (ICT) information resources in libraries are no longer limited to printed books and journals but also electronic resources in form of e-book, e-journal, databases, digital audio and video etc. (Aina, 2004). Libraries now subscribe to electronic versions of information resources in form of online databases that house e-books, e-journals and e-maps and so on. Thanks to the development of the internet the publishing and distribution of books and journals are being done electronically. Also the automation derive experienced by libraries and the arrival of internet and digital resources coupled with the desire of libraries to provide unlimited access to information, result in the emergence of PACs into the library.

Most libraries now have recognized that PACs are essential to providing excellent service to patrons. This led libraries and their international networks issued manifestos and statements highlighting the need to adopt and adapt PACs to their work. For instance, the 2002 Internet manifesto of the International Federation of Library Association (IFLA) proclaims freedom of access to information via the internet in libraries and the IFLA/UNESCO Guidelines on the Internet (2006), provides recommendations for developing policies and priorities of action applicable to Internet services under the needs of various types of communities. Additionally the guidelines and statements by international networks of libraries, as well as the work of the national network of libraries with the support of government officials and academics led to the approval of the landmark United States (US) National Libraries Law 1379 of 2010. The National Libraries Law established the fundamental rights of expression and access to information and aimed to ensure access to the Internet as a basic public service. It also mandated libraries to

address the challenge of improving digital literacy and offering locally relevant information services. (Beagle, 2010)

As academic libraries continue to spend more and more on subscribing to online electronic information resources and internet bandwidth (Idowu and Oduwole 2012), so there is vital need to ensure effective utilization of the subscribed resources by providing equal and adequate access to these resources across all the patrons, which is clearly reflected in the setting up of PACs in academic libraries. In support of this James (2010) argues that the number of computers sharing in developing countries should indeed be greater than in developed countries, as their income will not allow them maintain computers and internet at home. In his publication 'Integrated Public Access Computer Systems' Bailey (1989) indicates that Academic libraries have begun to shift their computing emphasis from the long process of automating internal library functions, such as circulation, to providing computer systems for direct use by library patrons, such as reference CD-ROM and online databases. These PACs will provide users with an increasing diversity of information materials and services. He also highlighted the need for multiplying, integrating and networking these PACs due to increasing demand for access by patrons; as these systems multiply, there will be a growing need to integrate them to provide effective user accesses.

On the other hand, a study by Shill and Tonner (2002) shows that many academic libraries had PACs, and even in-house computer laboratories, long before the development and adaptation of the electronic information resources. This is appearing from their study that surveyed 354 academic libraries facility improvement projects between 1995 and 2002. Their first article makes it clear that over 50% of the libraries surveyed already had more than 10 PACs even before their projects began. Despite that, Beagle (2011) underlined shortcomings with the

manner in which those early PACs and laboratories were deployed in libraries, and that their use by students may not have been adequately supported by library or IT personnel but Caniano (2010) assert that PACs are not only the key elements of academic library but also the key defining element of the Commons model of academic libraries. In line with this, Granath & Samson (2008) reported that about 102 computers are available for use by patron at the Mansfield Library, USA. Gulam & Sahu (2005) also reported that; The IIMT Library India provides the facility to all users to browse the library collection through online catalogue-OPAC. He further indicates that it provides facilities to access internet and online databases inside the library. IIMT Library has connected with Wi Fi network, with 10 computers available inside the library for student to access online databases.

In Africa, Shibanda (2002) reported that the main library of Moi University, Kenya has 35 PACs being served by two file servers running on SFT version of Novel in a network environment. Six of the PACs have CD-ROM drives. The branch libraries have several PACs with CD-ROMs drives. They enjoy internet connectivity and connect through the main library system via intranet. Iwu& Yusuf (2010) revealed that Covenant University library has an abundance of PACs connected to the internet with web based Millennium software. Similarly in 2010 Abubakar, in a study on availability and use of ICT in six Nigerian university libraries, notably identified availability of computers and internet. Ibinaiye (2012) in her study Challenges & Prospects of Digitization of Library Resources in Nigerian Universities indicated the presence of desktop computers in Kashim Ibrahim Library (KIL), ABU, Zaria Kasa (2012) also proved the existence of cluster of PACs in KIL, University of Lagos & University of Nigeria (NSUKKA) Libraries as a result of intervention by MTN Foundation Project.

2.3 Types of Hardware and Software configured and installed on Public Access Computers (PACs) in Academic Libraries

Public Access Computers (PACs) share the same components with many personal computers (PC) in addition to some networking devices and management software. In terms of hardware, Scherer (1996) suggested the provision of special facilities and equipment such as high-branded workstations among the ways by which academic libraries can add value to the educational process. On the other hand, Granath & Samson (2008) identified some application software among the basic components of PACs in library which includes: Microsoft Office Suite (MS), Electronic Reserves (ER), Library Databases (D), Library Catalog (C) email (M) Vacant (V) and Web browser (W). While explaining the software configuration on PACs, Wayne (2004) highlighted that Antivirus software like Norton, McAfee, AVG, Kaspersky, and Trend Micro are setup on PACs to provide security against viruses, malware, spyware, and other nasty bits of code that can be picked up while browsing the Internet. Deep Freeze, Clean Slate, and Smart Shield are configured to restore each computer to its original state and discard any changes made by individual users. Time Limit Manager, Cybrarian, and PC Reservation are installed to schedule computer sessions. Pharos and LPT:One to release print jobs. This supports the assertion of Adanu (2006) who was of the view that library automation means more than the use of computers alone but purchasing and installing software for an integrated library system. Krubu and Osawaru (2011) in the same vein, reveal some factors hindering the impact of computers in Nigerian university, among which are expensive software and hardware.

Bertot (2009) indicates both hardware and software components of PACs in library in the following statement; Like any other computer systems PACs comprise of Hardware that include, Desktop or Laptop computers (Workstations), printers, scanners and other computer accessories,

networking technologies which include a range of hardware to enable networks to run (e.g., routers, hubs, switches, etc.). Software that consist of operating system software (e.g., Microsoft Windows, Mac OS, and Linux), Desktop publishing software i.e. Microsoft Office, Open Office, graphics software, audio software, e-book readers, assistive software. Functional, security and educational software i.e. Web browsers, databases, and digital reference, Antivirus Software, Anti-Spyware Software and so on. Networking software i.e. Integrity Maintenance Software, Time Management Software, Print Management Software, other networking protocols.

2.4 Uses of Public Access Computers (PACs) in Academic Libraries

Public Access Computers (PACs) in academic libraries play a vital role in bridging the digital divide by providing patrons with access to current information resources and creating opportunity for understanding the latest technological development and services. According to a study by American Libraries Association (ALA) (2012) on public funding and technology access, nearly 75% of Kentucky libraries offer free access to the Internet in their communities. While examining the uses of PACs Gbaje (2007) stated that Technology has made it possible for Nigerian academic libraries to use the internet for search, e-mail etc. and to access online digital resources such as Amazon, Wikipedia and so on.

The dominant finding of Gitta & Ikoja (2003); Robinson (2004); Haseloff (2005); Parkinson (2006); Gamage & Halpin (2007) revealed that public access computers are used primarily to meet personal and social needs such as communicating with friends and family, entertainment, doing homework, and developing computer skills. Additionally, Kaiser (2005) & Lauzon (2008) affirmed that public access computers were used for skills development to explore computers and the internet. Parvyn (2003); Strover et al. (2004); Mercer & Lengyel et al.

(2006) recognized that the demand for internet browsing, email and computer training services were very high.

Public Access Computers (PACs) also serve as a means for finding safety and shelter in terms of crisis such as natural disasters and other emergency situations. For example, people have used Public Access Computers for seeking aid and attempting to locate missing people in Jamaica (Bailey, 2009), in the U.S. (Bertot, 2006) and in Africa (Etta & Parvyn, 2003). In their article entitled Trend Setters Computers in Commons Environment, Granath & Samson (2008) highlighted several uses of PACs at the University of Montana Library, USA where Internet browsing constituted (41.5 %) use of Microsoft word (32.2%) use of email (15.1%) library catalog (3.8 %) library databases (3.7%) and electronic reserve (1.9%). Kentucky library (2013) discussed that they provide access to the Kentucky Virtual Library (KYVL), catalog through Integrated Library System (ILS) and Internet.

A study conducted by Nwezeh (2010) on the use of ICT in Nigerian Universities found out that 78% of staff and 85% of students at Obafemi Awolowo University use the internet for their projects. Iwu and Yusuf (2010) also affirmed that 61.9% of students at Covenant University use OPACs to locate materials on the shelves. Furthermore, Krubu and Osawaru's (2011) findings identified the use of resources available at John Harris and Benson Idahosa University libraries such as search engine, internet, CD-ROM, Online database, and World Wide Web.

Public access computers (PACs) offers a wide range of services, however, users typically only access a few. Uses of PACs can summarily be categorized into the following:

1. Internet and communication
2. Desktop publication

3. Access to resources
4. Use of Library Automation Software / OPAC
5. Training among others

2.5 Management of Public Access Computers (PACs) in Academic Libraries

Most libraries now recognize the essentiality of PACs in providing excellent service to patrons. However, managing these computers has become a major responsibility for library staff. Patrons expect to find secure and well-maintained computers that have simple, stable, and predictable interfaces (Wayne, 2004). To remain efficient, effective and keep the cost implications to the minimum size possible, organizations have to adopt a proactive approach to management of PACs in library. This means deploying new customized computer configuration, use of security software, Integrity Maintenance Software, Browser Control Tools, Antivirus Software, Anti-Spyware Software, Session Managers, Print Management Systems along with many update strategies. Kentucky (2013) highlighted the standard practices of managing PACs in academic libraries in the following statement;

“Antivirus and other protection software is a critical investment to safeguard the library’s computer hardware and to handle the high volume of traffic. Antivirus software from AVG, Avast, Kaspersky, MacAfee and trend micro provide an insurance policy against viruses, malware, spyware, and other nasty bits of code that can be picked up while browsing the Internet. Earlier this year, the license for Microsoft Security Essentials was updated to exclude government use. Another vital component of stress-free public computing is a program to restore each computer to its original state and discard any changes

made by individual users. Deep Freeze, Clean Slate, and Smart Shield are examples of restore software. Investing in robust antivirus and restore software will improve patrons' computer experience and reduce maintenance and support issues".

