# Development of an Online Based Tetfund Interventions Management System in Nuhu Bamalli Polytechnic, Zaria

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**Abstract**
*Software development is the procedure employed to create software and systems to minimize redundancies and manual interventions in the Information Technology (IT) field. Software development in the IT environment plays an influential role in business scaling through substantial cost-saving and helps the IT expert refocus more on strategic activities than administrative functions. Software design and development supposed to be based principles of software development life cycle (SDLC). In this paper we explore and applied these software development principles to develop an online based Tertiary Education Trust Fund (TETFund) interventions management system: case study of Nuhu Bamalli Polytechnic, Zaria. The development was based on PHP, HTML, JavaScript/Jquery, CSS and MySQL database technologies. The result was the report output from the new online based TETFund interventions management system. The result shows that 95% were displayed correctly based on the browser compatibility especially on A4 paper size. Finally, we find out that interventions management system was accepted. The system is designed to enhance effective, timely and reliable TETFund) interventions management information. We developed the source code using Bracket code editor for the design of the client side, server side. The database and DBMS used was Msql and Sqlyog respectively.*

**Keywords:** *Software Development, Information Technology, Database, Software Lifecycle*

## INTRODUCTION

Tertiary Education Trust Fund (TETFund) interventions in Nuhu Bamalli polytechnic Zaria are managed and coordinated by Academic Planning Division of the institution. It is division that keeps all records pertaining to TETFund intervention, checks the eligibility of each applicant based on the criteria given by TETFund and so much more tasks. These tasks are much and convoluted to handle thereby consuming a lot of working hours of the staff in the division. There are also some difficulties that both the staff of the division and other staff of the institution are facing while engaging themselves in managing staff applications for TETFund intervention and applying for TETFund intervention respectively.

Some of the difficulties are most of the staff have little knowledge on TETFund requirement for applying a particular intervention. So many staff are moving up and down to Academic Planning Division seeking for one information or another concerning TETFund interventions. Some records are being lost in the division, which is normal to every organization that is using filing system. Searching for record is also a difficult task, almost all the files have to be accessed before a single file can be found. Generating even a simple report requires computer operator to open all the files that are involved and start typing the details required.

Separate file holders for each TETFund intervention have been provided to address some of the issues but still accessing the

files can only be done during the working hours and in the institution. Updating staff records means searching for all the staff files in a particular file holder.

The importance of the proposed system cannot be overemphasized as it helps to assuage the workloads of staff in academic planning division. This will also ease processing of documents such as manual generation of reports and applying for intervention by staff. This research will help academic planning division to organize interventions' information by providing a database for easy access, monitoring, controlling and updating information. This research work will computerize the conventional paper-based operations of academic planning division in Nuhu Bamalli polytechnic Zaria in terms of TETFund intervention management system. Also, the research work will enable the system administrator to easily generate different kind of reports of different interventions. The proposed TETFund management system is a stepping stone and a challenge for the researcher to continuously improve their knowledge on research and system analysis, design and implementation. This will also serve as a basis for future system development.

## LITERATURE REVIEW

The governments of most industrialized nations in the world are investing heavily in research programs to address the issues of conventional paper records, but yet there is no comprehensive technical solution. However, a fundamental strategy is emerging that involves refreshing the storage media, migrating the data onto a new hardware and software; and all necessary steps to validate their integrity, authenticity and addressing issues that has to do with the context of the data which preserve the meaning of the data. The objective is to retain the ability to display, retrieve, manipulate and use digital information in the face of constantly changing technology. These strategies require the development of highly specialized techniques which are also often relative expensive. The management of these electronic records is a relatively new issue for developing countries, but the governments are already beginning to address these challenges.

The existing literature on Human Resources and Information System (HRIS) suggests that they have different impacts on HR across organizations; but provides little explanation for this variation. Early surveys suggested that HRIS were used predominantly to automate routine tasks and "to replace filing cabinets" (Martinsons, 1994). Ball (2001) submitted that HR had missed the strategic opportunity provided by HRIS. More recent research shows greater use of HRIS in support of strategic decision-making by HR (Hussain *et al*., 2007). However, the extent to which HRIS is used in a strategic fashion differs across organizations, with the vast majority of organizations continuing to use HRIS simply to replace manual processing and to reduce costs (Bee *et al*, 2002; Brown, 2002). The last decade has witnessed a significant increase in the number of organisations gathering, storing and analysing human resources data using Human Resource Information Systems (HRIS) (Dery, 2006; Ball, 2001; Barron *et al*, 2004; Hussain *et al*, 2007; Ngai *et al*, 2006). In this paper we showed that the study of the impact of HRIS is of direct significance to the ongoing debate about the extent to which Human Resources (HR) can play a strategic role in the organization (Dery, 2006; Beckers *et al*, 2001; Hewitt Associates, 2007; Lawler *et al*, 2003; Sheehan *et al*, 2006). Specifically, we examine the argument that through its capacity to deliver accurate and timely metrics, HRIS has the potential to assist the HR function in developing business strategy and thus enhancing organizational performance (Barney *et al*, 1998; Broderick *et al*, 1992; Gueutal,

2003; Lawler *et al*, 2004; Lengnick-Hall *et al*, 2003).