Many libraries use software to schedule computer sessions and release print jobs. Time management software can save staff valuable time and energy, reduce computer wait times, and cut down on the monitoring of patrons. Time management software packages include Time Limit Manager (TLM), Cybrarian, and Envisionware's PC Reservation. Print management solutions include Pharos and Envision ware's LPT: One. To meet the Essential Level, library computer hardware and software need to be up-to-date and adequate network protection supposed to be provided with firewalls and anti-virus software. Equipment needs regular maintenance by trained personnel. Regular backed up, and network equipment (such as servers and routers) should be kept in a secured area. Inventories of all computer equipment and software licenses need to be conducted on a regular basis.

The strategies taken by library offering open access to the internet in order to secure and maintain their PACs are clearly stated in a report conducted by Madden in (2004).

- 7) Keep Windows up-to-date
- 8) Install anti-virus software and keep it up-to-date
- 9) Get a firewall
- 10) Limit user rights on the local machine
- 11) Keep your applications up-to-date and change default passwords on hardware
- 12) Keep spyware off of the computers.

Managing PACs entails setting up a customized computer configuration, use of some software and constant hardware and software update.

2.6 Skills and Competencies Necessary for Managing PACs in Academic Libraries

A substantive progress in the implementation of information and communications and for that matter progress in quality of life and development cannot be achieved without preparing people for a knowledge society. This partially involves making an environment amenable for using computers in schools, training the population in computer application and building, a solid national computer and communication science education (Castells, 1996). According to Kimaro (2006) the call for ICT sustainability is pertinent because it would not be of benefit when left unattended to. It will not deliver any benefits on their own unless they supported and enhanced by skilled human resources coupled with appropriate institutional capacity. Aina (2004) admits the high cost of ICT training but pronounced that library staff and users should do something on their own to improve their IT skills. Yusuf (2010) reported about 60% of faculty members indicated inadequate training of library staff on managing PACs. Krubu and Osawaru (2011) identified search skill among factors hindering impact of ICT in Nigerian university libraries.

The advent of ICT and the ready availability of information have redefined the roles and duties of librarians. Griffiths and King (2008) contend that three major factors have led to the information age: new technologies, social adaptation to information availability and use, and the emergence of a new information profession.

The appearance of ICT on the global scene has caused a revolution in libraries and all service providing industries. ICT has changed the ways and pattern in which information and other services are dispensed. Nwachukwu (2005) supports this argument by observing that with

all the changes in information and the processes of access, storage, transmission, and reproduction, and librarians and libraries must adapt to new roles and skills to cope with change. The only way of satisfying user demand is to use ICT in information service delivery. Librarians and libraries must do this to remain relevant in the face of challenges and changes. Sass (2001) contends that to ensure our relevance to a new generation of users, “we need to be where our users are, even if they are not inside our libraries.”

Academic librarians must acquire relevant skills and competence in the application of the skills to the use of ICT. Obodoeze (2007) concludes that human resources development becomes fundamental. Shibanda (2001) holds that the information managers, especially academic librarians, must build on the positive aspects of information era while alleviating the negative aspects of globalization. Supporting this view, Edekor (2004) contends that the effective management of new technologies depends largely on the availability of skilled employees and the society's level of literacy. For librarians to move forward in relevance and for libraries to provide services to demanding users, they must acquire relevant skills and competence in the use of ICT. Garuba (2007) support this view when he holds that the changing role requires that librarians learn new ways of performing their duties. He adds that computer literacy is of paramount importance to library professionals not only in Nigeria but other developing countries.

Salisu (2002) observes that strategies to cope with the challenges of ICTs must start with an examination of education for librarianship. Advocacy for continuing professional education (CPE) becomes inevitable, especially in core competencies of ICT. The world is driven by ICTS, and information service providers should be prepared to catch up with the global trend, so that they will not be abandoned.

Defining the skills and competencies necessary for managing PACs is the first step toward providing a roadmap for library staff to follow. In order to identify the skills through this assessment and to connect to learning opportunities to achieve each, according to Web Junction (2007), the skills and competencies are divided into two sections: Patron Assistance and System Administration. The Patron Assistance section addresses skills that front-line library staff needed in order to provide direct assistance to patrons on the public computers. The System Administration section addresses skills necessary for setting up, configuring and maintaining the public computers and networks. Under each high-level skill, there is a list of associated skills. The public use of the systems introduces special requirements for networking, security and time management; these competences assume and build upon knowledge of the Patron Assistance skills for hardware, operating systems and security. Competencies for configuring, administering and maintaining the computers and networks are listed under Technology Competencies for System Administration of PACs.

Multiple skills needed not only is the pace of technological change increasing, but the change requires an ever-increasing array of skills because of the complexity of applications, technologies, and services. An example of such complexity is the library OPAC or ILS. Visited libraries indicated that such systems are becoming so complex and technologically sophisticated that there is a need for a full-time staff person to run and maintain the library ILS. Given the range of hardware, software, and networking infrastructure, as well as PACs management requirements, librarians need a number of skills to successfully implement, secure and maintain PACs. Moreover, the skill needs depend on the librarian's position—for example, an actual IT staff person versus a systems librarian who does double duty by serving as the library's IT

person. The skills required fall into technology, information literacy, service and facilities management, and leadership and advocacy areas:

- General computer troubleshooting
- Identify the version of the operating system running on each computer. Be aware of the features and limitations of the current version.
- Determine the processing speed, the amount of RAM, and both free and total hard drive space on a Windows computer.
- Basic maintenance, such as mouse and key-board cleaning
- Basic computer repair, such as memory replacement, drive replacement, disk defragmentation, etc.
- Basic networking, such as troubleshooting an “Internet” issue versus a computer problem
- Understanding what is meant by a network server, file server, application server and print server and how to troubleshoot them
- Back up files and recovering backed-up files
- Integrated library systems
- Web design Information literacy
- Searching and using Internet-based resources
- Searching and using library licensed resources
- Training patrons on the use of the public access computers, general Internet resources, and library resources
- Designing curriculum for various patron training courses Services and facilities planning

- Technology plan development and implementation
- Determining the connection status of a computer and test connections on the LAN or WAN
- Integration of PACs into library operations
- Setting up a switch and use it to connect several network devices (computers, printers, etc.) together, and to connect those computers to a larger network.
- Policy development, such as acceptable use, filtering, and filtering removal requests by patrons, etc.

2.7 The Summary of the Review

This chapter reviewed literature on the concept of Public Access Computers, which was defined as the computer systems made available for access by the public within a specific community and often without or with minimal intervention by staff to provide users with access to an increasing diversity of information and services. Although there are several definitions of the concept but the above definition stands liberal and comprehensive. Both hardware and software components of public access computers including printers, scanners, operating systems and various software were also reviewed.

On the emergence of PACs in academic libraries, the review concluded that; the automation derive experienced by libraries and the emergence of internet and digital resources coupled with the desire for libraries to provide unlimited access to information, made many libraries recognized the need of PACs. This recognition led library associations and their international networks to establish policies and statements calling for the adoption of PACs in libraries. These and many other reasons lead to the emergence of PACs in the library. The PACs

are meant for access to the Internet, communication, desktop publication, electronic resources, library automation software / OPAC, training among other.

This chapter also reviewed literature on the management of PACs in three phases; Planning which entails the setting up a customized network / computer configuration and use of policy. Organization and control phases combined in the network implementation, use of some software and updates strategies. Then the skills and competencies for managing PACs are reviewed in two sections: Patron Assistance and System Administration. The Patron Assistance section addresses skills that front-line library staff needed in order to provide direct assistance to patrons on the public computers. The System Administration section addresses skills necessary for setting up, configuring and maintaining the public computers and networks.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the method adopted for the study under the following sub-headings:

- 1.2 Research Method adopted for the Study
- 1.3 Population of the Study
- 1.4 Sample and Sampling Technique
- 1.5 Instruments for Data Collection
- 1.6 Validation of Instruments
- 1.7 Pilot Test
- 1.8 Procedure for Data Collection
- 1.9 Procedure for data Analysis

3.2 Research Method adopted for the Study

The study adopted the qualitative research approach. According to Strauss and Corbin (1990) Qualitative research is any kind of research that produces findings that were not arrived at by means of statistical proceedings or other means of quantification. The researcher decided on qualitative research approach because it gives focus on interpretation rather than quantification, emphasis on subjectivity rather than objectivity, orientation toward process rather than outcome, and is flexible in the process of conducting research. Since qualitative method investigates phenomena in their natural setting, it is found appropriate for this study because the phenomena

of the management of Public Access Computers within academic libraries in Kaduna State formed the focus of the study.

The study adopted case study and triangulation methods. Case study as defined by Thomas (2011) is analysis of persons, events, decisions, projects, policies, or systems that are studied holistically by one or more method. The choice of case study became necessary because as Stake (2000) suggested case study became “one of the most common way to do qualitative inquiry” YIN (2003a) in the same pattern states that, the case study method allows researcher to retain the holistic and meaningful characteristics of real-life events, such as organizational and managerial processes. Patton (2002) advocates the use of triangulation by stating “triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches”.

3.3 Population of the Study

The population of the study comprised of all the seven (7) academic libraries located in higher institutions offering diploma and degree programmes in Kaduna State. In terms of target population all the 52 staff managing PACs in these academic libraries constituted the population of this study.

TABLE 3.1 POPULATION OF THE STUDY

S/N	TOI	NOI	Name of Institution	Name of Academic Library	Sections	NOS	Remarks
1	Universities	3	Ahmadu Bello University	Kashim Ibrahim Library	MTN, OPAC, CD Search, Internet Training	15	Federal
			Nigerian Defence Academy	Nigerian Defence Academy Library	E-Library – OPAC	6	Federal
			Kaduna State University	Kaduna State University Library	E-Library – OPAC	8	State
2	Colleges of Education	2	Federal College Of Education, Zaria	Federal College Of Education Library	Internet Unit	10	Federal
			Kaduna State College of Education, Kafanchan	Kaduna State College of Education Library, Kafanchan	E-Library	5	State
3	Polytechnics	2	Kaduna Polytechnic	Isa Kaita Library	E-Library	6	Federal
			Nuhu Bamalli Polytechnic, Zaria	Ambassador Yahaya Aliyu Library	E-Library	2	State
Total number of staff managing PACs = Population						52	

As collected from the staff from of each library in their various sections

Key

- TOI - Types of Institution
 NOI - Number of Institution
 NOS - Number of Staff

3.4 Sample and Sampling Technique

Considering the fact that the size of the population can be managed by the researcher, purposive sampling technique was used in selecting the entire elements of population as a sample size of the study.

3.5 Instruments for Data Collection

The instruments used to collect data for this study were interview and direct observation. The researcher used semi-structured and structured interview schedules to interview the staff responsible for the management of PACs in e-library, OPAC and training units. These instruments found appropriate because they will provide the researcher with rich qualitative data. According to Shneiderman and Plaisant (2005), interview can be very productive since the interview can pursue specific issues of concern that may lead to focused and constructive suggestions. Similarly Bryam (2007) state that; in conducting a case study, there is need for some structured interview in order to ensure cross-case comparability.

3.5.1 Interview

General interview guide approach with standardized open-ended questions in which all interviewees were asked was adopted for data collection (see Appendix A). This approach is intended to ensure that the same general areas of information are collected from each interviewee, and this provides more focus than the conversational approach, but still allows a degree of freedom and adapts ability in getting information from the interviewee. General interview guide approach facilitates faster interviews that can be more easily analysed and compared.

The semi- structured and structured interviews were divided into five sections. The first section tried to find out the considerations in acquiring Public Access Computers (PACs), the second section identified the purposes of providing Public Access Computers (PACs), the third assessed the types of hardware and software configured and installed on PACs, the fourth investigated strategies deployed in maintaining Public Access Computers (PACs) in Academic Libraries in Kaduna State. Finally, the fifth section investigated the level of skills and competencies of staff managing Public Access Computers in Academic Libraries in Kaduna State.

3.5.2 Observation

Observation was used to obtain first-hand information. PACs were physically inspected with the view to observing the nature of the hardware and software, and other aspects of maintenance and management. Field note was the instrument used to collect data from observation (see Appendix B). Basically, observation is one of the best instruments for assessing PACs management due to the fact that it provides researcher with the real views of the phenomena.

3.6 Validity

Triangulation was used to ensure the validity of data collected from different sources. Golafshani (2003) posits that triangulation is typically a test for improving the validity and reliability of research or evaluation of findings. Similarly Creswell (2003) suggests that triangulation can be used to establish validity. In triangulation all data items are corroborated from at least one other source and normally by another method of data collection (Keen and Packwood, 1995).

3.7 Pilot Test

A test was conducted at the outset of this research. The purpose of the test was to test the method of data collection and pre-test the interview schedules and field note. It was hoped that difficulties inherent in the administration of these instruments would be revealed during the conduct of the test leading to the acceptance of the research method, revision of the instruments, or adoption of another research method.

In order to achieve that, a pilot test was conducted within two weeks at the Bayero University, Kano. According to Dangani (2010) a pilot test is usually conducted on smaller size of sample than the sample of the main study. As such only library staff responsible for the management of PACs were used for the test.

The procedure for the test study entailed:

- i. Administering interview schedule
- ii. Inspecting PACs Management activities in the library.

The completed questions from the interview were carefully examined to determine if there is need for changes. Although no formal statistics was conducted due to the small sample size, some difficulties were noted in the interview questions. Considering the fact that management of PACs is new phenomena to many of the respondents, it was discovered that the use of computer jargons and acronyms like, PACs, TLM, Computer Configuration, Browser Control Tools, Driver Protection Software were confusing. Hence, it was decided that during the interview the researcher provided explanations to some of the jargons and acronyms while avoid using others where possible.

3.8 Procedure for Data Collection

The researcher personally visited each site selected for the study, during which the researcher sought for interview with the respondents. Four weeks were used before the researcher succeeded in collecting data through interview and observation. During the observation session some of the PACs management activities and available hardware and software configured and installed on PACs were physically checked.

The heads of each unit with the staff constituted the interviewees. Each participant was given a copy of the structured interview questions and each question was jointly discussed where the right response was agreed and indicated on the interview schedule.

3.9 Procedure for Data Analysis

The data that was collected from the research instruments was organized for analysis and transcribed into different types, depending on the sources of information. The data was then tabulated where necessary and discussed descriptively.

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CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the data collected for the study. The data were analyzed using descriptive statistics and the findings presented and discussed. The following are the major subheadings under the chapter:

4.2 Response Rate of Staff

4.3 Data Analysis and Discussion

4.2 Response Rate of Staff

Out of the 52 respondents selected for the study, 46 (88.46 %) were successfully interviewed. The remaining could not be interviewed because some were either on annual leave or study leave at the time of the study. The response rate of the respondents according to their libraries is presented in table 4.1:

Table 4.1: Response Rate of Staff Managing Public Access Computers (PACs) according to their Libraries

S/N	Name of Academic Library	Unit	Sample Size	Response Rate	Percentage (%)	Remark
1	Kashim Ibrahim Library, ABU	MTN Net-Library, OPAC, CD Search, Internet Training	15	14	93.3	Federal
2	Nigerian Defence Academy Library	E-Library - OPAC	6	4	66.6	Federal
3	Kaduna State University Library	E-Library - OPAC	8	7	87.5	State
4	Federal College Of Education Library	Internet Unit	10	9	90	Federal
5	Kaduna State College of Education Library, Gidan Wayan	E-Library	5	5	100	State
6	Isa Kaita Library, Kaduna Polytechnic	E-Library	6	5	83.3	Federal
7	Ambassador Yahaya Aliyu Library, Nuhu Bamalli Polytechnic	E-Library	2	2	100	State
	Total		52	46	88.43	

Table 4.1 clearly indicates that there is variation in the response rate. These variations are due to the fact that the population size and the number of units of academic libraries studied are

not of equal proportion. Kashim Ibrahim Library (ABU) has the highest 14 (26.92%) response rate followed by Federal College of Education Library with 9 (17.3%) response rates. Whereas, Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic) is the least due to the fact that they have only two staff responsible for the management of PACs. The table 4.2 shows the distribution of respondents by designation according to their units.

Table 4.2: Distributions of Respondents by Designation

S/N	Name of Academic Library	Units	Designation				Total
			HOU	SL	SA	EA	
1	Kashim Ibrahim Library (ABU)	MTN NET-Library	1	2	1	1	5
		OPAC	-	-	4	-	4
		CD Search	1	1	1	1	4
		Internet Training	-	1	-	-	1
2	Nigerian Defence Academy Library	E-Library	1	1	1	-	3
		OPAC	-	1	-	-	1
3	Kaduna State University Library	E-Library	1	1	1	1	4
		OPAC	-	3	-	-	3
4	Federal College Of Education Library	Internet Unit	1	4	2	2	9
5	Kaduna State College of Education Library	E-Library	1	3	-	1	5
6	Isa Kaita Library (Kaduna Polytechnic)	E-Library	1	2	1	1	5
7	Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)	E-Library	1	-	-	1	2
	Total		8	19	11	8	46

Key:

HOU - Head of Unit

SL - Systems Librarian

SA - Systems Analyst

E-A - E-library Assistant

From Table 4.2 it can be clearly seen that there are unit heads and supporting staff responsible for managing PACs in the libraries studied. It also shows that all the units are named e-library except the unit of Kashim Ibrahim Library (ABU), which is named MTN Net-Library and FCE, Zaria which is named Internet Unit. Only Kashim Ibrahim Library, Kaduna State University and NDA Libraries provided designated computers specifically for access to library catalogue under OPAC Unit. It is also discovered that there is only Head of Unit and one e-library assistant managing over 100 computers in Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic). The implication of this is that two persons cannot successfully handle the management of hundred computers and equally satisfy the needs of over hundred users at a time.

4.3 Data Analysis and Discussion

This section analysed and discussed the data collected in line with the research questions raised in the study. The section involved descriptive analysis of PACs Management in academic libraries in Kaduna State as derived from responses to the semi-structured and structured interviews and observation. The analysis and discussion were carried out as follows:

4.3.1 Considerations in acquiring PACs in Academic Libraries in Kaduna State

The first research question aimed at identifying the factors usually consider by academic libraries in Kaduna State in acquiring PACs. In order to achieve this, a list of factors and possible ways for acquiring PACs were outlined and respondents were asked to mention and discuss the factors. Five factors were identified to be the general considerations used in

acquiring PACs in the libraries studied. The factors includes, policy guide, standard requirement of the system, computer brand name, technical description of computer and price of computer.

From the result of the interview, it shows that NDA Library consider library policy in acquisition of PACs while Kashim Ibrahim Library, Federal College of Education Library, Kaduna State University Library and Isah Kaita Library consider standard requirement of the systems. On the other hand, Ambassador Yahaya Aliyu Library and College of Education Library consider all the five factors in acquisition of PACs in their library. Additionally Kaduna State University Library also consider Computer brand name. It was discovered in the course of interview that there is no written policy on how PACs are to be acquired in all the academic libraries studied. The implication of the finding is that each and every task that computer performs has a specific requirement. Therefore, there must be guide line factors to be consider while acquiring PACs in these libraries.

Furthermore, the study tried to find out how PACs are acquired in the academic libraries studied. Three ways were identified with only Kashim Ibrahim Library acquiring PACs through all the three ways. Kaduna State University Library, Nigerian Defence Academy Library Federal College of Education Library and Isah Kaita Library acquire through both purchase by the management of the institution and TET Fund Intervention. While Ambassador Yahaya Aliyu Library and College of Education Library acquire PACs only through the TET fund Intervention. Most of the times PACs that are acquired through donation or intervention do not meet up with the services requirements of the systems.