Albert *et al* (1977) conducted their study when human resources information system (HRIS) was a new concept and just came into the market. They portrayed HRIS as a system useful in planning and accountability of human resources and as a staff management tool too. The authors also specified various modules, advantages and uses of HRIS at that time and future expectations from HRIS in human resource management. Kirstie (2001) explained the dearth of research in Human Resources Information Systems (HRIS) in her work by quoting that the gigantic information system related literature including its implementation, use and impact clarifies that it is a healthy researched area but its implementation with human resource is a scarce. Initially staff systems were developed to stockpile the records and reports allied with staff administration, but with time call for efficacy increases and thus computer-based HRIS is developed (Khera *et al*, 2012; Martinsons, 1997).

Beckers *et al* (2002) avowed that the main obstruction in the implementation of a HRIS is the sky-scraping cost of setting up and maintaining a HRIS which is in line with Kovach *et al* (1999) affirmed that a lack of funds and support of top management are the stumbling blocks in achieving the full potential of HRIS. Due to this obstacle, in order to embrace HRIS operations, it is necessary to make certain that bankers or organizations are agreeable to give their support for setting up a HRIS (Ngai *et al*, 2006). Apart from these difficulties HRIS has various advantages and the most crucial is the employee retention as employees themselves are crucial for the organization; this is also supported by Beulen (2009) as he contended that an HRIS blunt the edge of staff attrition by providing HR officers with the information they need.

The current generation of HRIS automate and transfer routine administrative and compliance functions traditionally performed by corporate HR departments and can facilitate the outsourcing of HR (Barron *et al*., 2004). In doing so, HRIS does not only make it possible for organizations to significantly reduce the costs associated with HR delivery, but also to reassess the need for retaining internal HR capabilities. However, HRIS also provide HR professionals with opportunities to enhance their contribution to the strategic direction of the firm. Firstly, by automating and devolving many routine HR tasks to line management, HRIS provide HR professionals with the time needed to direct their attention towards more business critical and strategic level tasks, such as leadership development and talent management (Lawler *et al*., 2003). Second HRIS provides an opportunity for HR to play a more strategic role, through their ability to generate metrics which can be used to support strategic decision making (Hendrickson, 2003; Lawler *et al*., 2004; Lengnick-Hall *et al*., 2003).

## METHODOLOGY

### Design Method

System Development Life Cycle (SDLC) which is a framework that describes the activities performed at each stage of a software development project shall be employed in this study which involves software development. It starts with system analysis, design and implementation, and continues through the maintenance and disposal of the system. The design of this project would be on Windows platform. Web based technologies like HTML, Unified Markup Language (UML), Cascading Style Sheet (CSS), PHP, MySQL and Apache Web Server would be utilized in this design.

The understanding of database management system (DBMS) and data modeling is very crucial in this study.

**System Analysis**

Analysis involves a detailed study of the existing paper-based system, which leads to the specifications of the new computer-based TETFund management system. During analysis, data were collected on the available files, decision points and transactions handled by the present system. Interviews and on-site observations were the tools employed for this system analysis of the present system. The system analysis in this research work also includes sub-dividing complex process that involves the entire system, identification of data store and manual processes. The main purpose of analyzing the existing system is to produce clear requirement specifications of the proposed system to be designed.

**System Design**

To translate the identified requirement from system analysis into system design specification for construction. At this stage we would be able to construct the initial prototype of interface and database, although this would only be used to discuss the logical flow of operations. The following subject matters are very crucial for discussion under system design.

**Design Goals**

The qualities (user-friendliness) of the system should be optimized. These types of goals are usually derived from the non-functional requirements of the system such as security and user validation.

**System Architecture**

The proposed system is to replace the existing paper-based system by a computerized system in all areas. The architecture used for this system is a 3-tier Client/Server architecture where the staff or user can use internet browsers to access the online report provided by the system within the local area network (LAN) of the organization or anywhere using the internet. The data tier maintains the applications data such as staff data, progress report, fund released by TETFund etc., and stores these data in a relational database management system (RDBMS). A relational database is the most popular database management system (DBMS) in use today by computers. It stores data in a series of two-dimensional tables called relation, which is in tabular form. The middle tier (Web/Application Server) implements the business logic, controller logic and presentation logic to control the interactions between the applications clients and data. The business logic dictates how clients would be able or not to access the application data and how applications would process data. The controller logic processes client requests include request to view staff records, to record grant benefitted so far or to retrieve information from the database.