4.3.2 Purposes of providing Public Access Computers (PACs) in Academic Libraries in Kaduna State

In order to find out the purposes of providing PACs in academic libraries in Kaduna State, a research question was setup in which respondents were asked to indicate the reasons why academic libraries provide PACs. The reasons for the provision of PACs in academic libraries in Kaduna State are very wide and varied ranging from internet access, training to access to e-resources.

The result of the interview indicates that the academic libraries studied purposely provide PACs for access to the internet, electronic resources and CD ROM. Kashim Ibrahim Library, Nigerian Defence Academy Library and Kaduna State University Library, in addition, provide PACs for access to Library Catalogue. At the same time, Kaduna State University Library, Federal College of Education Library, Isah Kaita Library, Ambassador Yahaya Aliyu Library and college of Education Library provide access to some productive software, additionally, Kashim Ibrahim Library provide cluster of PACs for purpose of training only.

This confirmed the finding of Iwu and Yusuf (2010) which stated that 61.9% of students at Covenant University use OPACs to locate materials on the shelves. It is also in agreement with the findings of Krubu and Osawaru's (2011) who identified the purpose of providing PACs at John Harris and Benson Idahosa University libraries such as access to search engine, Internet, CD-ROM and Online database. This also supports the finding of Kaiser (2005) & Lauzon (2008) who affirmed that public access computers were purposely provided for skills development to explore computers and the internet.

In order to identify the problems hindering the achievements of objectives of PACs in academic libraries studied, the researcher asked the respondents to mention the problems

encountered in management of PACs. Lists of relevant problems were provided for them to choose. Their responses are shown in table 4.6.

Table 4.3 Problems Encountered in the Management of PACs in Academic Libraries in Kaduna State

Problem encountered	KIL	NDAL	KASUL	FCEL	CEL	IKL	AYAL
Lack of awareness	X	X	X	X	X	✓	✓
Inadequate bandwidth	X	✓	✓	✓	✓	✓	✓
In adequate no. of computers	✓	✓	✓	✓	X	X	X
Lack of skills	X	X	X	✓	✓	✓	X
Library Policy restrictions	✓	X	X	✓	✓		X
Power failure	✓	✓	✓	✓	✓	✓	✓
Systems malfunctions	✓	✓	✓	✓	✓	✓	✓
too much systems restrictions	✓	X	X	X	X	X	X
Absent of productive software	✓	X	X	X	X	X	X
Lack of user assistance	X	X	✓	✓	✓		✓
Lack of Training	X	✓	✓	✓	✓		✓

Key:

✓ - Available

x - Not Available

KIL - Kashim Ibrahim Library (ABU)

KASUL - Kaduna State University Library

NDAL - Nigerian Defence Academy Library

FCEL - Federal College of Education Library

CEL - State College of Education Library, GidanWaya

IKL - Isah Kaita Library (Kaduna Polytechnic)

AYAL - Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)

Table 4.3 indicated that the highest problems experienced by all the academic libraries in Kaduna State are systems malfunctions and power failure followed by inadequate internet bandwidth and absent of training. Despite the fact that Kashim Ibrahim Library seem to have no problem of internet bandwidth it has been discovered that some sections suffer from low internet bandwidth. Inadequate number of computers and No user assistance appeared as the third most experienced problem on the table, while lack of skills from the users and Library policy problems came fourth. Although some respondents admitted that the PACs were not adequately used but lack of awareness from the users appeared less of the problem for many academic libraries in Kaduna State as it is the fifth problem on the table at the same time too much restrictions and absence of productive software appeared only once which makes it the problem with most lowest frequency.

This tallied with the earlier findings of African Internet (2002), Lawal (2010) and Emwanta (2012) that lack of technical experienced IT staff, limited ICT facilities and infrastructure, Power supply, inadequate staff training opportunities and slow Internet connection are some of the major challenges still facing the Nigerian academic libraries.

It also tallied with the findings of Ashcroft and Watts (2005) that lack of ICTs management policies in libraries, lack of skilled human resources to install and manage computer networks which cause slow Internet connection and shortage of technological literate manpower to manage the ICT facilities make ICT application to the Nigerian libraries difficult. It demonstrated that staff of the library may not be able to compete with other librarians around the world as such goals and objectives of their libraries may not be achieved in meeting the current, timely and relevant information need of the clients.

4.3.3 Types of Hardware and software configured and installed on Public Access Computers (PACs) in Academic Libraries

Hardware and software installed and configured on PACs play significant role in task performed by computer. Therefore, in order to identify the types of hardware and software installed on PACs in academic libraries in Kaduna State, lists of suitable hardware and software configuration were provided during the interview and respondents were asked to indicate those available. The field note was also used during the observation sessions to note the number of computers, type of hardware and software. Table 4.4 shows the result from both interview and observation.

Table 4.4 Available PACs in Academic Libraries in Kaduna State

S/N	Name of Academic Library	Units	No. of PAC	Total
1	Kashim Ibrahim Library (ABU)	MTN NET-Library	130	180
		OPAC	10	
		CD Search	10	
		Internet Training	30	
2	Nigerian Defence Academy Library	E-Library	55	61
		OPAC	6	
3	Kaduna State University Library	E-Library	55	58
		OPAC	3	
4	Federal College Of Education Library	Internet Unit	60	60
5	Kaduna State College of Education Library	E-Library	50	50
6	Isa Kaita Library (Kaduna Polytechnic)	E-Library	120	120
7	Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)	E-Library	100	100

From the table 4.4 it can be clearly seen that all academic libraries studied have fifty and above computer systems available for access by the public, with Kashim Ibrahim Library having

the highest number of 180 public computers, followed by Isa Kaita Library with 120 Computers. Therefore, on comparing the ratio of library users in the academic libraries studied with available computer systems, it is clear that the number is quite inadequate in these libraries. This implied that the ratio did not meet up with National University Commission (NUC) ratio of 1:5 computer per users standard.

In order to identify whether other computer peripherals were used to widen the services of PACs by academic libraries studied; physical inspection was conducted during the observation session and the result shows that the academic libraries studied acquired some computer peripheral. Table 4.5 shows those computer peripherals available in the academic libraries studied.

Table 4.5 Computer Peripherals on PACs in Academic Libraries

Name of the Academic Library	Other computer peripherals on PACs		
	Printers	Scanners	Projectors
Kashim Ibrahim Library (ABU)	✓	✓	✓
Nigerian Defence Academy Library	✓	✓	✓
Kaduna State University Library	✓	✓	✓
Federal College of Education Library	✓	✓	✓
State College of Education Library	✓	X	X
Isah Kaita Library (Kaduna Polytechnic)	✓	✓	✓
Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)	✓	✓	✓

✓ - Available

X - Not Available

Printing and scanning are the most prominent services that users always demand. Therefore, it is not surprising, as indicated in the above table that all the libraries studied have most of the computer peripherals. However, the result of physical inspection conducted shows that the State College of Education does not have scanners and projectors.

To find out the operating systems installed on PACs, the interview schedule seeks to find out the operating systems installed. The result of the interview was later confirmed during the observation session. Both instruments indicated that all the libraries studied have some of their PACs with windows XP and a very few of them have Windows 7 installed. It is rather unfortunate that at a time when most PACs venues are upgrading their operating system from Windows 8 to Windows 10, most PACs in the academic libraries studied still runs with Windows XP and there is no plan for upgrading. In other word there is no regular upgrade of the operating systems in the academic libraries studied.

The research question is structured to confirm if there are others educational software installed on PACs in academic libraries studied. Educational software is normally installed on PACs to assist users and researchers. The interview schedule found out and was later confirmed by the field note as shown in table 4.6 that there are various type of educational software in the libraries studied.

Table 4.6 Types of Educational Software installed on PACs in Academic Libraries in Kaduna State

Name of the Academic Library	Types of educational software installed on PACs			
	Encarta	Encyclopedia	Offline database	Dictionaries
Kashim Ibrahim Library (ABU)	✓	✓	✓	✓
Nigerian Defence Academy Library	✓	✓	X	✓
Kaduna State University Library	✓	✓	✓	✓
Federal College of Education Library	✓	✓	X	✓
State College of Education Library	X	X	X	X
Isah Kaita Library (Kaduna Polytechnic)	✓	X	X	✓
Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)	X	✓	X	X

✓ - Available

x - Not Available

While most of the academic libraries studied had Encarta Dictionaries and Encyclopedia installed on their PACs, only Kashim Ibrahim Library (ABU) and Kaduna State University Library have offline databases and e-resources that can be accessed locally within the Local Area Network (LAN) in their Libraries. This implies that even if there is no internet connection these libraries can still function and users can find their needs.

Controlling what user can access on PACs in library cannot be neglected in this study. To find out whether or not, and if yes, the type of browser the academic libraries studied use to

control users' behavior on PACs, respondents were interviewed and the computers were also physically inspected to ascertain the types.

The results of the interview and physical inspection show that only Kashim Ibrahim Library (ABU) use browser control software to block some untrusted websites. Browser control software is very crucial for public computer as Grimez (2005) submits that public computer can crash if users are allowed to visit untrusted locations. Therefore, lack of browser control software in most of the academic libraries studied could be the reason why most of their computers have crashed. It is important to note that browser control software is not only used to prevent crash but can be used for banning access into any other service than these not authorized by the library policy, as well as for balancing the privilege and equalizing the changes of download between users by giving them equal opportunity to open certain number of pages at a given time. Hence installing browser control software is very important.

Antivirus is also security software for avoiding data corruption, distortion, destruction and systems crash. In line with the importance of this, respondents were asked during the interview session and later confirmed at the observation stage the types of antivirus installed on PACs of academic libraries studied. AVAST, KASPASKY, McAfee and NORTON were the most popular antivirus installed on PAC in all the academic libraries studied. However, the researcher also observed that most of the installed Antivirus are obsolete or free versions.