Moreover, the web server in architecture is a program that runs on a network server (Computer) to respond to hypertext transfer protocol (HTTP) requests. The commonly used web servers are Internet Information Server (IIS) and Apache. The web server used in this system is IIS. HTTP is a standard protocol for transferring data across the internet and intranet. On the other hand, the client tier is the application user interface that contains data entry forms and clients side applications. It displays data to the user and it is the interface where the user interacts directly with the application. Also, the client tier interacts with Web/ Application Server to make requests and to retrieve data from the database and then displays the retrieved data from the server to the user.

**Hardware/Software Platform**

One of the main tasks in system design is the software and hardware platform required for the application. This system is a client-server application with a system

unit in the General Manager Administration office which will be the client. MySQL was used to develop the database for greater and reliable security purposes. This can easily be downloaded from the Internet; consequently, there is no need for licensing fee. On the other hand, Microsoft Windows (such as Windows 8 and Windows 10) and Windows 2000 server serves as the operating system. For the hardware requirements, a hard disk with a capacity of 40GB for holding all the files that would be stored; another 40GB mobile hard disk drive is needed as backup. Other hardware requirements are the monitor, keyboard, mouse, printer, Internet access, Pentium 4 GHZ processor and Uninterrupted Power Supply (UPS). All these defined the hardware and software requirements needed to complete the proposed system.

**Database Design**

Database design can be used to depict the various parts of the designs of an overall database system. It is mainly the consideration of the logical design of the base data structures that is used to store data. The database deals with how data such as file and database are stored and managed; and it goes beyond a single execution of the system. Information related to staff basic information, nomination form, interventions records, eligibility for intervention and other related information are persistently stored on a database management system. The database allows all the programs that operate on the TETFund intervention management system to be consistent and to perform complex queries on a large dataset. In practice, there are only few things that can be done with databases which are to view the data, find data of interests, modify the data, add or delete some data.

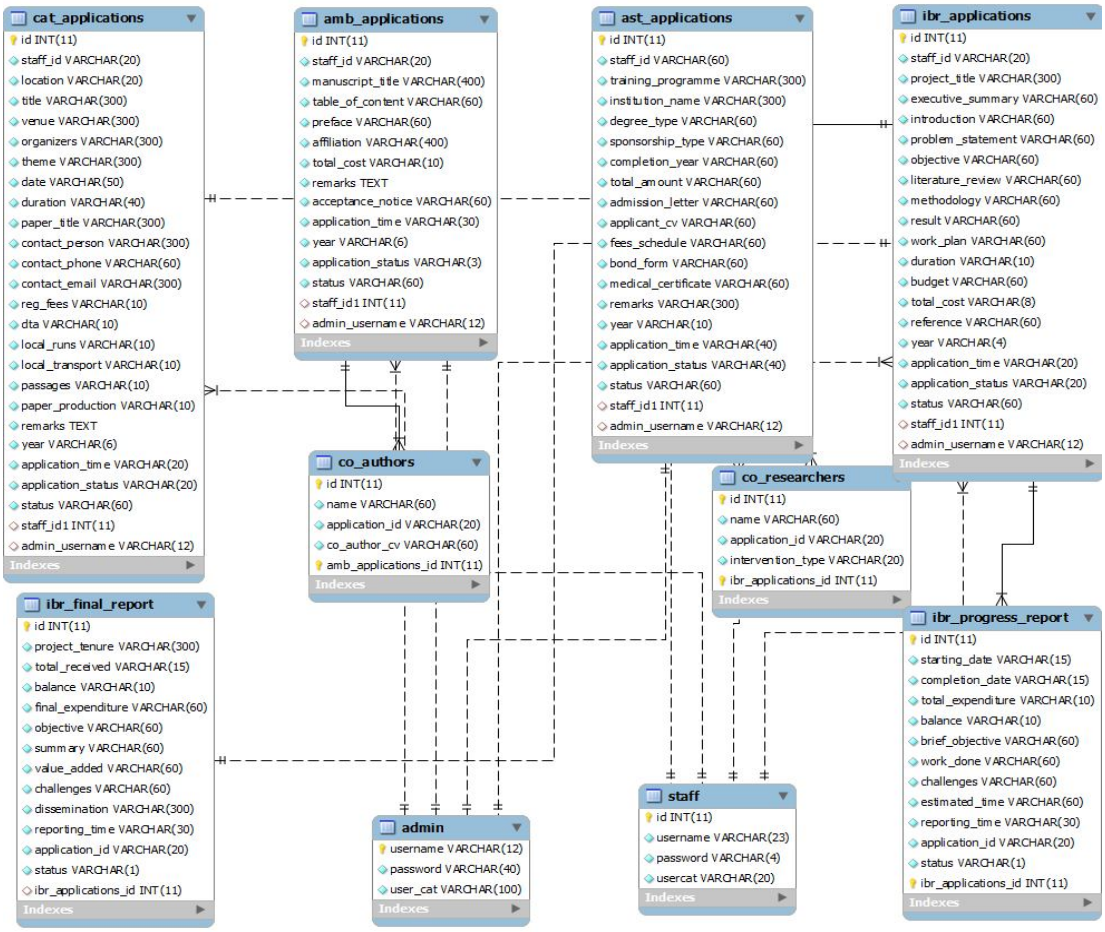


Figure 3.0. Entity Relationship Diagram

The design of database system is far from being a trivial operation as much analysis of the particular application is necessary to determine the data that are required and how they would be linked together. Once this is done, an appropriate database model can then be chosen. In order to store information consistently, the researcher map objects into tables and the attributes into fields to the specific table based on the objects found in the system. Therefore, major tables that will be implemented on the selected database management system (DBMS) would be identified. The DBMS ties together the logically related data in one or more files by using hierarchical structure or relational structure.

A hierarchical database system exhibits a data hierarchical whereby each record is owned by another record, and each member record type can be owned by only one owner record type. With records placed at multiple levels a record at a lower level is subordinate to a record above it. The only way to get to a subordinate record is by entering at the topmost record and working down through the levels until the required record is reached. A relational database is the most popular type of DBMS in use today by computers. It stores data in a series of two-dimensional tables called relation, which is in tabular form. A relation is just a table containing rows (records) and columns (fields) and the referral of one table to another through a common field is also called a relation. These groupings of tables are called relational databases. By and large, there are three types of relationships in a relational database system. These are one-to-one, one-to-many and many-to-

many relationships. The design under consideration has one-to-many and many-to-many relationships. The staff and staff records tables have many-to many relationships. And one of the aims of database system is to reduce redundancy for this reason, many-to-many relationships has to be reduced to one-to-one relationship. The table relationship generated in this database is shown in figure 1.

**Coding**

The system design needs to be implemented to make the proposed system a workable project. This requires coding of design into computer understandable language, which is programming language. The proposed system coding is done by using PHP, CSS, MySQL, JavaScript and HTML. At this stage, the program specifications of the detailed design are converted into PHP, CSS, MySQL, JavaScript and HTML instructions. The programs that are generated from these languages coordinate the data movements and control the entire process in the TETFund Intervention Management System.

```
<?php
include "../config/conn.php";
include "../config/functions.php";
?>
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>TETFUND | Add Staff</title>
    <link rel="stylesheet" type="text/css" href="../css/bootstrap.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/font-awesome.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/jquery-ui-1.10.3.custom.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/style.css"/>
</head>
<body style="background: #777;">
<div id="background">
    <div id="main-container">
        <?php include("header.php");?>
        <div class="body">
            <div class="content-heading">
                <h4><span class="fa fa-pencil"> </span>Add Staff</h4>
            </div>
            <div class="content-body">
                <h3 class="color center">
                    Add Staff
                </h3>
                <div class="col-sm-offset-2 col-sm-8 well">
                    <?php
//SUBMIT BUTTON
$errors = [];

if(isset($_POST['register'])){
    $ps_no = validate(@$_POST['ps_no']);
    $name = validate(@$_POST['name']);
    $gender = validate(@$_POST['gender']);
    $dob = validate(@$_POST['dob']);
    $phone = validate(@$_POST['phone']);
    $email = validate(@$_POST['email']);
    $qualification = validate(@$_POST['qualification']);
    $category = validate(@$_POST['category']);
    $dept_id = validate(@$_POST['dept_id']);
    $appointment_nature = validate(@$_POST['appointment_nature']);
```

e 1, Column 1 — 367 Lines

Figure 3.2: Sample HTML code for application.php

```php
<?php
include "../config/conn.php";
include "../config/functions.php";
include "../config/Tetfund.php";
$tetObj = new Tetfund();
?>
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>TETFUND | Applications</title>
    <link rel="stylesheet" type="text/css" href="../css/bootstrap.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/font-awesome.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/jquery-ui-1.10.3.custom.min.css"/>
    <link rel="stylesheet" type="text/css" href="../css/style.css"/>
</head>
<body style="background: #777;">
<div id="background">
    <div id="main-container">
        <?php include("header.php");?>
        <div class="body">
            <div class="content-heading">
                <h4><span class="fa fa-group"> </span>Applications</h4>
            </div>
            <div class="content-body">
                <h3 class="color">
                    List of all Applications
                </h3>
                <div>
                    <?php
                        $sel = mysqli_query($conn, "SELECT * FROM interventions WHERE status=1");
                        if(mysqli_num_rows($sel) == 0)
                            echo "<p style='color:#B80C0C;'>No intervention registered so far.</p>";
                        else{
                            echo '<table class="table table-striped table-bordered">
                            <tr>
                                <th style="background-color:#006464;color:#FFF;">#</th>
                                <th style="background-color:#006464;color:#FFF;">Intervention</th>
                                <th style="background-color:#006464;color:#FFF;">Total Applications</th>
                                <th style="background-color:#006464;color:#FFF;">Pending Applications</th>
                                <th style="background-color:#006464;color:#FFF;">Operation</th>
                            </tr>';
```