The study considered the drive protection software as core of the PACs management software due to the role it plays in protecting computer from intended and unintended abuses. To identify the installed protection software on PACs in the academic libraries studied, the respondents were asked to mention the type of driver protection software installed on PACs in their libraries. The interview revealed that it is only Kashim Ibrahim Library (ABU) and Kaduna

State University Library that have deep freeze as Disk and System protection software installed on their PACs. The importance of driver and system protection software is that; as long as users are allowed to change the systems setting or download file for some reasons, the disk on PACs is not safe as well as the PACs operating systems and also the managing staff will everyday spend extra time on restoring back the systems and deleting the downloaded files unnecessarily. Instead, the drive and systems protection software will automatically restore the systems to the initial setting and delete all the downloaded files upon every restart. This will always keep the stable, constant and unique setting on all the PACs.

Library installed time and session manager on PACs to manage the access to computer and give the users equal opportunity to use the available computers. In order to find out if the academic libraries studied have installed time management software, a list is provided to the respondent to tick the applicable software in their respective libraries.

During the interview the researcher discovered that MTN Net library Unit of Kashim Ibrahim Library (ABU) uses Technocrat while Kaduna State University Library uses Microtick as time limit manager to grant access to user for a defined time.

The study further investigated the print management software installed on PACs in academic libraries studied. To do that, a list was provided to the respondents to select the installed print management software on PACs in their libraries.

All of the interviewee admitted that they do not use any print management software for controlling the printing in their libraries. The implication is that a profitable management of PACs cannot be fully achieved without using print management software. Wayne (2004) affirmed that print management software helps in reducing the wasted papers and ink cartridges and make printing cost recovery more efficient.

4.3.4 Strategies deployed in maintaining PACs in academic libraries in Kaduna State

The importance of maintenance of any system cannot be underscored. Therefore, if PACs should stay long and continue to serve users, they should regularly be maintained. It was in view of this research sought to determine the strategies used in managing PACs in the academic libraries studied. A list of available strategies was provided for the library staff responsible for the management of PACs to indicate those adopted. Table 4.7 shows the adopted strategies by the academic libraries studied.

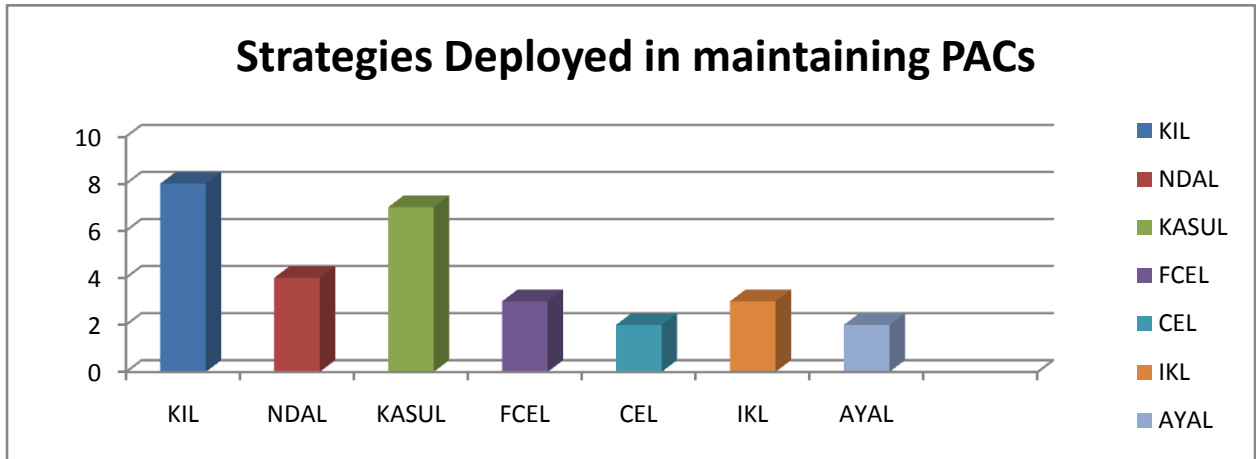
Table 4.7 Strategies Deployed In Maintaining PACs in Academic Libraries in Kaduna

Strategies Deployed In Maintaining PACs	KIL	NDAL	KASUL	FCEL	CEL	IKL	AYAL
Setting up a customized configuration	✓	X	✓	X	X	X	X
Hardware update	✓	X	X	✓	X	✓	X
Constant software update	X	✓	✓	X	X	X	X
Use of firewall	✓	✓	✓	✓	✓	✓	✓
Limiting users right on local machine	✓	X	✓	X	X	X	X
Use of antivirus	✓	✓	✓	✓	✓	✓	✓
Driver protection software	✓	X	✓	X	X	X	X
Session manager	✓	✓	✓	X	X	X	X
Browse control software	✓	X	X	X	X	X	X
Print management software	X	X	X	X	X	X	X
Total Strategies applied	8	4	7	3	2	3	2

✓ - Available

x - Not Available

Figure 4.1 Strategies Deployed in maintaining PACs



Key:

- KIL - Kashim Ibrahim Library (ABU)
- KASUL - Kaduna State University
- NDAL - Nigerian Defence Academy Library
- FCEL - Federal College of Education Library
- CEL - College of Education Library, GidanWaya
- IKL - Isah Kaita Library (Kaduna Polytechnic)
- AYAL - Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)

From table 4.8 and Figure 4.1 it can be clearly seen that almost all the ten listed maintenance strategies are applied on PACs in the academic libraries studied, especially the MTN E-Library of Kashim Ibrahim Library (ABU) where eight out of the ten strategies were applied. However, it is observed by the researcher that most of the third party software like Deep freeze, Firewall, Browser control and Antivirus were used on default setting. On the contrary view, it is supposed to be installed on user customize options so that the system can be setup in a way that suit the needs of users and the services of the library. Kaduna State University Library came second in the table by applying seven of the ten listed strategies. KASUL uses Microtick as session or time manager. It is obvious that Microtick is not PACs time Management software it is Internet browse session manager which is mainly used for granting and timing access to the

internet through the web browser not access to computer also Microtick is not library based software. Apart from these two libraries, the other five libraries mostly use two to four strategies. The implication of this is that there are four necessary maintenance strategies that were not fully implemented in the majority of academic libraries studied which include; hardware update, driver and systems protection, session manager and print management software. This is not in agreement with the standard of Wayne (2004) who pronounced the above strategies as fundamental in PACs management in the library.

It should be noted that, it is not all the ten strategies are applicable in every PACs Unit for instance in OPACs unit Browser control software is necessary so that any sort of browsing other than Catalogue-Access will be banned but Time and session Manager is not needed in the same unit. Contrarily Time and Session Manager is compulsory in the internet or e-library unit while Browser Control Software is partially required.

4.3.5 Level of Skills and Competences of Staff Managing PACs in Academic Libraries in Kaduna State

There is no way a study of PACs management can be effective, reliable and acceptable without finding out the skills and competences of staff handling PACs. Therefore, to ascertain the skills and competencies of staff managing the PACs, the last research question was setup. To answer this research question list of educational qualifications; years of working experience and required skill are provided to the respondents to sincerely select the appropriate options. Table 4.8 shows the various Educational qualifications possessed by staff handling PACs in the academic libraries studied.

Table 4.8 Educational Qualifications of Staff Managing PACs in Academic Libraries in Kaduna State

Educational qualifications	KIL	NDAL	KASUL	FCEL	CEL	IKL	AYAL	Total
PhD	-	-	-	-	-	-	-	-
Masters in Library & Info Sc.	5	-	-	-	1	-	1	7
BSc. Library Science / BLS	5	2	5	3	3	2	-	20
BSc. Computers Science	-	-	-	-	-	-	-	-
HND Library Science	-	-	-	-	-	-	-	-
HND Computer Science	1	1	1	1		2	-	6
Diploma in Library Science	2	1	1	1	1	1	-	7
Diploma in Computer Science	-	-	-	3	-	-	1	4
Others (eg. NCE,SSCE)	1	-	-	1	-	-	-	2
Total	14	4	7	9	5	5	2	46

Key:

- KIL - Kashim Ibrahim Library (ABU)
- KASUL - Kaduna State University Library
- NDAL - Nigerian Defence Academy Library
- FCEL - Federal College of Education Library
- CEL - State College of Education Library, Gidan Waya
- IKL - Isah Kaita Library (Kaduna Polytechnic)
- AYAL - Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)

Form Table 4.8it is very interesting to find out that the academic libraries studied have qualified staff with good educational background. Although too negligible, the table shows a mix of staff with qualifications in librarianship and computer science. Further investigation during

the interview session shows that all the staff with degree in Library and Information Science also had certificate in computer appreciation.

IT qualification is very essential for the management of PACs. Therefore, it is interesting to find out those IT qualifications that staff handling PACs have. In this regard, table 4.9 below shows the various qualifications.

Table 4.9 Additional IT Qualifications of Staff Managing PACs in Academic Libraries in Kaduna State

IT qualifications	KIL	NDAL	KASUL	FCEL	CEL	IKL	AYAL
Computer Certificate on windows and Office	5	3	4	3	2	2	0
Cert. in Cert. in computer Maintenance	1	0	1	0	0	0	0
Cert. in Computer Networking	4	0	1	1	0	2	0
A+	1	0	0	1	0		0
Network +	2	0	0	0	0	1	0
CCNA	3	0	1	0	1	0	0
MCP	0	0	1	0	0	0	0
No. of Computer training / workshops	5	2	3	4	1	4	0

Table 4.9 revealed that most of the staff managing PACs in academic libraries studied have only certificate in office, windows or attended workshops and a very few of them have certificate in computer maintenance or networking. On comparing the libraries, Kashim Ibrahim Library (ABU) has the largest number of staff with certificate in computer maintenance and networking. Even in Kashim Ibrahim Library the researcher observed that the MTN e-library have more staff with advance IT qualification than any other unit within the library.

Working experience also matters a lot in managing PACs. It is expected that the longer a staff works with PACs the better he/she handles the management of PACs. It is in this respect that respondents were asked on the number of years they spent on handling PACs and other related ICTs. Table 4.10 shows their response.

Table 4.10 Years of Working Experience on PACs or IT Related Areas

Years of working on PACs or IT related		Frequency (N)	Total Frequency	Percentage (%)
Less than 3 years	Kashim Ibrahim Library (ABU)	5	23	50.00
	Nigerian Defence Academy Library	2		
	Kaduna State University Library	5		
	Federal College of Education Library	3		
	State College of Education Library	4		
	IsahKaita Library (Kaduna Polytechnic)	2		
	Ambassador YahayaAliyu Library (NuhuBamalli Polytechnic)	2		
3-6 years	Kashim Ibrahim Library (ABU)	5	14	30.43
	Nigerian Defence Academy Library	2		
	Kaduna State University Library	2		
	Federal College of Education Library	3		
	State College of Education Library	1		
	IsahKaita Library (Kaduna Polytechnic)			
	Ambassador YahayaAliyu Library (NuhuBamalli Polytechnic)	1		
7-9 years	Kashim Ibrahim Library (ABU)	2	6	13.04
	Nigerian Defence Academy Library			
	Kaduna State University Library			
	Federal College of Education Library	2		
	State College of Education Library			
	Isah Kaita Library (Kaduna Polytechnic)	2		
	Ambassador Yahayan Aliyu Library (Nuhu Bamalli Polytechnic)			
10 and above	Kashim Ibrahim Library (ABU)	2	3	6.52
	Nigerian Defence Academy Library			
	Kaduna State University Library			
	Federal College of Education Library	1		
	State College of Education Library			
	Isahn Kaita Library (Kaduna Polytechnic)			
	Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)			
Total			46	100.00

Figure 4.2 Years of Working on PACS or IT Related Areas

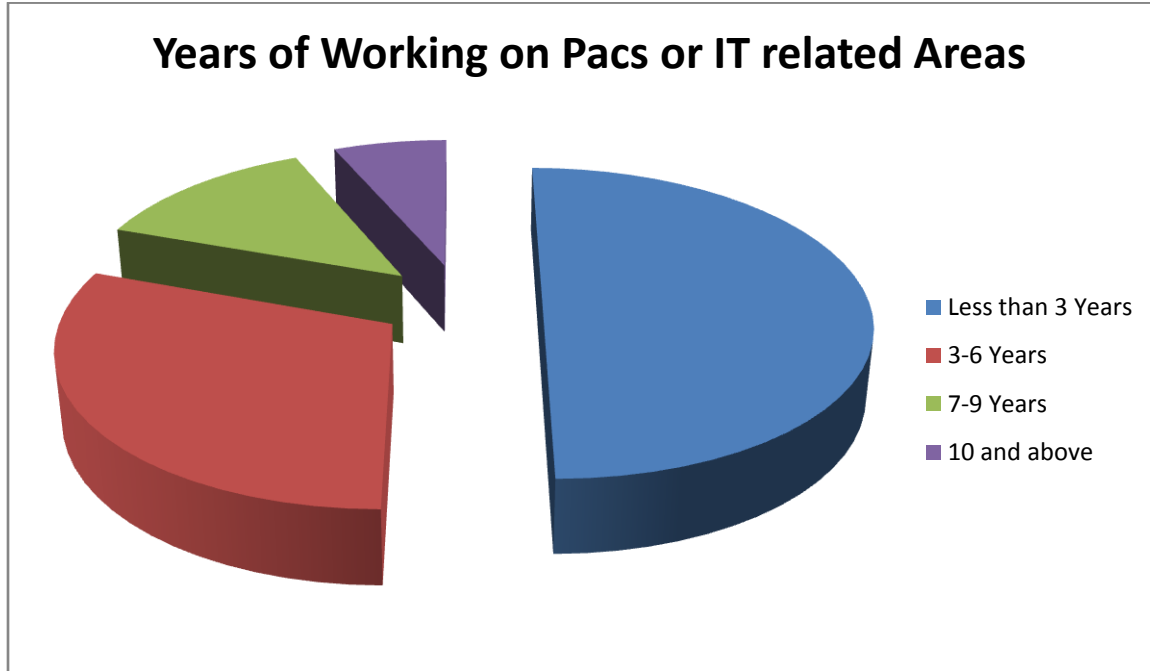


Table 2.6 showed that half of the respondents have less than three years working experience on PACs. While thirty percent of them have between 3-6 years working experience and about thirteen percent have six to nine years and only six and half have working experience from ten years and above. This attributed to the fact that the provision of public computers in library is not very old as earlier confirmed by Ibrahim (2011) who described the computers and internet as a new phenomenon that Nigerian university libraries recently rely on in delivering their services.

Furthermore, computer and ICT Skills are crucial to the successful management of PACs. In order to ascertain the staff skills and competences in the management of PACs in the academic libraries studied and also to find out how competent are the library staff responsible for management of PACs in the application of ICT, a list of statements was provided for the respondents to answer using the five Likert scale of measurement: this is presented in table 4.11.

4.11 Areas of Skillfulness of Staff Managing PACs in Academic Libraries in Kaduna State

Areas of skills	Type of response						Mean
	HC (5)	VC(4)	C(3)	U(2)	NC(1)		
General computer troubleshooting such as MS Windows, MS Office, Antivirus, driver protection software etc. repair and installation	KIL	3	6	3	1	1	2.80
	NDAL	-	2	2	-	2	2.00
	KASUL	2	1	2	2	-	1.75
	FCEL	3	1	4	1	-	2.25
	CEL	-	-	2	-	1	1.50
	IKL	-	2	2	-	-	2.00
	AYAL	1	-	2	-	-	1.50
Determining the processing speed, the amount of RAM, and both free and total hard drive space on a Windows computer.	KIL	4	4	5	1	1	3.00
	NDAL	-	-	4	-	-	4.00
	KASUL	1	3	2	1	1	1.60
	FCEL	1	4	2	2	-	2.25
	CEL	-	2	-	-	2	2.00
	IKL	-	2	2	-	-	2.00
	AYAL	1	-	1	-	1	1.00
Basic maintenance, such as mouse and key-board cleaning use of dust blower	KIL	5	4	2	1	2	2.80
	NDAL	3	1	-	-	-	2.00
	KASUL	2	3	2	-	-	2.33
	FCEL	2	4	3	-	-	3.00
	CEL	-	-	2	1	1	1.33
	IKL	-	2	-	2	-	2.00
	AYAL	1	-	1	1	-	1.00
Connect and set up: equipment eg monitor, printer, modem/router, keyboard, mouse, speakers, microphone, RAM, hard drive, etc.	KIL	5	5	2	1	1	2.80
	NDAL	2	2	-	-	-	2.00
	KASUL	1	2	2	-	2	1.75
	FCEL	3	2	4	-	-	3.00
	CEL	-	1	1	-	2	1.33

	IKL	-	1	2	1	-	1.33
	AYAL	1	-	1	1	-	1.00
Basic computer repair, such as memory replacement, drive replacement, disk defragmentation, etc.	KIL	1	6	3	2	2	2.80
	NDAL	-	-	2	1	1	1.33
	KASUL	2	2	2	-	1	1.75
	FCEL	1	2	2	1	3	1.80
	CEL	-	-	1	1	2	1.33
	IKL	-	2	1	1	-	1.33
	AYAL	1	-	1	-	1	1.00
Basic networking, such as troubleshooting IP & Internet issue versus a computer problem	KIL	1	6	3	3	1	2.8
	NDAL	-	-	2	-	2	2.00
	KASUL	1	2		2	2	1.75
	FCEL	3	1	3	1	1	1.80
	CEL	-	-	2	-	2	2.00
	IKL	-	2	-	2	-	2.00
	AYAL	-	1	-	2	-	1.50
Knowing what is meant by a network server, file server, application server and print server.	KIL	2	5	4	2	1	2.80
	NDAL	-	1	2	1	-	1.33
	KASUL	1	3	-	-	2	2.00
	FCEL	2	3	-	2	2	2.25
	CEL	-	-	-	-	-	-
	IKL	-	1	3	-	-	2.00
	AYAL	-	1	-	2	-	1.50
Use of Integrated library systems	KIL	2	6	1	1	2	2.40
	NDAL	-	-	3	1	-	2.00
	KASUL	1	4	-	2	-	2.33
	FCEL	-	3	2	4	-	3.00
	CEL	-	-	2	-	2	2.00
	IKL	-	2	2	-	-	2.00
	AYAL	-	-	2	-	1	1.50

Searching and using Internet-based resources	KIL	4	5	2	2	1	2.80
	NDAL	2	2	-	-	-	2.00
	KASUL	4	2	1	-	-	2.33
	FCEL	4	3	2	-	-	3.00
	CEL	-	-	3	-	1	2.00
	IKL	-	2	2	-	-	2.00
	AYAL	1	-	1	1	-	1.00
Searching and using library licensed resources	KIL	5	6	1	1	1	2.80
	NDAL	2	2	-	-	-	2.00
	KASUL	-	1	2	2	2	1.75
	FCEL	-	4	3	2	-	3.00
	CEL	-	-	2		2	2.00
	IKL	-	2	2	-	-	2.00
	AYAL	-	1	-	2	-	1.50
Training patrons on the use of the public access computers, general Internet resources, and library resources	KIL	4	7	1	2	1	3.00
	NDAL	-	-	-	-	-	-
	KASUL	2	2	-	2	1	1.75
	FCEL	3	1		3	2	2.25
	CEL	-	1	2	1	1	1.25
	IKL	-	2	2	-	-	2.00
	AYAL	-	-	2	1	-	1.50
Determining the connection status of a computer and test connections on the LAN or WAN	KIL	5	3	3	2	1	2.80
	NDAL	-	2	-	-	2	2.00
	KASUL	1	3	-	3	-	2.33
	FCEL	2	2	-	3	2	2.25
	CEL	-	-	1	1	2	1.33
	IKL	-	1	3	-	-	2.00
	AYAL	-	1	-	1	1	1.00
Setting up a switch (or hub) and use it to connect several network devices	KIL	6	3	2	2	1	2.80
	NDAL	-	-	-	2	2	2.00