Figure 3.3: Sample HTML code for add_staff.php

```css
#background {
    position: absolute;
    top: 0;
    left: 0;
    width: 100%;
    height: 60%;
    background-color: #006464;
}
#main-container{
    width:80%;
    margin: auto;
    overflow: hidden;
}
.header{
    font-family: Copperplate, 'Copperplate Gothic Light', fantasy;
    text-shadow: 2px 5px 5px #000;
    color: #FFF;
    text-align: center;
    width: 100%;
    font-weight: bolder;
    padding: 0 30px;
}
.logo-img, .logo-text{
    display: inline-block;
    vertical-align: middle;
    position: relative;
}
.logo-img{
    float: left;
}
.logo-text{
    top:-15px;
}
.control-label{
    font-weight: bold;
}
a:link {
    color:#006464 !important;
}

a:visited {
    color:#006464 !important;
```

Figure 3.4: Sample HTML code for style.css

## RESULT

### Graphical User interface (GUI)

Graphical User interface (GUI) is the first impression of a software system from the user's point of view. Therefore, any software system must satisfy the requirement of user. GUI mainly performs two functions:

- Accepting the user's input
- Displaying the output

GUI plays a crucial role in any software system. It is the only visible aspect of a software system.

All the created Graphical User interface (GUI) generated using the flowing technology:

i. HTML
ii. CSS
iii. JavaScript and Jquery

Figure 4.1 to 4.7 shows the sample of the created output of GUI's, HTM, CSS, and Javascript code samples of the interfaces used in the interventions management system.