(computers, printers, etc.) together, and use it to connect those computers to a larger network.	KASUL	2	-	1	2	2	1.75
	FCEL	1	1	2	2	3	1.80
	CEL	-	-	-	2	2	2.00
	IKL	-	1	2	1	-	1.33
	AYAL	-	1	-	1	1	1.00
Integration of PACs into library operations	KIL	1	6	4	2	1	2.80
	NDAL	-	-	-	-	-	-
	KASUL	1	3		3	-	2.33
	FCEL	1	3	3	2	-	2.25
	CEL	-	-	1	1	2	1.33
	IKL	-	2	2	-	-	2.00
Policy development, such as acceptable use, filtering, and filtering removal requests by patrons, etc.	KIL	3	4	2	4	1	2.80
	NDAL	-	2	-	2	-	2.00
	KASUL	1	1	-	3	1	1.50
	FCEL	-	1	3	2	3	2.25
	CEL	-	-	1	1	2	1.33
	IKL	-	-	2	1	1	1.33
Back up files and recovering backed-up files	KIL	4	5	2	2	1	2.80
	NDAL	-	-	2	1	1	1.33
	KASUL	2	3	-	2	-	2.33
	FCEL	2	2	3	2		2.25
	CEL	-	-	2	-	2	2.00
	IKL	-	2	2	-	-	2.00
Grand Mean	AYAL	1	-	-	1	1	1.00
							1.98

Keys:

KIL - Kashim Ibrahim Library (ABU)

KASUL	-	Kaduna State University Library
NDAL	-	Nigerian Defence Academy Library
FCEL	-	Federal College of Education Library
CEL	-	College of Education Library, Gidan Waya
IKL	-	Isah Kaita Library (Kaduna Polytechnic)
AYAL	-	Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic)
HC:	-	Highly Competent
VC:	-	Very Competent
C:	-	Competent
NC:	-	Not Competent
U:	-	Undecided

Table 4.11 reveals that the respondents are with typical mean of 1.98, the result of this finding therefore implies that the level of skills and competences of staff managing PACs in the academic libraries studied is below average in discharging their responsibilities.

This indicates that there is the need for more training for skills and competences development on PACs management in academic libraries. This finding corroborated with the finding of Yusuf (2010) who reported that about 60% of faculty members indicated inadequate training of library staff on managing PACs and support the manifestation of Aina (2004) who admits the high cost of ICT training but pronounced that library staff should do something on their own to improve their IT skills.

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summaries of the study and findings. Conclusion was drawn and recommendations put forward. Also areas for further studies were suggested.

5.2 Summary of the Study

The purpose of this study is to investigate the management of PACs in academic libraries in Kaduna State, to do this successfully five research questions were formulated which among others; are the considerations in acquiring PACs in academic libraries in Kaduna State, the purposes of providing PACs in academic libraries in Kaduna State, the strategies deployed in maintaining PACs in academic libraries in Kaduna State.

Review of relevant literature was also conducted in which it was established that libraries and systems librarians have realized the need for proper management of PACs in order to sustain and keep the standard services of the public computers.

Qualitative type of research was employed for the study, while case study was the research methodology adopted for the study. A total number of fifty two (52) library staffs, (responsible for management of PACs) from e-library, Internet, OPAC, CD ROM Search and training units of the seven (7) academic libraries in Kaduna State formed the sample of the study. The seven academic libraries are Kashim Ibrahim Library (ABU), Kaduna State University Library, Nigerian Defence Academy Library, Federal College of Education Library, State College of Education Library, Gidan Waya, IsahKaita Library (Kaduna Polytechnic), Ambassador Yahaya Aliyu Library (Nuhu Bamalli Polytechnic). The instruments used for data

collection were structured and semi-structured interviews and observations. Four weeks were consumed before the researcher succeeded in collecting data through the interview and observations. The collected data was organized for analysis and transcribed into different type and then tabulated and discussed descriptively.

5.3 Summary of Findings

Based on the data collected for this study, the following are the summary of the major findings of the descriptive analysis:

1. Five major factors were considered in the process of acquiring PACs by the academic libraries in Kaduna State. The factors include Policy guide, standard requirement of the systems, technical description of the computer, computer brand name and Price of the computer. However, these PACs are acquired mostly through the TET Fund intervention, with few through donations, purchase by the management of the institutions or direct by the library.
2. PACs are purposely provided for access to the internet, electronic resources and CD-ROM search. While systems malfunctions, power failure, inadequate internet bandwidth and absence of training were the major problems encountered in the management of PACs in academic libraries in Kaduna State.
3. Although there are inadequate number of PACs available for users and out dated software like Windows XP installed on PACs in the academic libraries studied, printers, scanners and projectors were use to widen the services of PACs and cater various needs of users. Additionally, Encarta, encyclopedia, dictionary and offline database / electronic resources were installed on PACs in some academic libraries studied.

4. The major maintenance strategies were not deployed in the management of PACs in most of the academic libraries studied. These strategies include hardware and software update, driver protection, session and print management software.
5. Majority of the staff managing PACs are librarians with high level qualifications in library science but of low level qualification in IT and computer management. However, while some are competent in basic computer maintenance and troubleshooting many of them are lacking ICT skill and competencies necessary for the management of PACs.

5.4 Conclusion

Based on the findings of this study, it can be concluded that a number of PACs are provided for access to internet, electronic resources, library catalogue rather than training or access educational and productive software in the academic libraries studied. Due to the lack of written policy, skills and competences of staff on managing PACs majority of management measures and maintenance strategies were not deployed which result in inadequate service delivery, security vulnerabilities, users' privilege abuses, and systems malfunctions of PACs in academic libraries studied. Due to the fact that, PACs management is new to the academic libraries, training and retraining is crucial for the development of skills and competences on the management of PACs in these libraries.

5.5 Recommendations

Arising from the findings and conclusion of this study, the following recommendations were made:

1. Academic libraries in Kaduna State should establish a written policy on the acquisition of PACs and the policy should involve system librarians in the processes of acquiring PACs to ensure the compatibility, reliability and the quality of the computers.
2. The academic libraries in Kaduna state should provide PACs for all purposes including typesetting and access to productive and educational software, to ensure standard, adequate and quality service which satisfies the need of users.
3. In view of the importance of current and relevant information resources in any library and the trend of digital environment, the academic libraries in Kaduna State should upgrade the available PACs and acquire more public computers to be able to cater for the need of their users and give them equal opportunity to have access to the available technology.
4. The academic libraries in Kaduna State should apply some relevant PACs maintenance strategies i.e. the use of driver protection\integrity maintenance, Session manager, Print Management software, browser control software etc. in order to attain standard and quality service provision.
5. Human capacity building is crucial to the success of computer utilisation and effective service delivery. To successfully carry out the management of PACs there is need for additional IT Skills and competences on PACs management. Therefore, the academic libraries in Kaduna State should train and retain their staff on managing PACs in libraries so that, librarians can carry out the management of PACs properly.

5.6 Suggestions for Further Study

1. This study covered only the management of Public Access Computers in academic libraries in Kaduna State. Hence, there is a need for study on Access and Utilization of Public Access Computers in academic libraries in Kaduna State
2. There could be a study on User Satisfaction of Public Access Computers Services in academic libraries in Kaduna State
3. A subjective norm of Users towards Public Access Computers in Academic Libraries in Kaduna State is another alternative area for study.

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APPENDIX 1

Department of Library and Information Science,
Faculty of education,
Ahmadu Bello University (ABU), Zaria
Date:.....

.....,
.....,

Dear Respondent,

Questions on Assessment of the Management of Public Access Computers in Academic Libraries in Kaduna State, Nigeria

I am a postgraduate student of Ahmadu Bello University (ABU), Zaria conducting a research entitled: Assessment of the Management of Public Access Computers (PACs) in Academic Libraries in Kaduna State, Nigeria for the award of MSc. in Information Science.

The research is purely for academic purpose. Therefore, kindly respond to the attached questions. You are guaranteed of strict confidentiality of any information provided.

I thank you for the usual cooperation and assistance.

Yours truly,



Adam, Usman Ahmed

APPENDIX 2

INTERVIEW SCHEDULE FOR STAFF MANAGING PACS IN ACADEMIC LIBRARIES

INSTRUCTIONS: Please kindly fill the space provided and tick as many as applicable in the interview schedules below:

Section A: Demographic Information

1. Name of Institution:.....
2. What is your designation?
 - a) Head of PACs Unit { } b) Systems Librarian { } c) librarian { }
 - d) Systems Analyst { } e) e-library Assistant { } f) Other
3. What is your highest qualification
 - a) Dip in Computer Sc. { } b) Dip in Library Sc. { } c) HND Comp. Sc. { }
 - d) HND Library. Sc. { } e) BSc. Com. Sc. { } f) BSc. Lib. Sc. { } g) MLS { }
 - h) Others please specify:.....
4. How long have you been working in the library
 - a) Less than 3 years. { } b) 3 – 5 years. { } c) 7 - 9 { } d) 10 – and above

Section B: Factors considered in acquiring PACs in Academic Libraries in Kaduna State

1. What do you consider in acquiring PACs in your library?
 - a) Policy guide { } b) Standard requirement of the systems { }
 - c) Computer brand name { } d) Technical description of the computer { }
 - e) Price of the computer { } f) All of the above { }
 - g) If none of the above specify other considerations:.....
2. How your library acquire PACs?

- a. Direct Purchase by the library { } b) purchase by the institution { }
- c) Donation { } d) TET FUND intervention { }
- e) Other, please indicate.....

Section C: Purposes of providing Public Access Computers (PACs) in Academic libraries in Kaduna State

1. What are the uses of PACs in your library
 - a) Internet access { } b) Electronic resources { } c) Library Catalogue (OPAC) { }
 - d) Training { } e) Productive Software { } f) Access to CD ROOM { }
 - g) all of the above { } h) Other, please indicate:.....
2. Are your PACs been adequately utilized? a) Yes { } b) No { }
3. If no why
 - a) Lack of awareness { } b) No user assistance { } c) inadequate bandwidth { }
 - d) Lack of skills { } e) Training { } f) limited computer services { }
 - j) Library Policy { } h) other, please indicate.....
4. What are the problems encountered during usage?
 - a) Power failure { } b) Systems malfunctions { } c) too much restrictions { }
 - d) In adequate no. of computer Systems { } e) absent of productive software { }
 - h) Other, please indicate:.....