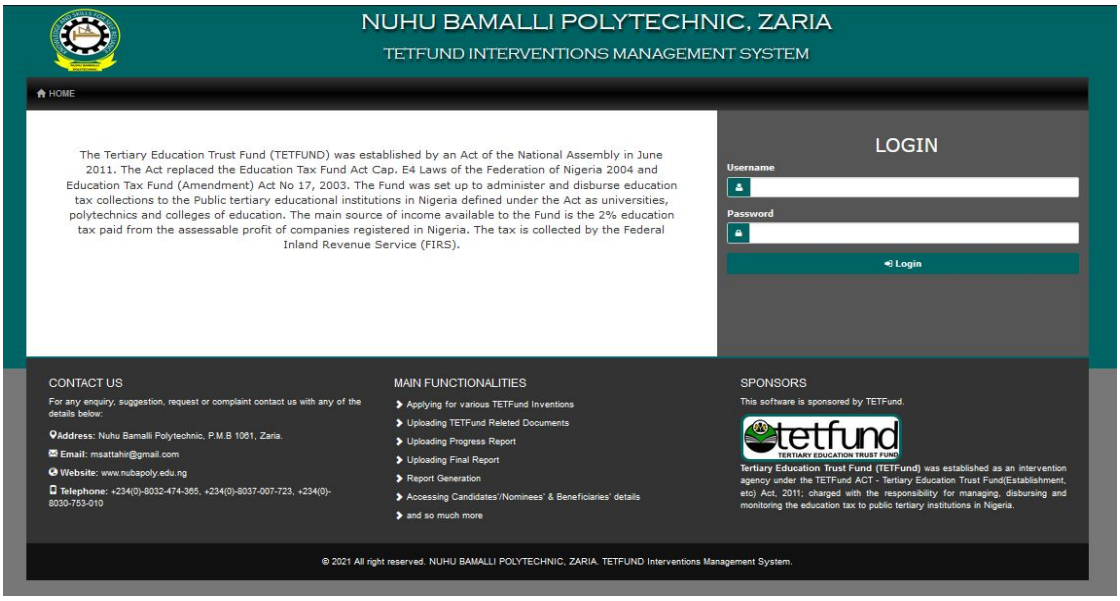


Figure 4.1: login page




Figure 4.2: Admin home page with menu

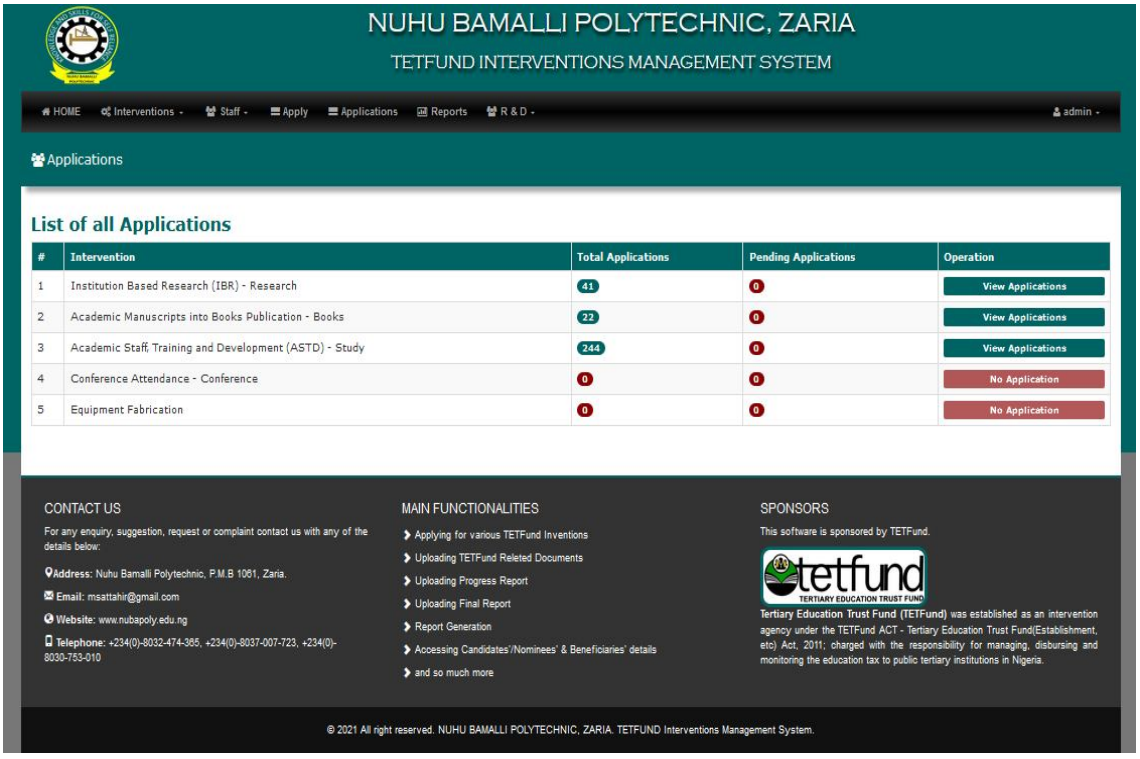


Figure 4.3: Interventions Summary

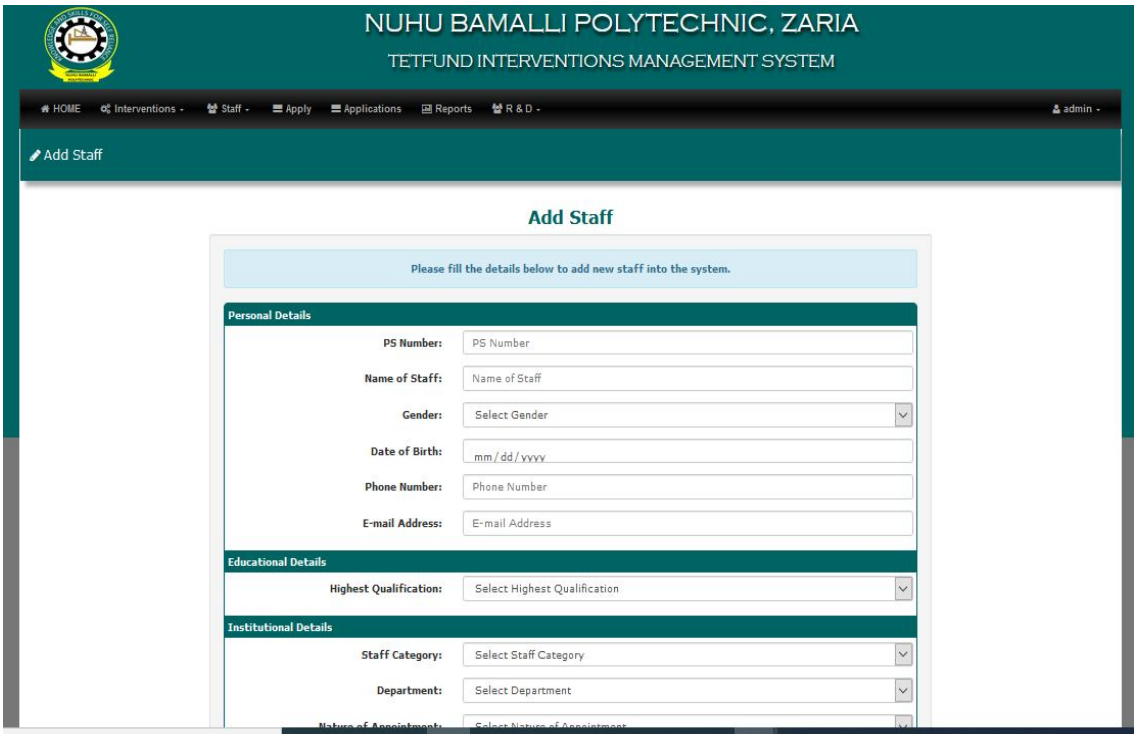


Figure 4.4: Add staff interface

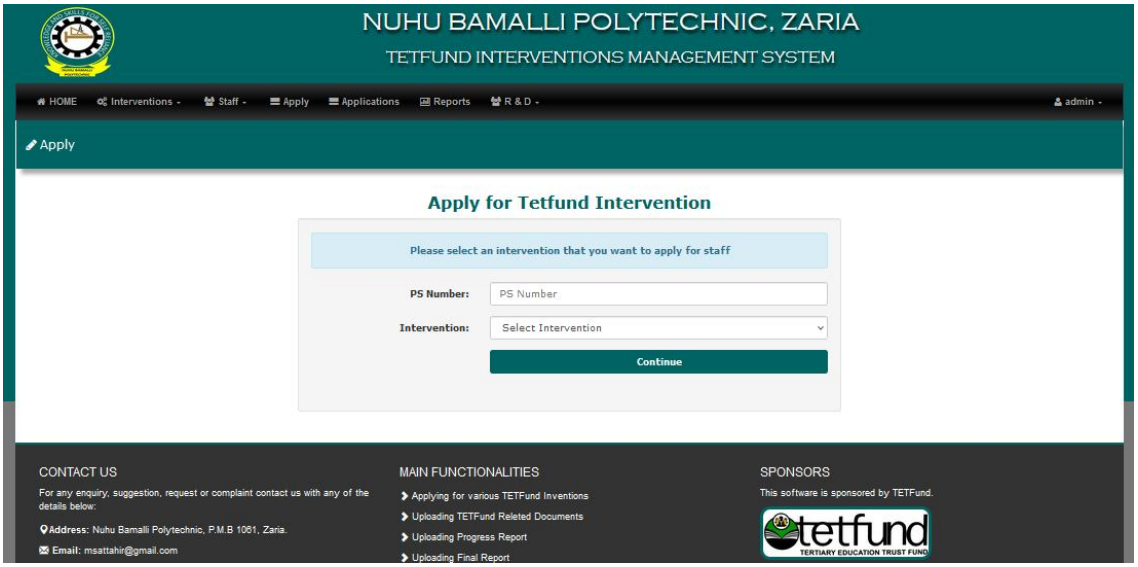


Figure 4.5: Apply sample page

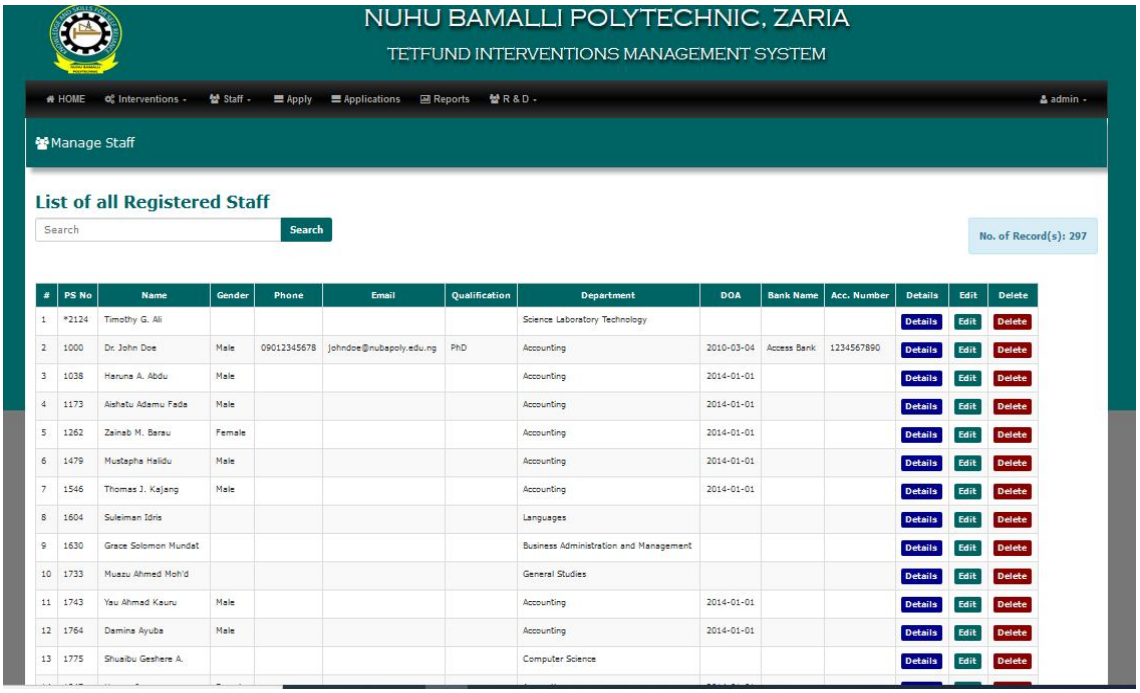


Figure 4.6: Manage staff page

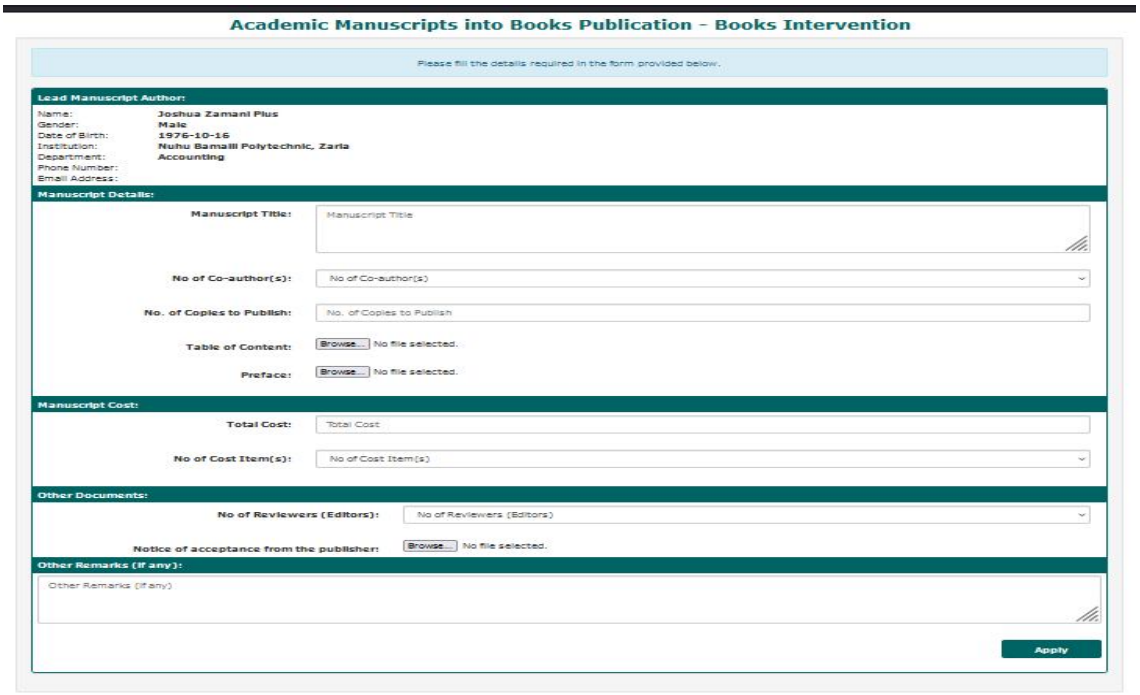


Figure 4.7: Intervention Sample Form

The new computerized system is a web-based system. The database of the system is a database which stores all the information pertinent to TETFund Interventions in Nuhu Bamalli polytechnic, Zaria. It monitors and updates changes and developments in its profile and management, and statistical reports. It creates and maintains a database on TETFund beneficiaries, their progress report, status of beneficiary on a particular intervention and so on. Furthermore, the system generates reports based on defined information needs and also provides

reliable statistical reports on TETFund Interventions in support of management planning and decision-making. Additionally, with the help of this system end-users can expedite the most time-consuming aspects of the institution which is processing and maintaining accurate TETFund records.