Section D: Type Hardware and software configured and installed on Public Access Computers (PACs) in Academic Libraries

Hardware Configuration

1. How many public access computers does your library has?
 - e-library..... OPAC:..... Training:..... CD-ROM Search:.....

2. What is the capacity of the processor on PACs in your library?
 - a) 512 GHz { } b) 1.3 GHz { } c) 1.6 GHz { } d) 2.0 GHz. { }
 - e) 2.8 GHz { } f) 3.0 GHz { } other indicate please;.....
3. What is the capacity of RAM of PACs in you library?
 - a) 512 MB { } b) 1 GB { } c) 2 GB { } d) 3 GB { }
 - e) 4 GB { } f) other indicate please;.....
4. What Other Computer Peripherals are there in your library
 - a) Printers { } b) Scanners { } c) Projectors { } d) Other indicate please;.....

Software setup on PACs

1. What version of Operating System are there in your library
 - a) MS Windows 2000 { } b) MS Windows XP { } c) MS Windows 7 { } d) MS Windows 8 { } e) MAC OS { } f) Linux { } g) Other indicate please:.....
2. What version of office suite are there in your library
 - a) MS Office 2003 { } b) MS Office XP { } c) MS Office 7 { }
 - d) MS Office 10 { } e) MS Office 10 { } f) MS Office 13 { }
 - g) Open Office 201..... { } h) kingsoft Office 20.... { }
 - i) Other indicate please:.....
3. What types of educational software are installed on PACs in your library?
 - a) Encarta { } b) Encyclopedia { } c) Offline database { }
 - d) Dictionaries { } e) Others, please indicate:.....

4. What browser control software is installed on PACs in your library?
 - a) PublicWebBrowser { } b) PublicFox { } c) MS admin KIT { }
 - d) Win Blocker { } e) Other indicate please:.....

5. What types of Antivirus is installed on PACs in your library?
 - a) AVAST { } b) KASPASKY { } c) Norton { }
 - d) McAfee { } e) Other indicate please:.....

6. What types of drive protection software is there in your library?
 - a) Drive Shield { } b) Deep Freeze { } c) Clean Slate { }
 - d) Norton Ghost{ } e) Centurion Guard { } f) Returnil RVS { }
 - g) Other indicate please:.....

7. What type of time and session management software is installed in your library?
 - a) PC Reservation { } b) Time Limit Manager { } c) WinSelect{ }
 - d) CMS Diginet PC Cop{ } e) Envisionware { } f) Returnil RVS { }
 - g) Other indicate please:.....

8. What type of Pint Management software is installed in your library?
 - a) EnvisionwareLPT:One{ } b) UniPrint { } c) Other indicate please:.....

Section E: Strategies adopted Managing Public Access Computers (PACs) in Academic Libraries in Academic Libraries in Kaduna State

1. What are the strategies deployed in managing PACs in your library?
 - Setting up a customized configuration a) Yes, { } b) No { }
 - If yes how? a) through Windows Local setting { } b) third party software { }
 - Hardware update a) Yes, { } b) No { }
 - If yes how frequent?

- a) every three years { } b) every five years { } c) occasionally { }
- Constant software update a) Yes, { } b) No { }
- If yes how frequent?
 - a) everyweek { } b) every month { } c) every year { } d) occasionally { }
- Use of firewall Yes, { } b) No { }
- If yes what type a) windows firewall { } b) Other specify please:.....
- Limiting users right on local machine Yes, { } b) No { }
- If yes how? a) NTFS access permission { } b) Local group policy { } c)
 - Other, please indicate:.....
- Use of antivirus Yes, { } b) No { }
- If yes, what is the name
- Driver protection software Yes, { } b) No { }
- If yes, what is the name
- Session manager Yes, { } b) No { }
- if yes, what is the name:.....
- Browse control software
- { } if yes, what is the name:.....
- Print management software Yes, { } b) No { }
- If yes, what is the name:.....
- Other

Section F: Level of Skills and Competences of Staff Managing PACs in Academic Libraries in Kaduna State

1. How long have you been working on PACs or IT related field?

- a) Less than 3 years { } b) 3-6 years { } c) 7-9 years { } d) 10 and above{ }

2. What additional IT qualifications do you have?

- b) Computer Certificate on windows and Office { } b) A+ { } c) Network + { } d) CCNA { } e) No. of Computer training / workshops attended { } f) Cert. in Cert. in computer Maintenance { } g) Computer Networking { } h) Other please mention:.....

3. How skillful are you in the following areas?Please tick

SN	Areas of skills	Options				
		excellent	Very good	good	novice	Not skilled
1	General computer troubleshooting such as MS Windows, MS Office, Antivirus, driver protection software etc. repair and installation					
2	Determining the processing speed, the amount of RAM, and both free and total hard drive space on a Windows computer.					
3	Basic maintenance, such as mouse and keyboard cleaning use of dust blower					

4	Connect and set up: equipment eg monitor, printer, modem/router, keyboard, mouse, speakers, microphone, RAM, hard drive, etc.					
5	Basic computer repair, such as memory replacement, drive replacement, disk defragmentation, etc.					
6	Basic networking, such as troubleshooting IP & Internet issue versus a computer problem					
7	Knowing what is meant by a network server, file server, application server and print server.					
7	Use of Integrated library systems					
9	Searching and using Internet-based resources					
10	Searching and using library licensed resources					
11	Training patrons on the use of public access computers, general Internet resources, and library resources					
12	Determining the connection status of a computer and test connections on the LAN or WAN					

13	Setting up a switch (or hub) and use it to connect several network devices (computers, printers, etc.) together, and use it to connect those computers to a larger network.					
14	Integration of PACs into library operations					
15	Policy development, such as acceptable use, filtering, and filtering removal requests by patrons, etc.					
16	Back up files and recovering backed-up files					
17	Others please indicate					

APPENDIX 3

FIELD NOTE ON ASSESSMENT OF THE MANAGEMENT OF PACS IN ACADEMIC LIBRARIES IN KADUNA STATE

Demographic Information

- 1. Name of Institution:.....
- 2. Unit:.....

Purposes of providing Public Access Computers (PACs) in Academic libraries in Kaduna State

- 1. Uses of PACs in your library
 - a) Internet access { } b) Electronic resources { } c) Library Catalogue (OPAC) { }
 - d) Training { } e) Productive Software { } f) Access to CD ROOM { }
 - g) all of the above { } h) Other, please indicate:.....
- 2. Problems encountered during usage
 - a) Power failure { } b) Systems malfunctions { } c) too much restrictions { }
 - d) In adequate no. of computer Systems { } e) absent of productive software { }
 - h) Other, please indicate:.....

Type Hardware and software configured and installed on Public Access Computers (PACs) in Academic Libraries

Hardware Configuration

- 1. Number of Public Access Computers in the library
 - e-library..... OPAC:..... Training:..... CD-ROM Search:.....

4 Capacity of the processor on PACs in the library

- a) 512 GHz { } b) 1.3 GHz { } c) 1.6 GHz { } d) 2.0 GHz. { }
e) 2.8 GHz { } f) 3.0 GHz { } other indicate please;.....

5 Capacity of RAM of PACs the library

- a) 512 MB { } b) 1 GB { } c) 2 GB { } d) 3 GB { }
e) 4 GB { } f) other indicate please;.....

6 Type of Computer Peripherals in the library

- a) Printers { } b) Scanners { } c) Projectors { }

Software setup on PACs

1. Version of Operating System on PACs in the library

- a) MS Windows 2000 { } b) MS Windows XP { } c) MS Windows 7{ } d)
MS Windows 8 { } e) MAC OS { } f) Linux { }

2. Version of office suite on PACs in the library

- a) MS Office 2003 { } b) MS Office XP { } c) MS Office 7{ }
d) MS Office 10 { } e) MS Office 10 { } f) MS Office 13 { }
g) Open Office 201.....{ } h) kingsoft Office 20.... { }

7 Types of educational software installed on PACs in the library

- a) Encarta { } b) Encyclopedia { } c) Offline database { }
d) Dictionaries { }

8 Browser control software installed on PACs in the library

- a) PublicWebBrowser { } b) PublicFox { } c) MS admin KIT { }
d) Win Blocker { }

9 Types of Antivirus installed on PACs in the library

- a) AVAST { } b) KASPASKY { } c) Norton { }
d) McAfee { }

10 Types of drive protection software on PACs in the library

- a) Drive Shield { } b) Deep Freeze { } c) Clean Slate { }
d) Norton Ghost{ } e) Centurion Guard { } f) Returnil RVS { }

11 Type of time and session management software installed in the library

- a) PC Reservation { } b) Time Limit Manager { } c) WinSelect{ }
d) CMS Diginet PC Cop{ } e) Envisionware { } f) Returnil RVS { }

12 Type of Print Management software installed in the library

- a) EnvisionwareLPT:One{ } b) UniPrint { }

Strategies adopted Managing Public Access Computers (PACs) in academic libraries in Academic Libraries in Kaduna State

2. The strategies deployed in managing PACs in the library

- Setting up a customized configuration a) Yes, { } b) No { }
- If yes how? a) through Windows Local setting { } b) third party software { }
- Hardware update a) Yes, { } b) No { }
- Constant software update a) Yes, { } b) No { }
- Use of firewall Yes, { } b) No { }
- If yes what type a) windows firewall { }
- Limiting users right on local machine Yes, { } b) No { }
- If yes how? a) NTFS access permission { } b) Local group policy { }
- Use of antivirus Yes, { } b) No { }

- If yes, what is the name
- Driver protection software Yes, { } b) No { }
- If yes, what is the name
- Session manager Yes, { } b) No { }
- if yes, what is the name:.....
- Browse control software
- { } if yes, what is the name:.....
- Print management software Yes, { } b) No { }
- If yes, what is the name:.....