The result of the findings concluded that most of the research objectives had been met. These include the following.

(i) An online based TETFund interventions management system for Nuhu Bamalli polytechnic.

(ii) Facilitate the input of data; the system will guide user in the correct order of entering data and by simply clicking the tab allows you to go to the next field.

(iii)The system would automatically report on TETFund related information such as number of IBR beneficiaries in a particular year.

(iv) Construction of an efficient database management system using MySQL

## DISCUSSION

The emergence of the personal computer revolutionized office automation, and today, popular operating systems (Windows) and user interfaces dominate office computer systems. This revolution has been so completed, and has infiltrated so many areas of public organization and private business, that almost all use at least one commercial computer application in the course of daily activity. The presented system has the following benefits/advantages.

i. Staff can now apply anywhere at their discretion
ii. It will reduce the need for a large staff (users)
iii. It will reduce storage size.
iv. Multi user capability that allows data update simultaneously in the event of changes.

The result shows that 95% were displayed correctly based on the browser compatibility especially on A4 paper size. Finally, we find out that interventions management system was accepted. The system is designed to enhance effective, timely and reliable TETFund) interventions management information. We developed the source code using Bracket code editor for the design of the client side, server side. The database and DBMS used was Msql and Sqlyog respectively

## CONCLUSION AND RECOMMENDATIONS

It is recommended to have a good software tool with communication strategy that will provide successful automation functionality. Office automation is intended to provide elements which make it possible to simplify, improve, and automate the organization of the activities of a company or a group of people (management of administrative data, synchronization of meetings, etc.). Therefore, further research work is hereby recommended. The area of further research should include the following:

v. Adapting new web technology like Jquey and node.js
vi. Using another web application framework like
vii. SMS (Short Message Service) to alert the staff.

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